

# FUJITSU Enterprise Postgres 9.5



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# FUJITSU Enterprise Postgres 9.5



## Getting Started

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# FUJITSU Enterprise Postgres 9.5



## Documentation Roadmap

Windows/Linux

J2UL-2113-02ENZO(00)  
June 2016

# Preface

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## Purpose of this manual

This document is intended for users of "FUJITSU Software Enterprise Postgres" (hereafter referred to as "FUJITSU Enterprise Postgres"), and explains how to read the manuals.

## Structure of this document

The structure and content of this manual is shown below.

### [Chapter 1 How to Read the Manuals](#)

This section explains the notational conventions in FUJITSU Enterprise Postgres manuals.

### [Chapter 2 Trademarks](#)

This section explains the trademarks.

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## Issue date and version

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# Chapter 1 How to Read the Manuals

The FUJITSU Enterprise Postgres manuals use certain notational conventions and rules. Pay attention to these conventions and rules when reading the FUJITSU Enterprise Postgres manuals.

## 1.1 Intended Products

The manuals apply to the following products:

- FUJITSU Enterprise Postgres Advanced Edition
- FUJITSU Enterprise Postgres Standard Edition
- FUJITSU Enterprise Postgres Mirroring Controller

## 1.2 Abbreviations of manual titles

The following tables list abbreviations of the titles of manuals for FUJITSU Enterprise Postgres as they appear in the manuals.

| Formal manual title   | Abbreviation in FUJITSU Enterprise Postgres manuals |
|---|---|
| FUJITSU Enterprise Postgres Release Notes                           | Release Notes                                       |
| FUJITSU Enterprise Postgres General Description                     | General Description                                 |
| FUJITSU Enterprise Postgres Installation and Setup Guide for Server | Installation and Setup Guide for Server             |
| FUJITSU Enterprise Postgres Installation and Setup Guide for Client | Installation and Setup Guide for Client             |
| FUJITSU Enterprise Postgres Operation Guide                         | Operation Guide                                     |
| FUJITSU Enterprise Postgres Cluster Operation Guide                 | Cluster Operation Guide                             |
| FUJITSU Enterprise Postgres Application Development Guide           | Application Development Guide                       |
| FUJITSU Enterprise Postgres Reference                               | Reference   |
| FUJITSU Enterprise Postgres Java API Reference                      | Java API Reference                                  |
| FUJITSU Enterprise Postgres Glossary                                | Glossary  |
| FUJITSU Enterprise Postgres Messages                                | Messages  |
| PostgreSQL 9.5.2 Documentation                                      | PostgreSQL Documentation                            |

## 1.3 System of manuals and how to use the manuals

This section describes the system of manuals for FUJITSU Enterprise Postgres.

### 1.3.1 System of Manuals

#### FUJITSU Enterprise Postgres manuals

The table below shows the manuals on FUJITSU Enterprise Postgres.

| <b>Use/Purpose</b>  | <b>Manual title</b>                     | <b>Content</b>  | <b>When to read</b>   |
|---|---|---|---|
| Deciding whether to upgrade the product.  | Release Notes                           | Overview of upgraded features and incompatibility information.  | Learn about features upgraded from earlier versions and incompatibility information.                                    |
| Acquiring an overview of the product and the basic information required for work and operation. | General Description                     | Description of all available functions associated with each intended purpose or use, and screenshots of operations. | Learn basic information and restrictions that system engineers and operators must know to actually operate the product. |
| Installing and setting up FUJITSU Enterprise Postgres correctly to enable its use.              | Installation and Setup Guide for Server | Procedure for installing and setting up FUJITSU Enterprise Postgres.  | Install and Setup FUJITSU Enterprise Postgres.  |
| Installing the FUJITSU Enterprise Postgres client function correctly to enable its use.         | Installation and Setup Guide for Client | Installing the FUJITSU Enterprise Postgres client function.   | Install the FUJITSU Enterprise Postgres client function.  |
| Operating and managing FUJITSU Enterprise Postgres.   | Operation Guide                         | Description of the tasks required in FUJITSU Enterprise Postgres management and operation.                          | Learn how to operate and manage the databases.  |
| Performing switchover operation.  | Cluster Operation Guide                 | Description of the tasks required for database multiplexing operation.  | Create operating environment for switchover and perform it.   |
| Applications using the interface provided by FUJITSU Enterprise Postgres.                       | Application Development Guide           | Procedure for creating an application using embedded SQL, JDBC driver, ODBC driver, and .NET Data Provider.         | Develop an application using the interface provided by FUJITSU Enterprise Postgres.                                     |
| Usage of FUJITSU Enterprise Postgres commands.  | Reference                               | Explanation of the FUJITSU Enterprise Postgres commands expanded on from PostgreSQL.                                | Learn FUJITSU Enterprise Postgres command functions, options, and examples of use.                                      |
| Learning the syntax of Java API.  | Java API Reference                      | Explanation of the syntax of the Java APIs.   | Learn the syntax of Java APIs.  |
| Learning the meaning of the term of FUJITSU Enterprise Postgres.                                | Glossary                                | Explanation of the term and the relating term of FUJITSU Enterprise Postgres.                                       | Check for the cause of the meaning of the term used with FUJITSU Enterprise Postgres manuals.                           |
| Referring to messages from FUJITSU Enterprise Postgres and taking measures for them.            | Messages                                | Explanation of each message and description of any  | Find out the specific measures for dealing with messages from FUJITSU Enterprise Postgres.                              |

| Use/Purpose | Manual title | Content                      | When to read |
|-------------|--------------|------------------------------|--------------|
|             |              | measures to be taken for it. |              |

## PostgreSQL manual

The table below shows the manual on PostgreSQL-compatible features.

| Use/Purpose                         | Manual title             | Content   | When to read                    |
|-------------------------------------|--------------------------|---|---------------------------------|
| To learn about PostgreSQL features. | PostgreSQL Documentation | Official PostgreSQL documentation.<br><br>Explains all features officially supported by the relevant version of PostgreSQL. | To learn how to use PostgreSQL. |

## 1.3.2 Documentation Roadmap

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This section provides a documentation roadmap, broken down by user role.

### Database administrator

The database administrator is a user who performs FUJITSU Enterprise Postgres installation and setup, and who operates and monitors the database.

Refer to the manuals in the table below, according to purpose:

|                      | Purpose  | Manual name                             |                         |
|----------------------|--|---|-------------------------|
| Required reading     | To learn about upgraded features and incompatibility information | Release Notes                           |                         |
|                      | To read an overview of the software                              | General Description                     |                         |
|                      | To perform installation and setup                                | Installation and Setup Guide for Server |                         |
|                      | Operation  |   | Operation Guide         |
|                      |  |   | Cluster Operation Guide |
|                      |  |   | Reference               |
|                      | Reference  |   | Messages                |
| Glossary             |  |   |                         |
| Refer to as required | To learn about PostgreSQL features                               | PostgreSQL Documentation                |                         |

### Application developer

The application developer is a user who defines the database and develops applications.

Refer to the manuals in the table below, according to purpose:

|                  | Purpose                             | Manual name         |
|------------------|-------------------------------------|---------------------|
| Required reading | To read an overview of the software | General Description |

|                      | Purpose                            | Manual name                             |
|----------------------|------------------------------------|---|
|                      | To perform installation and setup  | Installation and Setup Guide for Client |
|                      | To define a database               | Operation Guide                         |
|                      | To develop applications            | Application Development Guide           |
|                      |                                    | Java API Reference                      |
|                      | Reference                          | Messages                                |
| Glossary             |                                    |   |
| Refer to as required | To learn about PostgreSQL features | PostgreSQL Documentation                |

## 1.4 Notational Conventions in the Manuals

Manual titles and product names in the manual are abbreviated.

This section explains the notational conventions for abbreviations and platform-specific information in the manuals.

### 1.4.1 Platform-specific information

Even manuals whose title has a platform name contains content common to all the platforms supported by FUJITSU Enterprise Postgres. In such cases, the platform-specific information is marked as shown below. Refer to only the necessary information.

**L**

#### Linux

Indicates content concerning Linux.

**W**

#### Windows(R)

Indicates content concerning Windows(R).

### 1.4.2 Abbreviation of product names

The following table lists abbreviations of the names of products related to FUJITSU Enterprise Postgres as they appear in the manuals.

| Formal name  | Abbreviation     |
|--|------------------|
| Red Hat(R) Enterprise Linux(R) 6 (for Intel64),<br>Red Hat(R) Enterprise Linux(R) 6 (for x86) and<br>Red Hat(R) Enterprise Linux(R) 7                        | Linux            |
| Red Hat(R) Enterprise Linux(R) 6 (for Intel64)   | RHEL6(Intel64)   |
| Red Hat(R) Enterprise Linux(R) 6 (for x86)   | RHEL6(x86)       |
| Red Hat(R) Enterprise Linux(R) 6 (for Intel64) and<br>Red Hat(R) Enterprise Linux(R) 6 (for x86)   | RHEL6            |
| Red Hat(R) Enterprise Linux(R) 7   | RHEL7            |
| Windows Vista(R) Home Basic,<br>Windows Vista(R) Home Premium,<br>Windows Vista(R) Business,<br>Windows Vista(R) Ultimate and<br>Windows Vista(R) Enterprise | Windows Vista(R) |

| Formal name  | Abbreviation                      |
|--|-----------------------------------|
| Windows(R) 7 Home Premium,<br>Windows(R) 7 Professional,<br>Windows(R) 7 Enterprise and<br>Windows(R) 7 Ultimate   | Windows(R) 7                      |
| Windows(R) 8,<br>Windows(R) 8 Pro and<br>Windows(R) 8 Enterprise   | Windows(R) 8                      |
| Windows(R) 8.1,<br>Windows(R) 8.1 Pro and<br>Windows(R) 8.1 Enterprise   | Windows(R) 8.1                    |
| Windows(R) 10 Home,<br>Windows(R) 10 Education,<br>Windows(R) 10 Pro and<br>Windows(R) 10 Enterprise   | Windows(R) 10                     |
| Microsoft(R) Windows Server(R) 2008 Standard,<br>Microsoft(R) Windows Server(R) 2008 Enterprise,<br>Microsoft(R) Windows Server(R) 2008 Datacenter,<br>Microsoft(R) Windows(R) Web Server 2008,<br>Microsoft(R) Windows Server(R) 2008 Standard without Hyper-V,<br>Microsoft(R) Windows Server(R) 2008 Enterprise without Hyper-V and<br>Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V | Windows Server(R) 2008            |
| Microsoft(R) Windows Server(R) 2008 Standard,<br>Microsoft(R) Windows Server(R) 2008 Enterprise,<br>Microsoft(R) Windows Server(R) 2008 Datacenter,<br>Microsoft(R) Windows(R) Web Server 2008,<br>Microsoft(R) Windows Server(R) 2008 Standard without Hyper-V,<br>Microsoft(R) Windows Server(R) 2008 Enterprise without Hyper-V and<br>Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V | Windows Server(R) 2008 for<br>x64 |
| Microsoft(R) Windows Server(R) 2008 R2 Datacenter,<br>Microsoft(R) Windows Server(R) 2008 R2 Enterprise,<br>Microsoft(R) Windows Server(R) 2008 R2 Standard,<br>Microsoft(R) Windows Server(R) 2008 R2 Foundation and<br>Microsoft(R) Windows(R) Web Server 2008 R2  | Windows Server(R) 2008 R2         |
| Microsoft(R) Windows Server(R) 2012 Datacenter,<br>Microsoft(R) Windows Server(R) 2012 Standard.<br>Microsoft(R) Windows Server(R) 2012 Essentials and<br>Microsoft(R) Windows Server(R) 2012 Foundation   | Windows Server(R) 2012            |
| Microsoft(R) Windows Server(R) 2012 R2 Datacenter,<br>Microsoft(R) Windows Server(R) 2012 R2 Standard and<br>Microsoft(R) Windows Server(R) 2012 R2 Foundation   | Windows Server(R) 2012 R2         |
| Windows Vista(R) Home Basic,<br>Windows Vista(R) Home Premium,<br>Windows Vista(R) Business,<br>Windows Vista(R) Ultimate,<br>Windows Vista(R) Enterprise,<br>Windows(R) 7 Home Premium,<br>Windows(R) 7 Professional,<br>Windows(R) 7 Enterprise,<br>Windows(R) 7 Ultimate,<br>Windows(R) 8,<br>Windows(R) 8 Pro,<br>Windows(R) 8 Enterprise,   | Windows(R)                        |

| Formal name   | Abbreviation                                       |
|---|--|
| Windows(R) 8.1,<br>Windows(R) 8.1 Pro,<br>Windows(R) 8.1 Enterprise,<br>Windows(R) 10 Home,<br>Windows(R) 10 Education,<br>Windows(R) 10 Pro,<br>Windows(R) 10 Enterprise,<br>Microsoft(R) Windows Server(R) 2008 Standard,<br>Microsoft(R) Windows Server(R) 2008 Enterprise,<br>Microsoft(R) Windows Server(R) 2008 Datacenter,<br>Microsoft(R) Windows(R) Web Server 2008,<br>Microsoft(R) Windows Server(R) 2008 Standard without Hyper-V,<br>Microsoft(R) Windows Server(R) 2008 Enterprise without Hyper-V,<br>Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V,<br>Microsoft(R) Windows Server(R) 2008 R2 Datacenter,<br>Microsoft(R) Windows Server(R) 2008 R2 Enterprise,<br>Microsoft(R) Windows Server(R) 2008 R2 Standard,<br>Microsoft(R) Windows Server(R) 2008 R2 Foundation,<br>Microsoft(R) Windows(R) Web Server 2008 R2,<br>Microsoft(R) Windows Server(R) 2012 Datacenter,<br>Microsoft(R) Windows Server(R) 2012 Standard,<br>Microsoft(R) Windows Server(R) 2012 Essentials,<br>Microsoft(R) Windows Server(R) 2012 Foundation,<br>Microsoft(R) Windows Server(R) 2012 R2 Datacenter,<br>Microsoft(R) Windows Server(R) 2012 R2 Standard and<br>Microsoft(R) Windows Server(R) 2012 R2 Foundation |  |
| Microsoft(R) Internet Explorer 8.0,<br>Microsoft(R) Internet Explorer 9.0,<br>Internet Explorer(R) 10.0 and<br>Internet Explorer(R) 11.0  | Internet Explorer                                  |
| Microsoft(R) Edge   | Edge   |
| Java Naming and Directory Interface   | JNDI   |
| Java(TM) 2 SDK, Standard Edition,<br>Java(TM) 2 Platform, Enterprise Edition,<br>Java(TM) Platform, Standard Edition and<br>Java(TM) Development Kit  | JDK  |
| Java(TM) 2 Runtime Environment, Standard Edition and<br>Java(TM) Runtime Environment  | JRE  |
| Microsoft(R) Visual Basic(R) for Applications   | VBA  |
| Microsoft(R) Visual Basic   | Visual Basic                                       |
| Microsoft(R) Visual Basic.NET   | Visual Basic.NET                                   |
| Microsoft(R) Visual Studio  | Visual Studio                                      |
| Microsoft(R) Visual Studio.NET  | Visual Studio.NET                                  |
| Microsoft .NET Framework  | .NET Framework or .NET                             |
| Interstage Application Server Enterprise Edition,<br>Interstage Application Server Standard-J Edition and<br>Interstage Web Server  | Interstage Application Server                      |
| FUJITSU Enterprise Postgres Advanced Edition (64bit)  | AE or FUJITSU Enterprise Postgres Advanced Edition |

| Formal name  | Abbreviation                                       |
|--|--|
| FUJITSU Enterprise Postgres Standard Edition (64bit) | SE or FUJITSU Enterprise Postgres Standard Edition |
| PRIMECLUSTER Global Disk Services                    | PRIMECLUSTER GDS or GDS                            |
| PRIMECLUSTER Global Link Services                    | GLS  |

Remarks: The symbols (R) and (TM) may be omitted in this manual.

memo: No translation req'd at FEP 9.5 AE. See corresponding JA in JA manual.

|  |                      |
|--|----------------------|
| FUJITSU Enterprise Postgres Mirroring Controller | Mirroring Controller |
|--|----------------------|

### 1.4.3 FUJITSU Enterprise Postgres conventions

The naming conventions for the FUJITSU Enterprise Postgres product names and functions used in the FUJITSU Enterprise Postgres manuals are shown below.

#### 1.4.3.1 Server

The names used in the manuals in explanations regarding FUJITSU Enterprise Postgres functions are shown below.

| Product name  | Name used in manuals |
|---|----------------------|
| FUJITSU Enterprise Postgres Advanced Edition (64bit)<br>and<br>FUJITSU Enterprise Postgres Standard Edition (64bit) | 64-bit product       |

#### 1.4.3.2 Client

The names used in the manuals in explanations regarding FUJITSU Enterprise Postgres client functions are shown below.

| Product name                               | Name used in manuals |
|--|----------------------|
| FUJITSU Enterprise Postgres Client (64bit) | 64-bit product       |
| FUJITSU Enterprise Postgres Client (32bit) | 32-bit product       |

### 1.4.4 Abbreviations for specific terms



The following abbreviations are used in descriptions concerning the Linux:

- "UNIX system" is an abbreviation for FUJITSU Enterprise Postgres running under the Linux.
- "UNIX system files" is an abbreviation for the files handled under the Linux.
- "UNIX system" is an abbreviation for the system configured for the Linux.

### 1.4.5 Symbol convention

The symbols shown below are used in the manuals.

| Symbol | Meaning  |
|--------|--|
| [ ]    | These symbols indicate characters displayed in a window or dialog box or keyboard keys.<br><br>Examples: [Setting] dialogue box, [File] menu, [Item name], [OK] button, [Enter] key. |

## 1.5 Notes about Manuals

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This section contains notes about the FUJITSU Enterprise Postgres operating environments and manuals.

- Images in figures

The FUJITSU Enterprise Postgres manuals contain figures showing printouts for FUJITSU Enterprise Postgres to provide the reader an idea of what the printouts look like, but since the figures are only examples, they are incomplete.

- Explanatory examples

- Most of the examples of databases in the FUJITSU Enterprise Postgres manuals are modeled after inventory control databases of retail stores. The design and contents of the databases in the examples are fictitious and do not represent any real database.

- The examples given in the FUJITSU Enterprise Postgres manuals are assumed to be for RHEL6 unless expressly stated otherwise.(For Linux)

- UNIX release version number

This system conforms to UNIX System V Rel4.2MP.

- No translation req'd at FEP 9.5 AE. See corresponding JA in JA manual.

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# FUJITSU Enterprise Postgres 9.5



## Glossary

Windows/Linux

J2UL-2122-01ENZO(00)  
June 2016

# Preface

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## Purpose of This Document

This document explains FUJITSU Enterprise Postgres terminology.

## Intended Readers

This document is aimed at all users of FUJITSU Enterprise Postgres.

## Export Restrictions

Exportation/release of this document may require necessary procedures in accordance with the regulations of your resident country and/or US export control laws.

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# Glossary

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## Archive log

Contains the history of updates made to the database, and is used during recovery.

## Backup data storage destination

The directory that stores the backup data.

## Client command

A command that is executed from the client machine and used. Also known as a client application.

## Data storage destination

The directory that stores the database clusters.

## Database cluster

The database storage area on the database storage disk. Database clusters are a collection of databases managed by an instance.

## Data masking

A feature that can change the returned data for queries generated by applications, to prevent exposing actual data.

## Database multiplexing

Mechanism in which a database is made redundant on multiple servers, by transferring transaction logs (WAL) via the network to enable application jobs to be continued.

## Database superuser

A user defined in the database with access privileges for all database objects.

## Encoding

Indicates the character set.

## Instance

A series of server processes for managing database clusters.

## Instance administrator

The OS user account that owns the database cluster files and operates the database server processes.

## Instance name

Indicates the instance name.

## Masking policy

A method of changing data under specific conditions when it is returned for a query from an application. You can configure masking target, masking type, masking condition and masking format.

## Mirrored transaction log

The log that mirrors the transaction log at the backup data storage destination.

## Primary server

The server that processes the main database jobs during multiplexed database operation.

---

### Server command

A command used on the database server. Also known as a server application.

---

### Standby server

A server that generates a replicated database synchronized with the primary server, and that can run as an alternative server in case the primary server fails during multiplexed database operation.

---

### Transaction log

Contains the history of updates made to the database by transactions. Also known as the WAL (Write-Ahead Log).

---

### Transaction log storage destination

The directory that stores the transaction log.

---

### VCI (Vertical Columnar Index)

An index with columnar data structure suitable for aggregation.

---

### WAL (Write-Ahead Log)

Has the same meaning as 'transaction log'.

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# FUJITSU Enterprise Postgres 9.5



## General Description

Windows/Linux

J2UL-2115-02ENZO(00)  
June 2016

# Preface

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## Purpose of This Document

This document explains the FUJITSU Enterprise Postgres concepts to those who are to operate databases using it.

This document explains the features of FUJITSU Enterprise Postgres.

## Intended Readers

This document is intended for people who are:

- Considering installing FUJITSU Enterprise Postgres
- Using FUJITSU Enterprise Postgres for the first time
- Wanting to learn about the concept of FUJITSU Enterprise Postgres
- Wanting to see a functional overview of FUJITSU Enterprise Postgres

Readers of this document are also assumed to have general knowledge of:

- Computers
- Jobs
- Linux
- Windows(R)

## Structure of This Document

This document is structured as follows:

### [Chapter 1 FUJITSU Enterprise Postgres Basics](#)

Explains the features of FUJITSU Enterprise Postgres.

### [Appendix A List of Features](#)

Explains the lists of the main features provided by FUJITSU Enterprise Postgres.

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# Chapter 1 FUJITSU Enterprise Postgres Basics

FUJITSU Enterprise Postgres is a database that is fully compatible with PostgreSQL. The reliability, operability, and usability of FUJITSU Enterprise Postgres can be further improved by extending the PostgreSQL functionality.

This chapter explains the functionality extended by FUJITSU Enterprise Postgres.

FUJITSU Enterprise Postgres has the following features:

- Flexible database recovery  
Not only does FUJITSU Enterprise Postgres recover data to its most recent form when a failure occurs, which is essential for databases, but it can also recover to any point in time.
  
- Simple GUI-based installation and operation management  
FUJITSU Enterprise Postgres uses GUI to simplify cumbersome database operations, and allows databases to be used intuitively.
  
- High reliability by using database multiplexing  
Database multiplexing protects important data and enables highly reliable database operation.
  
- Seamless migration from Oracle databases  
FUJITSU Enterprise Postgres provides a compatibility feature with Oracle databases that localizes the correction of existing applications and allows easy migration to FUJITSU Enterprise Postgres.
  
- Linkage with integrated development environment  
FUJITSU Enterprise Postgres links with Visual Studio, thereby allowing a standard framework to be used to create applications.
  
- Storage Data Protection using Transparent Data Encryption  
Information can be protected from data theft by encrypting data to be stored in the database.
  
- Data masking for improved security  
The data masking feature changes the returned data for queries from applications, to prevent exposing actual data. This improves security for handling confidential data such as personal information.
  
- Enhanced query plan stability  
The following features can control SQL statement query plans:
  - Optimizer hints
  - Locked statisticsThese features are used for curbing performance deterioration caused by changes in SQL statement query plans, such as with mission-critical jobs that emphasize performance stability over improved SQL statement processing performance.
  
- Parallel scan  
Parallel scan uses available resources within the server to speed up scan processing for queries that require searching a large amount of data.
  
- Increased aggregation performance using the in-memory feature  
The following features help speed up scans even when aggregating many rows.
  - Vertical Columnar Index (VCI)

- In-memory data

## 1.1 Flexible Database Recovery

Threats such as data corruption due to disk failure and incorrect operations are unavoidable in systems that use databases. The ability to reliably recover corrupted databases without extensive damage to users when such problems occur is an essential requirement in database systems.

FUJITSU Enterprise Postgres provides the following recovery features that flexibly respond to this requirement:

- Media recovery, which recovers up to the most recent point in time
- Point-in-time recovery, which can recover up to a specific point in time

### Media recovery, which recovers up to the most recent point in time

When a disk failure occurs, media recovery can recover data to how it was immediately before the failure.

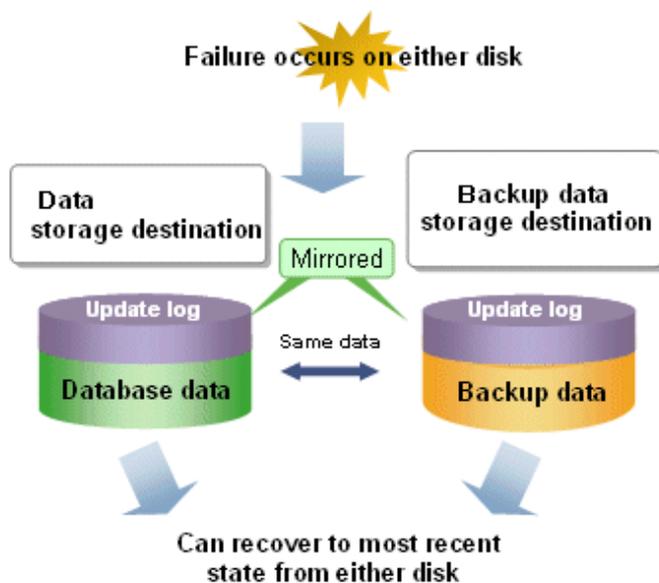
In order to recover the database, FUJITSU Enterprise Postgres accumulates a history of database update operations, such as data additions and deletions, as an update log.

FUJITSU Enterprise Postgres retains a duplicate (mirror image) of the update log after backup execution on the data storage destination and on the backup data storage destination. Therefore, the data on one disk can be used to recover to the most recent state of the database even if a disk failure has occurred on the other.

Media recovery is executed using either a GUI tool provided with FUJITSU Enterprise Postgres (WebAdmin) or server commands.

#### Information

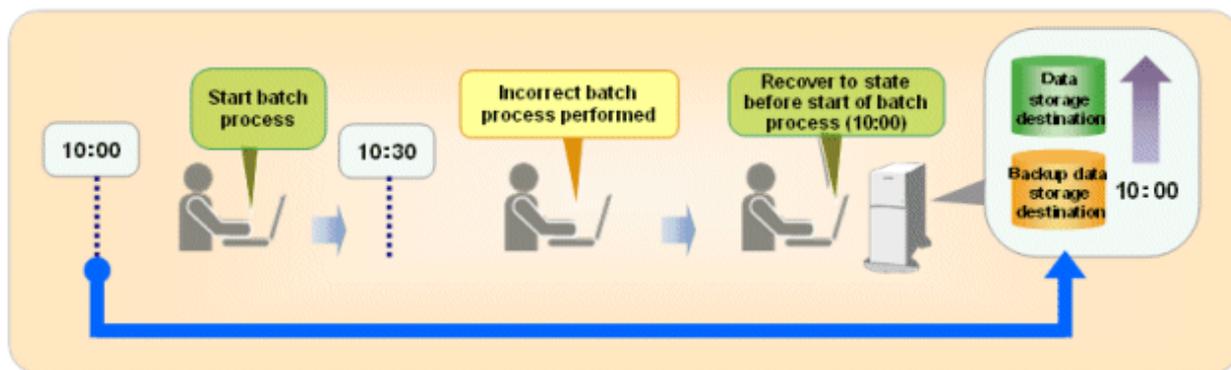
Recovery using WebAdmin requires less time and effort, since WebAdmin automatically determines the scope of the operation.



### Point-in-time recovery, which can recover up to a specific point in time

Point-in-time recovery can be used to recover a database that has been updated by an incorrect operation, for example, by specifying any date and time before the incorrect operation.

Point-in-time recovery is executed using FUJITSU Enterprise Postgres server commands.



## 1.2 Simple GUI-Based Installation and Operation Management

FUJITSU Enterprise Postgres provides WebAdmin, which is a GUI tool for a range of tasks, from database installation to operation management. This allows the databases to be used simply and intuitively.

WebAdmin can be used for FUJITSU Enterprise Postgres setup, creating and monitoring a streaming replication cluster, database backups, and for recovery. Depending on the configuration, WebAdmin can be used to manage FUJITSU Enterprise Postgres instances in a single server, or instances spread across multiple servers.

### - Setup

To perform setup using WebAdmin, you must create an instance. An instance is a set of server processes that manage a database cluster (database storage area on the data storage destination disk). Instances can be created easily and with only minimal required input, because the tool automatically determines the optimal settings for operation.

### - Database backup/recovery

Database backup and recovery can be performed using simple GUI operations.

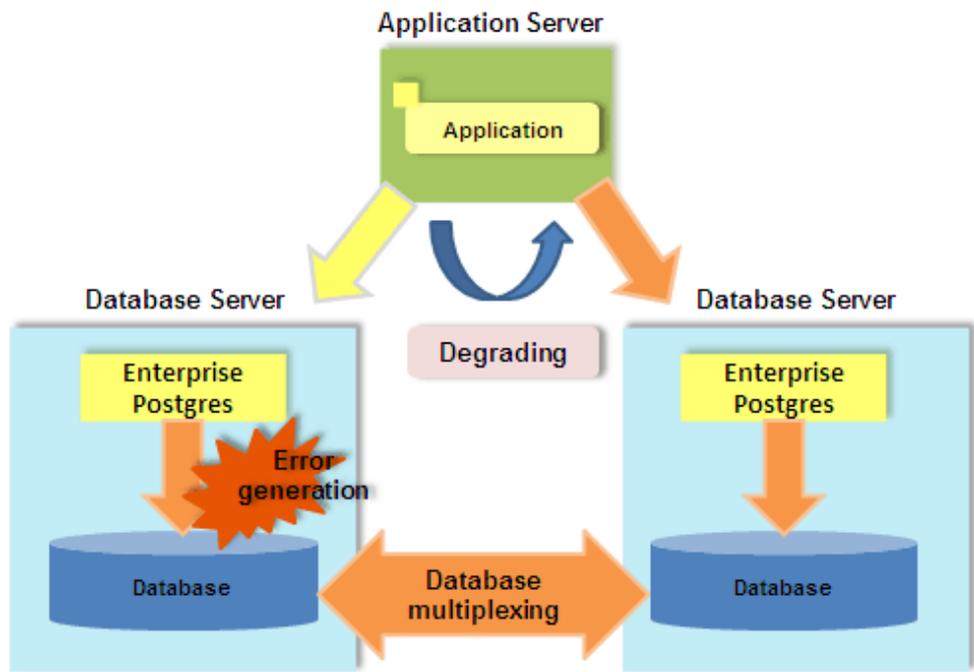
In particular, FUJITSU Enterprise Postgres can automatically identify and isolate the location of errors. This simplifies the recovery process and enables faster recovery.

In addition, FUJITSU Enterprise Postgres provides the following expanded features in pgAdmin:

- NCHAR type
- Expanded trigger definition
  - REPLACE feature
  - Function call feature

## 1.3 High Reliability with Database Multiplexing

It is vital for systems that use databases to protect data from damage or loss caused by a range of factors such as hardware and software errors. Database multiplexing protects important data and enables highly reliable database operation.



FUJITSU Enterprise Postgres not only mirrors a database using the PostgreSQL streaming replication feature, but also provides simplified switchover and standby disconnection features as well as a feature to detect faults in elements that are essential for the continuity of process, disk, network, and other database operations.

Even if a switchover is performed, the client automatically distinguishes between the primary and standby servers, so applications can be connected transparently regardless of the physical server.

The Mirroring Controller option enables the primary server (the database server used for the main jobs) to be switched automatically to the standby server if an error occurs in the former.

In addition, by using the data on the standby server, reference jobs such as data analysis and form output can be performed in parallel to the jobs on the primary server.

 See

Refer to "Database Multiplexing Mode" in the Cluster Operation Guide for information on the database multiplexing.

## 1.4 Seamless Migration from Oracle Databases

FUJITSU Enterprise Postgres supports Oracle, to provide compatibility with Oracle databases.

Using the compatibility feature reduces the cost of correcting existing applications and results in easy database migration.

 See

Refer to "Compatibility with Oracle Databases" in the Application Development Guide for information on compatible features.

 Information

The features compatible with Oracle databases are enabled by default.

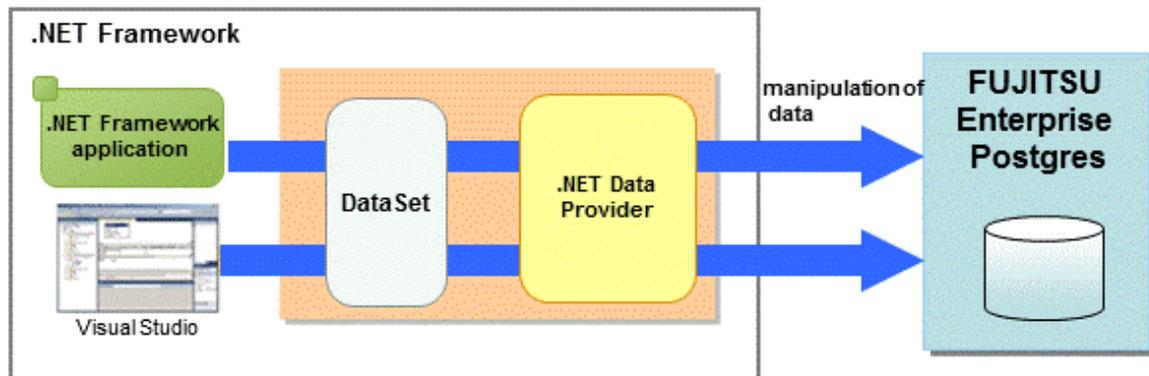
## 1.5 Linkage with Integrated Development Environment

---

You can link with Microsoft Visual Studio to create application. And, you can automatically generate applications to access database resources by linking to Visual Studio.

### Relationship between .NET Framework and FUJITSU Enterprise Postgres

FUJITSU Enterprise Postgres provides .NET Data Provider, which is an interface for ADO.NET of .NET Framework. This enables you to select FUJITSU Enterprise Postgres as the connection destination database of ADO.NET and use the intuitive and efficient application development features of Visual Studio.



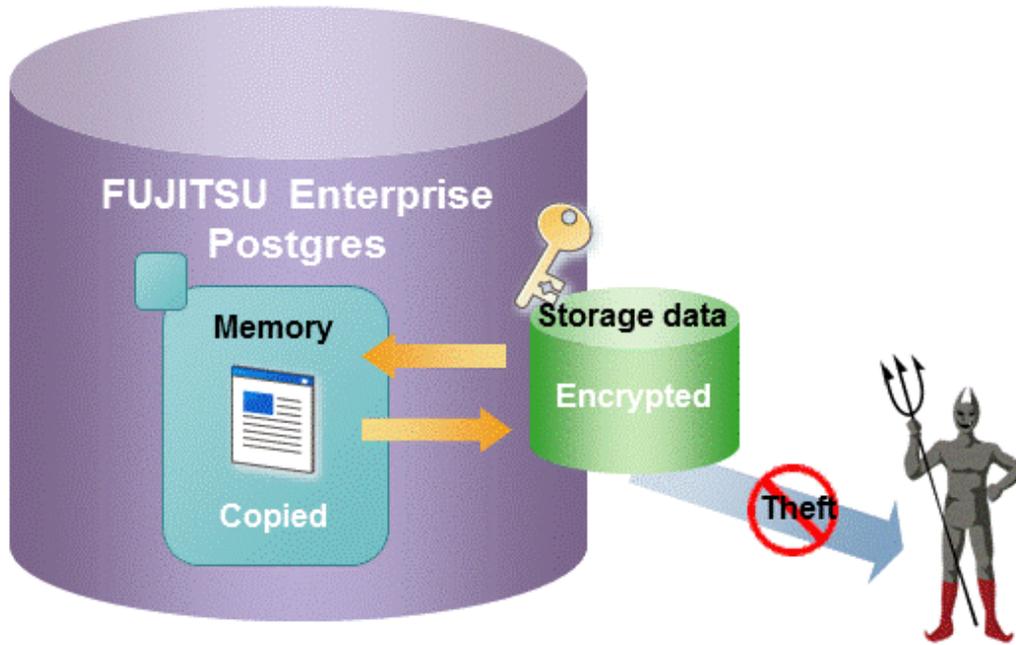
## 1.6 Storage Data Protection using Transparent Data Encryption

---

The encryption of data to be stored in a database is essential under the following encryption requirements of PCI DSS (Payment Card Industry Data Security Standard), the data security standard of the credit industry:

- Confidential information (such as credit card numbers) can be encrypted.
- The encryption key and data are managed as separate entities.
- The encryption key is replaced at regular intervals.

To satisfy these requirements, FUJITSU Enterprise Postgres provides a transparent data encryption feature. Note that PostgreSQL uses an encryption feature called pgcrypto, which can also be used in FUJITSU Enterprise Postgres, but requires applications to be modified. Therefore, we recommend using FUJITSU Enterprise Postgres's transparent data encryption feature.



See

Refer to "Protecting Storage Data Using Transparent Data Encryption" in the Operation Guide for information on stored data encryption.

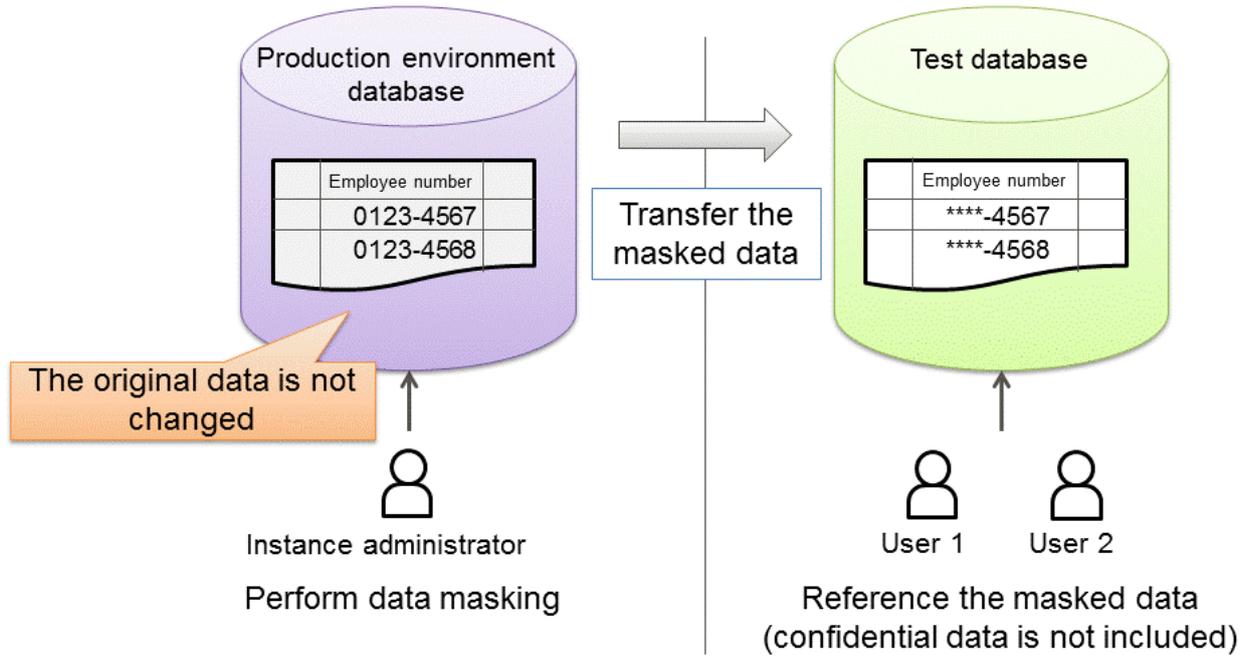
## 1.7 Data Masking for Improved Security

FUJITSU Enterprise Postgres provides a data masking feature that protects data to maintain security of data handled in systems.

The data masking feature changes the returned data for queries from applications and makes it available for reference without exposing the actual data.

For example, for a query of employee data, digits except the last four digits of an eight-digit employee number can be changed to "\*" so that it can be used for reference.

Also, the data changed by the data masking feature can be transferred to a test database so that users who perform testing or development can reference the data. As production data should not be used in a test or development environment because of the risk of data leakage, this feature enables data that is similar to actual production data to be safely used in those environments.



See

Refer to "Data Masking" in the Operation Guide for information on data masking.

## 1.8 Enhanced Query Plan Stability

FUJITSU Enterprise Postgres estimates the cost of query plans based on SQL statements and database statistical information, and selects the least expensive query plan. However, like other databases, FUJITSU Enterprise Postgres does not necessarily select the most suitable query plan. For example, it may suddenly select unsuitable query plan due to changes in the data conditions.

In mission-critical systems, stable performance is more important than improved performance, and changes in query plans case to be avoided. In this situation, the following features can stabilize query plans:

- Optimizer hints

You can use `pg_hint_plan` to specify a query plan in each individual SQL statement.

- Locked statistics

You can use `pg_dmbs_stats` to lock statistical information per object, such as a database, schema, or table.



See

Refer to "Optimizer Hints" in the Application Development Guide for information on optimizer hints.

Refer to "Locked Statistics" in the Application Development Guide or information on locked statistics.



Note

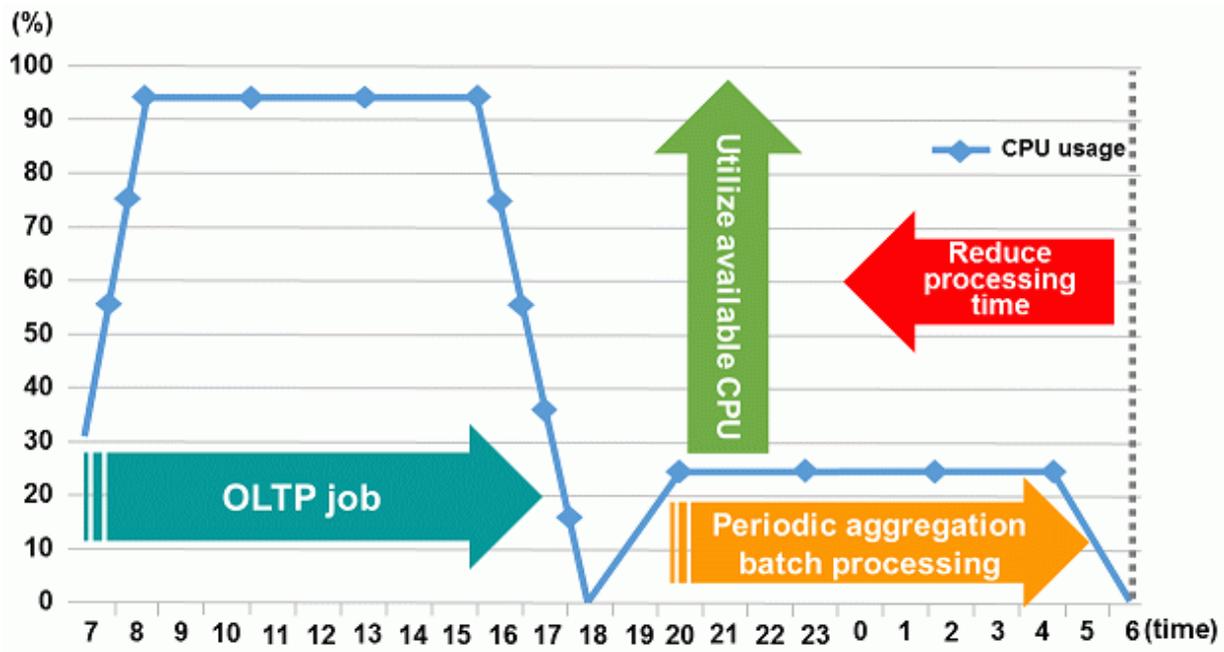
Use the features provided when FUJITSU Enterprise Postgres is installed for optimizer hints and locked statistical information. FUJITSU Enterprise Postgres does not support other similar open-source features.

## 1.9 Parallel Scan

FUJITSU Enterprise Postgres enhances scan performance by distributing scan processes that contain a high number of items to multiple CPU cores (according to their load) and then processing them in parallel.

### Periodic aggregation, in periods such as night time

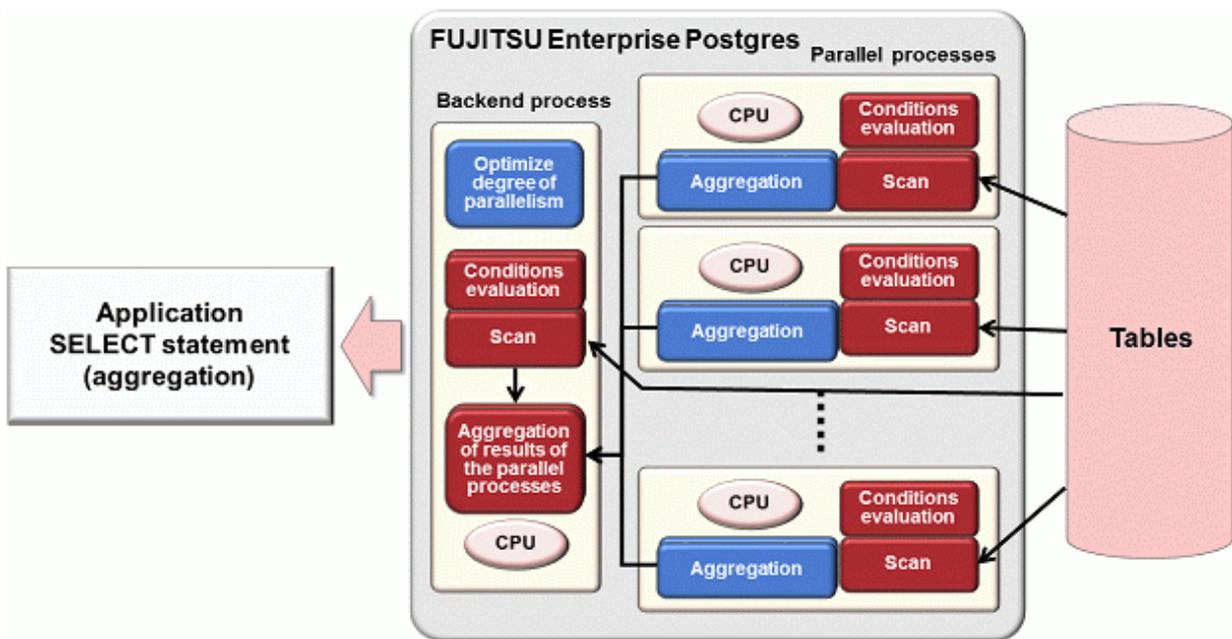
As shown in the figure below, processing time can be significantly reduced by taking full advantage of available server resources if online processes are executed separately from traditional SQL applications (grouped in periodic aggregation batch processing).



FUJITSU Enterprise Postgres parallel scan supports the following:

- Sequential scan
- Aggregation (aggregation functions, GROUP BY)

As shown in the figure below, processing is partitioned for each read range and allocated to parallelized background processes (called parallel processes) according to the CPU load. FUJITSU Enterprise Postgres uses the scan result of each parallel process and performs aggregation. Lastly, it aggregates all results and returns the result to the application.



It performs parallel processing using more processes if the CPU load is low, and redundant processes are not parallelized if the CPU load is high. This type of automatic determination enables more efficient use of CPUs and improved scan performance.

 See

Refer to "Parallel Scan" in the Application Development Guide for details.

## 1.10 Increased Aggregation Performance Using the In-memory Feature

FUJITSU Enterprise Postgres provides the in-memory feature, which uses columnar index and memory-resident data. This reduces disk I/Os and enhances aggregation performance.

### Vertical Columnar Index (VCI)

Many aggregation processes may require a large portion of data in a particular column. However, traditional row data structure reads unnecessary columns, resulting in inefficient use of memory and CPU cache, and slower processing. FUJITSU Enterprise Postgres provides a type of columnar index, VCI (Vertical Columnar Index). This addresses the above issues, and enhances aggregation performance.

VCI provides the following benefits:

- Minimizes impact on existing jobs, and can perform aggregation using job data in real time.
- Provided as an index, so no application modification is required.
- Stores data also on the disk, so aggregation jobs can be quickly resumed using a VCI even if a failure occurs (when an instance is restarted).

It also provides the features below:

- Disk compression  
Compresses VCI data on the disk, minimizing required disk space. Even if disk access is required, read overhead is low.
- Parallel scan  
Enhances aggregation performance by distributing aggregation processes to multiple CPU cores and then processing them in parallel.

### In-memory data

The following features keep VCI data in memory and minimize disk I/Os on each aggregation process.

- Preload feature  
Ensures stable response times by loading VCI data to memory before an application scans it after the instance is restarted.
- Stable buffer feature  
Reduces disk I/Os by suppressing VCI data eviction from memory by other job data.

### Purposes of this feature

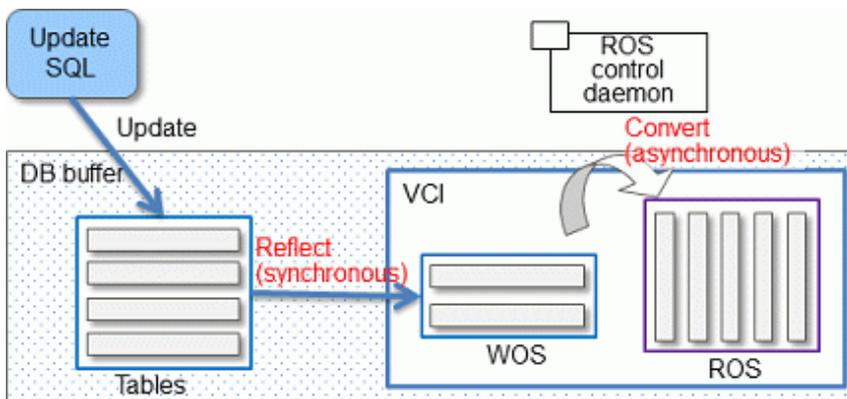
This feature has a data structure that can efficiently use the newly added resources, and aims to enhance the existing aggregation processing in normal operations to be faster than parallel scan. It shares the same purpose of enhancing aggregation performance with the parallel scan feature that is provided separately, but differs in that it speeds up nightly batch processes by utilizing available resources.

### VCI architecture

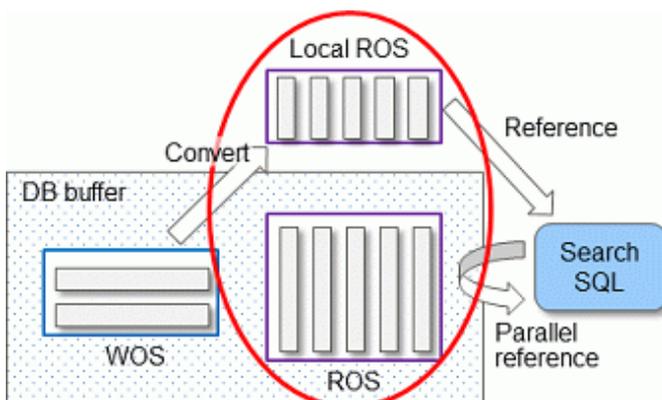
This section briefly explains VCI architecture as it contains basic terminology required, for example, when setting parameters.

Update and aggregation operations to enable real time use of job data are described.

VCI has write buffer row-based WOS (Write Optimized Store) in addition to the columnar data structure ROS (Read Optimized Store). Converting each update into a columnar index has a significant impact on the update process response times. Therefore, data is synchronously reflected to the row-based WOS when updating. After a certain amount of data is stored in WOS, the ROS control daemon asynchronously converts it to ROS. As above, the entire VCI is synchronized with the target table column, minimizing update overhead.



The same scan results can be obtained without a VCI by using WOS in conjunction with ROS. More specifically, WOS is converted to Local ROS in local memory for each aggregation process, and aggregated with ROS.



### See

Refer to "Installing and Operating the In-memory Feature" in the Operation Guide for information on installation and operation of VCI.

Refer to "Scan Using a Vertical Columnar Index (VCI)" in the Application Development Guide for information on scan using a VCI.

## Appendix A List of Features

The following table lists the main features provided by FUJITSU Enterprise Postgres.

| Category                              | Feature  | Linux |    | Windows |    |
|---------------------------------------|--|-------|----|---------|----|
|                                       |  | AE    | SE | AE      | SE |
| Fujitsu-developed software technology | WebAdmin<br>(Rapid setup, One-click recovery)  | Y     | Y  | Y       | Y  |
| Improved reliability                  | Database multiplexing  | Y     | N  | Y       | N  |
| Application development               | Embedded SQL integration<br>Java integration<br>ODBC integration<br>.NET Framework integration | Y     | Y  | Y       | Y  |
|                                       | Features compatible with Oracle databases  | Y     | Y  | Y       | Y  |
| Security                              | Storage data encryption  | Y     | Y  | Y       | Y  |
|                                       | Data masking   | Y     | Y  | Y       | Y  |
| Performance                           | Parallel scan  | Y     | N  | Y       | N  |
|                                       | In-memory feature  | Y     | N  | Y       | N  |
| Performance tuning                    | Optimizer hints  | Y     | Y  | Y       | Y  |
|                                       | Fixed statistical information  | Y     | Y  | Y       | Y  |

Y: Provided

N: Not provided

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# FUJITSU Enterprise Postgres 9.5



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# FUJITSU Enterprise Postgres 9.5



## Release Notes (*Linux*)

Linux

J2UL-2114-02ENZO(00)  
June 2016

# Preface

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## Purpose of This Document

This document provides release information for FUJITSU Enterprise Postgres.

## Structure of This Document

This document is structured as follows:

### [Chapter 1 New Features and Improvements](#)

Explains the new features and improvements in this version.

### [Chapter 2 Compatibility Information](#)

Provides information regarding compatibility.

### [Chapter 3 Program Updates](#)

Explains updates incorporated in this version.

## Export Restrictions

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## Issue Date and Version

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| Second edition: June 2016<br>First edition: March 2016 |
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# Chapter 1 New Features and Improvements

This chapter explains FUJITSU Enterprise Postgres new features and improvements added in this version.

Table 1.1 New features and improvements

| Version and level    | Classification                                   | Feature   | Provided in AE | Provided in SE |
|----------------------|--|---|----------------|----------------|
| 9.5                  | Security   | <a href="#">Data masking</a>  | Y              | Y              |
|                      | Operations                                       | <a href="#">Improvements to the GUI</a>                                   | Y              | Y              |
|                      |  | <a href="#">Database multiplexing</a>                                     | Y              | N              |
|                      | Performance                                      | <a href="#">Parallel scan</a>   | Y              | N              |
|                      |  | <a href="#">In-memory</a>   | Y              | N              |
|                      | Application development                          | <a href="#">Support for embedded SQL national character data in COBOL</a> | Y              | Y              |
|                      |  | <a href="#">Support for Oracle's compatibility functions (Orafce)</a>     | Y              | N              |
| Platform enhancement | <a href="#">Client operating system addition</a> | Y   | Y              |                |

## 1.1 Features Added in 9.5

This section explains new features and improvements in FUJITSU Enterprise Postgres 9.5.

### 1.1.1 Security

This section explains the new features related to security.

- Data masking

#### 1.1.1.1 Data Masking

The data masking feature can achieve data protection by masking data so that users can refer to the data without the behavior of applications having to be changed and instead of having to prevent access to the entire table using access rights.



See

Refer to "Data Masking" in the Operation Guide for details.

### 1.1.2 Operations

This section explains the new features related to operation.

- Improvements to the GUI
- Database multiplexing

#### 1.1.2.1 Improvements to the GUI

The WebAdmin GUI has an improved, more intuitive design. In addition, it incorporates several new features: the centralized administration of the database instances running on multiple server machines, comprehensive and easy-to-use credential management, and replication functionality in various configuration modes.



See

Refer to "Operating Methods" in the Operation Guide for details.

### 1.1.2.2 Database Multiplexing

Database multiplexing is a feature provided for multiplexing a database. It enables highly reliable database operation.

In addition, it enables you to automatically switch the database if the database server fails. Moreover, reference jobs that use the standby server can therefore be executed parallel to jobs on the primary server.



See

Refer to "Database Multiplexing Mode" in the Cluster Operation Guide for details.

## 1.1.3 Performance

---

This section explains the new features added to improved performance:

- Parallel scan
- In-memory

### 1.1.3.1 Parallel Scan

Parallel scan is a feature provided for parallelizing scan processing and utilizing free server resources for scans that are likely to require high throughput. This enhances scan processing performance.



See

Refer to "Parallel Scan" in the Application Development Guide for details.

### 1.1.3.2 In-memory

In-memory is a feature provided for keeping a columnar index and its data in memory. This enhances the aggregation process performance by reducing the disk I/O that occurs for each aggregation processing.



See

Refer to "Increased aggregation performance using the in-memory feature" in the General Description for details.

## 1.1.4 Application Development

---

This section explains the new features related to application development:

- Support for embedded SQL national character data in COBOL
- Support for Oracle's compatibility functions (Orafce)

### 1.1.4.1 Support for Embedded SQL National Character Data in COBOL

National character data is supported using SQL embedded COBOL preprocessor. This allows existing application COBOL variable type "PIC N" to be used without any modifications.



.....  
Refer to "Embedded SQL in COBOL" in the Application Development Guide for details.  
.....

### 1.1.4.2 Support for Oracle's Compatibility Functions (Orafce)

It is now possible to use Oracle's compatibility functions (Orafce). The existing compatibility features have been kept and more compatibility features are now available.



.....  
Refer to "Compatibility with Oracle Databases" in the Application Development Guide for details.  
.....

## 1.1.5 Platform Enhancement

---

This section explains the new features related to platform enhancement:

- Client operating system addition

### 1.1.5.1 Client Operating System Addition

The following are supported as operating environments.

- Windows 10



.....  
Refer to "Required Operating System" in the Installation and Setup Guide for Client for details.  
.....

# Chapter 2 Compatibility Information

This chapter lists the incompatible items and any action required for features that have changed since the previous version.

## 2.1 Columns Added to System Catalog and Statistics View

New columns relating to parallel scan were added to system catalogs and statistics views in FUJITSU Enterprise Postgres 9.5 or later.

### Incompatibility

FUJITSU Enterprise Postgres 9.4 and 9.5 or later return different results if "SELECT \*" is executed for the system catalog or statistics view below.

- System catalog

| Catalog      | Changes  |
|--------------|--|
| pg_aggregate | The column below was added between "aggfinalfn" and "aggmtransfn".<br>- aggcombinefn |
| pg_proc      | The column below was added between "provolatile" and "pronargs".<br>- proparallel    |

- Statistics view

| View  | Changes  |
|---|--|
| - pg_stat_all_tables<br>- pg_stat_sys_tables<br>- pg_stat_user_tables<br>- pg_stat_xact_all_tables<br>- pg_stat_xact_sys_tables<br>- pg_stat_xact_user_tables | The column below was added between "seq_scan" and "seq_tup_read".<br>- parallel_scan |

### Corrective action

If "SELECT \*" is specified for a system catalog or statistics view above, replace "\*" with the appropriate columns .



See

Refer to "Parallel Scan" in the Application Development Guide for information on changing the system catalog or statistics view.

## Chapter 3 Program Updates

This version incorporates the updates implemented in PostgreSQL 9.4.5, 9.5, 9.5.1 and 9.5.2.



See

Refer to the PostgreSQL Global Development Group website for the updates implemented:

**[PostgreSQL 9.4.5]**

<http://www.postgresql.org/docs/9.4/static/release-9-4-5.html>

**[PostgreSQL 9.5]**

<http://www.postgresql.org/docs/9.5/static/release-9-5.html>

**[PostgreSQL 9.5.1]**

<http://www.postgresql.org/docs/9.5/static/release-9-5-1.html>

**[PostgreSQL 9.5.2]**

<http://www.postgresql.org/docs/9.5/static/release-9-5-2.html>

The following security issues have been introduced in PostgreSQL 9.4.5.

**CVE-2015-5289**

json or jsonb input values constructed from arbitrary user input can crash the PostgreSQL server and cause a denial of service.

**CVE-2015-5288**

The crypt() function included with the optional pgCrypto extension could be exploited to read a few additional bytes of memory.

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# FUJITSU Enterprise Postgres 9.5



## Release Notes *(Windows)*

Windows

B1WS-1275-02ENZ0(00)  
July 2016

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|                      | Operations                                       | <a href="#">Improvements to the GUI</a>                                   | Y              | Y              |
|                      |  | <a href="#">Database multiplexing</a>                                     | Y              | N              |
|                      | Performance                                      | <a href="#">Parallel scan</a>   | Y              | N              |
|                      |  | <a href="#">In-memory</a>   | Y              | N              |
|                      | Application development                          | <a href="#">Support for embedded SQL national character data in COBOL</a> | Y              | Y              |
|                      |  | <a href="#">Support for Oracle's compatibility functions (Orafce)</a>     | Y              | N              |
| Platform enhancement | <a href="#">Client operating system addition</a> | Y   | Y              |                |

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### 1.1.1 Security

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- Data masking

#### 1.1.1.1 Data Masking

The data masking feature can achieve data protection by masking data so that users can refer to the data without the behavior of applications having to be changed and instead of having to prevent access to the entire table using access rights.



See

Refer to "Data Masking" in the Operation Guide for details.

### 1.1.2 Operations

This section explains the new features related to operation.

- Improvements to the GUI
- Database multiplexing

#### 1.1.2.1 Improvements to the GUI

The WebAdmin GUI has an improved, more intuitive design. In addition, it incorporates several new features: the centralized administration of the database instances running on multiple server machines, comprehensive and easy-to-use credential management, and replication functionality in various configuration modes.



Refer to "Operating Methods" in the Operation Guide for details.

### 1.1.2.2 Database Multiplexing

Database multiplexing is a feature provided for multiplexing a database. It enables highly reliable database operation.

In addition, it enables you to automatically switch the database if the database server fails. Moreover, reference jobs that use the standby server can therefore be executed parallel to jobs on the primary server.



Refer to "Database Multiplexing Mode" in the Cluster Operation Guide for details.

## 1.1.3 Performance

---

This section explains the new features added to improved performance:

- Parallel scan
- In-memory

### 1.1.3.1 Parallel Scan

Parallel scan is a feature provided for parallelizing scan processing and utilizing free server resources for scans that are likely to require high throughput. This enhances scan processing performance.



Refer to "Parallel Scan" in the Application Development Guide for details.

### 1.1.3.2 In-memory

In-memory is a feature provided for keeping a columnar index and its data in memory. This enhances the aggregation process performance by reducing the disk I/O that occurs for each aggregation processing.



Refer to "Increased aggregation performance using the in-memory feature" in the General Description for details.

## 1.1.4 Application Development

---

This section explains the new features related to application development:

- Support for embedded SQL national character data in COBOL
- Support for Oracle's compatibility functions (Orafce)

### 1.1.4.1 Support for Embedded SQL National Character Data in COBOL

National character data is supported using SQL embedded COBOL preprocessor. This allows existing application COBOL variable type "PIC N" to be used without any modifications.



.....  
Refer to "Embedded SQL in COBOL" in the Application Development Guide for details.  
.....

### 1.1.4.2 Support for Oracle's Compatibility Functions (Orafce)

It is now possible to use Oracle's compatibility functions (Orafce). The existing compatibility features have been kept and more compatibility features are now available.



.....  
Refer to "Compatibility with Oracle Databases" in the Application Development Guide for details.  
.....

## 1.1.5 Platform Enhancement

---

This section explains the new features related to platform enhancement:

- Client operating system addition

### 1.1.5.1 Client Operating System Addition

The following are supported as operating environments.

- Windows 10



.....  
Refer to "Required Operating System" in the Installation and Setup Guide for Client for details.  
.....

# Chapter 2 Compatibility Information

This chapter lists the incompatible items and any action required for features that have changed since the previous version.

## 2.1 Columns Added to System Catalog and Statistics View

New columns relating to parallel scan were added to system catalogs and statistics views in FUJITSU Enterprise Postgres 9.5 or later.

### Incompatibility

FUJITSU Enterprise Postgres 9.4 and 9.5 or later return different results if "SELECT \*" is executed for the system catalog or statistics view below.

- System catalog

| Catalog      | Changes  |
|--------------|--|
| pg_aggregate | The column below was added between "aggfinalfn" and "aggmtransfn".<br>- aggcombinefn |
| pg_proc      | The column below was added between "provolatile" and "pronargs".<br>- proparallel    |

- Statistics view

| View  | Changes  |
|---|--|
| - pg_stat_all_tables<br>- pg_stat_sys_tables<br>- pg_stat_user_tables<br>- pg_stat_xact_all_tables<br>- pg_stat_xact_sys_tables<br>- pg_stat_xact_user_tables | The column below was added between "seq_scan" and "seq_tup_read".<br>- parallel_scan |

### Corrective action

If "SELECT \*" is specified for a system catalog or statistics view above, replace "\*" with the appropriate columns.



See

Refer to "Parallel Scan" in the Application Development Guide for information on changing the system catalog or statistics view.

## Chapter 3 Program Updates

This version incorporates the updates implemented in PostgreSQL 9.4.5, 9.5, 9.5.1 and 9.5.2.



See

Refer to the PostgreSQL Global Development Group website for the updates implemented:

**[PostgreSQL 9.4.5]**

<http://www.postgresql.org/docs/9.4/static/release-9-4-5.html>

**[PostgreSQL 9.5]**

<http://www.postgresql.org/docs/9.5/static/release-9-5.html>

**[PostgreSQL 9.5.1]**

<http://www.postgresql.org/docs/9.5/static/release-9-5-1.html>

**[PostgreSQL 9.5.2]**

<http://www.postgresql.org/docs/9.5/static/release-9-5-2.html>

The following security issues have been introduced in PostgreSQL 9.4.5.

**CVE-2015-5289**

json or jsonb input values constructed from arbitrary user input can crash the PostgreSQL server and cause a denial of service.

**CVE-2015-5288**

The crypt() function included with the optional pgCrypto extension could be exploited to read a few additional bytes of memory.

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# FUJITSU Enterprise Postgres 9.5



## Installation/Setup

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[Installation and Setup Guide for Client >](#)

# FUJITSU Enterprise Postgres 9.5



## Installation and Setup Guide for Server

[Linux >](#)

[Windows >](#)

# FUJITSU Enterprise Postgres 9.5



## Installation and Setup Guide for Server *(Linux)*

Linux

J2UL-2116-02ENZO(00)

June 2016

# Preface

---

## Purpose of This Document

The FUJITSU Enterprise Postgres database system extends the PostgreSQL features and runs on the Linux platform.

This document describes how to install and set up "FUJITSU Enterprise Postgres".

## Intended Readers

This document is intended for those who install and operate FUJITSU Enterprise Postgres.

Readers of this document are assumed to have general knowledge of:

- PostgreSQL
- SQL
- Linux

## Structure of This Document

This document is structured as follows:

### [Chapter 1 Overview of Installation](#)

Describes the installation types and procedures

### [Chapter 2 Operating Environment](#)

Describes the operating environment required to use FUJITSU Enterprise Postgres

### [Chapter 3 Installation](#)

Describes how to perform a new installation of FUJITSU Enterprise Postgres

### [Chapter 4 Setup](#)

Describes the setup to be performed after installation

### [Chapter 5 Uninstallation](#)

Describes how to uninstall FUJITSU Enterprise Postgres

### [Appendix A Installation in Silent Mode](#)

Provides specifications for installation in silent mode

### [Appendix B Recommended WebAdmin Environments](#)

Describes the recommended WebAdmin environment.

### [Appendix C Setting Up and Removing WebAdmin](#)

Describes how to set up and remove WebAdmin

### [Appendix D Configuring Parameters](#)

Describes FUJITSU Enterprise Postgres parameters.

### [Appendix E Uninstall \(middleware\)](#)

Describes the Uninstall (middleware)

### [Appendix F Uninstall \(middleware\) Messages](#)

Describes the messages output by the Uninstall (middleware) tool.

### [Appendix G Estimating Database Disk Space Requirements](#)

Describes how to estimate database disk space requirements

### [Appendix H Estimating Memory Requirements](#)

Describes the formulas for estimating memory requirements

### [Appendix I Quantitative Limits](#)

Describes the quantity range

### [Appendix J Configuring Kernel Parameters](#)

Describes the settings for kernel parameters

### [Appendix K Determining the Preferred WebAdmin Configuration](#)

Describes the two different configurations in which WebAdmin can be used and how to select the most suitable configuration

## **Export Restrictions**

Exportation/release of this document may require necessary procedures in accordance with the regulations of your resident country and/or US export control laws.

## **Issue Date and Version**

|  |
|--|
| Second edition: June 2016<br>First edition: March 2016 |
|--|

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# Chapter 1 Overview of Installation

This chapter provides an overview of FUJITSU Enterprise Postgres installation.

## 1.1 Features that can be Installed

Each FUJITSU Enterprise Postgres feature is installed on the machine that was used to build the database environment.

The following table shows the relationship between the product to be installed and the features that can be installed.

| Feature that can be installed                  | Product name |    |
|--|--------------|----|
|  | AE           | SE |
| Basic feature (server feature, client feature) | Y            | Y  |

Y: Can be installed

N: Cannot be installed

## 1.2 Installation Types

The following three installation types are available for FUJITSU Enterprise Postgres:

- New installation
- Reinstallation
- Multi-version installation

### 1.2.1 New Installation

In initial installation, FUJITSU Enterprise Postgres is installed for the first time.

### 1.2.2 Reinstallation

Perform reinstallation to repair installed program files that have become unusable for any reason.

### 1.2.3 Upgrade Installation

Perform upgrade installation to upgrade installed program files to the latest version.

### 1.2.4 Multi-Version Installation

Perform multi-version installation to install different versions to the installed program files separately.

## 1.3 Installation Procedure

The following installation procedures are available for FUJITSU Enterprise Postgres:

- Installation in interactive mode
- Installation in silent mode

Select the installation procedure that corresponds to your environment.

### 1.3.1 Installation in Interactive Mode

Interactive mode enables installation to be performed while the required information is entered interactively.

In the interactive mode installation, the installation state of FUJITSU Enterprise Postgres is determined automatically. Install FUJITSU Enterprise Postgres using one of the following installation types in accordance with the installation state:

- New installation
- Reinstallation
- Multi-version installation

### **1.3.2 Installation in Silent Mode**

---

Silent mode enables installation to be performed without the need to enter any information interactively.

New installations and multi-version installations can be performed in silent mode.

## **1.4 Uninstallation**

---

Uninstallation removes the system files of the installed FUJITSU Enterprise Postgres.

# Chapter 2 Operating Environment

This chapter describes the operating environment required to use FUJITSU Enterprise Postgres.



See

Refer to "Operating Environment" in the installation and Setup Guide for Client when installing the FUJITSU Enterprise Postgres client feature at the same time.

## 2.1 Required Operating System

One of the operating systems shown in the below is required to use FUJITSU Enterprise Postgres.

- RHEL6 (Intel 64)
- RHEL7



Note

The SELinux (Security-Enhanced Linux) feature is not supported for RHEL6.



Information

Select the x86\_64 architecture package when installing the 64-bit product.

- The following packages are required for operations on RHEL6 (Intel64).

| Package name       | Remarks                                 |
|--------------------|---|
| alsa-lib           | -                                       |
| audit-libs         | -                                       |
| dstat              | Required when using parallel scan.      |
| glibc              | -                                       |
| libgcc             | -                                       |
| libstdc++          | -                                       |
| libtool-ldt        | Required when using ODBC drivers.       |
| ncurses-libs       | -                                       |
| nss-softokn-freebl | -                                       |
| pam                | Required when using PAM authentication. |
| python-libs        | Required when using PL/Python           |
| redhat-lsb         | -                                       |
| tcl                | Required when using PL/Tcl              |
| unzip              | -                                       |
| xz-libs            | -                                       |
| zlib               | -                                       |

- The following packages are required for operations on RHEL7.

| Package name       | Remarks   |
|--------------------|---|
| alsa-lib           | -   |
| audit-libs         | -   |
| dstat              | Required when using parallel scan.              |
| glibc              | -   |
| libgcc             | -   |
| libstdc++          | -   |
| libtool-ltdl       | Required when using ODBC drivers.               |
| ncurses-libs       | -   |
| net-tools          | -   |
| nss-softokn-freebl | -   |
| pam                | Required when using PAM authentication.         |
| perl               | Install v5.10.1 if using PL/Perl.               |
| python-libs        | Required when using PL/Python<br>Install 2.6.6. |
| redhat-lsb         | -   |
| tcl                | Required when using PL/Tcl                      |
| unzip              | -   |
| xz-libs            | -   |
| Zlib               | -   |

## 2.2 Related Software

The following software required to use FUJITSU Enterprise Postgres.

- NetCOBOL Standard Edition V7.0L10 or later

The following table lists servers that can be connected to the FUJITSU Enterprise Postgres client feature.

Table 2.1 Connectable servers

| OS               | Product name   |
|------------------|--|
| Windows<br>Linux | - FUJITSU Software Enterprise Postgres Advanced Edition 9.5<br>or later<br><br>- FUJITSU Software Enterprise Postgres Standard Edition 9.4<br>or later |

## 2.3 Excluded Software

This section describes excluded software.

FUJITSU Enterprise Postgres

If all the following conditions are met, FUJITSU Enterprise Postgres cannot be installed:

- The product generations are the same
- The editions are different

### Example

In the following cases, FUJITSU Enterprise Postgres cannot be installed as an exclusive product:

- The installed product is FUJITSU Software Enterprise Postgres Standard Edition (64bit) 9.5
- The product to be installed is FUJITSU Software Enterprise Postgres Advanced Edition (64bit) 9.5

### Other products

There are no exclusive products.

## 2.4 Required Patches

---

There are no required patches.

## 2.5 Hardware Environment

---

The following hardware is required to use FUJITSU Enterprise Postgres.

### Memory

At least 512 MB of memory is required.

## 2.6 Disk Space Required for Installation

---

The following table shows the disk space requirements for new installation of FUJITSU Enterprise Postgres. If necessary, increase the size of the file system.

Table 2.2 Disk space required for installation

| Directory                                       | Required disk space (Unit: MB) |
|---|--------------------------------|
| /etc  | 1 + 1(*1)                      |
| /var  | 1 + 4(*1) + 1(*2)              |
| /opt  | 85(*1) + 1(*2)                 |
| Installation destination of the server          | 660                            |
| Installation destination of the client (32-bit) | 95                             |
| Installation destination of the client (64-bit) | 100                            |

\*1: Required for the installation of the Uninstall (middleware) tool.

\*2: Required for the installation of FJQSS.

## 2.7 Supported System Environment

---

This section describes the supported system environment.

### 2.7.1 TCP/IP Protocol

---

FUJITSU Enterprise Postgres supports version 4 and 6 (IPv4 and IPv6) of TCP/IP protocols.



Do not use link-local addresses if TCP/IP protocol version 6 addresses are used.

## 2.7.2 File System

---

All file systems with a POSIX-compliant interface are supported.

However, for stable system operation, the disk where the database is deployed must use a highly reliable file system. Consider this aspect when selecting the file system to be used.

The recommended file system is "ext4".



.....  
In terms of software reliability, ext3 is preferable to ext4 on RHEL 6.4 and earlier.  
.....

## 2.8 PostgreSQL Version Used for FUJITSU Enterprise Postgres

---

FUJITSU Enterprise Postgres is based on PostgreSQL 9.5.2.

## 2.9 Notes on Using Streaming Replication

---

To use streaming replication, build the primary server and all standby servers using the same FUJITSU Enterprise Postgres version (\*1).

\*1: The product version is indicated by "x" in the notation "x.y SPz".



.....  
Streaming replication cannot be used in combination with Open Source PostgreSQL.  
.....

# Chapter 3 Installation

This chapter explains each of the installation procedures of FUJITSU Enterprise Postgres.

## 3.1 Pre-installation Tasks

Check the system environment below before installing FUJITSU Enterprise Postgres.

Note that "x.ySPz" in sample windows indicates the version level of installed products, and similarly, "<xy>" in paths indicates the product version level.

### Check the disk space

Ensure that there is sufficient disk space to install FUJITSU Enterprise Postgres.

Refer to "[2.6 Disk Space Required for Installation](#)" for information on the required disk space.

Reconfigure the disk partition if disk space is insufficient.

### Check the installed product and determine the installation method

Using the operation shown below, start Uninstall (middleware), and check the installed products.

Example

```
# /opt/FJSVcir/cimanager.sh
Loading Uninstaller...

Currently installed products
1. FUJITSU Enterprise Postgres Client(64bit)  x.y SPZ
2. FUJITSU Enterprise Postgres Client(32bit)  x.y SPZ
3. FUJITSU Enterprise Postgres Standard Edition(64bit)  x.y SPZ

Type [number] to select the software you want to uninstall.
[number,q]
=>q

Exiting Uninstaller.
```

If FUJITSU Enterprise Postgres is already installed, determine which installation method to use:

- Reinstallation
- Multi-version installation

### Remove applied updates

If you perform reinstallation as the installation method, remove applied updates using the procedure shown below.



If a product is installed without removing applied updates, the following problems will occur:

- Performing reinstallation

if an update with the same update and version number is applied, an error informing you that the update has already been applied is displayed.

Perform reinstallation after removing the update.

## 1. Display the applied updates

Execute the following command to display the applied updates:

Example

```
# /opt/FJSVfupde/bin/uam showup
[product-name FUJITSU Enterprise Postgres Standard Edition(64bit) X.Y SPZ]
2015/11/04 13:32 update-number R A L O - - - FUJITSU Enterprise Postgres SE(FSEPDB)
2015/11/04 13:32 update-number R A L O - - - FUJITSU Enterprise Postgres SE(FSEPGUI)
[product-name FUJITSU Enterprise Postgres Client X.Y SPZ]
2015/11/04 13:33 update-number R A L O - - - FUJITSU Enterprise Postgres Client
[product-name FUJITSU Enterprise Postgres Client X.Y SPZ]
2015/11/04 13:32 update-number R A L O - - - FUJITSU Enterprise Postgres Client
```

## 2. Remove the updates

Execute the command below to remove the updates. If an update with the same update number was applied more than once, the updates are removed in order, starting from the highest version number.

Example

```
# /opt/FJSVfupde/bin/uam remove -i update-number
2015/11/04 13:32 update-number R A L O - - - FUJITSU Enterprise Postgres SE(FSEPDB)
Are you sure you want to restore the updated product to its pre-update state? (Y/N)y
Restoration to the pre-update state is completed.
The update application management ledger has been updated.
```

## Determine the preferred WebAdmin configuration

Starting with FUJITSU Enterprise Postgres 9.5, WebAdmin can be installed in two configurations:

- Single-server
- Multiserver

Refer to "[Appendix K Determining the Preferred WebAdmin Configuration](#)" for details.

## 3.2 Installation in Interactive Mode

---

Install according to the following procedure:



The following characters can be used as input values:

Alphanumeric characters, hyphens and forward slashes

### 1. Stop applications and the client program

If the installation method is one of the following, the applications and the program must be stopped:

- Reinstallation

Before starting the installation, stop the following:

- Applications that use the product
- Instance

Using WebAdmin 9.4

In the [Monitor] menu window, click [Stop].

Using WebAdmin 9.5

In the [Instances] tab, select the instance to stop and click .

## Using server commands

Execute the `pg_ctl` command with the stop mode option specified.

### Example

```
$ /opt/fsepv<xy>server64/bin/pg_ctl stop -D /database/inst1
```

## - Web server feature of WebAdmin

Execute the `WebAdminStop` command to stop the Web server feature of WebAdmin.

### Example

```
# cd /opt/fsepv<xy>server64/gui/sbin  
# ./WebAdminStop
```

In the example above, `/opt/fsepv<xy>server64` is the installation directory.

## - Mirroring Controller

Execute the `mc_ctl` command with the stop mode option specified and stop the Mirroring Controller.

### Example

```
$ mc_ctl stop -M /mdir/inst1
```

## 2. Change to the superuser

Run the following command to switch to the superuser on the system.

```
$ su -  
Password:*****
```

## 3. Mount the DVD drive

Insert the server program DVD in the DVD drive, and run the command given below.

### Example

```
# mount -t iso9660 -r -o loop /dev/dvd /media/dvd
```

`/dev/dvd` is the DVD drive device, and `/media/dvd` is the mount point (which must already exist before calling the command).



If the DVD was mounted automatically using the automatic mount daemon (autofs), "noexec" is set as the mount option, so the installer may fail to start. In this case, use the mount command to remount the DVD correctly, and then run the installation. Note that the mount options of a mounted DVD can be checked by executing the mount command without any arguments.

## 4. Run the installation

Execute the following command:

### Example

```
# cd /media/dvd  
# ./install.sh
```

In the example above, `/media/dvd` is the DVD mount point.

## 5. Select the product for installation

The list of installation target products is displayed as shown below.

Type the number for the product to be installed, or "all", and press Enter.

Note that "x.y SPz" in sample windows indicates the version level of products to install.

```
The following products can be installed:
1: FUJITSU Enterprise Postgres Standard Edition (64bit) X.Y SPZ
2: FUJITSU Enterprise Postgres Client (32bit) X.Y SPZ
3: FUJITSU Enterprise Postgres Client (64bit) X.Y SPZ
4: FUJITSU Enterprise Postgres WebAdmin X.Y SPZ

Select the product to be installed.
To select multiple products, separate using commas (,). (Example: 1,2)
[number,q](The default value is 1,2,3): 1,2,3

Selected product
FUJITSU Enterprise Postgres Standard Edition (64bit) X.Y SPZ
FUJITSU Enterprise Postgres Client (32bit) X.Y SPZ
FUJITSU Enterprise Postgres Client (64bit) X.Y SPZ

Do you want to install the above product?
y: Proceed to the next step
n: Select the product again
q: Quit without installing
[y,n,q](The default value is y): y
```

## Information

- To develop or execute a 32-bit application in a 64-bit environment, FUJITSU Enterprise Postgres Client (32bit) is required.
- Options 1 and 4 cannot be selected together. Option 4 is used to install WebAdmin in a multiserver configuration. Refer to "[Appendix K Determining the Preferred WebAdmin Configuration](#)" for details.
- The window below is displayed for each product that that was selected but has already been installed.

To perform a reinstallation, type the number for the product and press Enter.

```
Select the method to install client product (32bit).
If performing a reinstallation, select the number of the product to be reinstalled.

1: FUJITSU Enterprise Postgres Client (32bit) X.Y SPZ (*1)
q: Quit without installing
[number,q]:
```

\*1: Output if the installed product can undergo installation or reinstallation.

To perform a multi-version installation, type "m" and press Enter.

```
An older version of the same product is already installed.
Select m for multi-version installation.

m: Multi-version installation (*1)
q: Quit without installing
[m,q]:
```

\*1: Output if the installed product can undergo multi-version installation.

## 6. Check the settings

The window for checking the installation information is displayed as shown below.

If there is no problem with the settings, type "y" and press Enter to start the installation (refer to "[10. Display the installation status](#)").

To change the settings, type "c" and press Enter.

```
Product to be installed
FUJITSU Enterprise Postgres Standard Edition (64bit) X.Y SPZ
New installation
```

```
FUJITSU Enterprise Postgres Client (32bit) X.Y SPZ
New installation
FUJITSU Enterprise Postgres Client (64bit) X.Y SPZ
New installation
```

#### Installation directory information

```
FUJITSU Enterprise Postgres Standard Edition (64bit) X.Y SPZ
/opt/fsepv<XY>server64
FUJITSU Enterprise Postgres Client (32bit) X.Y SPZ
/opt/fsepv<XY>client32
FUJITSU Enterprise Postgres Client (64bit) X.Y SPZ
/opt/fsepv<XY>client64
```

#### Setup information

```
WebAdmin setup: Execute
Web server port number: 27515
WebAdmin internal port number: 27516
```

Start installation using the above information?

```
y: Start the installation
c: Change the information          (*1)
q: Quit without installing
[y,c,q](The default value is y): c          (*1)
```

\*1: This option is not displayed if there is no information that can be modified.

If the user types "c", then the window mentioned in the next step is displayed.

## 7. Enter the installation directory

If the installation method is one of the following, the window below is displayed for each product:

- New installation
- Multi-version installation

Enter the directory and press Enter.

```
FUJITSU Enterprise Postgres Standard Edition (64bit) X.Y SPZ : Specify the installation directory.
[directory name,q](The default value is /opt/fsepv<XY>server64): /opt/fsepsv64
```

## 8. Enter the WebAdmin setup information

If a server product or WebAdmin was selected, and the installation method is one of the following, the window below will be displayed:

- New installation
- Multi-version installation

Type the item name and press Enter.

```
Do you want to execute WebAdmin setup?
y: Execute
n: Do not execute
[y,n,q](The default value is y):

Specify the Web server port number.
Web server port number [1024-32767,q](The default value is 27515):

Specify the WebAdmin internal port number.
WebAdmin internal port number [1024-32767,q](The default value is 27516):
```

If you have not set up WebAdmin, refer to "[Appendix C Setting Up and Removing WebAdmin](#)" for details.

## 9. Check the changed settings

The changed settings are displayed as shown below.

If there is no problem with the settings, type "y" and press Enter.

To change the settings again, type "c" and press Enter.

```
Product to be installed
FUJITSU Enterprise Postgres Standard Edition (64bit) X.Y SPZ
  New installation
FUJITSU Enterprise Postgres Client (32bit) X.Y SPZ
  New installation
FUJITSU Enterprise Postgres Client (64bit) X.Y SPZ
  New installation

Installation directory information
FUJITSU Enterprise Postgres Standard Edition (64bit) X.Y SPZ
  /opt/fsepsv64
FUJITSU Enterprise Postgres Client (32bit) X.Y SPZ
  /opt/fsepcl32
FUJITSU Enterprise Postgres Client (64bit) X.Y SPZ
  /opt/fsepcl64

Setup information
WebAdmin setup: Execute
Web server port number: 27515
WebAdmin internal port number: 27516

Start installation using the above information?
y: Start the installation
c: Change the information
q: Quit without installing
[y,c,q](The default value is y): y
```

## 10. Display the installation status

The installation status is displayed as follows:

```
Starting installation.

FUJITSU Enterprise Postgres Standard Edition (64bit) X.Y SPZ Installation

Installation is complete.

FUJITSU Enterprise Postgres Client (32bit) X.Y SPZ Installation

Installation is complete.

FUJITSU Enterprise Postgres Client (64bit) X.Y SPZ Installation

Installation is complete.

Starting setup.          (*1)

Sets up WebAdmin.      (*1)

Setup is complete.     (*1)
```

\*1: Displayed only when "Execute" is selected for WebAdmin setup.

Even if WebAdmin setup fails, the process will still continue.

If the following message is displayed, manually execute WebAdmin setup after installation is completed.

Refer to "[C.1 Setting Up WebAdmin](#)" for information on the WebAdmin setup procedure.

```
Starting setup.  
  
Setting up WebAdmin.  
  
ERROR: WebAdmin setup failed.
```

## 11. Finish the installation

Upon completion, a message is displayed showing the status.  
If installation was successful, a message like the one shown below is displayed:

```
Installed successfully.
```



If an error occurs during the installation, read the error message and remove the cause of the error, and then reexecute the `install.sh` command.

## 3.3 Installation in Silent Mode

Installation in silent mode can be performed only when the installation method is one of the following:

- New installation
- Multi-version installation

The installation procedure is described below.

### 1. Change to the superuser

Run the following command to switch to the superuser on the system.

```
$ su -  
Password:*****
```

### 2. Mount the DVD drive

Insert the server program DVD in the DVD drive, and run the command given below.

Example

```
# mount -t iso9660 -r -o loop /dev/dvd /media/dvd
```

`/dev/dvd` is the DVD drive device, and `/media/dvd` is the mount point (which must already exist before calling the command).



If the DVD was mounted automatically using the automatic mount daemon (`autofs`), `"noexec"` is set as the mount option, so the installer may fail to start. In this case, use the `mount` command to remount the DVD correctly, and then run the installation. Note that the mount options of a mounted DVD can be checked by executing the `mount` command without any arguments.

### 3. Create an installation parameters CSV file

Consider the features that will be required for system operations, and then create an installation parameters CSV file that uses the following specification format.

```
sectionName, parameterName, value  
sectionName, parameterName, value  
:
```

Refer to "[Appendix A Installation in Silent Mode](#)" for information on installation parameters CSV files.

### Information

The template for the installation parameters CSV file is "mountpoint/sample/sample.csv".

## 4. Run the installation

Execute the following command:

Example

```
# cd /media/dvd
# ./silent.sh /home/work/inspara.csv
```

In the example above, /media/dvd is the DVD mount point, and /home/work/inspara.csv is the installation parameter CSV.

If the installer ends in an error, a message is output to the log file and return values are returned. Refer to "[Appendix A Installation in Silent Mode](#)" for details.

## 3.4 Post-installation Tasks

---

There are no post-installation tasks.

# Chapter 4 Setup

This chapter describes the setup procedures to be performed after installation completes.

## 4.1 Operating Method Types and Selection

This section describes how to operate FUJITSU Enterprise Postgres.

There are two methods of managing FUJITSU Enterprise Postgres operations - select one that suits your purposes:

The Operation Guide describes the operating method using WebAdmin, and the equivalent operating method using the server commands.

### Simple operation management using a web-based GUI tool (WebAdmin)

Suitable when using frequently used basic settings and operations for operation management.

This method allows you to perform simple daily tasks such as starting the system before beginning business, and stopping the system when business is over, using an intuitive operation.

#### Usage method

Usage is started by using WebAdmin to create the instance.

By using an external scheduler and the `pgx_dmpall` command, periodic backups can be performed, which can then be used in recovery using WebAdmin.



- Do not use a server command other than `pgx_dmpall` or a server application. Operation modes that use server commands and server applications cannot be used in conjunction with WebAdmin. If used, WebAdmin will not be able to manage the instances correctly.  
Refer to Reference and the PostgreSQL Documentation for information on server commands and server applications.
- An instance that was created using WebAdmin can be set up to operate database multiplexing, however once the setup is complete, it will no longer be possible to select that instance from the WebAdmin management window. Refer to the Cluster Operation Guide for information on how to perform database multiplexing operations.

### Advanced operation management using server commands

When operating in a system that is automated by operation management middleware (Systemwalker Centric Manager, for example), this method allows you to use more detailed settings and operations and perform higher level operation management.

An overview of the operating method using the GUI, and its relationship with the operating method using the server commands, are shown below.

Refer to the Operation Guide for details.

| Operation |                                  | Operation with the GUI  | Operation with commands  |
|-----------|----------------------------------|---|--|
| Setup     | Creating an instance             | WebAdmin is used.<br>The server machine capacity, and the optimum parameter for operations using WebAdmin, are set automatically. | The configuration file is edited directly using the <code>initdb</code> command. |
|           | Creating a standby instance      | WebAdmin is used.<br>WebAdmin performs a base backup of the source instance and creates a standby instance.                       | A standby instance is created using the <code>pg_basebackup</code> command.      |
|           | Changing the configuration files | WebAdmin is used.   | The configuration file is edited directly.                                       |

| Operation                           |                   | Operation with the GUI   | Operation with commands  |
|-------------------------------------|-------------------|--|--|
| Activating and stopping an instance |                   | WebAdmin is used.  | The pg_ctl command is used.  |
| Creating a database                 |                   | This is defined using pgAdmin of the GUI tool, or using the psql command or the application after specifying the DDL statement.                  |  |
| Backing up the database             |                   | WebAdmin, or the pgx_dmpall command, is used.  | It is recommended that the pgx_dmpall command be used. Recovery to the latest database can be performed. |
| Database recovery                   |                   | WebAdmin is used.  | To use the backup that was performed using the pgx_dmpall command, the pgx_rcvall command is used.       |
| Monitoring                          | Database errors   | The status in the WebAdmin window can be checked. (*1)   | The messages that are output to the database server log are monitored (*1)                               |
|                                     | Disk space        | The status in the WebAdmin window can be checked. A warning will be displayed if the free space falls below 20%. (*1)                            | This is monitored using the df command of the operating system, for example. (*1)                        |
|                                     | Connection status | This can be checked using pgAdmin of the GUI tool, or referencing pg_stat_activity of the standard statistics view from psql or the application. |  |

\*1: This can be used together with system log monitoring using operations management middleware (Systemwalker Centric Manager, for example).



See

Refer to "Periodic Operations" and "Actions when an Error Occurs" in the Operation Guide for information on monitoring and database recovery.

## 4.2 Preparations for Setup

This section describes the preparation required before setting up FUJITSU Enterprise Postgres.

### 4.2.1 Creating an Instance Administrator

Decide which OS user account will be assigned the instance administrator role. You can assign it to a new user or to an existing one, but you cannot assign it to the OS superuser (root).

The following example shows an OS user account with the name "fsepuser" being assigned the instance administrator role.

Example

```
# useradd fsepuser
# passwd fsepuser
```

### 4.2.2 Preparing Directories for Resource Deployment

Prepare the directories required when creating instances.

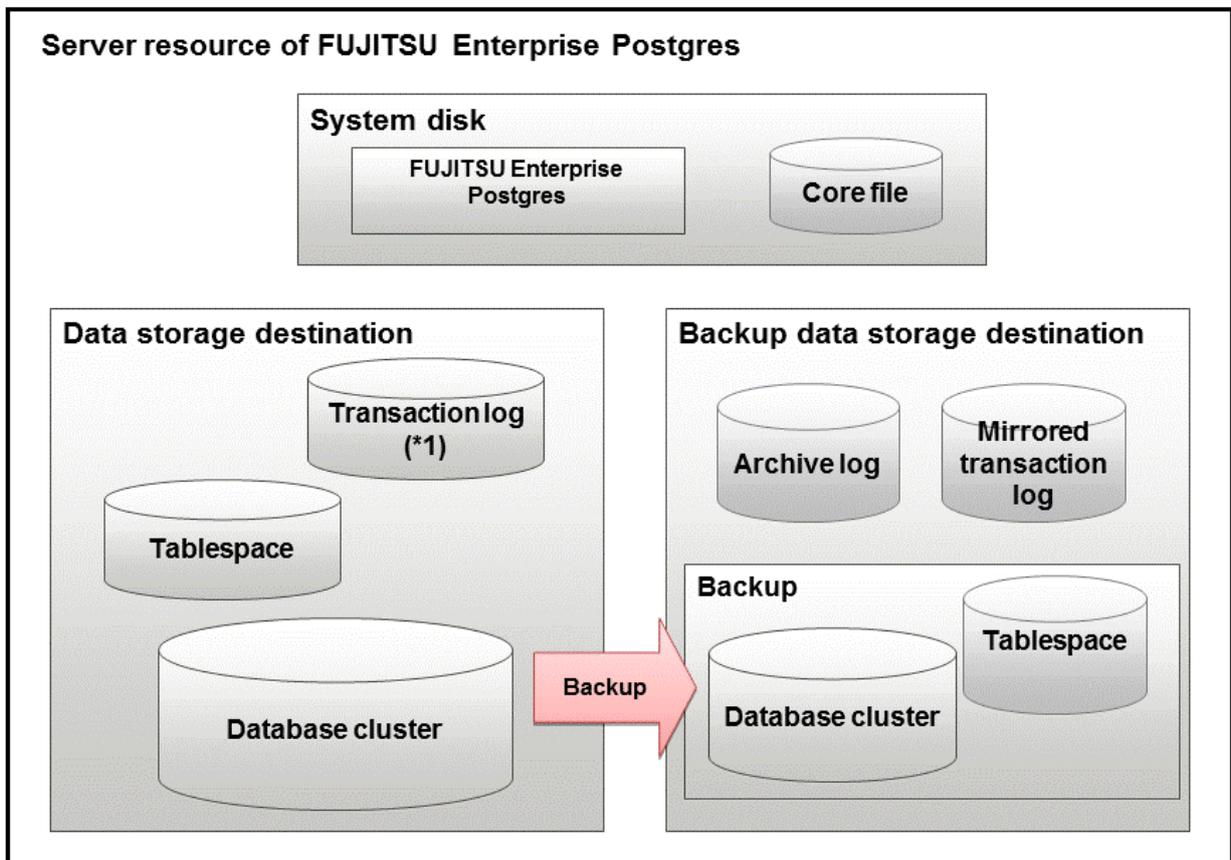
#### Considerations when deploying resources

The disk configuration on the resource deployment destination is important, because it affects not only recovery following disk corruption, but normal operation as well. The points for determining the disk configuration are as follows:

1. If the backup data storage destination and the data storage destination are both lost, it will not be possible to recover the data, so deploy them to separate disks.
2. To shorten the recovery time following a single disk fault, deploy the system disk and data storage destination to separate disks.
3. The backup data storage destination requires at least double the capacity of the data storage destination, so deploy it to the disk with the most space available.
4. When large amounts of data are updated, the write-to load for the data storage destination, transaction log storage destination, and backup data storage destination (mirrored transaction log) will also be great. For this reason, deploy them to separate disks, out of consideration for performance.

 **Note**

When using the volume manager provided by the operating system, be aware of which physical disk the file system has been created on, for example, by deploying the data storage destination and the backup data storage destination to separate disks.



\*1: To distribute the I/O load, place the transaction log on a different disk from the data storage destination.

| Resource         | Role   |
|------------------|--|
| Database cluster | The area where the database is stored. It is a collection of databases managed by an instance. |
| Tablespace       | Stores table files and index files in a separate area from the database cluster.               |
| Transaction log  | Stores log information in preparation for a crash recovery or rollback.                        |
| Archive log      | Stores log information for recovery  |

| Resource | Role   |
|----------|--|
| Corefile | FUJITSU Enterprise Postgres process corefile output when an error occurs with a FUJITSU Enterprise Postgres process. |

### Examples of disk deployment

The following are examples of disk deployment:

| Number of disks | Disk                    | Deployment  |
|-----------------|-------------------------|---|
| 3               | System disk             | FUJITSU Enterprise Postgres program                           |
|                 |                         | Corefile  |
|                 | Connected physical disk | Data storage destination, transaction log storage destination |
|                 | Connected physical disk | Backup data storage destination                               |
| 2               | System disk             | FUJITSU Enterprise Postgres program                           |
|                 |                         | Corefile  |
|                 |                         | Data storage destination, transaction log storage destination |
|                 | Connected physical disk | Backup data storage destination                               |

### Proposal for disk deployment using WebAdmin

To generate an instance using WebAdmin, we propose an optimum deployment that takes into account the status of all disks at the time of instance is generation, and item 1 to 3 in the "Considerations when deploying resources" subheading above, based on the criteria below (note that a different deployment can also be specified).

- The mount point does not include national characters
- The instance administrator has the proper permissions to read and write on the mount point

### Preparing directories

The directories to be prepared depend on the way that you create the instances.

The following shows the directories that need to be prepared:

| Directory to be prepared            | Using WebAdmin | Using the initdb command |
|-------------------------------------|----------------|--------------------------|
| Data storage destination            | Y (*1)         | Y                        |
| Backup data storage destination     | Y (*1)         | O                        |
| Transaction log storage destination | O (*1) (*2)    | O                        |
| Corefile output destination         | N (*3)         | O                        |

Y: Required

O: Optional

N: Not required

\*1: WebAdmin automatically creates a directory

\*2: The default is to create in a directory in the data storage destination. When it is necessary to distribute the I/O load for the database data and the transaction log, consider putting the transaction log storage destination on a different disk from the data storage destination

\*3: The default is to output to `/var/tmp/fsepuser_ Version/instanceAdmin_instanceName/core` - to change it, configure the `core_directory` and the `core_contents` parameters in `postgresql.conf` (refer to "Parameters" in the Operation Guide for details)



- The directories must meet the following conditions:
  - The directory owner must be the OS user account that you want to be the instance administrator
  - The directory must have write permission
  - The directory must be empty
- It is not possible to use a directory mounted by NFS (Network File System) when using WebAdmin.

#### Example

The following example shows the OS superuser creating `/database/inst1` as the directory for storing the database data and changing the owner of the directory to the OS user account "fsepuser".

```
# mkdir /database/inst1
# chown fsepuser:fsep /database/inst1
# chmod 700 /database/inst1
```

## 4.2.3 Estimating Resources

Estimate the resources to be used on the FUJITSU Enterprise Postgres.

Refer to "[Appendix G Estimating Database Disk Space Requirements](#)" for information on estimating database disk space requirements.

Refer to "[Parameters automatically set by WebAdmin according to the amount of memory](#)" when creating multiple instances with WebAdmin.

Refer to "[Appendix H Estimating Memory Requirements](#)" when creating instances with the `initdb` command, to estimate memory usage.

## 4.2.4 Configuring Corefile Names

If a process crashes, a corefile for the process will be generated by the operating system. If a corefile is generated with the same name as an existing corefile generated for a different process, the newly-generated corefile will overwrite the previously dumped corefile. To prevent this, configure a unique corefile name for each crash by appending the process ID, program name, and datetime.

Corefile names can be configured using the "kernel.core\_pattern" and "kernel.core\_uses\_pid" kernel parameters.

Refer to the "man page" in "core(5)" for information on how to use these parameters.

Note that with regard to the location for storing corefiles, the operating system settings take precedence over the `core_directory` parameter of `postgres.conf`.

## 4.3 Creating an Instance

There are two methods that can be used to create an instance:

- [4.3.1 Using WebAdmin](#)
- [4.3.2 Using the `initdb` Command](#)

### Creating multiple instances

Multiple instances can be created.

The memory allocated needs to be adjusted when multiple instances are created with WebAdmin (refer to "[Parameters automatically set by WebAdmin according to the amount of memory](#)" for details).

### Features that cannot be set up using WebAdmin

The feature below cannot be set up using WebAdmin. After creating the instance using WebAdmin, perform the additional setup tasks according to the manual for each feature described in the Operation Guide.

- Storage data protection using transparent data encryption

### Note

- Instances created using the `initdb` command cannot be managed using WebAdmin.
- Always use WebAdmin to delete instances that were created using it. Because WebAdmin management information cannot be deleted, WebAdmin will determine that the instance is abnormal.
- Databases with the names 'template0' and 'template1' are automatically created when an instance is created. These databases are used as the templates for databases created later. Furthermore, a default database with the name 'postgres' is automatically created, which will be used with FUJITSU Enterprise Postgres commands. It is important that you do not delete these databases created by default.

## 4.3.1 Using WebAdmin

---

This section describes how to create an instance using WebAdmin.

If WebAdmin is not set up when the installation is performed, or needs to be configured to use an external repository database, refer to "C.1 Setting Up WebAdmin" and then set up WebAdmin.

Use Windows(R) Internet Explorer 8.0, 9.0, 10.0 or 11.0 as the browser, and allow cookies and pop-up requests from the server on which FUJITSU Enterprise Postgres is installed.

Refer to "Appendix B Recommended WebAdmin Environments" for information on how to change the pop-up request settings and other recommended settings.

### Note

- WebAdmin does not run in Windows(R) safe mode.
- If the same instance is operated from multiple WebAdmin windows, it will not work correctly.
- For efficient use of WebAdmin, it is recommended not to use the browser's navigation buttons for [Back], [Forward] and context-sensitive menus.
- WebAdmin uses the labels "Data Storage Path", "Backup Storage Path" and "Transaction Log Path" to indicate "data storage destination", "backup data storage destination" and "transaction log storage destination" respectively. In this manual these terms are used interchangeably.
- If the browser was not operated for a fixed period (about 30 minutes), the session will time out and the login window will be displayed again for the next operation.
- Port access permissions  
If a port is blocked (access permissions have not been granted) by a firewall, enable use of the port by granting access. Refer to the vendor document for information on how to grant port access permissions.  
Consider the security risks carefully when opening ports.

### 4.3.1.1 Logging in to WebAdmin

This section describes how to log in to WebAdmin.

#### Activation URL for WebAdmin

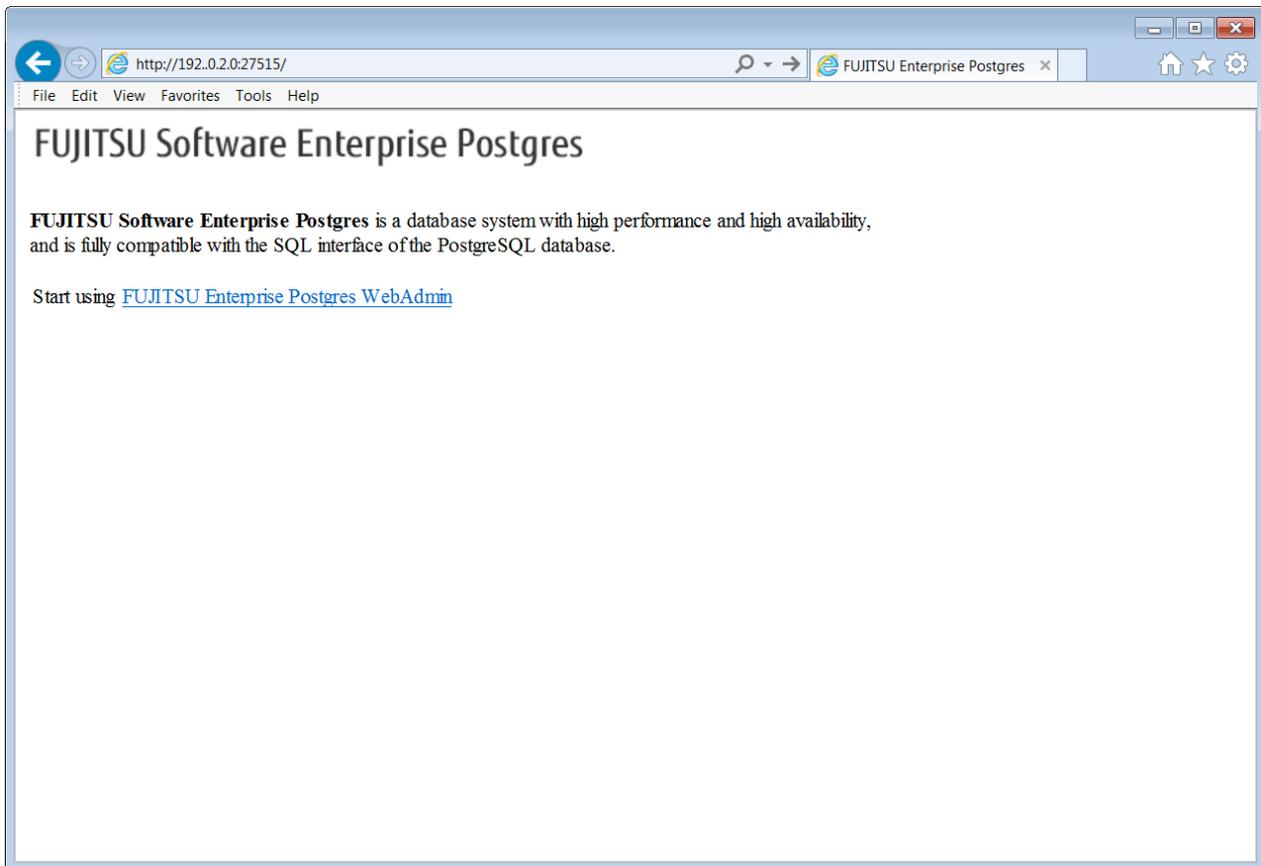
In the browser address bar, type the activation URL of the WebAdmin window in the following format:

```
http://hostNameOrIpAddress:portNumber/
```

- *hostNameOrIpAddress*: Host name or IP address of the server where FUJITSU Enterprise Postgres is installed.

- *portNumber*: Port number of WebAdmin. The default port number is 27515.

The activation URL window shown below is displayed.



### Logging in to the database server

Click [FUJITSU Enterprise Postgres WebAdmin] in the activation URL window to activate WebAdmin and display the [Log in] window. Enter the instance administrator user ID (operating system user account name) and password, and log in to WebAdmin.



|         |          |
|---------|----------|
| User ID | Password |
|---------|----------|

Login

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### 4.3.1.2 Creating an Instance

This section describes how to create an instance.

#### Information

WebAdmin calculates values using the formula indicated in "Managing Kernel Resources" under "Server Administration" in the PostgreSQL Documentation, and configures these in the kernel parameters. Refer to "[Appendix J Configuring Kernel Parameters](#)" for information on configuring parameter names.

Refer to "[Appendix D Configuring Parameters](#)" for information on the postgresql.conf values required to derive the set values.

1. Activate WebAdmin, and log in to the database server.
2. In the [Instances] tab, click .

3. Enter the information for the instance to be created.

Enter the following items:

- [Configuration type]: Whether to create a standalone instance or an instance which is part of a cluster
- [Location]: Whether to create the instance in the server that the current user is logged into, or in a remote server. The default is "Local", which will create the instance in the server machine where WebAdmin is currently running.
- [Instance name]: Name of the database instance to manage  
The name must meet the conditions below:
  - Maximum of 16 characters
  - The first character must be an ASCII alphabetic character
  - The other characters must be ASCII alphanumeric characters
- [Instance port]: Port number of the database server
- [Data storage path]: Directory where the database data will be stored
- [Backup storage path]: Directory where the database backup will be stored
- [Transaction log path]: Directory where the transaction log will be stored
- [Encoding]: Database encoding system

If "Remote" is selected for [Location], the following additional items must be entered:

- [Host name]: Name of the host where the instance is to be created
- [Operating system credential]: Operating system user name and password for the remote machine where the instance is to be created
- [Remote WebAdmin port for standalone]: Port in which WebAdmin is accessible in the remote machine

 **Note**

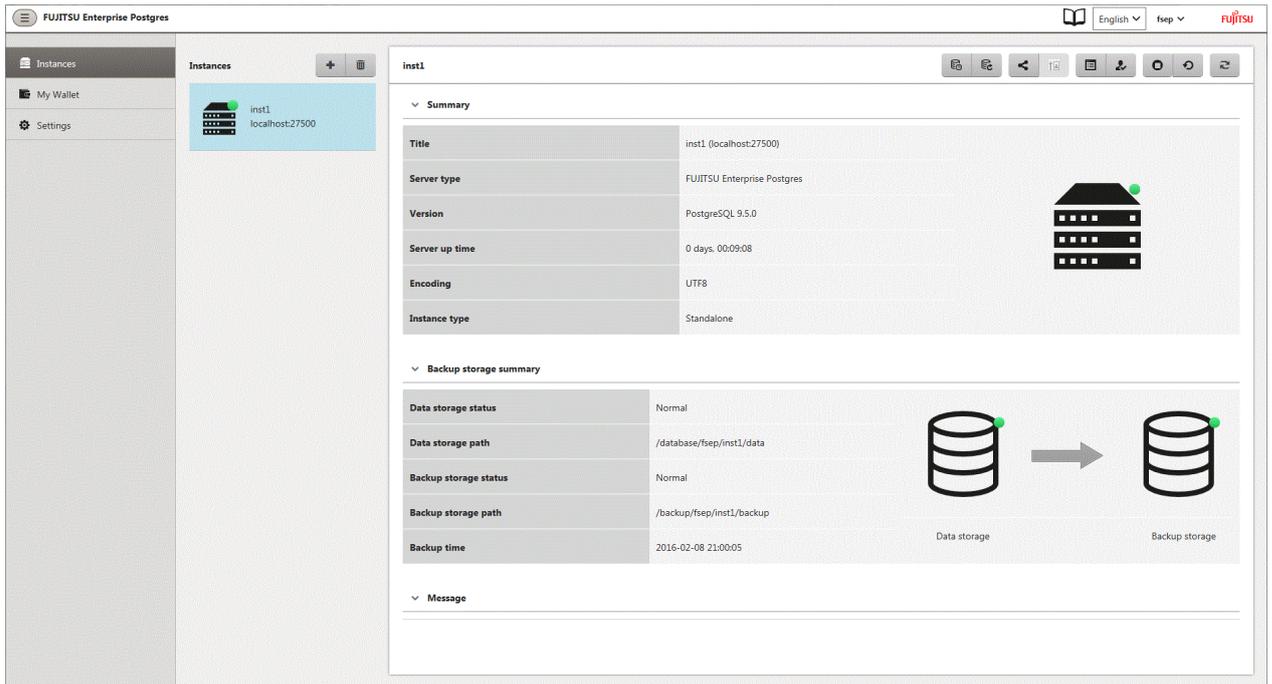
- Refer to "[4.2.2 Preparing Directories for Resource Deployment](#)" - "Considerations when deploying resources" for information on points to consider when determining the data storage path, backup storage path, and transaction log path.

- Only the port number can be modified after the instance has been created.
- Do not specify directories that include symbolic link or multibyte characters when specifying the data storage destination or backup data storage destination.
- In the instance that is created using WebAdmin, the locale of the character set to be used in the database, and the locale of the collating sequence, are fixed using C.

4. Click  to create the instance.

If the instance is created successfully, a message indicating the same will be displayed.

5. The instance will be started when it is created successfully.



6. Back up the basic information that was set

Back up the WebAdmin management information periodically to ensure operational continuity when a fault occurs on the system disk. Follow the procedure below to perform the backup.

- Stop the WebAdmin server. Refer to "[C.1.3 Stopping the Web Server Feature of WebAdmin](#)" for details.
- Back up the following directory:

```
install/Dir/gui/data/fepwa
```

### 4.3.1.3 Changing the Settings

You can change the following information that is set when instances are created.

You can change the character set and maximum number of connections, for example, to suit the operating and management environment for FUJITSU Enterprise Postgres.

- [Character set](#)
- [Client authentication](#)
- [Communication](#)
- [SQL options](#)
- [Used memory](#)
- [Streaming replication](#)

## Information

These settings are the same as the parameters that can be set in the files shown below. Refer to "[Appendix D Configuring Parameters](#)" for information on the equivalence relationship between the item name and the parameter.

- postgresql.conf
- pg\_hba.conf

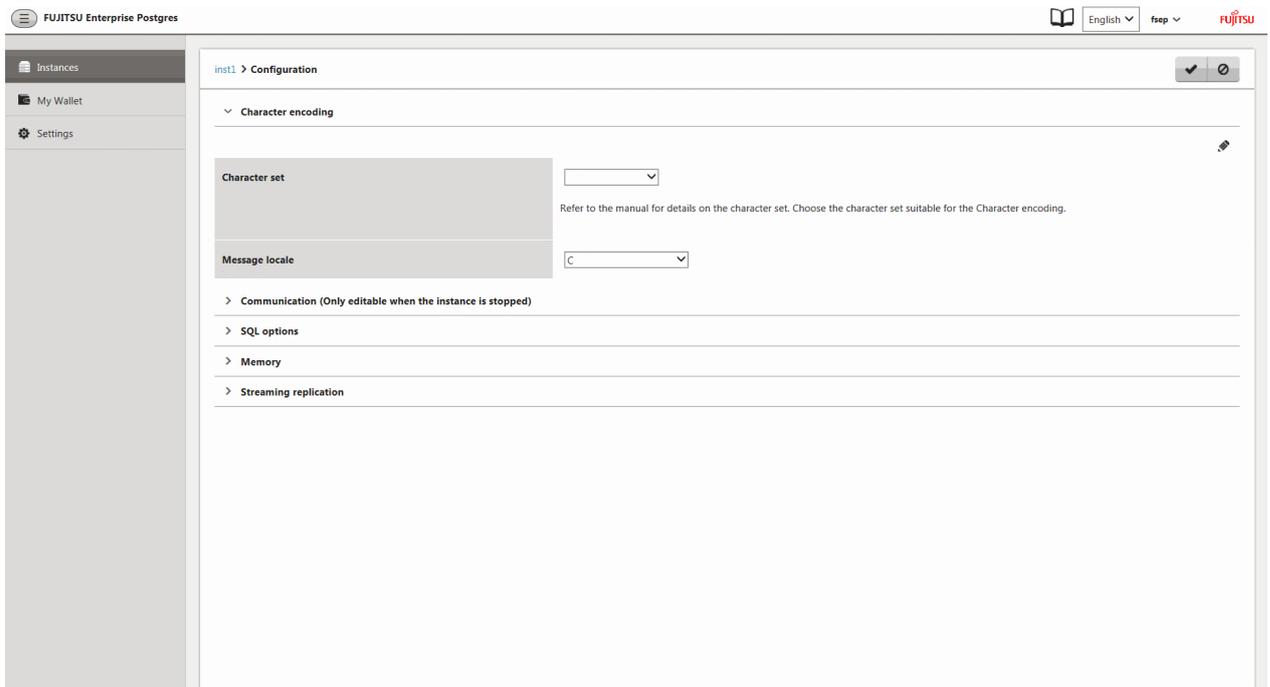
## Note

The files shown below can also be modified directly, however if a parameter not described in "[Appendix D Configuring Parameters](#)" was edited by mistake, WebAdmin may not run correctly.

- postgresql.conf
- pg\_hba.conf

## Changing the instance configuration

1. Start WebAdmin and log in to the database server.
2. In the [Instances] tab, click .
3. Click  on the section that needs to be modified. In the example below, the [Character encoding] section is being modified.
4. Edit [Character set] and [Message locale], and then click .



## See

Select a client-side encoding system that can be converted to/from the database encoding system. Refer to "PostgreSQL Documentation" - "Server Administration" - "Automatic Character Set Conversion Between Server and Client" for information on the encoding system combinations that can be converted.

## Changing client authentication

1. Start WebAdmin and log in to the database server.
2. In the [Instances] tab, click .

Click  to register new authentication information.

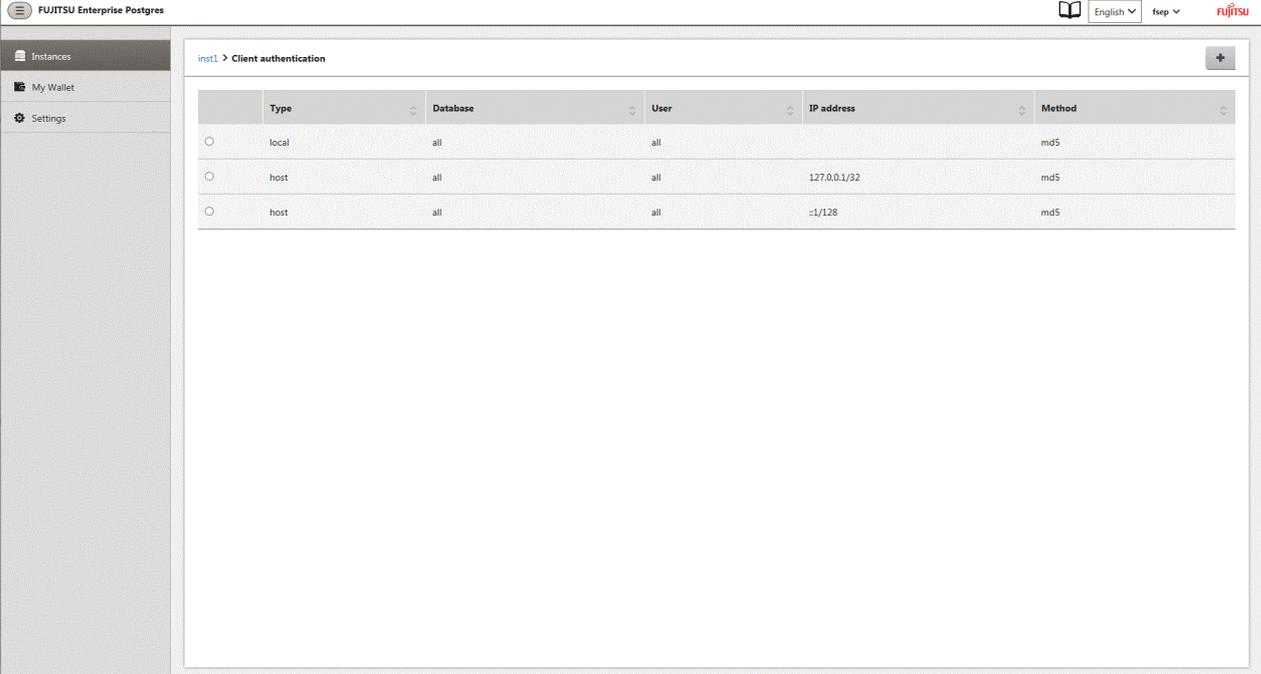
To change authentication information, select the information, and then click .

To delete authentication information, select the information, and then click .

## Note

When creating the instance, do not delete the entry below, because it is a connection required for WebAdmin to monitor the operational status of the database:

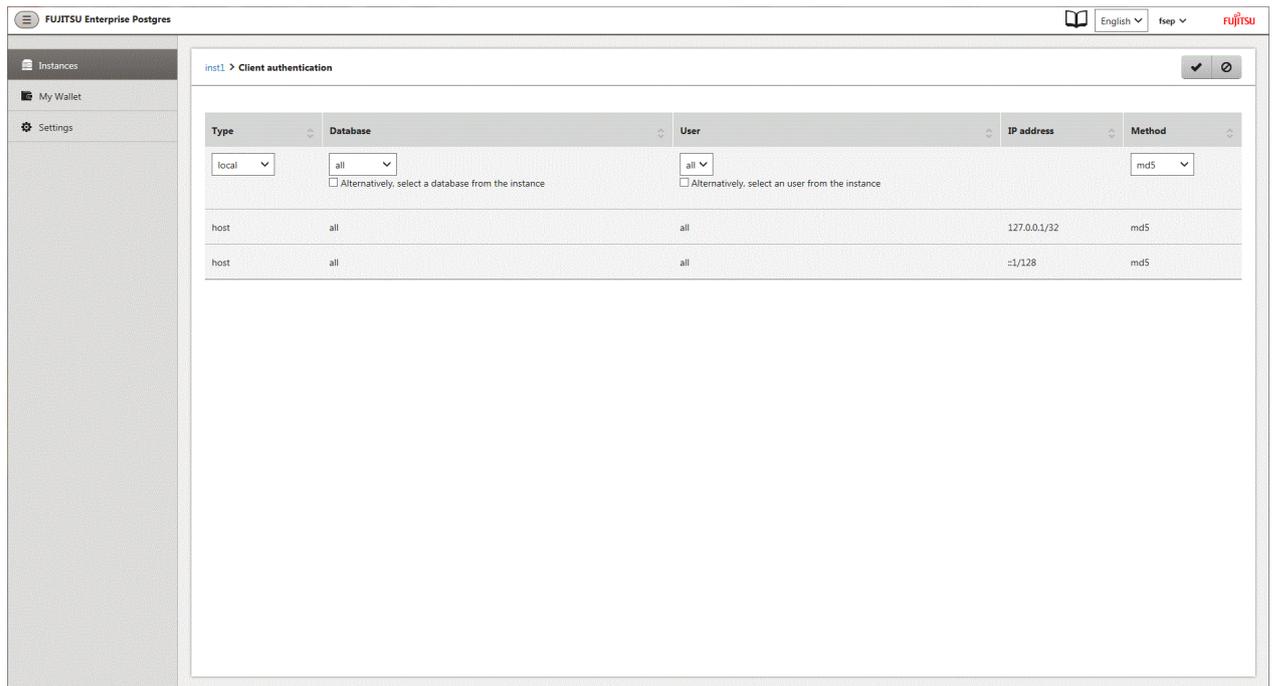
Type=local, Database=all, User=all, and Method=md5



The screenshot shows the 'FUJITSU Enterprise Postgres' WebAdmin interface. The left sidebar contains 'Instances', 'My Wallet', and 'Settings'. The main content area is titled 'inst1 > Client authentication' and features a table with the following data:

|                       | Type  | Database | User | IP address   | Method |
|-----------------------|-------|----------|------|--------------|--------|
| <input type="radio"/> | local | all      | all  |              | md5    |
| <input type="radio"/> | host  | all      | all  | 127.0.0.1/32 | md5    |
| <input type="radio"/> | host  | all      | all  | :::1/128     | md5    |

Click  - the window will change as shown below.



## 4.3.2 Using the initdb Command

This section describes the procedure to create an instance using the initdb command.

### Note

If a port is blocked (access permissions have not been granted) by a firewall, enable use of the port by granting access. Refer to the vendor document for information on how to grant port access permissions. Consider the security risks carefully when opening ports.

### 4.3.2.1 Editing Kernel Parameters

Refer to "[Appendix J Configuring Kernel Parameters](#)" prior to editing these settings.

After the settings are complete, check the command specifications of the relevant operating system and restart the system if required.

### 4.3.2.2 Creating an Instance

Create an instance, with the database cluster storage destination specified in the PGDATA environment variable or in the -D option. Furthermore, the user that executed the initdb command becomes the instance administrator.

### Note

- Instances created using the initdb command cannot be managed using WebAdmin.
- If creating multiple instances, ensure that there is no duplication of port numbers or the directories that store database clusters.



See

Refer to "initdb" in "Reference" in the PostgreSQL Documentation for information on the initdb command.

The procedure to create an instance is described below.

1. Use the OS user account that you want as the instance administrator.

Connect with the server using the OS user account that you want as the instance administrator.

You cannot use the OS superuser (root).

The following example shows the OS superuser connected to the server being changed to the OS user account "fsepuser".

Example

```
# su fsepuser
```

2. Configure the environment variables

Configure the environment variables in the server with the newly created instance.

Set the following environment variables:

- PATH environment variables

Add the installation directory "/bin".

- MANPATH environment variables

Add the installation directory "/share/man".

- LD\_LIBRARY\_PATH environment variables

Add the installation directory "/lib".

Example

The following example configures environment variables when the installation directory is "/opt/fsepv<xy>server64".

Note that "<xy>" indicates the product version and level.

sh, bash

```
$ PATH=/opt/fsepv<xy>server64/bin:$PATH ; export PATH
$ MANPATH=/opt/fsepv<xy>server64/share/man:$MANPATH ; export MANPATH
$ LD_LIBRARY_PATH=/opt/fsepv<xy>server64/lib:$LD_LIBRARY_PATH ; export LD_LIBRARY_PATH
```

csh, tcsh

```
$ setenv PATH /opt/fsepv<xy>server64/bin:$PATH
$ setenv MANPATH /opt/fsepv<xy>server64/share/man:$MANPATH
$ setenv LD_LIBRARY_PATH /opt/fsepv<xy>server64/lib:$LD_LIBRARY_PATH
```

3. Create a database cluster

Create the database cluster with the initdb command, specifying the storage destination directory.

Specify the transaction log storage destination and the locale setting option as required.

Example

```
$ initdb -D /database/inst1 --xlogdir=/transaction/inst1 --lc-collate="C" --lc-ctype="C" --
encoding=UTF8
```

## Point

In some features, instance names are requested, and those names are required to uniquely identify the instance within the system. These features allow names that conform to WebAdmin naming conventions, so refer to the following points when determining the names:

- Maximum of 16 characters
- The first character must be ASCII alphabetic character
- The other characters must be ASCII alphanumeric characters

## Note

- To balance I/O load, consider deploying the transaction log storage destination to a disk device other than the database cluster storage destination and the backup data storage destination.
- Specify "C" or "POSIX" for collation and character category. Performance deteriorates if you specify a value other than "C" or "POSIX", although the behavior will follow the rules for particular languages, countries and regions. Furthermore, this may need to be revised when running applications on systems with different locales.  
For example, specify as follows:

```
initdb --locale="C" --lc-messages="C"  
initdb --lc-collate="C" --lc-ctype="C"
```

- Specify the same string in the LANG environment variable of the terminal that starts FUJITSU Enterprise Postgres as was specified in lc-messages of initdb (lc\_messages of postgresql.conf). If the same string is not specified, messages displayed on the terminal that was started, as well as messages output to the log file specified in the -l option of the pg\_ctl command or the postgres command used for startup, may not be output correctly.
- Specify an encoding system other than SQL\_ASCII for the database. If SQL\_ASCII is used, there is no guarantee that the encryption system for data in the database will be consistent, depending on the application used to insert the data.

## See

Refer to "Locale Support" in "Localization" in "Server Administration" in the PostgreSQL Documentation for information on locales.

### 4. Set port number.

Specify a port number in the port parameter of postgresql.conf. Ensure that the specified port number is not already used for other software. If a port number is not specified, "27500" is selected.

Register the specified port numbers in the /etc/services file if WebAdmin is used to create other instances. WebAdmin uses the /etc/services file to check if port numbers specified as available candidates have been duplicated.

Register any name as the service name.

### 5. Set the corefile output destination.

Specify the output destination of the corefile, which can later be used to collect information for investigation, by setting the core\_directory and core\_contents parameters of postgresql.conf.

## See

Refer to "Parameters" in the Operation Guide for information on the settings for these parameters.

### 6. Set the backup storage destination.

Specify the backup data storage destination and other backup settings when backup is to be performed as a provision against database errors.



See

Refer to "Backup Methods" in the Operation Guide for information on specifying backup settings.

#### 7. Start an instance.

Start with the start mode of the pg\_ctl command.

It is recommended to specify the -w option, which causes the command to return after waiting for the instance to start. If the -w option is not specified, it may not be possible to determine if the starting of the instance completed successfully or if it failed.

If either of the following conditions are met, the message "FATAL:the database system is starting up(11189)" may be output.

- An application, command, or process connects to the database while the instance is starting
- An instance was started with the -w option specified

This message is output by the pg\_ctl command to check if the instance has started successfully.

Therefore, ignore this message if there are no other applications, commands, or processes that connect to the database.

Example

```
$ pg_ctl start -w -D /database/inst1
```



See

Refer to "pg\_ctl" in "Reference" in the PostgreSQL Documentation for information on the pg\_ctl command.

## 4.4 Configuring Remote Connections

This section describes the settings required when connecting remotely to FUJITSU Enterprise Postgres from a database application or a client command.

### 4.4.1 When an Instance was Created with WebAdmin

#### Settings related to connection

The default is to accept connections from remote computers to the database.

Change "listen\_addresses" in postgresql.conf to change this.

Refer to "[Appendix D Configuring Parameters](#)" for more information on postgresql.conf.

#### Client Authentication Information settings

The following content is set by default when WebAdmin is used to create an instance.

- Authentication of remote connections from local machines is performed.
- Only the instance administrator can perform connections in a UNIX domain socket.

When changing Client Authentication Information, select [Client Authentication] from [Setting], and then change the settings.

### 4.4.2 When an Instance was Created with the initdb Command

#### Connection settings

The default setting only permits local connections from the client to the database. Remote connections are not accepted.

Change "listen\_addresses" in postgresql.conf to perform remote connection.

All remote connections will be allowed when changed as shown below.

## Example

```
listen_addresses = '*'
```

Also, configure the parameters shown below in accordance with the applications and number of client command connections.

| Parameter name                 | Parameter description  |
|--------------------------------|--|
| superuser_reserved_connections | Number of connections reserved for database maintenance, for example backup or index rebuilding. If you need to simultaneously perform a large number of processes that exceed the default value, change this value accordingly. |
| max_connections                | Set the value as:<br><i>numberOfSimultaneousConnectionsToInstance</i> +<br>superuser_reserved_connections  |

## Client authentication information settings

When trying to connect from a client to a database, settings are required to determine whether the instance permits connections from the client - if it does, then it is possible to make settings to determine if authentication is required.



See

Refer to "The pg\_hba.conf File" in "Server Administration" in the PostgreSQL Documentation for details.

## 4.5 Other Settings

This section describes settings that are useful for operations.

### 4.5.1 Error Log Settings

This section explains the settings necessary to monitor errors in applications and operations, and to make discovering the causes easier.

Make error log settings only when instances are created with the initdb command.

When creating instances with WebAdmin, these settings are already made and hence do not need to be set.

Furthermore, some parameters are used by WebAdmin, and if changed, may cause WebAdmin to no longer work properly. Refer to "[Appendix D Configuring Parameters](#)" for details.



Note

Set the output destination for the system log to the server log so that it cannot be viewed by administrators of other instances.

Application errors are output to the system log or server log. The output destination directory for the system log and server log should have access permissions set so that they cannot be viewed by people other than the instance administrator.

Edit the following parameters in postgresql.conf:

| Parameter name    | Parameter description  | How to enable the settings        |
|-------------------|--|-----------------------------------|
| syslog_ident      | Used to specify labels to attach to messages, so that these can be identified when output to the system log if more than one FUJITSU Enterprise Postgres is used.                      | reload option of the pg_ctl mode  |
| logging_collector | Specify "on" to ensure that messages are output by FUJITSU Enterprise Postgres to the server log file. The server log file is created in the pg_log directory in the database cluster. | restart option of the pg_ctl mode |

| Parameter name  | Parameter description   | How to enable the settings       |
|-----------------|---|----------------------------------|
| log_destination | Specify "stderr,syslog" to output messages from FUJITSU Enterprise Postgres to the screen and either the system log or the event log.   | reload option of the pg_ctl mode |
| log_line_prefix | Specify information to be added at the start of messages output by an instance. This information is useful for automatic monitoring of messages.<br><br>You can output the SQLSTATE value, output time, executing host, application name, and user ID.<br><br>Refer to "What To Log" in the PostgreSQL Documentation for details.<br><br>Example: log_line_prefix = '%e: %t [%p]: [%l-1] user = %u,db = %d,remote = %r app = %a ' | reload option of the pg_ctl mode |

### Point

- If you want fewer application errors being output to the system log, refer to "When To Log" and "What To Log" in the PostgreSQL Documentation for information on how to reduce the output messages.
- If you want to separate errors output from other software, refer to "Where To Log" in the PostgreSQL Documentation to change the output destination to the server log file rather than the system log.

## 4.5.2 Configuring Automatic Start and Stop of an Instance

You can automatically start or stop an instance when the operating system on the database server is started or stopped.

Use the following procedure to configure automatic start and stop of an instance.

Note that, if an instance is activated in a failover operation, the cluster system will control the start or stop, therefore this feature should not be used. Also, when performing database multiplexing, refer to "Enabling Automatic Start and Stop of Mirroring Controller and Multiplexed Instances" in the Cluster Operation Guide.

Note that "<xy>" in paths indicates the product version and level.

If using an rc script

1. Set the OS user account of the instance administrator

If you logged in using the OS user account of the instance administrator, set the environment variables required for starting the instance.

2. Copy the shell script and set access permissions

Copy the sample shell script (stored in the location shown below) to /etc/rc.d/init.d, then set and register the access rights. After that, revise the shell script according to the target instance.

```
fujitsuEnterprisePostgresInstallDir/share/rc_fsepsvoi.sample
```

The content to be revised is as follows:

- In the "SYMDATA" variable, set the data storage destination.
- In the "SYMUSER" variable, set the OS user account of the instance administrator mentioned in step 1.
- Ensure that the file name in "/var/lock/subsys" of the "LOCKFILE" variable is the same as the shell script name.

Example

In the following example, the installation directory is "/opt/fsepv<xy>server64", and the shell script has been created as "rc\_fsepsvoi\_inst1".

```
# cp /opt/fsepv<xy>server64/share/rc_fsepsvoi.sample /etc/rc.d/init.d/rc_fsepsvoi_inst1
# chmod 755 /etc/rc.d/init.d/rc_fsepsvoi_inst1
```

### 3. Register and enable automatic start and stop

As the OS superuser, execute the chkconfig command to register and enable the script.

Execute "chkconfig --add" to register the script, and execute "chkconfig --level" to set the run level and enable the script.

#### Example

```
# chkconfig --add rc_fsepsvoi_inst1
# chkconfig --level 35 rc_fsepsvoi_inst1 on
```

### If using systemd

#### 1. Create a unit file

Copy the unit file sample stored in the directory below, and revise it to match the target instance.

*fujitsuEnterprisePostgresInstallDir/share/fsepsvoi.service.sample*

#### Example

In the following example, the installation directory is "/opt/fsepv<xy>server64", and the instance name is "inst1".

```
# cp /opt/fsepv<xy>server64/share/fsepsvoi.service.sample /usr/lib/systemd/system/
fsepsvoi_inst1.service
```

Revise the underlined portions of the options below in the unit file.

| Section | Option      | Specified value   | Description  |
|---------|-------------|---|--|
| Unit    | Description | FUJITSU Enterprise Postgres<br><i>instanceName</i>  | Specifies the feature overview.<br><br>Specifies the name of the target instance. (*1) |
| Service | ExecStart   | '/bin/bash -c ' <u>installDir</u> /bin/pgx_symstd<br>start <u>installDir</u> <u>dataStorageDestinationDir</u> '     | Command to be executed when the service is started.                                    |
|         | ExecStop    | '/bin/bash -c ' <u>installDir</u> /bin/pgx_symstd<br>stop <u>installDir</u> <u>dataStorageDestinationDir</u> '      | Command to be executed when the service is stopped.                                    |
|         | ExecReload  | '/bin/bash -c ' <u>installDir</u> /bin/pgx_symstd<br>reload <u>installDir</u><br><u>dataStorageDestinationDir</u> ' | Command to be executed when the service is reloaded                                    |
|         | User        | <u>User</u>   | OS user account of the instance administrator.   |
|         | Group       | <u>Group</u>  | Group to which the instance administrator user belongs.                                |

\*1: The instance name should be as follows:

If WebAdmin is used to create the instance: *instanceName*

If the initdb command is used to create the instance: *nameThatIdentifiesTheInstance*

The naming conventions for the instance name or for identifying the instance are as follows:

- Up to 16 bytes
- The first character must be an ASCII alphabetic character
- The other characters must be ASCII alphanumeric characters

#### 2. Enable automatic start and stop

As the OS superuser, use the systemctl command to enable automatic start and stop.

#### Example

```
# systemctl enable fsepsvoi_inst1.service
```

### 4.5.3 Settings when Using the features compatible with Oracle databases

The compatibility feature for Oracle databases enables FUJITSU Enterprise Postgres to be used without any special settings by creating a database instance. Note that settings are required only when using the SUBSTR function.



Refer to "Notes on SUBSTR" in the Application Development Guide for details.

## 4.6 Integration with Message-Monitoring Software

To monitor messages output by FUJITSU Enterprise Postgres using software, configure the product to monitor SQLSTATE, instead of the message text - this is because the latter may change when FUJITSU Enterprise Postgres is upgraded.

Configure FUJITSU Enterprise Postgres to output messages in a format that can be read by the message-monitoring software by specifying "%e" in the log\_line\_prefix parameter of postgresql.conf to output the SQLSTATE value.

A setting example is shown below - it outputs the output time, executing host, application name, and user ID, in addition to the SQLSTATE value.

#### Example

```
log_line_prefix = '%e: %t [%p]: [%l-1] user = %u,db = %d,remote = %r app = %a '
```



Refer to "What To Log" in the PostgreSQL Documentation for information on how to configure the settings.

## 4.7 Deleting Instances

This section explains how to delete instances.

- [4.7.1 Using WebAdmin](#)
- [4.7.2 Using Server Commands](#)



- Always use WebAdmin to delete instances that were created using it. Because WebAdmin management information cannot be deleted, WebAdmin will determine that the instance is abnormal.
- If you have set automatic start and stop of the instance, execute the following commands to disable the script and cancel registration.

If using systemd

```
chkconfig nameOfShellScriptForAutomaticStartAndStop off  
chkconfig --del nameOfShellScriptForAutomaticStartAndStop  
rm /etc/rc.d/init.d/nameOfShellScriptForAutomaticStartAndStop
```

#### Example

```
# chkconfig rc_fsepsvoi_inst1 off  
# chkconfig --del rc_fsepsvoi_inst1  
# rm /etc/rc.d/init.d/rc_fsepsvoi_inst1
```

If using systemd

```
systemctl disable nameOfUnitFileThatPerformsAutomaticStartAndStop  
rm /usr/lib/systemd/system/nameOfUnitFileThatPerformsAutomaticStartAndStop
```

Example

```
# systemctl disable fsepsvoi_inst1.service  
# rm /usr/lib/systemd/system/fsepsvoi_inst1.service
```

---

## 4.7.1 Using WebAdmin

This section explains how to delete instances using WebAdmin.

Use the following procedure to delete instances.

1. Stop the instance

In the [Instances] tab, select the instance to stop and click .

2. Back up files.

Before deleting the instance, back up any required files under the data storage destination, the backup data storage destination, and the transaction log storage destination.

3. Delete the instance

In the [Instances] tab, select the instance to delete and click .



Deleting an instance deletes only the following lowest-level directories. If they are not required, delete them manually.

- Data storage destination
- Backup data storage destination
- Transaction log storage destination (if different from the data storage destination)

---

## 4.7.2 Using Server Commands

This section explains how to delete instances using server commands.

Use the following procedure to delete instances.

1. Stop the instance

Execute the stop mode of the pg\_ctl command.

An example is shown below:

Example

```
$ pg_ctl stop -D /data/inst1
```

2. Back up files.

Before deleting the instance, back up any required files under the data storage destination, the backup data storage destination, and the transaction log storage destination.

3. Delete the instance

Use a standard UNIX tool (the rm command) to delete the following directories:

- Data storage destination

- Backup data storage destination
- Transaction log storage destination (if a directory different from the data storage directory was specified)

# Chapter 5 Uninstallation

This chapter describes the procedure for uninstalling FUJITSU Enterprise Postgres.

## 5.1 Uninstallation in Interactive Mode

Uninstall according to the following procedure:

Note that "*x.y*SPz" in sample windows indicates the version level of products to uninstall, and similarly, "<*xy*>" in paths indicates the product version level.



To reinstall FUJITSU Enterprise Postgres after it was uninstalled, and reuse an instance that was already created so that it can be managed from WebAdmin, back up the directory shown below in which the WebAdmin instance management information had been defined before uninstalling FUJITSU Enterprise Postgres, and then restore the backed up directory to its original location once FUJITSU Enterprise Postgres has been reinstalled.

Follow the procedure below to perform the backup.

1. Stop the WebAdmin server. Refer to "[C.1.3 Stopping the Web Server Feature of WebAdmin](#)" for details.
2. Back up the following directory:

```
installDir/gui/data/fepwa
```



If an error occurs while the product is being uninstalled, refer to "[Appendix F Uninstall \(middleware\) Messages](#)" and take the required action.

### 1. Delete the operation information

If the FUJITSU Enterprise Postgres operation information has been registered in the operating system or another middleware product, for example, then it must be deleted. Cases in which deletion is required are as follows:

- If you have set automatic start and stop of the instance, execute the following commands to disable the script and cancel registration.

If using an rc script

```
chkconfig nameOfShellScriptForAutomaticStartAndStop off
chkconfig --del nameOfShellScriptForAutomaticStartAndStop
rm /etc/rc.d/init.d/nameOfShellScriptForAutomaticStartAndStop
```

Example

```
# chkconfig rc_fsepsvoi_inst1 off
# chkconfig --del rc_fsepsvoi_inst1
# rm /etc/rc.d/init.d/rc_fsepsvoi_inst1
```

If using systemd

```
systemctl disable nameOfUnitFileThatPerformsAutomaticStartAndStop
rm /usr/lib/systemd/system/nameOfUnitFileThatPerformsAutomaticStartAndStop
```

Example

```
# systemctl disable fsepsvoi_inst1.service
# rm /usr/lib/systemd/system/fsepsvoi_inst1.service
```

## 2. Stop applications and the client program

Before starting the uninstallation, stop the following:

- Applications that use the product
- Instance

Using WebAdmin

In the [Instances] tab, select the instance to stop and click .

Using server commands

Execute the pg\_ctl command in stop mode.

```
$ /opt/fsepv<XY>server64/bin/pg_ctl stop -D /database/inst1
```

- Web server feature of WebAdmin

Execute the WebAdminStop command to stop the Web server feature of WebAdmin.

Example

```
# cd /opt/fsepv<XY>server64/gui/sbin  
# ./WebAdminStop
```

In the example above, /opt/fsepv<xy>server64 is the installation directory.

- Mirroring Controller

Execute the mc\_ctl command with the stop mode option specified and stop the Mirroring Controller.

Example

```
$ mc_ctl stop -M /mdir/inst1
```

## 3. Change to the superuser

Run the following command to switch to the superuser on the system.

```
$ su -  
Password:*****
```

## 4. Start the Uninstall (middleware)

Execute the following command:

```
# /opt/FJSVcir/cimanager.sh -c
```

## 5. Select the software

Type the number for the product to be uninstalled, and press Enter.

```
Loading Uninstaller...  
  
Currently installed products  
1. FUJITSU Enterprise Postgres Client(64bit)  X.y SPZ  
2. FUJITSU Enterprise Postgres Client(32bit)  X.y SPZ  
3. FUJITSU Enterprise Postgres Standard Edition(64bit)  X.y SPZ  
  
Type [number] to select the software you want to uninstall.  
[number,q]  
=>3
```

## 6. Start the uninstallation

To start the uninstallation, type "y" and press Enter.

To display the list of products again, type "b" and press Enter.

```
FUJITSU Enterprise Postgres Standard Edition(64bit)
  Description: FUJITSU Enterprise Postgres Standard Edition(64bit)
  Version: X.Y SPZ
  Manufacturer: Fujitsu Limited.
  Install directory: /opt/fsepsv64
  Date of install: 2015-6-2

Starting the uninstall of the software. Are you sure you want to continue?
[y,b,q]y
```

## 7. Finish the uninstallation

Upon successful completion, the window below is displayed.

The installation directory may remain after uninstallation. If it is not required, delete it.

```
Uninstalling...

FUJITSU Enterprise Postgres Standard Edition(64bit) is being uninstalled now.
 100% #####

The following products have been uninstalled successfully:
  FUJITSU Enterprise Postgres Standard Edition(64bit)

Uninstallation of "FUJITSU Enterprise Postgres Standard Edition (64bit) X.Y SPZ" has completed
successfully.

Exiting Uninstaller.
```

## 5.2 Uninstallation in Silent Mode

Uninstall according to the following procedure:



To reinstall FUJITSU Enterprise Postgres after it was uninstalled, and reuse an instance that was already created so that it can be managed from WebAdmin, back up the directory shown below in which the WebAdmin instance management information had been defined before uninstalling FUJITSU Enterprise Postgres, and then restore the backed up directory to its original location once FUJITSU Enterprise Postgres has been reinstalled.

Follow the procedure below to perform the backup.

1. Stop the WebAdmin server. Refer to "[C.1.3 Stopping the Web Server Feature of WebAdmin](#)" for details.
2. Back up the following directory:

```
installDir/gui/data/feqwa
```

### 1. Delete the operation information

If the FUJITSU Enterprise Postgres operation information has been registered in the operating system or another middleware product, for example, then it must be deleted. Cases in which deletion is required are as follows:

- If you have set automatic start and stop of the instance, execute the following commands to disable the script and cancel registration.

If using an rc script

```
chkconfig nameOfShellScriptForAutomaticStartAndStop off
chkconfig --del nameOfShellScriptForAutomaticStartAndStop
rm /etc/rc.d/init.d/nameOfShellScriptForAutomaticStartAndStop
```

Example

```
# chkconfig rc_fsepsvoi_inst1 off
# chkconfig --del rc_fsepsvoi_inst1
# rm /etc/rc.d/init.d/rc_fsepsvoi_inst1
```

If using systemd

```
systemctl disable nameOfUnitFileThatPerformsAutomaticStartAndStop

rm /usr/lib/systemd/system/nameOfUnitFileThatPerformsAutomaticStartAndStop
```

Example

```
# systemctl disable fsepsvoi_inst1.service
# rm /usr/lib/systemd/system/fsepsvoi_inst1.service
```

## 2. Stop applications and the client program

Before starting the uninstallation, stop the following:

- Applications that use the product
- Instance

Using WebAdmin

In the [Instances] tab, select the instance to stop and click .

Using server commands

Execute the pg\_ctl command with the stop mode option specified.

```
$ /opt/fsepv<XY>server64/bin/pg_ctl stop -D /database/inst1
```

- Web server feature of WebAdmin

Execute the WebAdminStop command to stop the Web server feature of WebAdmin.

Example

```
# cd /opt/fsepv<XY>server64/gui/sbin
# ./WebAdminStop
```

In the example above, /opt/fsepv<xy>server64 is the installation directory.

- Mirroring Controller

Execute the mc\_ctl command with the stop mode option specified and stop the Mirroring Controller.

Example

```
$ mc_ctl stop -M /mdir/inst1
```

## 3. Change to the superuser

Run the following command to switch to the superuser on the system.

```
$ su -
Password:*****
```

#### 4. Run the uninstallation

Execute the command below.

The installation directory may remain after uninstallation. If it is not required, delete it.

Example

```
# /opt/fsepv<XY>server64/setup/suninst.sh
```

In the example above, /opt/fsepv<xy>server64/setup is the name of the installation directory in which the server product is installed.

#### 5. Check the results

The uninstaller result is output to the log file.

Log file

xyz is the number part when the product version level is x.y SPz.

64-bit products

```
Path name: /var/log/fsep_SERVER64_xyz_uninstall.log
```

32-bit products

```
Path name: /var/log/fsep_SERVER32_xyz_uninstall.log
```

Return values

The following return values are output:

| Return values | Meaning  |
|---------------|--|
| 0             | Uninstallation was successful.   |
| 13            | Processing was interrupted.  |
| 15            | The resources required for uninstallation do not exist.                              |
| 19            | A process is running.  |
| 60            | An error occurred in Uninstall (middleware).   |
| 62            | Uninstall (middleware) was started.  |
| 63            | Uninstall (middleware) has not been installed, or there are no execution privileges. |
| 99            | A system error occurred.   |
| 100           | The command argument is invalid.   |
| 106           | The command was not executed with administrator privileges.                          |

# Appendix A Installation in Silent Mode

This appendix provides specifications for installation in silent mode.

## A.1 Specification Format

The installation parameters CSV file, which is specified as the argument for the silent installer, has three columns per line in CSV format.

```
sectionName, parameterName, value
sectionName, parameterName, value
:
```

Enter the following settings in respective columns.

| Item                 | Settings  | Optional  |
|----------------------|---|-----------|
| <i>sectionName</i>   | Specify the section name. There are two types of section names:<br>"installinfo": Set the product information.<br>"parameters": Set the parameter information for this product. | Mandatory |
| <i>parameterName</i> | Specify the parameter name. Each section has a valid parameter.   | Mandatory |
| <i>value</i>         | Specify the value.  | Optional  |

### Note

- Blank lines cannot be included.
- Section names and parameter names cannot be omitted.
- Undefined parameters cannot be set in lines where the section name is "installInfo". Also, note that the same parameter cannot be specified multiple times.
- Specify at least one line with the section name "parameters".
- Undefined parameters specified in lines within the "parameters" section will be ignored during execution. Note that when the same parameter is specified multiple times, the settings in the lowest line will be valid.
- The setting values for lines where the section name is "installInfo" may contain alphanumeric characters (at least one), and symbols, excluding double quotation marks (") and commas (,).
- The following characters can be used in the setting for rows with the section name "installInfo":  
Alphanumeric characters and double quotation marks
- The following characters can be used in the setting for rows with the section name "parameters":  
Alphanumeric characters, hyphens and forward slashes

### Information

The template for the installation parameters CSV file is "mountpoint/sample/sample.csv".

## A.2 List of Parameters

This section describes the parameters that can be set for each section.

## installInfo section

The parameters that can be set in the installInfo section are shown below.

| No. | Type        | Parameter             |        | Description  |
|-----|-------------|-----------------------|--------|--|
| 1   | Software ID | <b>Parameter name</b> | Name   | Mandatory.<br>Specify the software identifier.<br>For this software, specify the following value:<br>"FUJITSU Enterprise Postgres" |
|     |             | <b>Value/Range</b>    | String |  |
|     |             | <b>Default value</b>  | None   |  |

## Information

- In addition to "Name", the following parameters can be used in the "installInfo" section.
  - softwareName
  - OS
  - Version
  - Edition
- Note that specifying a parameter name other than "Name" and the parameters listed above will result in an error.
- The values set in these parameters do not affect silent installation.

## Example

```
installInfo,Name,FUJITSU Enterprise Postgres
```

## parameters section

The parameters that can be set in the parameters section are shown below.

Note that "<xy>" indicates the product version and level.

| No. | Type                                   | Parameter             |  | Description   |
|-----|--|-----------------------|--|---|
| 1   | Whether to install the server          | <b>Parameter name</b> | ServerInstallExecute                                 | Optional.<br>Specify whether to run the installation of the server.<br>Y: Install<br>No: Do not install           |
|     |  | <b>Value/Range</b>    | Y or N   |   |
|     |  | <b>Default value</b>  | Y  |   |
| 2   | Installation destination of the server | <b>Parameter name</b> | ServerInstallPath                                    | Optional.<br>Specify the installation destination of the software.<br>The root directory (/) cannot be specified. |
|     |  | <b>Value/Range</b>    | Path name  |   |
|     |  | <b>Default value</b>  | /opt/fsepv<xy>server32, or<br>/opt/fsepv<xy>server64 |   |
| 3   | Whether to install the client (32-bit) | <b>Parameter name</b> | Client32InstallExecute                               | Optional.<br>Specify whether to run the installation of the client (32-bit).<br>Y: Install<br>N: Do not install   |
|     |  | <b>Value/Range</b>    | Y or N   |   |
|     |  | <b>Default value</b>  | Y  |   |

| No. | Type  | Parameter             |                        | Description  |
|-----|---|-----------------------|------------------------|--|
| 4   | Installation destination of the client (32-bit) | <b>Parameter name</b> | Client32InstallPath    | Optional.<br>Specify the installation destination of the client (32-bit).<br>The root directory (/) cannot be specified.   |
|     |   | <b>Value/Range</b>    | Path name              |  |
|     |   | <b>Default value</b>  | /opt/fsepv<xy>client32 |  |
| 5   | Whether to install the client (64-bit)          | <b>Parameter name</b> | Client64InstallExecute | Optional.<br>Specify whether to run the installation of the client (64-bit).<br>Y: Install<br>N: Do not install<br>This parameter is ignored on 32-bit operating systems.          |
|     |   | <b>Value/Range</b>    | Y or N                 |  |
|     |   | <b>Default value</b>  | Y                      |  |
| 6   | Installation destination of the client (64-bit) | <b>Parameter name</b> | Client64InstallPath    | Optional.<br>Specify the installation destination of the client (64-bit).<br>This parameter is ignored on 32-bit operating systems.<br>The root directory (/) cannot be specified. |
|     |   | <b>Value/Range</b>    | Path name              |  |
|     |   | <b>Default value</b>  | /opt/fsepv<xy>client64 |  |
| 7   | Whether to set up WebAdmin                      | <b>Parameter name</b> | WebSetupExecute        | Optional.<br>Specify whether to set up WebAdmin.<br>Y: Install<br>N: Do not install<br>This will be ignored if the server is not installed.  |
|     |   | <b>Value/Range</b>    | Y or N                 |  |
|     |   | <b>Default value</b>  | Y                      |  |
| 8   | Web server port number                          | <b>Parameter name</b> | WebPortNumber1         | Optional.<br>Specify the port number of the Web server.<br>This will be ignored if the server is not installed.  |
|     |   | <b>Value/Range</b>    | 1024 to 32767          |  |
|     |   | <b>Default value</b>  | 27515                  |  |
| 9   | WebAdmin internal port number                   | <b>Parameter name</b> | WebPortNumber2         | Optional.<br>Specify the WebAdmin internal port number.<br>This will be ignored if the server is not installed.  |
|     |   | <b>Value/Range</b>    | 1024 to 32767          |  |
|     |   | <b>Default value</b>  | 27516                  |  |
| 10  | Whether to install WebAdmin                     | <b>Parameter name</b> | WebAdminInstallExecute | Optional.<br>Specify whether to run the installation of WebAdmin in multiserver mode.<br>Y: Install<br>N: Do not install   |
|     |   | <b>Value/Range</b>    | Y or N                 |  |
|     |   | <b>Default value</b>  | N                      |  |
| 11  | Installation destination of WebAdmin            | <b>Parameter name</b> | WebAdminInstallPath    | Optional.<br>Specify the installation destination of WebAdmin.<br>The root directory (/) cannot be specified.  |
|     |   | <b>Value/Range</b>    | Path name              |  |
|     |   | <b>Default value</b>  | /opt/fsepv<xy>webadmin |  |

## Example

```
parameters,ServerInstallExecute,Y
parameters,ServerInstallPath,/opt/fsepv<xy>server64
parameters,Client32InstallExecute,Y
parameters,Client32InstallPath,/opt/fsepv<xy>client32
parameters,Client64InstallExecute,Y
parameters,Client64InstallPath,/opt/fsepv<xy>client64
parameters,WebSetupExecute,Y
parameters,WebPortNumber1,27515
parameters,WebPortNumber2,27516
parameters,WebAdminInstallExecute,N
parameters,WebAdminInstallPath,/opt/fsepv<xy>webadmin
```

## A.3 Messages and Return Values

Messages are output when errors are detected during parametric analysis.

If an error is detected during installation of the product, a message is output to the log:

### Log file

xyz is the number part when the product version level is x.y SPz.

64-bit product

```
path name : /var/log/fsep_SERVER64_media_xyz_install.log
```

32-bit product

```
Path name : /var/log/fsep_SERVER32_media_xyz_install.log
```

### Messages and return values

CSV file errors

The following messages are output if errors are detected while parsing CSV files.

| Return value | Message  | Explanation and actions   |
|--------------|--|---|
| 4            | CSV file error:code = 1, Invalid CSV error.                    | There is an error in the specification format of the CSV file.                                |
| 4            | CSV file error:code = 2, installInfo/Name is required.         | Either installInfo or the Name parameter has not been specified.                              |
| 4            | CSV file error:code = 3, Invalid installInfo key.              | There is an error in the installInfo specification.<br>Or the section name is invalid.        |
| 4            | CSV file error:code = 4, Duplicated installInfo key.           | The same parameter has been defined more than once in installInfo.                            |
| 4            | CSV file error:code = 5, Invalid character length.             | No setting value is specified, or the specified string is too long.                           |
| 4            | CSV file error:code = 6, Invalid character format or encoding. | An invalid character has been specified in the installation parameters CSV file.              |
| 4            | CSV file error:code = 8, Parameter is required.                | There is no line in the "parameters" section.   |
| 20           | The input file does not exist.                                 | The input file does not exist.  |
| 21           | The value of @1@ is incorrect, the value is @2@.               | The value is incorrect. Specify the correct value.<br>The parameter name is displayed in @1@. |

| Return value | Message   | Explanation and actions  |
|--------------|---|--|
|              |   | The specified parameter is displayed in @2@.   |
| 22           | The value same at @1@ and @2@ is specified.                         | The same value is specified in different parameters. Specify different values.<br>The parameter name is displayed in @1@ and @2@.  |
| 23           | The @2@ of @1@ already exists.                                      | The path already exists. Specify a different path.<br>The parameter name is displayed in @1@.<br>The specified value is displayed in @2@.  |
| 26           | Port number @1@ is already used in the service file(/etc/services). | The port number is already being used. Specify an unused port number.<br>The port number is displayed in @1@   |
| 28           | There is no product for installation.                               | No product was specified for installation. Specify "Y" for at least one of the following parameters:<br>- ServerInstallExecute<br>- Client32InstallExecute<br>- Client64InstallExecute |
| 29           | USAGE : silent.sh inputfile   | The argument specified in the command is incorrect. Specify the correct argument.  |

#### Product installer errors

The following return values are returned when errors occur while the product installer is running.

| Return value | Explanation  |
|--------------|--|
| 0            | Completed successfully.  |
| 11           | A product that cannot coexist with FUJITSU Enterprise Postgres has been installed. |
| 12           | This OS is not supported.  |
| 13           | Processing was interrupted.  |
| 14           | The resources required for installation do not exist on the media.                 |
| 15           | The resources required for installation do not exist.                              |
| 16           | Unable to change the permission because the directory does not exist.              |
| 19           | A process is running.  |
| 30           | Failed to copy the installation material.  |
| 31           | Upgrade installation not possible.   |
| 32           | The product is already installed.  |
| 33           | Server product and WebAdmin product cannot be installed in the same machine.       |
| 60           | An error occurred in Uninstall (middleware).                                       |
| 61           | Failed to install Uninstall (middleware).  |
| 62           | Uninstall (middleware) was started.  |
| 68           | Failed to set up WebAdmin.   |
| 99           | A system error occurred.   |

| Return value | Explanation   |
|--------------|---|
| 106          | The command was not executed with administrator privileges. |

## A.4 CSV File Format

---

The format of CSV files is based on RFC4180, with the following specifications.

### Records

- Separate each record with a "CRLF" newline (operation is not guaranteed with only a "CR" or "LF" newline).
- Specify a newline at the end of a file.
- Separate each field within a record with a halfwidth comma ",".

| Format      | Record |     |     |
|-------------|--------|-----|-----|
| aaa,bbb,ccc | aaa    | bbb | ccc |

- If several commas are entered in succession, or if a comma precedes a newline, the data following the comma is regarded as empty.

| Format   | Record |     |     |
|----------|--------|-----|-----|
| aaa,,ccc | aaa    |     | ccc |
| aaa,bbb, | aaa    | bbb |     |

- Headers cannot be specified.

| Format      | Record |        |         |
|-------------|--------|--------|---------|
|             | field1 | field2 | field 3 |
| aaa,bbb,ccc | aaa    | bbb    | ccc     |

## Appendix B Recommended WebAdmin Environments

This appendix describes the recommended WebAdmin environment. The following explanation is based on the assumption that Internet Explorer 8.0 or later is used unless otherwise stated.

### B.1 Recommended Browser Settings

---

- Use a display resolution of 1024 x 768 or higher, and 256 colors or more.
- Select [View] >> [Text size] >> [Medium].
- Select [View] >> [Zoom] >> [100%].
- Click [Tools] >> [Internet options] >> [General] >> [Fonts], and then:
  - Set [Webpage font] to [Times New Roman].
  - Set [Plain text font] to [Courier New].

### B.2 How to Set Up the Pop-up Blocker

---

If the Pop-up Blocker is enabled, use the procedure below to configure settings to allow pop-ups from the server where FUJITSU Enterprise Postgres is installed.

1. Click [Tools] >> [Internet options], and then select the [Privacy] tab.  
If [Turn on Pop-up Blocker] is not selected, the Pop-up Blocker feature will not operate, and therefore steps below are not required.
2. Click [Settings].
3. In the [Pop-up Blocker Settings] window, enter in the [Address of website to allow] the URL of the server where FUJITSU Enterprise Postgres is installed, and then click [Add].
4. Click [Close].
5. In the [Internet Options] window, click [OK].

# Appendix C Setting Up and Removing WebAdmin

This appendix describes how to set up and remove WebAdmin.

Note that "<xy>" in paths indicates the product version and level.

## C.1 Setting Up WebAdmin

This section explains how to set up WebAdmin.

### C.1.1 Setting Up WebAdmin

Follow the procedure below to set up WebAdmin.

1. Change to the superuser

Acquire superuser privileges on the system.

Example

```
$ su -
Password:*****
```

2. Set up WebAdmin

Set up WebAdmin.

Example

If FUJITSU Enterprise Postgres is installed in "/opt/fsepv<xy>server64":

```
# cd /opt/fsepv<xy>server64/gui/sbin
# ./WebAdminSetup
```

3. Specify the port number

Specify the following port numbers to be used in WebAdmin.

Refer to the "/etc/services" file and only change to a different port number if there is overlap with a port number from another service.

Make a note of the port number for the Web server, because it will be required for activating the WebAdmin window.

| Item   | Value (recommended value) |
|--|---------------------------|
| Web server port number<br>enter port number of Web Server (default: 27515):                          | 27515                     |
| WebAdmin internal port number<br>enter Internal port number for WebAdmin (default: 27516):           | 27516                     |
| WebAdmin automatic start<br>Start WebAdmin automatically when system starting? [y,n]<br>(default: y) | y                         |

#### Web server port number

Specify a numeric value from 1024 to 32767 for the port number to be used for communication between the Web browser and the Web server.

The Web server port number will be registered as a port number with the following service name in the "/etc/services" file.

xy is the number part when the version is x.y.

64-bit product:

fsep\_xySPz\_edition\_64\_WebAdmin\_Port1

32-bit product:

```
fsep_xySPz_edition_32_WebAdmin_Port1
```

WebAdmin internal port number

Specify a numeric value from 1024 to 32767 for the port number to be used for communication between the Web server and the WebAdmin runtime environment.

The WebAdmin internal port number will be registered as a port number with the following service name in the /etc/services file.

xy is the number part when the version is x.y.

64-bit product:

```
fsep_xySPz_edition_64_WebAdmin_Port2
```

32-bit product:

```
fsep_xySPz_edition_32_WebAdmin_Port2
```

WebAdmin automatic start

Select whether or not to start WebAdmin when the machine is started.



- Unused port numbers  
Irrespective of the information specified in the "/etc/services" file, unused port numbers in the OS and other products can sometimes be automatically numbered and then used, or port numbers specified in environment files within products may also be used. Check the port numbers used by the OS and other products, and ensure that these are not duplicated.
- Access restrictions  
Prevent unauthorized access and maintain security by using a firewall product, or the packet filtering feature of a router device, to restrict access to the server IP address and the various specified port numbers.
- Port access permissions  
If a port is blocked (access permissions have not been granted) by a firewall, enable use of the port by granting access. Refer to the vendor document for information on how to grant port access permissions.  
Consider the security risks carefully when opening ports.
- Changing port numbers  
When using WebAdmin in multiserver mode, it is recommended not to change WebAdmin ports after creating instances. Otherwise, the created instances may not be accessible through WebAdmin after the port is changed.

## C.1.2 Activating the Web Server Feature of WebAdmin

Follow the procedure below to activate the Web server feature of WebAdmin.

1. Change to the superuser

Acquire superuser privileges on the system.

Example

```
$ su -  
Password:*****
```

2. Activate the Web server feature of WebAdmin

Execute the WebAdminStart command to activate the Web server feature of WebAdmin.

Example

If FUJITSU Enterprise Postgres is installed in "/opt/fsepv<xy>server64":

```
# cd /opt/fsepv<xy>server64/gui/sbin  
# ./WebAdminStart
```

## C.1.3 Stopping the Web Server Feature of WebAdmin

---

Follow the procedure below to stop the Web server feature of WebAdmin.

1. Change to the superuser

Acquire superuser privileges on the system.

Example

```
$ su -  
Password:*****
```

2. Stop the Web server feature of WebAdmin

Execute the WebAdminStop command to stop the Web server feature of WebAdmin.

Example

If FUJITSU Enterprise Postgres is installed in "/opt/fsepv<xy>server64":

```
# cd /opt/fsepv<xy>server64/gui/sbin  
# ./WebAdminStop
```



- For efficient operation of WebAdmin, it is recommended that the Web server feature be stopped only during a scheduled maintenance period.
- When WebAdmin is used to create and manage instances in multiple servers, the Web server feature must be started and running on all servers at the same time.

## C.2 Removing WebAdmin

---

This section explains how to remove WebAdmin.

This removal procedure stops WebAdmin and ensures that it no longer starts automatically when the machine is restarted.

1. Change to the superuser

Acquire superuser privileges on the system.

Example

```
$ su -  
Password:*****
```

2. Remove WebAdmin setup

Execute the WebAdminSetup command to remove WebAdmin setup.

Example

If FUJITSU Enterprise Postgres is installed in "/opt/fsepv<xy>server64":

```
# cd /opt/fsepv<xy>server64/gui/sbin  
# ./WebAdminSetup -d
```

## C.3 Using an External Repository for WebAdmin

---

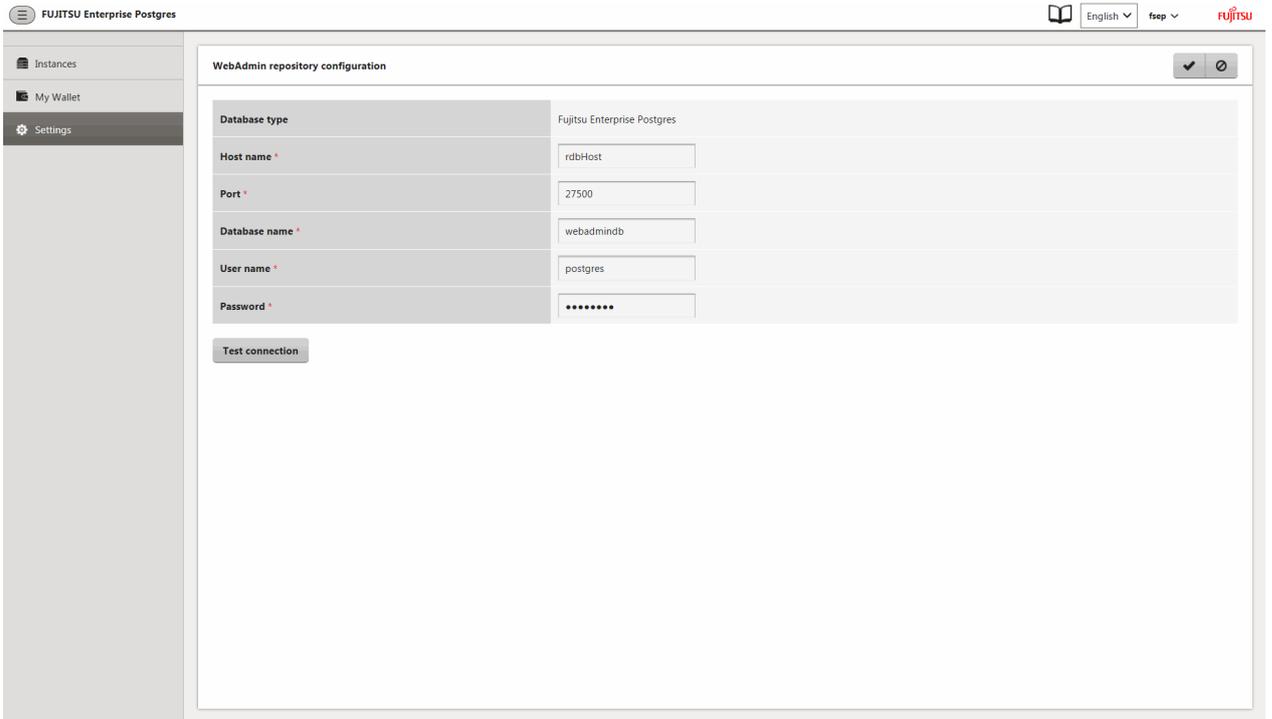
WebAdmin can be configured to use an external database, where it can store the various metadata information it uses. WebAdmin will use this database as a repository to store the information it uses to manage all the created instances. This can be a FUJITSU Enterprise Postgres database or an Open Source PostgreSQL V9.2 or later database.

Using an external database as a WebAdmin repository provides you with more flexibility in managing WebAdmin. This repository can be managed, backed up and restored as needed using PgAdmin or command line tools, allowing users to have greater flexibility and control.

Follow the procedure below to set up the repository.

1. Activate WebAdmin, and log in to the database server.
2. Click the [Settings] tab.

Click  to enter the information.



The screenshot shows the 'WebAdmin repository configuration' page in the Fujitsu Enterprise Postgres interface. The page has a sidebar on the left with 'Settings' selected. The main content area contains a configuration form with the following fields:

| Field           | Value                       |
|-----------------|-----------------------------|
| Database type   | Fujitsu Enterprise Postgres |
| Host name *     | rdhHost                     |
| Port *          | 27500                       |
| Database name * | webadmindb                  |
| User name *     | postgres                    |
| Password *      | *****                       |

Below the form is a 'Test connection' button.

Enter the following items:

- [Host name]: Host name of the database server
- [Port]: Port number of the database server
- [Database name]: Name of the database
- [User name]: User name to access the database
- [Password]: Password of the database user

### Note

- Database type  
It is recommended to use a FUJITSU Enterprise Postgres database as a repository. A compatible PostgreSQL database can also be used as an alternative.
- It is recommended to click [Test connection] to ensure that the details entered are valid and WebAdmin is able to connect to the target database.

3. Click  to register the repository details.

 Note

- Once the repository is set up, it can be changed any number of times by the user logged into WebAdmin. When a repository is changed:
  - It is recommended to preload the backup into this database.
  - If the data is not preloaded, WebAdmin will create a new repository.
- The database repository can be set up even after WebAdmin was already used to create instances. In that scenario, the instances already created are retained and can continue to be operated on.
- If the instance used as a repository is stopped, WebAdmin will be unusable. For this reason, it is recommended to be familiar with starting an instance from the command line. If the instance is stopped for any reason, start it from the command line and WebAdmin will be usable again.

# Appendix D Configuring Parameters

WebAdmin operates and manages databases according to the contents of the following configuration files:

- [postgresql.conf](#)

Contains various items of information that define the operating environment of FUJITSU Enterprise Postgres.

- [pg\\_hba.conf](#)

Contains various items of information related to client authentication.

These configuration files are deployed to a data storage destination. Data is written to them when the instance is created by WebAdmin and when settings are changed, and data is read from them when the instance is started and when information from the [Setting] menu is displayed.

Direct editing of each configuration file is possible with a text editor.



Refer to "Server Configuration" and "Client Authentication" in "Server Administration" in the PostgreSQL Documentation for information on the parameters.

## postgresql.conf

Parameters that can be changed in WebAdmin

The postgresql.conf parameters that can be changed in WebAdmin are shown below:

| Tab            | WebAdmin item                            | Parameter                     |
|----------------|--|-------------------------------|
| Character Code | Character set                            | client_encoding               |
|                | Message locale                           | lc_messages                   |
| Communication  | Port number                              | port                          |
|                | Max connection                           | max_connections               |
| SQL Options    | Interpreting NULL values                 | transform_null_equals         |
|                | Date output format                       | DateStyle (*1)                |
|                | Interval output format                   | IntervalStyle                 |
|                | The number of digits for floating values | extra_float_digits            |
|                | Transaction isolation levels             | default_transaction_isolation |
|                | Currency format                          | lc_monetary                   |
|                | Date and time format                     | lc_time                       |
| Memory         | Sort memory (Unit: KB)                   | work_mem                      |
|                | Share buffer (Unit: KB)                  | shared_buffers                |
| Replication    | WAL level                                | wal_level                     |
|                | Maximum WAL senders                      | max_wal_senders               |
|                | WAL keep segments                        | wal_keep_segments             |
|                | Hot standby                              | hot_standby                   |
|                | Synchronous standby names                | synchronous_standby_names     |

\*1: If you specify "Postgres" as the output format, dates will be output in the "12-17-1997" format, not the "Wed Dec 17 1997" format used in the PostgreSQL Documentation.

## Note

- Calculate the maximum number of connections using the formula below:

$$\text{maximumNumberOfConnections} = \text{maximumNumberOfConnectionsFromApplications} + 3 (*1)$$

\*1: 3 is the default number of connections required by the system.

Calculate the maximum number of connections using the following formula when changing either `max_wal_senders` (using streaming replication) or `superuser_reserved_connections` (connections reserved for use by the superuser) in `postgresql.conf`.

$$\text{maximumNumberOfConnections} = \text{maximumNumberOfConnectionsFromApplications} + \text{superuser_reserved_connections} + \text{max_wal_senders}$$

Refer to "[Appendix D Configuring Parameters](#)" for more information on `postgresql.conf`.

- Also check if the memory used exceeds the memory installed (refer to "[Parameters automatically set by WebAdmin according to the amount of memory](#)").
- When modifying the buffer size or the number of connections, edit the kernel parameter. Refer to "[Appendix J Configuring Kernel Parameters](#)", and "Managing Kernel Resources" in "Server Administration" in the PostgreSQL Documentation for details.

### Parameters set by WebAdmin

Parameters set by WebAdmin during instance startup are shown below (they will be ignored even if specified in `postgresql.conf`):

| Parameter                             | Value   |
|---------------------------------------|---|
| <code>listen_addresses</code>         | *   |
| <code>log_destination</code>          | 'stderr,syslog'   |
| <code>logging_collector</code>        | on  |
| <code>log_line_prefix</code>          | '%e: %t [%p]: [%l-1] user = %u,db = %d,remote = %r app = %a ' |
| <code>log_directory</code>            | '/var/tmp/fsep_version/instanceAdmin_instanceName/log'        |
| <code>log_filename (*1) (*2)</code>   | 'logfile-%a.log'  |
| <code>log_file_mode</code>            | 0600  |
| <code>log_truncate_on_rotation</code> | on  |
| <code>log_rotation_age</code>         | 1d  |

\*1: The server logs are split into files based on the day of the week, and are rotated after each week.

\*2: If the date changes while the instance is stopped, old logs are not deleted and continue to exist. Manually delete old logs that are no longer required to release disk space.

### Parameters automatically set by WebAdmin according to the amount of memory

The `postgresql.conf` parameters automatically set according to the amount of installed memory, during the creation of instances by WebAdmin, are shown below:

| Parameter                         | Value  |
|-----------------------------------|--|
| <code>shared_buffers</code>       | 30% of the machine's installed memory  |
| <code>work_mem</code>             | 30% of the machine's installed memory / <code>max_connections</code> / 2           |
| <code>effective_cache_size</code> | 75% of the machine's installed memory  |
| <code>maintenance_work_mem</code> | 10% of the machine's installed memory / (1 + <code>autovacuum_max_workers</code> ) |

When determining the values to be configured in the above parameters, you must take into account any anticipated increases in access volume or effects on performance during business operations, such as the number of applications and commands that will access the instance, and the content of processes. Also, note that in addition to FUJITSU Enterprise Postgres, other software may be running on the actual database server. You will need to determine the degree of priority for the database and other software, as well as the memory allocation size.

WebAdmin automatically configures complex parameter settings such as those mentioned above, based on the size of the internal memory of the machine. This enables maximum leverage of the machine memory to facilitate resistance against fluctuations during business operations.

Accordingly, the effects of the above-mentioned factors must be estimated and taken into account when determining and configuring parameter values, so that memory resources can be effectively allocated among other software or instances, and so that adverse effects can be mutually avoided. Refer to "Memory" in "Resource Consumption", and "Planner Cost Constants" in "Query Planning", under "Server Administration" in the PostgreSQL Documentation for information on parameter values and required considerations.

Parameter values can be modified using the WebAdmin [Setting] menu, or edited directly using a text editor.

If adding an instance, determine the parameter values, including for existing instances, and make changes accordingly.



## See

Kernel parameters need to be tuned according to the parameters being changed. Refer to "[Appendix J Configuring Kernel Parameters](#)", and "Managing Kernel Resources" in "Server Administration" in the PostgreSQL Documentation for information on tuning kernel parameters.



## Note

- Do not directly edit the following postgresql.conf parameters with a text editor, otherwise WebAdmin may not work properly if you make a mistake):
  - port
  - archive\_mode
  - archive\_command
  - wal\_level
  - log\_line\_prefix
  - log\_destination
  - logging\_collector
  - log\_directory
  - log\_file\_mode
  - log\_filename
  - log\_truncate\_on\_rotation
  - log\_rotation\_age
  - backup\_destination
- You must take care with the following parameter:
  - superuser\_reserved\_connections

Set it to a number that includes the 3 connections required in WebAdmin (the default is 3).

### Parameters automatically set by WebAdmin for streaming replication

The postgresql.conf parameters automatically set when a streaming replication standby is created, are shown below. These changes are performed in both the master as well as the standby instance.

| Parameter            | Value       |
|----------------------|-------------|
| wal_level (*1)       | hot_standby |
| max_wal_senders (*1) | 5           |
| hot_standby          | on          |

\*1: These values are set only if the master and standby instance are created at the same time. If only the standby instance is created, you need to set these values before the standby instance is created.



### See

Streaming replication parameters need to be tuned according to the requirements for replication performance and reliability. Refer to "Log-Shipping Standby Servers" in "Server Administration" in the PostgreSQL Documentation for information on tuning streaming replication parameters.

### pg\_hba.conf

Refer to "Client Authentication" in "Server Administration" in the PostgreSQL Documentation for information on content that can be configured in pg\_hba.conf.



### Note

- Configure the instance administrator permissions in the "local" connection format settings. WebAdmin may not work properly if permissions are not configured.
- If you specify an item or value that cannot be set by WebAdmin when editing the pg\_hba.conf file with a text editor, it will not be possible to reference that line from WebAdmin.

# Appendix E Uninstall (middleware)

## E.1 Features that are Installed

### [Windows]

| Feature     | Package name | Component name        | Remarks   | Selectively installed? |
|-------------|--------------|-----------------------|---|------------------------|
| Common tool | FJSVcir      | CIRuntime Application | Controls the installation and uninstallation of Fujitsu middleware products.<br><br>Manages the installation information of Fujitsu middleware products and includes a management function for viewing installation information and launching the uninstaller of each product. ("Uninstall (middleware)") | No                     |

### [Linux]

| Feature     | Package name | Component name        | Remarks   | Selectively installed? |
|-------------|--------------|-----------------------|---|------------------------|
| Common tool | FJSVcir      | CIRuntime Application | Controls the installation and uninstallation of Fujitsu middleware products.<br><br>Manages the installation information of Fujitsu middleware products and includes a management function for viewing installation information and launching the uninstaller of each product. ("Uninstall (middleware)") | No                     |

## E.2 Notes

### E.2.1 Notes on the Uninstall (middleware) Tool

"Uninstall (middleware)" is a tool used by Fujitsu middleware products. It performs information management for middleware products, and also, launching the uninstaller for removing these products from the installed systems.

#### Note

- To uninstall FUJITSU Enterprise Postgres, uninstall from "Uninstall (middleware)".
- This tool manages information about other Fujitsu middleware products as well as FUJITSU Enterprise Postgres. For this reason, do not uninstall it unless absolutely necessary. If you have accidentally uninstalled this tool, re-install it as described below.

#### [Windows]

1. Log on to the machine to be installed using a user name belonging to the Administrators group, or switch to an account with administrator privileges.
2. Insert the server program DVD in the drive device.
3. Execute the installation command.

```
z:\CIR\Windows\cirinst.exe
```

In the example above, for z, specify the drive name of the drive where the DVD has been inserted.

[Linux]

1. Log in as a superuser to the installation target machine, or switch to a user with administrative privileges.
2. Insert the product media in the drive.
3. Execute the installation command.

```
# /media/dvd/CIR/Linux/cirinst.sh
```

In the example above, /media/dvd is the DVD mount point.

- If you uninstall this tool as described below.

1. Check that there are no Fujitsu middleware products installed in the system.  
You can check this by using "Uninstall (middleware)", which is launched by the command below.

[Windows]

Select [All Programs] > [Fujitsu] > [Uninstall (middleware)]

[Linux]

```
/opt/FJSVcir/cir/bin/cimanager.sh -c
```

-c : CUI

2. If no Fujitsu middleware products have been installed, then issue the command below.

[Windows]

```
%SystemDrive%\FujitsuF4CR\bin\cirremove.exe
```

[Linux]

```
# /opt/FJSVcir/bin/cirremove.sh
```

3. At the uninstallation confirmation prompt, enter "y".

```
This software is a common tool of Fujitsu products.Are you sure you want to remove it?[y/n]:
```

Uninstallation will start.

.....

# Appendix F Uninstall (middleware) Messages

## F.1 Messages output by FJSVcir

---

### **FSP\_FJSVCIR\_CIRINST: ERROR: 101: CIRINST101: Administrator privilege is required.**

#### Description

The user does not have administrator privileges.

#### Action method

Login with administrator privileges and run the command again.

---

### **FSP\_FJSVCIR\_CIRINST: ERROR: 102: CIRINST102: Failed to create %s**

#### Parameters

%s: Directory name

#### Description

Failed to create a directory during the installation.

#### Action method

Creating the directory might have failed for some reason. Run the installer again, or run cirinst command again. If the problem persists, check the system log.

---

### **FSP\_FJSVCIR\_CIRINST: ERROR: 103: CIRINST103: It is required at least %dMB**

#### Parameters

%d: Disk spaces

#### Description

Insufficient disk space.

#### Action method

Confirm that the system has sufficient disk spaces.

---

### **[Windows] FSP\_FJSVCIR\_CIRINST: ERROR: 104: CIRINST104: Failed to copy CIR files.**

---

### **[Linux] FSP\_FJSVCIR\_CIRINST: ERROR: 104: CIRINST104: Failed to copy CIR installer files.**

#### Description

Failed to copy files required for the installation.

#### Action method

Copying the files failed for some reason. Run the installer again, or run cirinst command again. If the problem persists, check the system log.

---

### **FSP\_FJSVCIR\_CIRINST: ERROR: 105: CIRINST105: Failed to copy JRE.**

#### Description

Failed to copy JRE required for installation.

#### Action method

Copying the files failed for some reason. Run the installer again, or run cirinst command again. If the problem persists, check the system log.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 106: CIRINST106: Failed to copy CIR****Description**

Failed to copy files during the installation.

**Action method**

Copying the files failed for some reason. Run the installer again, or run cirinst command again. If the problem persists, check the system log.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 107: CIRINST107: invalid option.****Description**

An invalid option was specified.

**Action method**

Specify a valid option. [-c]: CUI

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 108: CIRINST108: JRE which should be deployed is not bundled.****Description**

An appropriate JRE for this system is not bundled.

**Action method**

Confirm that the product supports the platform.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 109: CIRINST109: Unsupported OS.****Description**

Unsupported operating system.

**Action method**

Confirm that the product supports the operating system.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 185: CIRINST185: lsb\_release was not found. Please install the package below.****- redhat-lsb****Description**

lsb\_release command was not found.

**Action method**

Add redhat-lsb package and then execute install again.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 186: CIRINST186: lsb\_release was not found.****Description**

lsb\_release command was not found.

**Action method**

Add the relevant package and then execute install again.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 201: CIRINST201: Administrator privilege is required.****Description**

The user does not have administrator privileges.

#### Action method

Login with administrator privileges and run the command again.

---

#### **FSP\_FJSVCIR\_CIRINST: ERROR: 203: CIRINST203: Failed to delete files.**

#### Description

Failed to delete FJSVcir files.

#### Action method

Deleting the files failed for some reason. Run cirremove command again. If the problem persists, check the system log.

---

#### **FSP\_FJSVCIR\_CIRINST: ERROR: 205: CIRINST205: invalid option.**

#### Description

Invalid option is specified.

#### Action method

No option is supported. Retry without any options.

---

#### **Specified installation parameters file was not found.**

#### Description

Specified installation parameters file was not found. (silent mode)

#### Action method

Specify the installation parameters file.

---

#### **It failed to install. See log for details**

#### Description

An error occurred during install. (silent mode)

#### Action method

Collect the files stored in the following directories.

[UNIX]

/var/opt/FJSVcir/cir/logs/cirlog0.log.0

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\logs\cirlog0.log.0

---

#### **Parameters are invalid. Please specify valid parameters.**

#### Description

Invalid option is specified. (silent mode)

#### Action method

Specify a valid option.

---

#### **Internal data is broken.**

#### Description

Internal data used by this product is corrupt.

#### Action method

Collect the files stored in the following directories and contact Fujitsu technical support:

[UNIX]

/var/opt/FJSVCIR/cir/

/etc/opt/FJSVCIR/cir/CIR.properties

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\

## F.2 Messages output by Uninstall (middleware)

---

### It has already been running in another process.

#### Description

An attempt was made to start Uninstall (middleware) more than once. Alternatively, an attempt was made to start Uninstall (middleware) while the installer was starting.

#### Action method

End any Uninstall (middleware) that have already started. Alternatively, start Uninstall (middleware) after the installer has ended.

---

### Specified option is invalid.

#### Description

An invalid option was specified.

#### Action method

Specify valid options and run the command again.

---

### Please enter a valid option.

#### Description

An invalid character was entered. Valid characters are y, n, or item numbers.

#### Action method

Enter a valid character.

---

### Failed to uninstall of the following software packages:

#### Description

Failed to uninstall the software listed in this message.

#### Action method

Confirm the information shown after this message and take the appropriate action.

---

### Unable to uninstall the software as it is referred from more than one software.

#### Description

Failed to uninstall the software because it is used by other software.

#### Action method

No specific action is required.

---

### Unable to uninstall the software as the software is mandatory.

#### Description

Failed to uninstall the software because it is required by another program.

#### Action method

No specific action is required.

---

### **Internal data is broken.**

#### Description

Internal data used by this product is corrupt.

#### Action method

Collect the files stored in the following directories and contact Fujitsu technical support:

[UNIX]

/var/opt/FJSVCIR/cir/

/etc/opt/FJSVCIR/cir/CIR.properties

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\

---

### **Unable to uninstall the software you were about to uninstall as the existence of the software is a precondition for the operation of another software.**

#### Description

Failed to uninstall the software because it is required by another program.

#### Action method

No specific action is required.

---

### **The program terminated abnormally.**

#### Description

The program has terminated abnormally.

#### Action method

Collect the files stored in the following directories and contact Fujitsu technical support:

[UNIX]

/var/opt/FJSVCIR/cir/

/etc/opt/FJSVCIR/cir/CIR.properties

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\

---

### **An unexpected error has occurred during uninstall.**

#### Description

An error occurred during uninstall.

#### Action method

Collect the files stored in the following directories and contact Fujitsu technical support:

[UNIX]

/var/opt/FJSVCIR/cir/

/etc/opt/FJSVCIR/cir/CIR.properties

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\

---

### **It failed to uninstall. See log for details.**

#### **Description**

An error occurred during uninstall. (silent mode)

#### **Action method**

Collect the files stored in the following directories.

[UNIX]

/var/opt/FJSVcir/cir/logs/cirlog0.log.0

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\logs\cirlog0.log.0

---

### **Failed to initialize the temp directory.**

#### **Description**

Can not start Uninstall (middleware) because failed to initialize the temp directory.

#### **Action method**

Run Uninstall (middleware) again. If the problem persists, check whether other processes have accessed the files in the following directories.

[UNIX]

/var/opt/FJSVcir/cir/temp/meta\_db

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\temp\meta\_db

---

### **[Notice]Need to restart for uninstall completion.**

#### **Description**

Uninstallation was completed. (silent mode)

#### **Action method**

Restart the system.

---

# Appendix G Estimating Database Disk Space Requirements

This appendix describes how to estimate database disk space requirements.

## G.1 Estimating Table Size Requirements

The following tables provide the formulas for estimating table size requirements.

Table G.1 Estimation formula when the record length is 2032 bytes or less

| Item   | Estimation formula (bytes)   |
|--|--|
| (1) Record length                                | <p><math>27(*1) + \text{NULL map} + \text{OID} + \text{column data}</math></p> <p>NULL map: Number of columns / 8 (*2)<br/>           OID: 4 for a table "WITH OID". The default is 0.<br/>           Column data: Sum of column lengths</p> <p>*1: Record head section<br/>           *2: Round the result up to the next integer.</p> <ul style="list-style-type: none"> <li>- Because the column data is placed in boundaries of 8 bytes, you need to make an adjustment so that the sum of the record head section, NULL map and OID is a multiple of 8.<br/>               For example, if the calculated length is <math>27 + 1 / 8</math> (rounded up) + 0 = 28 bytes, add 4 to make the length 32 bytes.</li> <li>- Because the data of each column is placed in boundaries of the defined data type, take the boundary of each data type into account for the length of the column data.<br/>               For example, the length of the column data in the table below will not be the sum of the data types, which is 37 bytes, but will instead be 64 bytes following boundary adjustment.<br/>               Definition: create table tb1(c1 char(1), c2 long, c3 int, c4 box)<br/>               Estimation: CHAR type 1 byte + boundary adjustment of 7 bytes for LONG type 8 bytes + LONG type 8 bytes + INT type 4 bytes + boundary adjustment of 12 bytes for BOX type 32 bytes + BOX type 32 bytes = 64 bytes</li> <li>- Because each record is placed in boundaries of 8 bytes, you need to make an adjustment so that the length of the column data is a multiple of 8.</li> <li>- If the calculated record length exceeds 2,032 bytes, the variable length data in the record might be compressed automatically. If so, use the estimation formulas in "<a href="#">Table G.2 Estimation formula when the record length exceeds 2032 bytes</a>" to estimate the table size.</li> </ul> |
| (2) Number of records per page                   | <p><math>8168 (*1) / ((1) \text{ record length} + 4 (*2))</math></p> <p>*1: Page length (8192) - page head (24)<br/>           *2: Pointer length (4)</p> <ul style="list-style-type: none"> <li>- The result will be rounded down to the next integer.</li> </ul>   |
| (3) Number of pages required for storing records | <p>Total number of records / (2) number of records per page</p> <ul style="list-style-type: none"> <li>- The result will be rounded up to the next integer.</li> </ul>   |
| (4) Amount of space                              | <p>(3) Number of pages required for storing records x page length x safety factor (*1)</p> <p>*1: Specify 2.0 or higher.</p> <ul style="list-style-type: none"> <li>- This is the safety factor assumed if vacuuming is performed for garbage collection in tables and indexes.</li> </ul>   |

Table G.2 Estimation formula when the record length exceeds 2032 bytes

| Item                | Estimation formula (bytes)  |
|---------------------|---|
| (4) Amount of space | Total number of records x (1) record length x safety factor (*1)<br>*1: Specify 2.0 or higher.<br>- This is the safety factor assumed if vacuuming is performed for garbage collection in tables and indexes. |

## G.2 Estimating Index Size Requirements

This section provides the formulas for estimating index size requirements.

FUJITSU Enterprise Postgres provides six index types: B-tree, Hash, GiST, GIN, SP-GiST, and VCI. If you do not specify the index type in the CREATE INDEX statement, a B-tree index is generated.

The following describes how to estimate a B-tree index. Refer to "[G.7 Estimating VCI Disk Space Requirements](#)" for information on how to estimate VCI.

A B-tree index is saved as a fixed-size page of 8 KB. The page types are meta, root, leaf, internal, deleted, and empty. Since leaf pages usually account for the highest proportion of space required, you need to calculate the requirements for these only.

Table G.3 Estimation formula when the key data length is 512 bytes or less

| Item   | Estimation formula (bytes)   |
|--|--|
| (1) Entry length                                 | 8 (*1) + key data length (*2)<br>*1: Entry head<br>*2: The key data length depends on its data type (refer to " <a href="#">G.3 Sizes of Data Types</a> " for details).<br>Because each entry is placed in boundaries of 8 bytes, you need to make an adjustment so that the length of the key data is a multiple of 8.<br>For example, if the calculated length is 28 bytes, add 4 to make the length 32 bytes.<br>- If the key data length exceeds 512 bytes, key data may be automatically compressed. In this case, use the estimation formula given in " <a href="#">Table G.4 Estimation formula when the key data length exceeds 512 bytes</a> " to estimate the key data length. |
| (2) Page size requirement                        | 8152 (*1)<br>*1: Page length (8192) - page header (24) - special data (16) = 8152  |
| (3) Number of entries per page                   | (2) Page size requirement / ((1) entry length + 4 (*1))<br>*1: Pointer length<br>- Result of (3) number of entries per page will be rounded down to the nearest integer.   |
| (4) Number of pages required for storing indexes | Total number of records / (3) number of entries per page<br>- Result of (4) number of pages required for storing indexes will be rounded up to the nearest integer.  |
| (5) Space requirement                            | (4) Number of pages required for storing indexes x 8192 (*1) / usage rate (*2)<br>*1: Page length<br>*2: Specify 0.7 or lower.   |

Table G.4 Estimation formula when the key data length exceeds 512 bytes

| Item                  | Estimation formula (bytes)   |
|-----------------------|--|
| (5) Space requirement | Total number of records x key data length x compression ratio (*1) / usage rate (*2)<br>*1: The compression ratio depends on the data value, so specify 1. |

| Item | Estimation formula (bytes)                  |
|------|---|
|      | *2: Specify 0.7 or lower as the usage rate. |

## G.3 Sizes of Data Types

---

This section lists the sizes of the data types.

### G.3.1 Sizes of Fixed-Length Data Types

---

The following table lists the sizes of fixed-length data types.

| Data type                   | Size (bytes)        |
|-----------------------------|---------------------|
| SMALLINT (INT2)             | 2                   |
| INTEGER (INT4)              | 4                   |
| BIGINT (INT8)               | 8                   |
| REAL                        | 4                   |
| DOUBLE PRECISION            | 8                   |
| SERIAL (SERIAL4)            | 4                   |
| BIGSERIAL (SERIAL8)         | 8                   |
| MONEY                       | 8                   |
| FLOAT                       | 8                   |
| FLOAT (1-24)                | 4                   |
| FLOAT (25-53)               | 8                   |
| TIMESTAMP WITHOUT TIME ZONE | 8                   |
| TIMESTAMP WITH TIME ZONE    | 8                   |
| DATE                        | 4                   |
| TIME WITHOUT TIME ZONE      | 8                   |
| TIME WITH TIME ZONE         | 12                  |
| INTERVAL                    | 12                  |
| BOOLEAN                     | 1                   |
| CIDR                        | IPv4: 7<br>IPv6: 19 |
| INET                        | IPv4: 7<br>IPv6: 19 |
| MACADDR                     | 6                   |
| POINT                       | 16                  |
| LINE                        | 32                  |
| LSEG                        | 32                  |
| BOX                         | 32                  |
| CIRCLE                      | 24                  |

### G.3.2 Sizes of Variable-Length Data Types

---

The following table lists the sizes of variable-length data types.

| Data type  | Size (bytes)   | Remarks  |
|--|--|--|
| path   | Length of size portion + 12 + 16 x number of vertices                            | 1) When carrying out division, round to the next integer.<br>2) If the real data length is less than 127, then the length of the size portion is 1 byte, otherwise it is 4 bytes.<br>3) The number of bytes per character depends on the character set (refer to " <a href="#">G.3.4 Number of Bytes per Character</a> " for details). |
| polygon  | Length of size portion + 36 + 16 x number of vertices                            |  |
| decimal  | Length of size portion + 2 + (integer precision / 4 + decimal precision / 4) x 2 |  |
| numeric  |  |  |
| bytea  | Length of size portion + real data length  |  |
| character varying( <i>n</i> ), varchar( <i>n</i> ) | Length of size portion + number of characters x number of bytes per character    |  |
| character( <i>n</i> ), char( <i>n</i> )            | Length of size portion + <i>n</i> x number of bytes per character                |  |
| text   | Length of size portion + number of characters x number of bytes per character    |  |

### G.3.3 Sizes of Array Data Types

The following table lists the sizes of array data types.

| Data type | Size (bytes)  | Remarks   |
|-----------|---|---|
| Array     | Length of size portion + 12 + 8 x number of dimensions + data size of each item | If the real data length is less than 127, then the length of the size portion is 1 byte, otherwise it is 4 bytes.<br>- Example of estimation when array data is "ARRAY[[1,2,3],[1,2,3]]"<br>Number of dimensions: 2<br>INTEGER data size: 4<br>Total size = 1+12+8x2+6x4 = 53 |

### G.3.4 Number of Bytes per Character

The following table lists the number of bytes per character.

The given values relate to the common character sets EUC-JP and UTF8.

| Character type              | Character set | Number of bytes per character |
|-----------------------------|---------------|-------------------------------|
| ASCII                       | EUC_JP        | 1                             |
| Halfwidth katakana          | EUC_JP        | 2                             |
| JIS X 0208 kanji characters | EUC_JP        | 2                             |
| JIS X 0212 kanji characters | EUC_JP        | 3                             |
| ASCII                       | UTF8          | 1                             |
| Halfwidth katakana          | UTF8          | 3                             |
| JIS X 0208 kanji characters | UTF8          | 3                             |
| JIS X 0212 kanji characters | UTF8          | 3                             |

## G.4 Estimating Transaction Log Space Requirements

This section provides the formula for estimating transaction log space requirements.

```
Transaction log space requirements = ( checkpoint_segments x 3 + 1 ) x 16 MB
```

However, if the update volume is extremely high (for example, due to a large data load and batch processing), disk writing at a checkpoint may not be able to keep up with the load, and a higher number of transaction logs than indicated here may temporarily be accumulated.

## G.5 Estimating Archive Log Space Requirements

---

This section explains how to estimate archive log space requirements.

The archive log is an archive of the transaction logs from the time of a previous backup to the present, so it fluctuates depending on the backup period and the content of update transactions.

The longer the backup period and the more update transactions, the greater the space required for the archive log.

Therefore, measure the actual archive log space by using a test environment to simulate backup scheduling and database update in a real operating environment.

## G.6 Estimating Backup Disk Space Requirements

---

This section provides the formula for estimating backup disk space requirements.

```
Backup disk space requirements = size of the database cluster + transaction log space requirements  
+ archive log space requirements
```

## G.7 Estimating VCI Disk Space Requirements

---

This section provides the formula for estimating VCI disk space requirements.

```
Disk space = (number of rows in tables) x (number of bytes per row) x (compression ratio) + (WOS size)
```

Number of bytes per row

```
Number of bytes per row = (19 + (number of columns specified in CREATE INDEX) / 8  
+ (number of bytes per single column value)) x 1.1
```

Note: Round up the result to the nearest integer.

Compression ratio

Specify a value between 0 and 1. Since compression ratio depends on the data being compressed, use actual data or test data that simulates it, then compare the value with the estimation result. As a guide, the compression ratio measured with the Fujitsu sample data is shown below:

- Data with high degree of randomness (difficult to compress): Up to approximately 0.9 times.
- Data with high degree of similarity (easy to compress): Up to approximately 0.5 times.

WOS size

```
WOS size = (number of WOS rows) / 185 x 8096
```

One row is added to the number of WOS rows for each INSERT and DELETE, and two rows are added for UPDATE. On the other hand, the number decreases to 520,000 rows or less during conversion to ROS performed by the ROS control daemon.

# Appendix H Estimating Memory Requirements

This appendix explains how to estimate the memory.

## H.1 FUJITSU Enterprise Postgres Memory Requirements

This section describes the formulas for estimating FUJITSU Enterprise Postgres memory requirements.

Use the following formula to obtain a rough estimate of memory required for FUJITSU Enterprise Postgres:

$$fujitsuEnterprisePostgresRequiredMemory = sharedMemoryAmount + LocalMemoryAmount$$

### Shared memory amount

Refer to "Shared Memory and Semaphores" under "Server Administration" in the PostgreSQL Documentation for information on shared memory.

However, note that if instances have been created using WebAdmin, the parameters below will be configured automatically when the instances are created. Take this into account when calculating the shared memory size.

| Parameter name            | Set value   |
|---------------------------|---|
| shared_buffers            | 30 percent of the internal memory of the machine. |
| max_connections           | 100   |
| max_prepared_transactions | 100   |

### Local memory amount

$$\begin{aligned} LocalMemoryAmount = & processStackArea \\ & + memoryUsedInDbSessionsThatUseTempTables \\ & + memoryUsedInDbSessionsThatPerformSortAndHashTableOperations \\ & + memoryUsedInMaintenanceOperations \\ & + baseMemoryUsedInEachProcess \\ & + memoryUsedPreparingForDataAccess \end{aligned}$$

### Process stack area

$$\begin{aligned} processStackArea \\ = & max\_stack\_depth \times (max\_connections + autovacuum\_max\_workers + 9) \end{aligned}$$

This formula evaluates to the maximum value.

Actually it is used according to the growth of the stack.

In the formula above, 9 is the number of processes that perform roles specific to servers.

### Memory used in database sessions that use temporary tables

$$\begin{aligned} memoryUsedInDbSessionsThatUseTempTables \\ = & temp\_buffers \times max\_connections \end{aligned}$$

This formula evaluates to the maximum value.

Memory is gradually used as temporary buffers are used, and is released when the session ends.

### Memory used in database sessions that perform sort and hash table operations

$$\begin{aligned} memoryUsedInDbSessionsThatPerformSortAndHashTableOperations \\ = & work\_mem \times max\_connections \end{aligned}$$

This formula evaluates to the maximum value.

Memory is gradually used as operations such as sort are performed, and is released when the query ends.

### Memory used in maintenance operations

$$\begin{aligned} & \text{memoryUsedInMaintenanceOperations} \\ & = \text{maintenance\_work\_mem} \times (\text{numOfSessionsPerformingMaintenance} + \text{autovacuum\_max\_workers}) \end{aligned}$$

Note that 'maintenance operations' are operations such as VACUUM, CREATE INDEX, and ALTER TABLE ADD FOREIGN KEY.

### Base memory used in each process

$$\begin{aligned} & \text{baseMemoryUsedInEachProcess} \\ & = 3\text{MB} \times (\text{max\_connections} + \text{autovacuum\_max\_workers} + 9) \end{aligned}$$

This formula evaluates to the memory used when server processes are running.

In the formula above, 9 is the number of processes that perform roles specific to servers.

### Memory used preparing for data access

$$\begin{aligned} & \text{memoryUsedPreparingForDataAccess} \\ & = \text{variationAmount} \times (\text{max\_connections} + \text{autovacuum\_max\_workers} + 4) \end{aligned}$$

where  $\text{variationAmount} = \text{shared\_buffers} / 8\text{KB} \times 4 \text{ bytes}$

(note that 8KB is the page length, and 4 bytes is the size of page management data)

This formula evaluates to the memory required to access the database cache in the shared memory.

In the formula above, among the processes that perform roles specific to servers, 4 is the number of processes that access the database.

## H.2 Database Multiplexing Memory Requirements

This section describes the formula for estimating database multiplexing memory requirements.

Use the following formula to obtain a rough estimate of memory required for database multiplexing:

$$\begin{aligned} & \text{Memory usage of the database multiplexing feature} \\ & = \text{Peak memory usage of the Mirroring Controller processes} \\ & \quad + \text{Peak memory usage of the Mirroring Controller commands} \\ & \text{Peak memory usage of the Mirroring Controller processes} = 150 \text{ MB} \\ & \text{Peak memory usage of the Mirroring Controller commands} = 50 \text{ MB} \times \text{Number of commands executed} \\ & \text{simultaneously} \end{aligned}$$

## H.3 PL/extJava Memory Requirements

This section describes the formula for estimating PL/extJava memory requirements.

Use the following formula to obtain a rough estimate of memory required for PL/extJava:

$$\text{memoryUsedByPLExtJavaInMegabytes} = 960 + (\text{numOfServerInstances(JavaVMs)} \times 47)$$



### Note

- Creating a container will create one server instance (Java VM).
- The number of server instances (Java VMs) may fluctuate based on the following actions:
  - Adding a container (one server instance (Java VM) will be added)
  - Adding a server instance (Java VM) to a container
  - Deleting a server instance (Java VM) from a container

## H.4 Parallel Scan Memory Requirements

This section describes the formulas for estimating parallel scan memory requirements.

Use the following formula to obtain a rough estimate of memory requirements:

$$\begin{aligned} \text{memUsedByParallelScan} = & \\ & (\text{sharedMemForParallelProcesses} \quad + \\ & \text{sharedMemForInterprocessCommunication} + \\ & \text{LocalMemForParallelProcesses} \\ & ) \\ & \times \text{maxNumOfSimultaneousStatementsForParallelScan} \end{aligned}$$

### Shared memory amount for parallel processes

$$\begin{aligned} \text{sharedMemForParallelProcesses} = & \\ & (\text{baseMemOfSharedMemInEachParallelProcess} + \text{max_locks_per_transaction} \times \text{lockInfoSize}) \\ & \times \text{max\_parallel\_degree} \end{aligned}$$

Base shared memory amount used in each parallel process

$$\text{baseSharedMemInEachParallelProcess} = 1800 \text{ bytes}$$

Lock information size

$$\text{lockInfoSize} = 272 \text{ bytes}$$

### Shared memory amount for interprocess communication

$$\begin{aligned} \text{sharedMemForInterprocessCommunication} = & \text{memForSharingScanProcesses} + \\ & \text{memForExchangingScanResults} \end{aligned}$$

Memory amount for sharing scan processes

$$\text{memForSharingScanProcesses} = 1 \text{ MB}$$

Memory amount for exchanging scan results

$$\text{memForExchangingScanResults} = 128 \text{ KB} \times \text{max\_parallel\_degree}$$

### Local memory amount for parallel processes

$$\begin{aligned} \text{LocalMemForParallelProcesses} = & (\text{baseLocalMemInEachParallelProcess} + \text{work\_mem}) \\ & \times \text{max\_parallel\_degree} \end{aligned}$$

Base local memory amount used in each parallel process

$$\text{baseLocalMemInEachParallelProcess} = 3 \text{ MB}$$



Shared memory uses IPC resources. Add the shared memory amount above to the values set for kernel parameters in "[Appendix J Configuring Kernel Parameters](#)".

## H.5 VCI Memory Requirements

This section describes the formula for estimating VCI memory requirements.

Use the following formula to obtain a rough estimate of memory requirements:

$$memUsedByVci = memForData + memForEachProcess$$

### Memory required to store data in memory

Secure the space estimated using the formula below on the stable buffer (part of `shared_buffer`).

$$memForData = (numOfRowsInTables) \times (numOfBytesPerRow) + (wosSize)$$

Number of bytes per row

$$numOfBytesPerRow = (19 + (numOfColumnsInCreateIndexStatement) / 8 + (numOfBytesPerSingleColumnValue)) \times 1.1$$

Note: Round up the result to the nearest integer.

WOS size

$$wosSize = (numOfWosRows) / 185 \times 8096$$

One row is added to the number of WOS rows for each INSERT and DELETE, and two rows are added for UPDATE. On the other hand, the number decreases to 520,000 rows or less during conversion to ROS performed by the ROS control daemon.

### Memory required for each process

$$memForEachProcess = memUsedPerScanning + memUsedForVciMaintenance + memUsedByCreateIndexStatement$$

Memory used per scanning

- Parallel scan

$$memUsedPerScanning = vci.shared_work_mem + (numOfParallelWorkers + 1) \times vci.maintenance_work_mem$$

Note: The number of parallel workers used by VCI simultaneously in the entire instance is equal to or less than `vci.max_parallel_degree`.

- Non-parallel scan

$$memUsedPerScanning = vci.max_local_ros + vci.maintenance_work_mem$$



- `vci.shared_work_mem`, and `vci.max_local_ros` are used to create local ROS. If local ROS exceeds these sizes, execute a query without using VCI according to the conventional plan.

- `vci.maintenance_work_mem` specifies the memory size to be secured dynamically. If it exceeds the specified value, a disk temporary file is used for operation.



Memory used for VCI maintenance

$$\text{memUsedForVciMaintenance} = \text{vci.maintenance\_work\_mem} \times \text{vci.control\_max\_workers}$$

Memory used by CREATE INDEX

$$\text{memUsedByCreateIndexStatement} = \text{vci.maintenance\_work\_mem}$$

 Note

`vci.maintenance_work_mem` specifies the memory to be secured dynamically. If it exceeds the specified value, a disk temporary file is used for operation.



# Appendix I Quantitative Limits

This appendix lists the quantitative limits of FUJITSU Enterprise Postgres.

Table I.1 Length of identifier

| Item                            | Limit                       |
|---------------------------------|-----------------------------|
| Database name                   | Up to 63 bytes (*1)(*2)(*3) |
| Schema name                     | Up to 63 bytes (*1)(*2)     |
| Table name                      | Up to 63 bytes (*1)(*2)     |
| View name                       | Up to 63 bytes (*1)(*2)     |
| Index name                      | Up to 63 bytes (*1)(*2)     |
| Table space name                | Up to 63 bytes (*1)(*2)     |
| Cursor name                     | Up to 63 bytes (*1)(*2)     |
| Function name                   | Up to 63 bytes (*1)(*2)     |
| Aggregate function name         | Up to 63 bytes (*1)(*2)     |
| Trigger name                    | Up to 63 bytes (*1)(*2)     |
| Constraint name                 | Up to 63 bytes (*1)(*2)     |
| Conversion name                 | Up to 63 bytes (*1)(*2)     |
| Role name                       | Up to 63 bytes (*1)(*2)(*4) |
| Cast name                       | Up to 63 bytes (*1)(*2)     |
| Collation sequence name         | Up to 63 bytes (*1)(*2)     |
| Encoding method conversion name | Up to 63 bytes (*1)(*2)     |
| Domain name                     | Up to 63 bytes (*1)(*2)     |
| Extension name                  | Up to 63 bytes (*1)(*2)     |
| Operator name                   | Up to 63 bytes (*1)(*2)     |
| Operator class name             | Up to 63 bytes (*1)(*2)     |
| Operator family name            | Up to 63 bytes (*1)(*2)     |
| Rewrite rule name               | Up to 63 bytes (*1)(*2)     |
| Sequence name                   | Up to 63 bytes (*1)(*2)     |
| Text search settings name       | Up to 63 bytes (*1)(*2)     |
| Text search dictionary name     | Up to 63 bytes (*1)(*2)     |
| Text search parser name         | Up to 63 bytes (*1)(*2)     |
| Text search template name       | Up to 63 bytes (*1)(*2)     |
| Data type name                  | Up to 63 bytes (*1)(*2)     |
| Enumerator type label           | Up to 63 bytes (*1)(*2)     |

\*1: This is the character string byte length when converted by the server character set character code.

\*2: If an identifier that exceeds 63 bytes in length is specified, the excess characters are truncated and it is processed.

\*3: Names of databases that use PL/extJava must be 28 bytes or less.

\*4: Names of roles for connecting from the PL/extJava application server must be 8 bytes or less.

Table I.2 Database object

| Item  | Limit                        |
|---|------------------------------|
| Number of databases   | Less than 4,294,967,296 (*1) |
| Number of schemas   | Less than 4,294,967,296 (*1) |
| Number of tables  | Less than 4,294,967,296 (*1) |
| Number of views   | Less than 4,294,967,296 (*1) |
| Number of indexes   | Less than 4,294,967,296 (*1) |
| Number of table spaces  | Less than 4,294,967,296 (*1) |
| Number of functions   | Less than 4,294,967,296 (*1) |
| Number of aggregate functions   | Less than 4,294,967,296 (*1) |
| Number of triggers  | Less than 4,294,967,296 (*1) |
| Number of constraints   | Less than 4,294,967,296 (*1) |
| Number of conversion  | Less than 4,294,967,296 (*1) |
| Number of roles   | Less than 4,294,967,296 (*1) |
| Number of casts   | Less than 4,294,967,296 (*1) |
| Number of collation sequences   | Less than 4,294,967,296 (*1) |
| Number of encoding method conversions   | Less than 4,294,967,296 (*1) |
| Number of domains   | Less than 4,294,967,296 (*1) |
| Number of extensions  | Less than 4,294,967,296 (*1) |
| Number of operators   | Less than 4,294,967,296 (*1) |
| Number of operator classes  | Less than 4,294,967,296 (*1) |
| Number of operator families   | Less than 4,294,967,296 (*1) |
| Number of rewrite rules   | Less than 4,294,967,296 (*1) |
| Number of sequences   | Less than 4,294,967,296 (*1) |
| Number of text search settings  | Less than 4,294,967,296 (*1) |
| Number of text search dictionaries  | Less than 4,294,967,296 (*1) |
| Number of text search parsers   | Less than 4,294,967,296 (*1) |
| Number of text search templates   | Less than 4,294,967,296 (*1) |
| Number of data types  | Less than 4,294,967,296 (*1) |
| Number of enumerator type labels  | Less than 4,294,967,296 (*1) |
| Number of default access privileges defined in the ALTER DEFAULT PRIVILEGES statement | Less than 4,294,967,296 (*1) |
| Number of large objects   | Less than 4,294,967,296 (*1) |
| Number of rows in tables defined by WITH OIDS   | Less than 4,294,967,296 (*1) |
| Number of index access methods  | Less than 4,294,967,296 (*1) |

\*1: The total number of all database objects must be less than 4,294,967,296.

Table I.3 Schema element

| Item   | Limit   |
|--|---|
| Number of columns that can be defined in one table | From 250 to 1600 (according to the data type) |
| Table row length                                   | Up to 400 gigabytes                           |

| Item   | Limit                          |
|--|--------------------------------|
| Number of columns comprising a unique constraint                           | Up to 32 columns               |
| Data length comprising a unique constraint                                 | Less than 2,000 bytes (*1)(*2) |
| Table size   | Up to 32 terabyte              |
| Search condition character string length in a trigger definition statement | Up to 800 megabytes (*1)(*2)   |
| Item size  | Up to 1 gigabyte               |

\*1: Operation might proceed correctly even if operations are performed with a quantity outside the limits.

\*2: This is the character string byte length when converted by the server character set character code.

Table I.4 Index

| Item   | Limit                      |
|--|----------------------------|
| Number of columns comprising a key (including VCI) | Up to 32 columns           |
| Key length (other than VCI)                        | Less than 2,000 bytes (*1) |

\*1: This is the character string byte length when converted by the server character set character code.

Table I.5 Data types and attributes that can be handled

| Item         |                             | Limit  |  |
|--------------|-----------------------------|--|--|
| Character    | Data length                 | Data types and attributes that can be handled (*1)   |  |
|              | Specification length (n)    | Up to 10,485,760 characters (*1)   |  |
| Numeric      | External decimal expression | Up to 131,072 digits before the decimal point, and up to 16,383 digits after the decimal point |  |
|              | Internal binary expression  | 2 bytes  | From -32,768 to 32,767   |
|              |                             | 4 bytes  | From -2,147,483,648 to 2,147,483,647   |
|              |                             | 8 bytes  | From -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807                                   |
|              | Internal decimal expression |  | Up to 13,1072 digits before the decimal point, and up to 16,383 digits after the decimal point |
|              | Floating point expression   | 4 bytes  | From -3.4E+38 to -7.1E-46, 0, or from 7.1E-46 to 3.4E+38                                       |
|              |                             | 8 bytes  | From -1.7E+308 to -2.5E-324, 0, or from 2.5E-324 to 1.7E+308                                   |
| bytea        |                             | Up to one gigabyte minus 53 bytes  |  |
| Large object |                             | Up to two gigabytes  |  |

\*1: This is the character string byte length when converted by the server character set character code.

Table I.6 Function definition

| Item   | Limit     |
|--|-----------|
| Number of arguments that can be specified                                  | Up to 100 |
| Number of variable names that can be specified in the declarations section | No limit  |

| Item   | Limit    |
|--|----------|
| Number of SQL statements or control statements that can be specified in a function processing implementation | No limit |

Table I.7 Data operation statement

| Item   | Limit                             |
|--|-----------------------------------|
| Maximum number of connections for one process in an application (remote access)  | 4,000 connections                 |
| Number of expressions that can be specified in a selection list  | Up to 1,664                       |
| Number of tables that can be specified in a FROM clause  | No limit                          |
| Number of unique expressions that can be specified in a selection list/DISTINCT clause/ORDER BY clause/GROUP BY clause within one SELECT statement | Up to 1,664                       |
| Number of expressions that can be specified in a GROUP BY clause   | No limit                          |
| Number of expressions that can be specified in an ORDER BY clause  | No limit                          |
| Number of SELECT statements that can be specified in a UNION clause/INTERSECT clause/EXCEPT clause   | Up to 4,000 (*1)                  |
| Number of nestings in joined tables that can be specified in one view  | Up to 4,000 (*1)                  |
| Number of functions or operator expressions that can be specified in one expression  | Up to 4,000 (*1)                  |
| Number of expressions that can be specified in one row constructor   | Up to 1,664                       |
| Number of expressions that can be specified in an UPDATE statement SET clause  | Up to 1,664                       |
| Number of expressions that can be specified in one row of a VALUES list  | Up to 1,664                       |
| Number of expressions that can be specified in a RETURNING clause  | Up to 1,664                       |
| Total expression length that can be specified in the argument list of one function specification   | Up to 800 megabytes (*2)          |
| Number of cursors that can be processed simultaneously by one session  | No limit                          |
| Character string length of one SQL statement   | Up to 800 megabytes (*1) (*3)     |
| Number of input parameter specifications that can be specified in one dynamic SQL statement  | No limit                          |
| Number of tokens that can be specified in one SQL statement  | Up to 10,000                      |
| Number of values that can be specified as a list in a WHERE clause IN syntax   | No limit                          |
| Number of expressions that can be specified in a USING clause  | No limit                          |
| Number of JOINS that can be specified in a joined table  | Up to 4,000 (*1)                  |
| Number of expressions that can be specified in COALESCE  | No limit                          |
| Number of WHEN clauses that can be specified for CASE in a simple format or a searched format  | No limit                          |
| Data size per record that can be updated or inserted by one SQL statement  | Up to one gigabyte minus 53 bytes |
| Number of objects that can share a lock simultaneously   | Up to 256,000 (*1)                |

\*1: Operation might proceed correctly even if operations are performed with a quantity outside the limits.

\*2: The total number of all database objects must be less than 4,294,967,296.

\*3: This is the character string byte length when converted by the server character set character code.

Table I.8 Data size

| Item   | Limit                    |
|--|--------------------------|
| Data size per record for input data files (COPY statement, psql command \copy meta command)  | Up to 800 megabytes (*1) |
| Data size per record for output data files (COPY statement, psql command \copy meta command) | Up to 800 megabytes (*1) |

\*1: Operation might proceed correctly even if operations are performed with a quantity outside the limits.

## Appendix J Configuring Kernel Parameters

Use the "System V IPC Parameters" table in "Managing Kernel Resources" in the PostgreSQL Documentation for the relationship between configuration parameters and kernel parameters, as well as calculation formulas.

Refer to the "Managing Kernel Resources" in the PostgreSQL Documentation to calculate shared memory usage.

For multiple instances, the kernel parameters should be evaluated for all instances. For example, in the case of the maximum number of shared memory segments for the entire system (SHMMNI), the total number of segments obtained by all instances should be added to the kernel parameters. In the case of the maximum number of semaphores for each process (SEMMSL), the largest of all sizes obtained by all instances should be compared to the current value prior to configuring the settings.



### Note

If there is insufficient shared memory due to miscalculation of SHMMAX, a message will be output indicating that the shmget system call failed at "errno=22 (EINVAL)". Review the calculation, and reconfigure.

The relationship between System V IPC parameters and kernel parameters in various operating systems is shown below.

| System | V IPC parameter                | Kernel parameter action  |
|--------|--------------------------------|--|
| SHMMAX | kernel.shmmax                  | If <i>currentValue</i> < <i>calculatedValue</i> , configure the calculated value |
| SHMMIN | No compatible parameter        |  |
| SHMALL | kernel.shmall                  | Specify <i>currentValue</i> + <i>calculatedValue</i>                             |
| SHMSEG | No compatible parameter        |  |
| SHMMNI | kernel.shmmni                  | Specify <i>currentValue</i> + <i>calculatedValue</i>                             |
| SEMNI  | Fourth parameter of kernel.sem | Specify <i>currentValue</i> + <i>calculatedValue</i>                             |
| SEMNS  | Second parameter of kernel.sem | Specify <i>currentValue</i> + <i>calculatedValue</i>                             |
| SEMMSL | First parameter of kernel.sem  | If <i>currentValue</i> < <i>calculatedValue</i> , configure the calculated value |
| SEMAP  | No compatible parameter        |  |
| SEMVMX | No compatible parameter        |  |

Remark 1: kernel.shmall is the page specification.

Remark 2: Specify all four parameters for kernel.sem. At this time, the value specified in the third parameter should be the same value as before configuration.

# Appendix K Determining the Preferred WebAdmin Configuration

This appendix describes the two different configurations in which WebAdmin can be used and how to select the most suitable configuration.

## K.1 WebAdmin Configurations

WebAdmin can be installed in two configurations:

- Single-server
- Multiserver

### K.1.1 Single-Server Configuration

In this configuration, WebAdmin can be used to create, manage and monitor instances only on the server machine in which it is installed.

This configuration is the same WebAdmin configuration that was available in FUJITSU Enterprise Postgres V9.4 and earlier.

### K.1.2 Multiserver Configuration

In this configuration, a single WebAdmin installation can be used to create, manage and monitor instances on multiple server machines.

This new configuration can be used to create a centralized platform, to manage and monitor a cluster of FUJITSU Enterprise Postgres Server instances.

## K.2 Installing WebAdmin in a Single-Server Configuration

To install WebAdmin in a single-server configuration, the FUJITSU Enterprise Postgres Server component and WebAdmin must be installed in the same machine.

The example below shows the option that needs to be selected during installation, to configure WebAdmin in a single-server configuration.

Example

```
# ./install.sh

The following products can be installed:
1: FUJITSU Enterprise Postgres Standard Edition (64bit) X.Y SPZ
2: FUJITSU Enterprise Postgres Client (32bit) X.Y SPZ
3: FUJITSU Enterprise Postgres Client (64bit) X.Y SPZ
4: FUJITSU Enterprise Postgres WebAdmin X.Y SPZ

Select the product to be installed.
To select multiple products, separate using commas (.). (Example: 1,2)
[number,all,q](The default value is 1,2,3): 1

Selected product
FUJITSU Enterprise Postgres Standard Edition (64bit) X.Y SPZ
```



Options 1 and 4 cannot be selected together. Option 4 is used to install WebAdmin in a multiserver configuration.

## K.3 Installing WebAdmin in a Multiserver Configuration

To install WebAdmin in a multiserver configuration, it is only necessary that the FUJITSU Enterprise Postgres WebAdmin component is installed in a single server machine.

The FUJITSU Enterprise Postgres Server component can then be installed in any number of different server machines.

### 1. Install WebAdmin

The example below shows the option that needs to be selected during installation, to configure WebAdmin in a multiserver configuration.

#### Example

```
# ./install.sh

The following products can be installed:
1: FUJITSU Enterprise Postgres Standard Edition (64bit) X.y SPZ
2: FUJITSU Enterprise Postgres Client (32bit) X.y SPZ
3: FUJITSU Enterprise Postgres Client (64bit) X.y SPZ
4: FUJITSU Enterprise Postgres WebAdmin X.y SPZ

Select the product to be installed.
To select multiple products, separate using commas (,). (Example: 1,2)
[number,all,q](The default value is all): 4

Selected product
FUJITSU Enterprise Postgres WebAdmin x.y SPZ
```

### 2. Install the FUJITSU Enterprise Postgres Server component in a different server

The example below shows the option that needs to be selected during installation, to only install the FUJITSU Enterprise Postgres Server component.

#### Example

```
# ./install.sh

The following products can be installed:
1: FUJITSU Enterprise Postgres Standard Edition (64bit) X.y SPZ
2: FUJITSU Enterprise Postgres Client (32bit) X.y SPZ
3: FUJITSU Enterprise Postgres Client (64bit) X.y SPZ
4: FUJITSU Enterprise Postgres WebAdmin X.y SPZ

Select the product to be installed.
To select multiple products, separate using commas (,). (Example: 1,2)
[number,all,q](The default value is all): 1

Selected product
FUJITSU Enterprise Postgres Standard Edition (64bit) x.y SPz
```

### Note

- Once WebAdmin is installed separately, it is not possible to install the FUJITSU Enterprise Postgres Server component on the same machine at a later time. To achieve this, uninstall WebAdmin and then install WebAdmin and the Server component together by selecting option 1 from the installer.
- When the FUJITSU Enterprise Postgres Server component is installed separately, it is still necessary to provide WebAdmin port numbers. These port numbers will be used by the WebAdmin component to communicate with multiple servers to perform various operations.
- When only WebAdmin is installed in a server machine (without the FUJITSU Enterprise Postgres Server component), it is not possible to create database instances in that machine. Both WebAdmin and the FUJITSU Enterprise Postgres Server component must be installed together to create database instances on the machine on which they are installed.

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## Installation and Setup Guide for Server *(Windows)*

Windows

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# Preface

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## Purpose of This Document

The FUJITSU Enterprise Postgres database system extends the PostgreSQL features and runs on the Windows platform.

This document describes how to install and set up "FUJITSU Enterprise Postgres".

## Intended Readers

This document is intended for those who install and operate FUJITSU Enterprise Postgres.

Readers of this document are assumed to have general knowledge of:

- PostgreSQL
- SQL
- Windows

## Structure of This Document

This document is structured as follows:

### [Chapter 1 Overview of Installation](#)

Describes the installation types and procedures

### [Chapter 2 Operating Environment](#)

Describes the operating environment required to use FUJITSU Enterprise Postgres

### [Chapter 3 Installation](#)

Describes how to perform a new installation of FUJITSU Enterprise Postgres

### [Chapter 4 Setup](#)

Describes the setup to be performed after installation

### [Chapter 5 Uninstallation](#)

Describes how to uninstall FUJITSU Enterprise Postgres

### [Appendix A Installation in Silent Mode](#)

Provides specifications for installation in silent mode

### [Appendix B Recommended WebAdmin Environments](#)

Describes the recommended WebAdmin environment

### [Appendix C Setting Up and Removing WebAdmin](#)

Describes how to set up and remove WebAdmin

### [Appendix D Configuring Parameters](#)

Describes FUJITSU Enterprise Postgres parameters

### [Appendix E Uninstall \(middleware\)](#)

Describes the Uninstall (middleware)

### [Appendix F Uninstall \(middleware\) Messages](#)

Explains the messages output by the Uninstall (middleware) tool

### [Appendix G Estimating Database Disk Space Requirements](#)

Describes how to estimate database disk space requirements

## [Appendix H Estimating Memory Requirements](#)

Describes the formulas for estimating memory requirements

## [Appendix I Quantitative Limits](#)

Describes the quantity range

## [Appendix J Determining the Preferred WebAdmin Configuration](#)

Describes the two different configurations in which WebAdmin can be used and how to select the most suitable configuration

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# Chapter 1 Overview of Installation

This chapter provides an overview of FUJITSU Enterprise Postgres installation.

## 1.1 Features that can be Installed

Each FUJITSU Enterprise Postgres feature is installed on the machine that was used to build the database environment.

The following table shows the relationship between the product to be installed and the features that can be installed.

| Feature that can be installed                  | Product name |    |
|--|--------------|----|
|  | AE           | SE |
| Basic feature (server feature, client feature) | Y            | Y  |

Y: Can be installed

N: Cannot be installed

## 1.2 Installation Types

The following three installation types are available for FUJITSU Enterprise Postgres:

- New installation
- Reinstallation
- Multi-version installation

### 1.2.1 New Installation

In initial installation, FUJITSU Enterprise Postgres is installed for the first time.

### 1.2.2 Reinstallation

Perform reinstallation to repair installed program files that have become unusable for any reason.

### 1.2.3 Upgrade Installation

Perform upgrade installation to upgrade installed program files to the latest version.

### 1.2.4 Multi-Version Installation

Perform multi-version installation to install different versions to the installed program files separately.

## 1.3 Installation Procedure

The following installation procedures are available for FUJITSU Enterprise Postgres:

- Installation in interactive mode
- Installation in silent mode

Select the installation procedure that corresponds to your environment.



If you have antivirus software installed, the server may crash, fail to start, or stop responding, during installation or when starting up after installation. Set scan exception settings for the installation directory and resource allocation directory so that the files in these directories are not scanned for viruses.

### **1.3.1 Installation in Interactive Mode**

---

Interactive mode enables installation to be performed while the required information is entered interactively.

In the interactive mode installation, the installation state of FUJITSU Enterprise Postgres is determined automatically. Install FUJITSU Enterprise Postgres using one of the following installation types in accordance with the installation state:

- New installation
- Reinstallation
- Multi-version installation

### **1.3.2 Installation in Silent Mode**

---

Silent mode enables installation to be performed without the need to enter any information interactively.

New installations and multi-version installations can be performed in silent mode.

## **1.4 Uninstallation**

---

Uninstallation removes the system files of the installed FUJITSU Enterprise Postgres.

# Chapter 2 Operating Environment

This chapter describes the operating environment required to use FUJITSU Enterprise Postgres.



Refer to "Operating Environment" in the Installation and Setup Guide for Client when installing the FUJITSU Enterprise Postgres client feature at the same time.

## 2.1 Required Operating System

One of the operating systems shown in the table below is required to use FUJITSU Enterprise Postgres.

Table 2.1 Operating systems

| Operating system name   | 64-bit product |
|---|----------------|
| <ul style="list-style-type: none"><li>- Microsoft(R) Windows Server(R) 2008 Standard</li><li>- Microsoft(R) Windows Server(R) 2008 Enterprise</li><li>- Microsoft(R) Windows Server(R) 2008 Datacenter</li><li>- Microsoft(R) Windows Server(R) 2008 Standard without Hyper-V</li><li>- Microsoft(R) Windows Server(R) 2008 Enterprise without Hyper-V</li><li>- Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V</li></ul> | Y              |
| <ul style="list-style-type: none"><li>- Microsoft(R) Windows Server(R) 2008 R2 Datacenter</li><li>- Microsoft(R) Windows Server(R) 2008 R2 Enterprise</li><li>- Microsoft(R) Windows Server(R) 2008 R2 Standard</li><li>- Microsoft(R) Windows Server(R) 2008 R2 Foundation</li></ul>   | Y              |
| <ul style="list-style-type: none"><li>- Microsoft(R) Windows Server(R) 2012 Datacenter</li><li>- Microsoft(R) Windows Server(R) 2012 Standard</li><li>- Microsoft(R) Windows Server(R) 2012 Essentials</li><li>- Microsoft(R) Windows Server(R) 2012 Foundation</li></ul>   | Y              |
| <ul style="list-style-type: none"><li>- Microsoft(R) Windows Server(R) 2012 R2 Datacenter</li><li>- Microsoft(R) Windows Server(R) 2012 R2 Standard</li><li>- Microsoft(R) Windows Server(R) 2012 R2 Foundation</li></ul>   | Y              |

Y: Can be used

N: Cannot be used



- The TCP/IP protocol must be installed.
- One of the following basic software products is required if performing failover that is linked to the cluster software of the operating system:
  - Microsoft(R) Windows Server(R) 2008 Enterprise
  - Microsoft(R) Windows Server(R) 2008 Datacenter
  - Microsoft(R) Windows Server(R) 2008 Enterprise without Hyper-V

- Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V
- Microsoft(R) Windows Server(R) 2008 R2 Datacenter
- Microsoft(R) Windows Server(R) 2008 R2 Enterprise
- Microsoft(R) Windows Server(R) 2012 Datacenter
- Microsoft(R) Windows Server(R) 2012 Standard
- Microsoft(R) Windows Server(R) 2012 Essentials
- Microsoft(R) Windows Server(R) 2012 Foundation
- Microsoft(R) Windows Server(R) 2012 R2 Datacenter
- Microsoft(R) Windows Server(R) 2012 R2 Standard
- Microsoft(R) Windows Server(R) 2012 R2 Foundation

## 2.2 Related Software

The following table lists the software required to use FUJITSU Enterprise Postgres.

Table 2.2 Related software

| No. | Software name  | Version                             | Product name of FUJITSU Enterprise Postgres |    | Remarks |
|-----|----------------|-------------------------------------|---|----|---------|
|     |                |                                     | AE  | SE |         |
| 1   | Visual Studio  | 2008<br>2010<br>2012<br>2013        | Y   | Y  | -       |
| 2   | .NET Framework | 3.5 SP1 or later<br>4<br>4.5<br>4.6 | Y   | Y  | -       |

Y: Can be used



### Note

The following programs are installed during installation of FUJITSU Enterprise Postgres:

- Microsoft Visual C++ 2005 Redistributable Package version 8.0.50727.42
- Microsoft Visual C++ 2010 Redistributable Package version 10.0.40219

Do not uninstall the above programs as they are required for running FUJITSU Enterprise Postgres.

The following table lists servers that can be connected to the FUJITSU Enterprise Postgres client feature.

Table 2.3 Connectable servers

| OS               | Product name   |
|------------------|--|
| Windows<br>Linux | <ul style="list-style-type: none"> <li>- FUJITSU Software Enterprise Postgres Advanced Edition 9.5 or later</li> <li>- FUJITSU Software Enterprise Postgres Standard Edition 9.4 or later</li> </ul> |

## 2.3 Excluded Software

---

This section describes excluded software.

### FUJITSU Enterprise Postgres

If all the following conditions are met, FUJITSU Enterprise Postgres cannot be installed:

- The product generations are the same
- The editions are different

### Example

In the following cases, FUJITSU Enterprise Postgres cannot be installed as an exclusive product:

- The installed product is FUJITSU Software Enterprise Postgres Standard Edition (64bit) 9.5
- The product to be installed is FUJITSU Software Enterprise Postgres Advanced Edition (64bit) 9.5

### Other products

There are no exclusive products.

## 2.4 Required Patches

---

There are no required patches.

## 2.5 Hardware Environment

---

The following hardware is required to use FUJITSU Enterprise Postgres.

### Memory

256 MB or more is recommended (at least 128 MB is required).

## 2.6 Supported System Environment

---

This section describes the supported system environment.

### 2.6.1 TCP/IP Protocol

---

FUJITSU Enterprise Postgres supports version 4 and 6 (IPv4 and IPv6) of TCP/IP protocols.



Do not use link-local addresses if TCP/IP protocol version 6 addresses are used.

### 2.6.2 File System

---

You can install FUJITSU Enterprise Postgres only if the system folder is an NTFS volume.

## 2.7 PostgreSQL Version Used for FUJITSU Enterprise Postgres

---

FUJITSU Enterprise Postgres is based on PostgreSQL 9.5.2.

## 2.8 Notes on Using Streaming Replication

---

To use streaming replication, build the primary server and all standby servers using the same FUJITSU Enterprise Postgres version (\*1).

\*1: The product version is indicated by "x" in the notation "x.y SPZ".

 Note

Streaming replication cannot be used in combination with Open Source PostgreSQL.

## Chapter 3 Installation

This chapter describes the procedures for the installation of FUJITSU Enterprise Postgres.

### Note

- The installation must be performed by a user with administrator privileges (a user ID that belongs to the Administrators group).
- Stop all applications before starting the installation.
- The Windows Installer service must be running.
- In either of the following cases, it is necessary to switch to install mode by executing the command shown below before installation. Also, after the installation is completed, execute the command shown below to switch back to execute mode.
  - In Windows Server(R) 2008, the terminal server is installed in application server mode.
  - In Windows Server(R) 2008 R2, Windows Server(R) 2012 or Windows Server(R) 2012 R2, the remote desktop service is installed in application server mode.

[Before the installation]

```
CHANGE USER /INSTALL
```

[After the installation]

```
CHANGE USER /EXECUTE
```

- The following window may be displayed when executing the installation program:



If this window is displayed, perform the following operations:

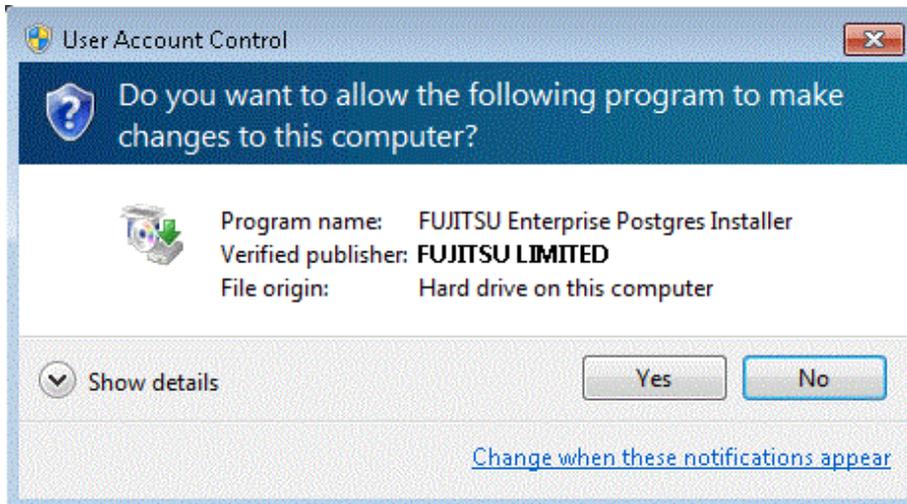
1. Perform the installation steps until the [InstallShield Wizard Complete] window is displayed.
2. At the window shown above, click [Next].

3. The window shown below is displayed. Click [Finish].



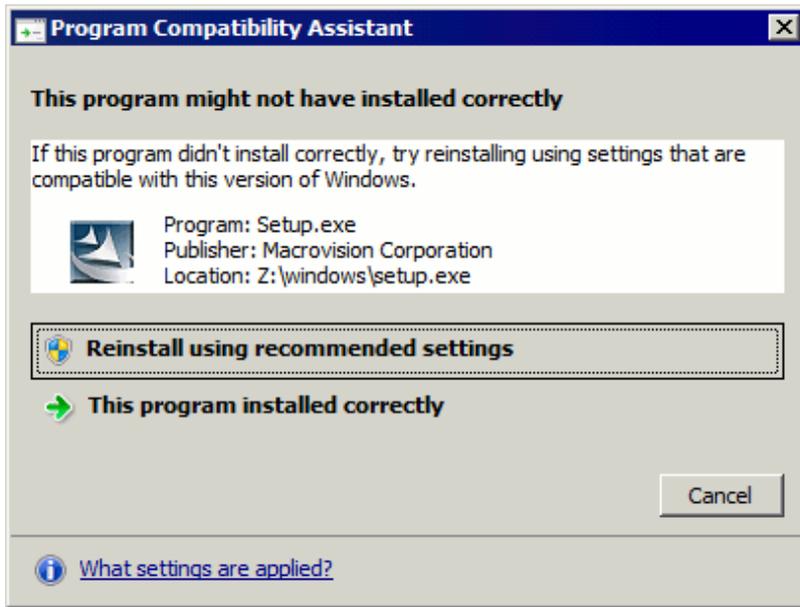
### Information

- If a [User Account Control] dialog box such as the following is displayed at the start of the installation, click [Yes] to continue processing:



If [No] is clicked, permission to continue is denied and an [Error] dialog box will be displayed. To continue the installation, click [Retry] at the [Error] dialog box. To end the installation, click [Cancel].

- If installation is suspended or processing terminates abnormally, a dialog box of the program compatibility assistant similar to the one shown below may be displayed. Click [This program installed correctly] and continue operation.



### 3.1 Pre-installation Tasks

Check the system environment below before installing FUJITSU Enterprise Postgres.

Note that "x.y.SPz" in sample windows indicates the version level of installed products.

#### Check the disk space

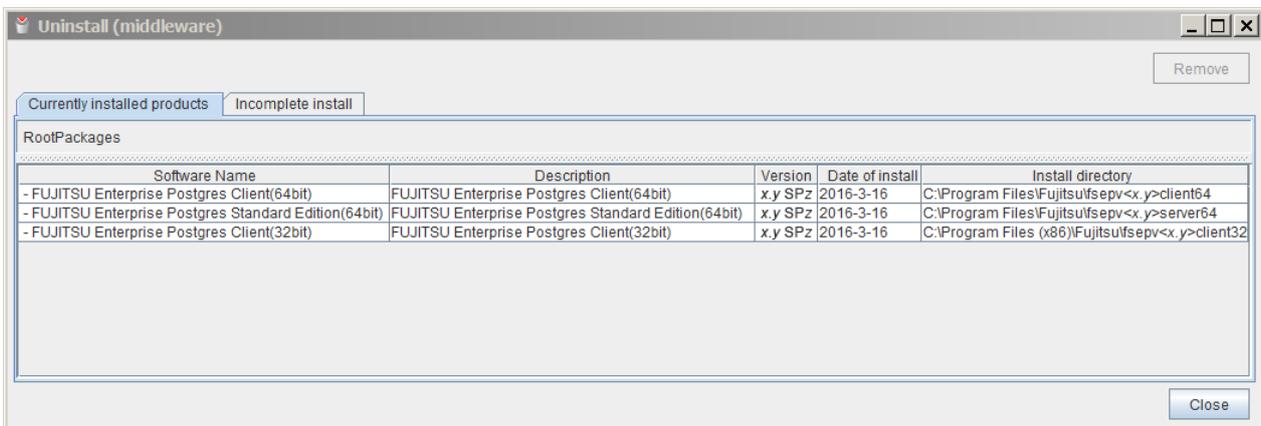
Ensure that there is sufficient disk space to install FUJITSU Enterprise Postgres.

#### Check the installed product and determine the installation method

Using the operation shown below, start Uninstall (middleware), and check the installed products.

The installed products are displayed in the window below.

In Windows, click [All Programs] or [All apps], then [Fujitsu], and then [Uninstall (middleware)].



If FUJITSU Enterprise Postgres is already installed, determine which installation method to use:

- Reinstallation
- Multi-version installation

## Remove applied updates

If you perform reinstallation or upgrade installation as the installation method, remove applied updates using the procedure shown below.



If a product is installed without removing applied updates, the following problems will occur:

- Performing reinstallation

If an update with the same update and version number is applied, an error informing you that the update has already been applied is displayed.

### 1. Display the applied updates

Execute the following command to display the applied updates:

Example

```
C:\>uam showup
```

### 2. Remove the updates

Execute the command below to remove the updates. If an update with the same update number was applied more than once, the updates are removed in order, starting from the highest version number.

Example

```
C:\>uam remove -i update-number
```

## Determine the preferred WebAdmin configuration

Starting with FUJITSU Enterprise Postgres 9.5, WebAdmin can be installed in two configurations:

- Single-server
- Multiserver

Refer to "[Appendix J Determining the Preferred WebAdmin Configuration](#)" for details.

## 3.2 Installation in Interactive Mode

---

The installation must be performed by a user with administrator privileges (a user ID that belongs to the Administrators group).

The installation procedure is described below.

Note that "x.ySPz" in sample windows indicates the version level of products to install.

### 1. Stop applications and the client program

When reinstalling the product, the applications and the program must be stopped.

Before starting the installation, stop the following:

- Applications that use the product
- pgAdmin
- Instance

Using WebAdmin 9.4

In the [Monitor] menu window, click [Stop].

## Using WebAdmin 9.5

In the [Instances] tab, select the instance to stop and click .

## Using server commands

Execute the net command or sc command of the operating system.

### Example 1

```
> net stop windowsServiceName
```

### Example 2

```
> sc stop windowsServiceName
```

- Web server feature of WebAdmin

If you are using WebAdmin, stop WebAdmin.

Refer to "[C.1.3 Stopping the Web Server Feature of WebAdmin](#)" for details.

- Mirroring Controller

Execute the mc\_ctl command with the stop mode option specified and stop the Mirroring Controller.

### Example

```
> mc_ctl stop -M D:\mcdire\inst1
```

## 2. Inserting the DVD

Insert the FUJITSU Enterprise Postgres DVD into the drive.

## 3. Run the installation

The installation menu will be displayed. Click [Installation].



#### Note

If the Autorun feature of Windows is disabled, or if the operating system is a remote desktop service (terminal service), the installation program is not automatically started. Execute the following file using [Run] or Windows Explorer.

```
Z:\autorun.exe
```

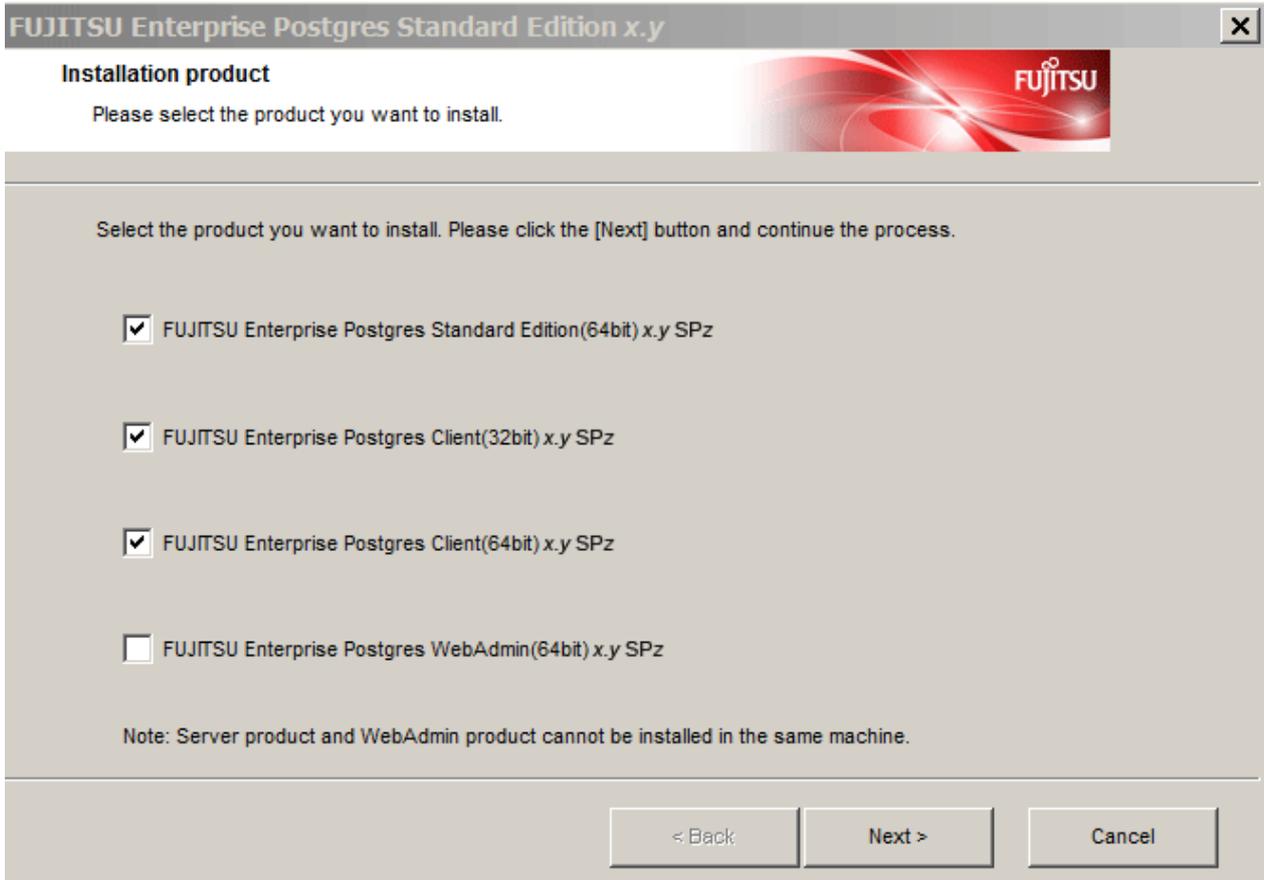
For Z, specify the drive name of the drive where the DVD has been inserted.

#### 4. Select the products to install

The [Installation product] window will be displayed.

Select the products to install, and then click [Next].

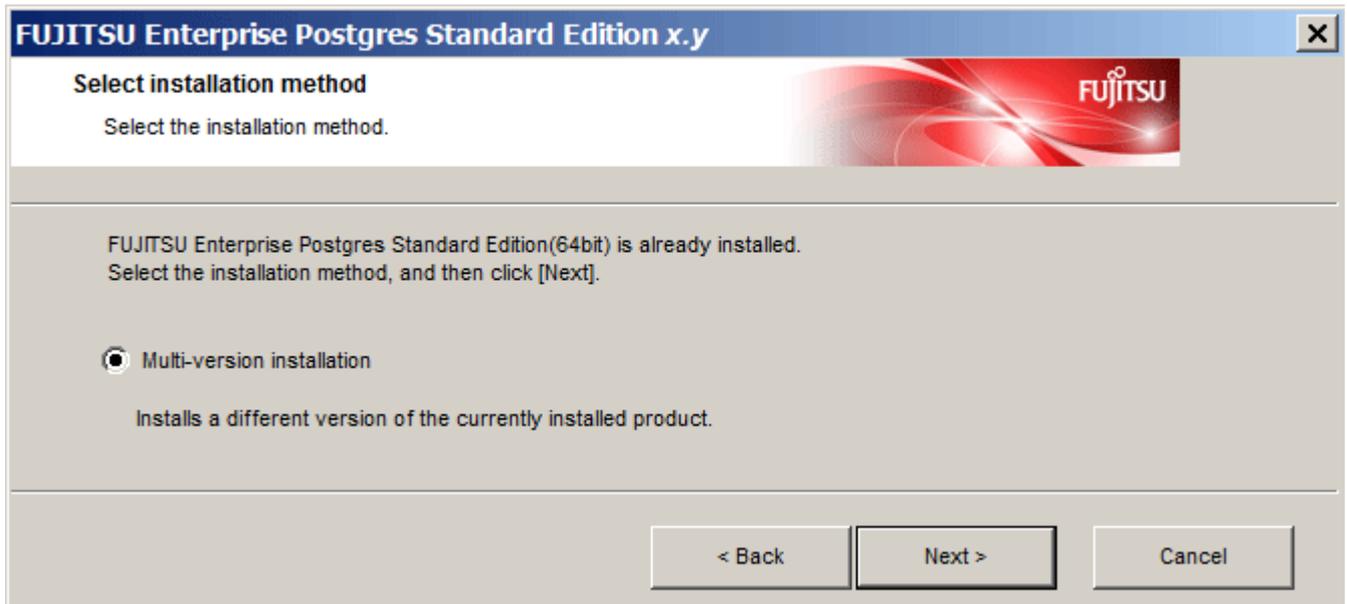
If a selected product can only be reinstalled, refer to "8. Check the settings".



## Information

- To develop or execute a 32-bit application in a 64-bit environment, FUJITSU Enterprise Postgres Client (32bit) is required.
- The first and last options (FUJITSU Enterprise Postgres Server component and WebAdmin component respectively) cannot be selected together. The last option is used to install WebAdmin in a multiserver configuration. Refer to "[Appendix J Determining the Preferred WebAdmin Configuration](#)" for details.
- A window is displayed for each product that was selected but has already been installed. An example is shown below. To perform a multi-version installation, click [Next].

Example



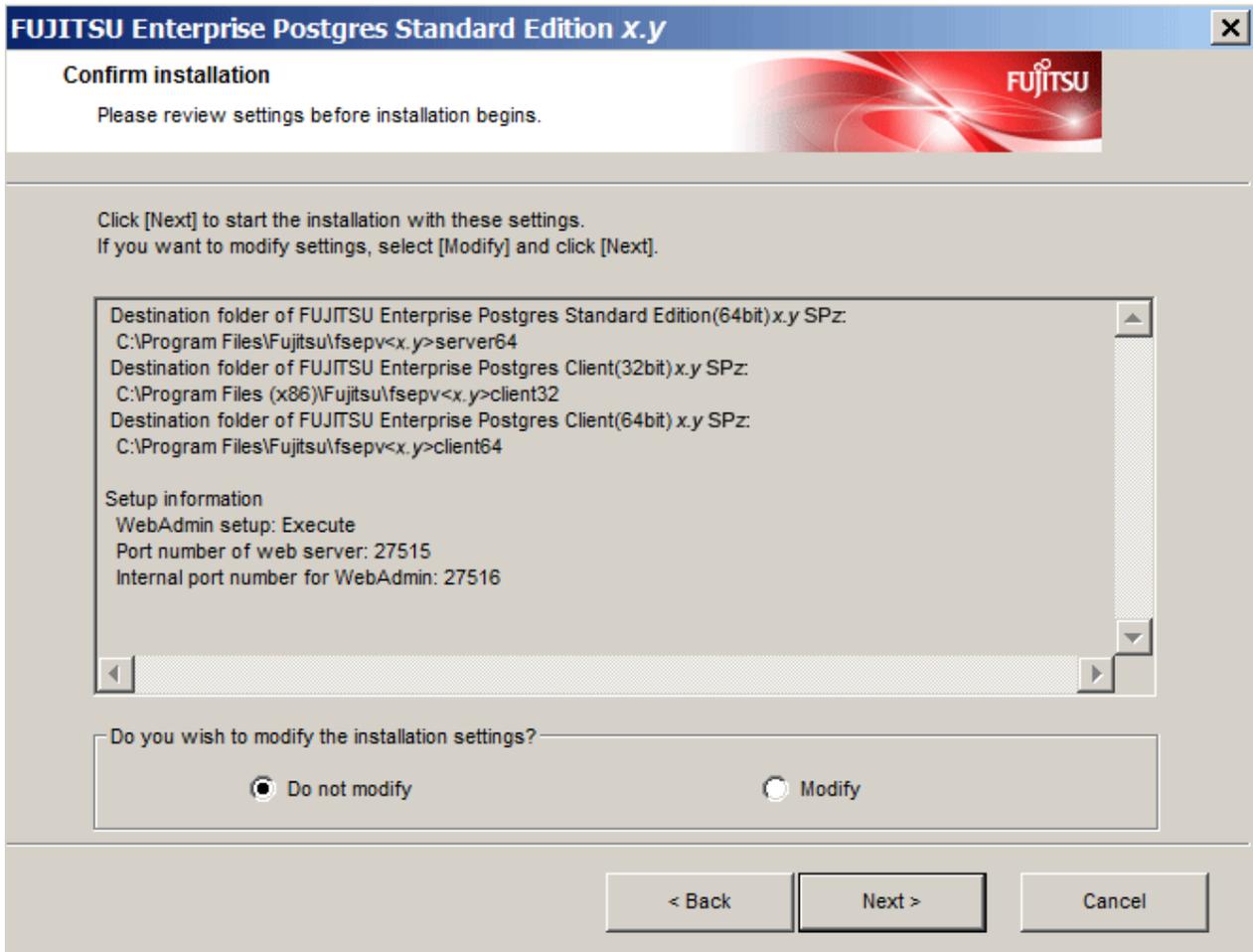
## 5. Checking the installation content

The [Confirm installation] window will be displayed.

If there are no issues with the settings content, click [Next].

The installation process will then start. Proceed to "[9. Completing installation](#)".

To modify the settings content, select [Modify], and then click [Next].



 Note

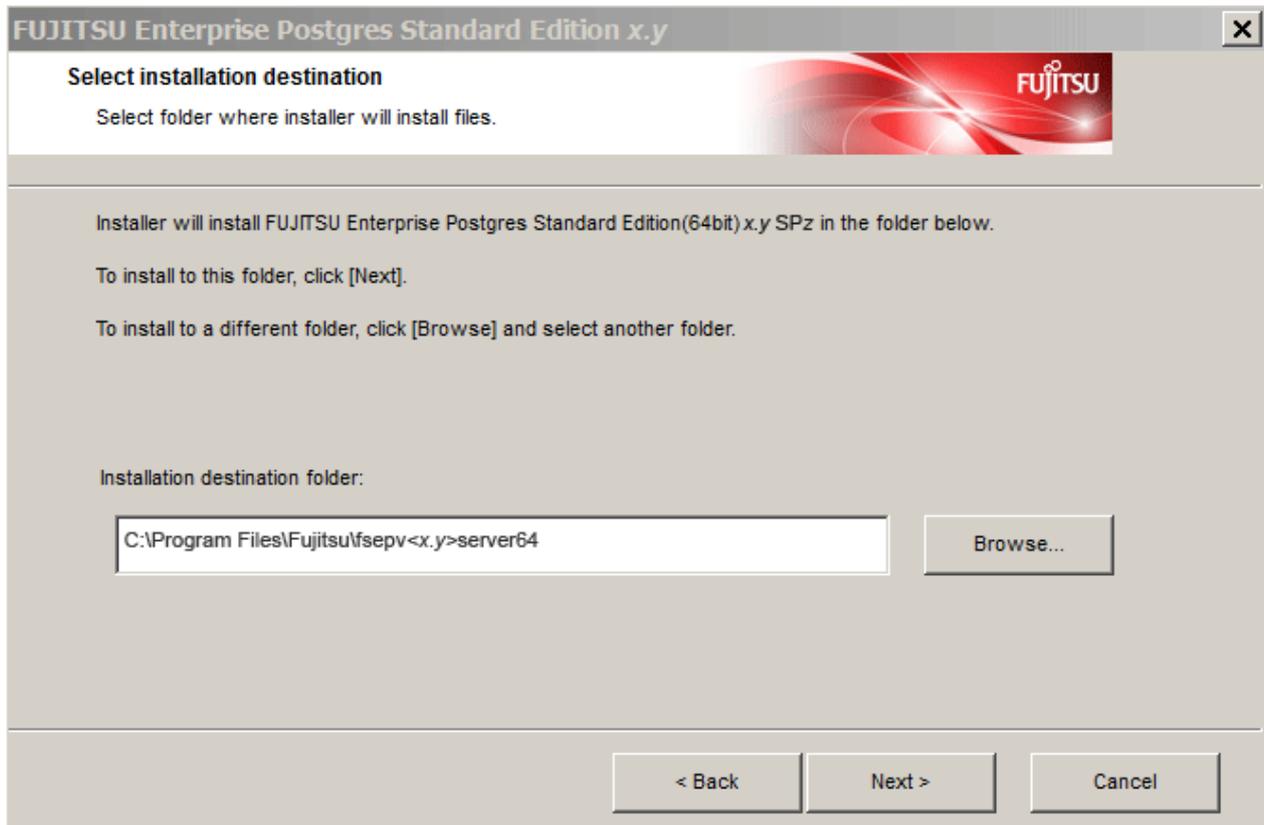
If using WebAdmin for operation, make a note of the Web server port number displayed in the settings, for use in the Windows firewall settings.

## 6. Enter the installation destination

If the installation method is one of the following, the [Select installation destination] window is displayed for each product:

- New installation
- Multi-version installation

Enter the installation destination, and then click [Next].



### Note

- It is necessary to specify a local disk as the installation destination of FUJITSU Enterprise Postgres.
- If using PL/extJava, the folder specified in [Installation destination folder] should not exceed 50 bytes.

## 7. Setting up WebAdmin

The [WebAdmin setup] window is displayed. To perform setup, confirm that the port numbers are unused port numbers in the following ranges, and then click [Next]:

- 1024 to 49151

**FUJITSU Enterprise Postgres Standard Edition x.y**

**WebAdmin setup**  
Please select whether to run the installation and WebAdmin setup simultaneously.

Set up the WebAdmin component of FUJITSU Enterprise Postgres?

No

Yes

Web server port number [1024-49151]

WebAdmin internal port number [1024-49151]

< Back    Next >    Cancel



#### Note

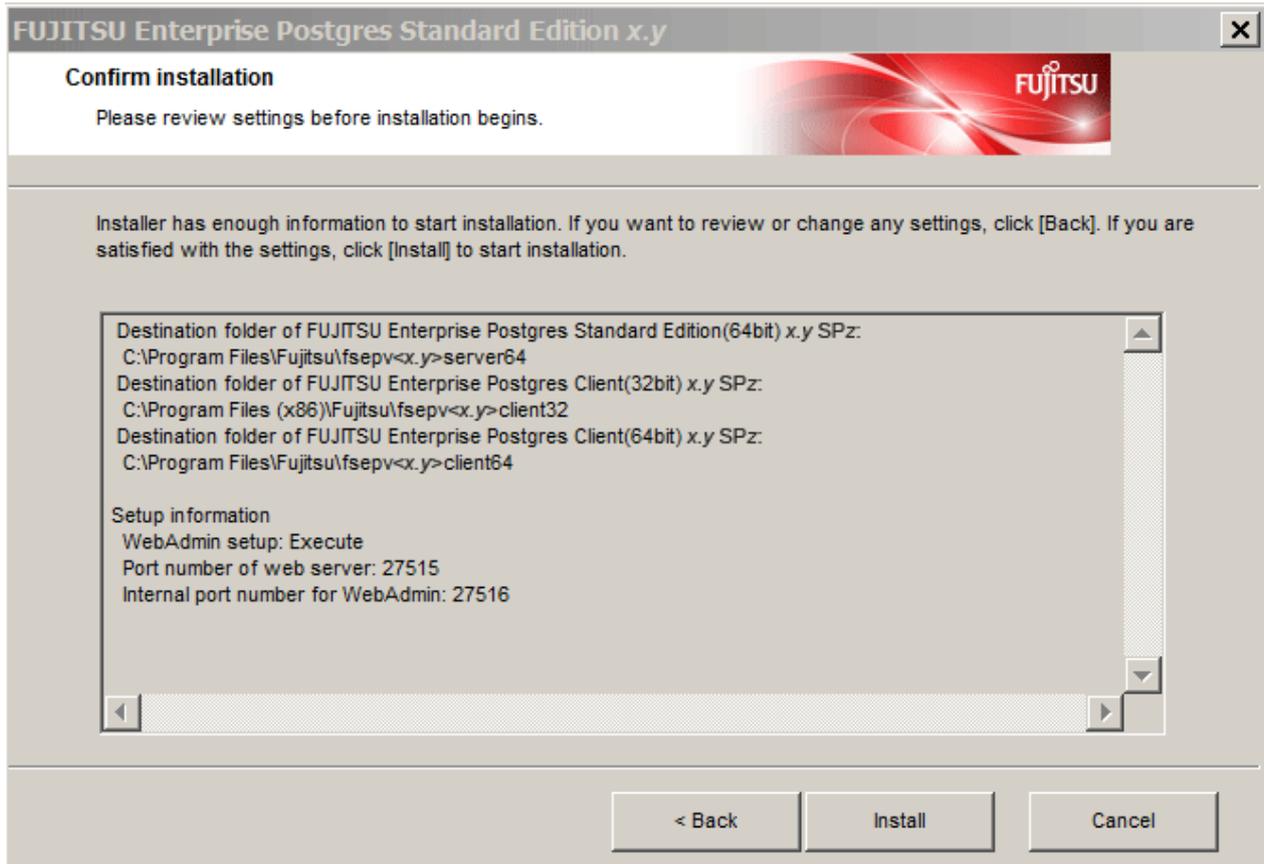
Make a note of the Web server port number for use in the Windows firewall settings.

### 8. Check the settings

The [Confirm installation] window is displayed.

If there are no issues with the settings content, click [Install].

To change any settings, click [Back].



## 9. Completing installation

The [Installation complete] window is displayed. Click [Finish].



Installation is successful if the following has been added to [All Programs] or [All apps] in Windows when you finish the installation:

- FUJITSU Enterprise Postgres Standard Edition *x.y* SPz

### 3.3 Installation in Silent Mode

---

Installation in silent mode can be performed only when the installation method is one of the following:

- New installation
- Multi-version installation

The installation procedure is described below.

#### 1. Insert the DVD

Insert the "server program" DVD in the DVD drive.

The [Install Menu] window will be displayed automatically. Click [Finish].

#### 2. Create an installation parameters CSV file

Consider the features that will be required for system operations, and then create an installation parameters CSV file that uses the following specification format.

```
secti onName, parameterName, value  
secti onName, parameterName, value  
:
```

Refer to "[Appendix A Installation in Silent Mode](#)" for information on installation parameters CSV files.

## Note

If using WebAdmin for operation, make a note of the Web server port number displayed in the settings (the port number defined in WebPortNumber1), for use in the Windows firewall settings.

## Information

The template for the installation parameters CSV file is "*Z:\sample\sample.csv*" (for *Z*, specify the drive name of the drive where the DVD has been inserted).

### 3. Start the command prompt

In Windows, right-click [Command Prompt] and then select [Run as administrator].

### 4. Run the installation

Execute the command below.

```
Z:\>silent.bat c:\temp\inspara.csv
```

For *Z*, specify the drive name of the drive where the DVD has been inserted.

Also in the example above, *c:\temp\inspara.csv* is the installation parameter CSV file name.

If the installer ends in an error, a message is output to the log file and return values are returned. Refer to "[Appendix A Installation in Silent Mode](#)" for details.

## 3.4 Post-installation Tasks

---

There are no post-installation tasks.

# Chapter 4 Setup

This chapter describes the setup procedures to be performed after installation completes.

## 4.1 Operating Method Types and Selection

This section describes how to operate FUJITSU Enterprise Postgres.

There are two methods of managing FUJITSU Enterprise Postgres operations - select one that suits your purposes:

The Operation Guide describes the operating method using WebAdmin, and the equivalent operating method using the server commands.

### Simple operation management using a web-based GUI tool (WebAdmin)

Suitable when using frequently used basic settings and operations for operation management.

This method allows you to perform simple daily tasks such as starting the system before beginning business, and stopping the system when business is over, using an intuitive operation.

#### Usage method

Usage is started by using WebAdmin to create the instance.

By using an external scheduler and the `pgx_dmpall` command, periodic backups can be performed, which can then be used in recovery using WebAdmin.



- Do not use a server command other than `pgx_dmpall` or a server application. Operation modes that use server commands and server applications cannot be used in conjunction with WebAdmin. If used, WebAdmin will not be able to manage the instances correctly.  
Refer to Reference and the PostgreSQL Documentation for information on server commands and server applications.
- An instance that was created using WebAdmin can be set up to operate database multiplexing, however once the setup is complete, it will no longer be possible to select that instance from the WebAdmin management window. Refer to the Cluster Operation Guide for information on how to perform database multiplexing operations.

### Advanced operation management using server commands

When operating in a system that is automated by operation management middleware (Systemwalker Centric Manager, for example), this method allows you to use more detailed settings and operations and perform higher level operation management.

An overview of the operating method using the GUI, and its relationship with the operating method using the server commands, are shown below.

Refer to the Operation Guide for details.

| Operation |                                  | Operation with the GUI  | Operation with commands  |
|-----------|----------------------------------|---|--|
| Setup     | Creating an instance             | WebAdmin is used.<br>The server machine capacity, and the optimum parameter for operations using WebAdmin, are set automatically. | The configuration file is edited directly using the <code>initdb</code> command. |
|           | Creating a standby instance      | WebAdmin is used.<br>WebAdmin performs a base backup of the source instance and creates a standby instance.                       | A standby instance is created using the <code>pg_basebackup</code> command.      |
|           | Changing the configuration files | WebAdmin is used.   | The configuration file is edited directly.                                       |

| Operation                           |                   | Operation with the GUI   | Operation with commands   |
|-------------------------------------|-------------------|--|---|
| Activating and stopping an instance |                   | WebAdmin is used.  | The net command or sc command of the operating system is used.  |
| Creating a database                 |                   | This is defined using pgAdmin of the GUI tool, or using the psql command or the application after specifying the DDL statement.                  |   |
| Backing up the database             |                   | WebAdmin, or the pgx_dmpall command, is used.  | It is recommended that the pgx_dmpall command be used. Recovery to the latest database can be performed.  |
| Database recovery                   |                   | WebAdmin is used.  | To use the backup that was performed using the pgx_dmpall command, the pgx_rcvall command is used.  |
| Monitoring                          | Database errors   | The status in the WebAdmin window can be checked. (*1)   | The messages that are output to the database server log are monitored (*1)  |
|                                     | Disk space        | The status in the WebAdmin window can be checked. A warning will be displayed if the free space falls below 20%. (*1)                            | This is monitored using the fsutil command (check free space), and the dir command (check used space), of the operating system, for example. (*1) |
|                                     | Connection status | This can be checked using pgAdmin of the GUI tool, or referencing pg_stat_activity of the standard statistics view from psql or the application. |   |

\*1: This can be used together with system log monitoring using operations management middleware (Systemwalker Centric Manager, for example).



See

Refer to "Periodic Operations" and "Actions when an Error Occurs" in the Operation Guide for information on monitoring and database recovery.

## 4.2 Preparations for Setup

This section describes the preparation required before setting up FUJITSU Enterprise Postgres.

### 4.2.1 Creating an Instance Administrator

Decide the OS user account that will become the instance administrator. Use either a new user, or a user that already exists.

To create a user in Windows, select [Administrative Tools], [Computer Management], and then create the user in [Local Users and Groups]. Refer to "Help and Support" for details.

The following characters can be used for user names:

- - (hyphen)
- \_ (underscore)
- Space
- A-Z, a-z, 0-9 (alphanumeric)



## Note

The following notes apply if using WebAdmin for operations:

- After creating the user account of the instance administrator, log in to the operating system. A profile directory is created for the user when logging in to the operating system for the first time. This directory will be used by WebAdmin.
- If changing the password for the user account of the instance administrator, always ensure to stop the instance and log out of WebAdmin before making the change. If you mistakenly change the password while logged in to WebAdmin or while the instance is running, log out from WebAdmin, and then log in again, and stop and start the instance.

### 4.2.1.1 Security policy settings

If using commands for operation, security settings that allow logon as a service are required for the operating system user account of the instance administrator in order to start and stop an instance using a Windows service.



## Information

If using WebAdmin for operation, these settings are not required as WebAdmin performs the settings automatically for the user ID (operating system user account) that logged in to the database server.

The following explains how to perform the security settings to allow logon as a service:

#### 1. Displaying the Local Security Policy window

In Windows, select [Administrative Tools], and then click [Local Security Policy].

#### 2. Setting up security

1. In the [Local Security Policy] window, select [Security Settings], select [Local Policies], and then click [User Rights Assignment].
2. Under [Policy] in the [User Rights Assignment] window, double-click [Log on as a service].
3. In the [Log on as a service Properties] window, set the following:
  - a. Select the [Local Security Setting] tab.
  - b. On the [Local Security Setting] tab, click [Add User or Group].
  - c. In the [Select Users or Groups] window, enter the operating system user account of the instance administrator in [Enter the object names to select].
  - d. Click [OK].
4. In the [Log on as a service Properties] window, click [OK].

## 4.2.2 Preparing Directories for Resource Deployment

---

Prepare the directories required when creating instances.

### Considerations when deploying resources

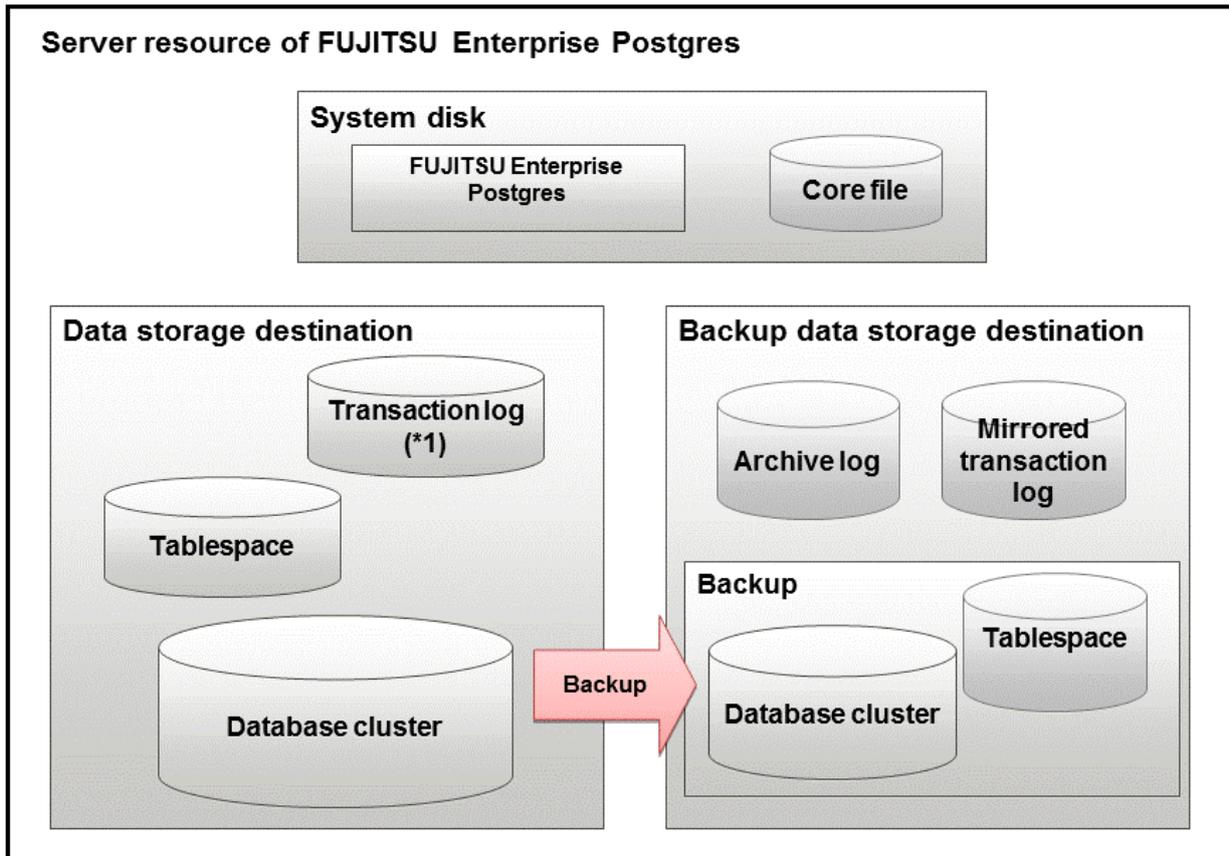
The disk configuration on the resource deployment destination is important, because it affects not only recovery following disk corruption, but normal operation as well. The points for determining the disk configuration are as follows:

1. If the backup data storage destination and the data storage destination are both lost, it will not be possible to recover the data, so deploy them to separate disks.
2. To shorten the recovery time following a single disk fault, deploy the system disk and data storage destination to separate disks.
3. The backup data storage destination requires at least double the capacity of the data storage destination, so deploy it to the disk with the most space available.

- When large amounts of data are updated, the write-to load for the data storage destination, transaction log storage destination, and backup data storage destination (mirrored transaction log) will also be great. For this reason, deploy them to separate disks, out of consideration for performance.

### Note

- When using the volume manager provided by the operating system, be aware of which physical disk the file system has been created on, for example, by deploying the data storage destination and the backup data storage destination to separate disks.
- If using WebAdmin, specify an NTFS volume for the data storage destination and backup data storage destination. A network drive cannot be specified.



\*1: To distribute the I/O load, place the transaction log on a different disk from the data storage destination.

| Resource         | Role   |
|------------------|--|
| Database cluster | The area where the database is stored. It is a collection of databases managed by an instance.                       |
| Tablespace       | Stores table files and index files in a separate area from the database cluster.                                     |
| Transaction log  | Stores log information in preparation for a crash recovery or rollback.  |
| Archive log      | Stores log information for recovery  |
| Corefile         | FUJITSU Enterprise Postgres process corefile output when an error occurs with a FUJITSU Enterprise Postgres process. |

#### Examples of disk deployment

The following are examples of disk deployment:

| Number of disks | Disk                    | Deployment  |
|-----------------|-------------------------|---|
| 3               | System disk             | FUJITSU Enterprise Postgres program                           |
|                 |                         | Corefile  |
|                 | Connected physical disk | Data storage destination, transaction log storage destination |
|                 | Connected physical disk | Backup data storage destination                               |
| 2               | System disk             | FUJITSU Enterprise Postgres program                           |
|                 |                         | Corefile  |
|                 |                         | Data storage destination, transaction log storage destination |
|                 | Connected physical disk | Backup data storage destination                               |

### Proposal for disk deployment using WebAdmin

To generate an instance using WebAdmin, we propose an optimum deployment that takes into account the status of all disks at the time of instance is generation, and item 1 to 3 in the "Considerations when deploying resources" subheading above, based on the criteria below (note that a different deployment can also be specified).

- The instance administrator has read and write privileges for the volumes.

### Preparing directories

The directories to be prepared depend on the way that you create the instances.

The following shows the directories that need to be prepared:

| Directory to be prepared            | Using WebAdmin | Using the initdb command |
|-------------------------------------|----------------|--------------------------|
| Data storage destination            | Y (*1)         | Y                        |
| Backup data storage destination     | Y (*1)         | O                        |
| Transaction log storage destination | O (*1) (*2)    | O                        |
| Corefile output destination         | N (*3)         | O                        |

Y: Required

O: Optional

N: Not required

\*1: WebAdmin automatically creates a directory

\*2: The default is to create in a directory in the data storage destination. When it is necessary to distribute the I/O load for the database data and the transaction log, consider putting the transaction log storage destination on a different disk from the data storage destination

\*3: The default is to output to "*userProfileFolder\localSettingsFolder\Fujitsu\sep\_version\instanceName\core*". For example, if using Windows Server(R) 2008 R2, *userProfileFolder\localSettingsFolder* will be "C:\Users\userName\AppData\Local".

To change the output destination, specify in the *core\_directory* parameter and *core\_contents* parameter in *postgresql.conf*. Refer to "Parameters" in the Operation Guide for information on the settings for these parameters.



### Note

- The directories must meet the following conditions:
  - The directory owner must be the OS user account that you want to be the instance administrator
  - The directory must have write permission
  - The directory must be empty

- If using WebAdmin, network drives cannot be used.
  - If using WebAdmin, the following halfwidth characters can be used for directory names:
    - \ (backslash)
    - - (hyphen)
    - \_ (underscore)
    - : (colon)
    - Space
    - A-Z, a-z, 0-9 (alphanumeric)
  - If anti-virus software is used, set scan exception settings for folders so that none of the server resources that comprise FUJITSU Enterprise Postgres are scanned for viruses. Alternatively, if the server resources that comprise FUJITSU Enterprise Postgres are to be scanned for viruses, stop the instance and perform the scan when tasks that use FUJITSU Enterprise Postgres are not operating.
- .....

### **Confirm and configure directory access permissions**

If the instance administrator user has "Administrator" permissions (user ID belonging to the Administrators group), it is necessary to configure the settings so that each directory inherits the file and directory access permissions for the instance administrator user.

Therefore, ensure that the setting to inherit permissions has been configured.

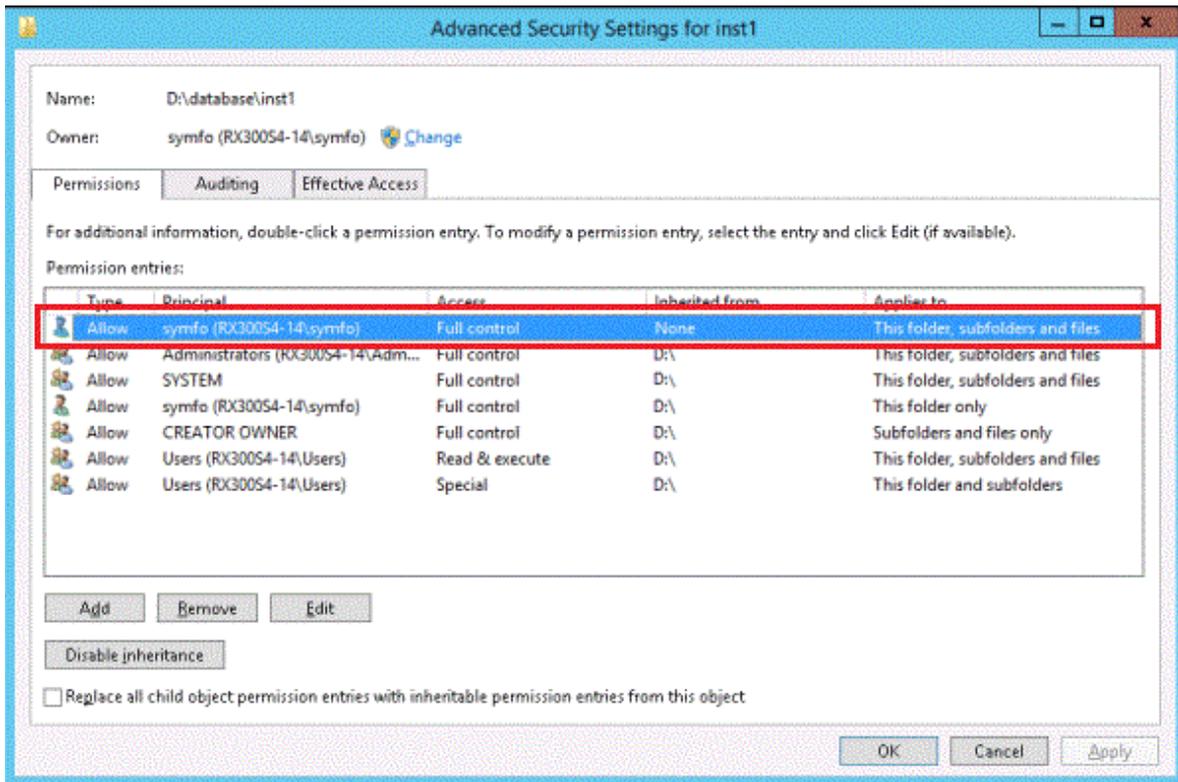
The following is an explanation on how to confirm and configure the settings.

#### **How to confirm access permissions**

Perform the following operations in Windows Explorer on the directories to be prepared in advance:

1. Right-click on the applicable directory, and then click [Properties] from the menu that is displayed.
2. In the [*applicableDir*Properties] window, select [Security] >> [Advanced].
3. In the [Advanced Security Settings for *applicableDir*] window, and in the [Permission entries] list under the [Permissions] tab, confirm that the application destination of the instance administrator user is "This folder, subfolders and files".
4. Click [OK].

A confirmation example using Windows Server(R) 2012 is shown below.



#### How to configure the access permissions

Perform the following operations in Windows Explorer if there are any directories that have not been configured for the access permissions to be inherited.

#### Windows Server(R) 2008 or Windows Server(R) 2008 R2:

1. Right-click on the applicable directory, and then click [Properties] from the menu that is displayed.
2. In the [*applicableDir* Properties] window, select [Security] >> [Advanced].
3. In the [Advanced Security Settings for *applicableDir*] window, under the [Permissions] tab, click [Change Permissions].
4. Click [Add].
5. In the [Select User or Group] window, enter the instance administrator user name as the object name to select, and then click [OK].
6. In the [Permission Entry for *applicableDir*] window, set [This folder, subfolders and files] for [Apply to], and under [Permissions], allow read and write permissions, and then click [OK].
7. In the [Advanced Security Settings for *applicableDir*] window, confirm that the instance administrator user has been added, with [This folder, subfolders and files] set for [Apply to] in the [Permission entries] list.
8. Click [OK].

#### Windows Server(R) 2012 or Windows Server(R) 2012 R2:

1. Right-click on the applicable directory, and then click [Properties] from the menu that is displayed.
2. In the [*applicableDir* Properties] window, select [Security] >> [Advanced].
3. In the [Advanced Security Settings for *applicableDir*] window, click [Add].
4. In the [Permission Entry for *applicableDir*] window, click [Select a principal].
5. In the [Select User or Group] window, enter the instance administrator user name as the object name to select, and then click [OK].
6. In the [Permission Entry for *applicableDir*] window, set "This folder, subfolders and files" for "Apply to:", and under "Basic permissions", allow read and write permissions, and then click [OK].

7. In the [Advanced Security Settings for *applicableDir*] window, confirm that the instance administrator user has been added, with "This folder, subfolders and files" set for "Apply to" in the "Permission entries" list.
8. Click [OK].

### Information

The access permissions can also be configured using the `icacls` command provided by the operating system.

The following is an execution example in which the application destination is set to "(OI)(CI)" and the access permissions are set to "(F)(Full access permissions)" when the data storage destination is "D:\database\inst1" and the instance administrator user is "fsepuser":

```
>icacls D:\database\inst1 /grant fsepuser:(OI)(CI)(F)
processed file: D:\database\inst1
Successfully processed 1 files; Failed processing 0 files
```

## 4.2.3 Estimating Resources

---

Estimate the resources to be used on the FUJITSU Enterprise Postgres.

Refer to "[Appendix G Estimating Database Disk Space Requirements](#)" for information on estimating database disk space requirements.

Refer to "[Parameters automatically set by WebAdmin according to the amount of memory](#)" when creating multiple instances with WebAdmin.

Refer to "[Appendix H Estimating Memory Requirements](#)" when creating instances with the `initdb` command, to estimate memory usage.

## 4.2.4 Windows Firewall Settings

---

This section explains the Windows firewall settings required if using WebAdmin for operation.

These settings are not required if using server commands for operation.

If the Windows firewall feature is to be enabled, you should enable a port number on the Web server. The following explains how to enable a port number:

### Windows Server(R) 2008:

1. In the [Start] menu, click [Control Panel].
2. Click [Security] and then click [Windows Firewall].
3. In the [Windows Firewall] window, click [Change settings].
4. On the [Exceptions] tab, click [Add port].
5. In the [Add a Port] window, set the following:
  - a. In [Name], specify the desired name.
  - b. In [Port number], specify the Web server port number that was specified during the WebAdmin setup.
  - c. Select [TCP].
6. Click [OK].
7. On the [Exceptions] tab, in the [Program or port] list, check if the added port is enabled.
8. In the [Windows Firewall] window, click [OK].

### Windows Server(R) 2008 R2:

1. In the [Start] menu, click [Control Panel].
2. Click [System and Security], and then click [Windows Firewall].
3. In the [Windows Firewall] window, click [Advanced settings] on the left side of the window.

4. In the [Windows Firewall with Advanced Security] window, click [Inbound Rules] on the left side of the window.
5. Click [New Rule] on the right side of the window.
6. In the [New Inbound Rule Wizard] window, select [Port], and then click [Next].
7. Select [TCP] and [Specific local ports], then specify the Web server port number specified during the WebAdmin setup, and click [Next].
8. Select [Allow the connection], and then click [Next].
9. Select the profiles for which this rule applies, and then click [Next].
10. In [Name], specify the desired name, and then click [Finish].
11. In the [Windows Firewall with Advanced Security] window, check if the added rule is enabled under [Inbound Rules] in the center of the window.

### **Windows Server(R) 2012 or Windows Server(R) 2012 R2:**

1. Right-click the [Start] screen, and then click [All apps] that is displayed in the bottom-right of the screen. In the [Apps] window, click [Control Panel].
2. Click [System and Security], and then click [Windows Firewall].
3. In the [Windows Firewall] window, click [Advanced settings] on the left side of the window.
4. In the [Windows Firewall with Advanced Security] window, click [Inbound Rules] on the left side of the window.
5. Click [New Rule] on the right side of the window.
6. In the [New Inbound Rule Wizard] window, select [Port], and then click [Next].
7. Select [TCP] and [Specific local ports], then specify the Web server port number specified during the WebAdmin setup, and click [Next].
8. Select [Allow the connection], and then click [Next].
9. Select the profiles for which this rule applies, and then click [Next].
10. In [Name], specify the desired name, and then click [Finish].
11. In the [Windows Firewall with Advanced Security] window, check if the added rule is enabled under [Inbound Rules] in the center of the window.

## **4.2.5 Preparing for Output to the Event Log**

---

This section provides an explanation on the preparation to be carried out if you are outputting error logs to the event log.

If outputting error logs to the event log, you should register an event source name beforehand.

If you do not register an event source name, the message content output to the event log may be incomplete.

Due to the default event source name "FUJITSU Enterprise Postgres" being output to the event log when using the following commands, you should register this default event source name beforehand:

- pg\_ctl command
- pgx\_dmpall command
- pgx\_rcvall command

The following is an example in which the DLL of a 64-bit product is registered under the default event source name:

```
regsvr32 "C:\Program Files\Fujitsu\fsepv<xy>server64\lib\pgevent.dll"
```

### **If using multiple instances**

You can output messages corresponding to the event source name assigned by the user, so that messages output to the event log can be identified by instance.

The following is an example in which the DLL of a 64-bit product is registered under the event source name "FUJITSU Enterprise Postgres inst1":

```
regsvr32 /n /i:"FUJITSU Enterprise Postgres inst1" "C:\Program Files\Fujitsu\fsepv<xy>server64\lib\npgevent.dll"
```

You will need to edit the parameters for each instance, therefore, after creating an instance, refer to "4.5.1 Error Log Settings" when performing this setting.

Note that this step is not required if using WebAdmin to create an instance.

### If installing multiple versions

If FUJITSU Enterprise Postgres is already installed on the same machine, search for the key below in Registry Editor, and make a note of the path of the registered DLL. Afterwards, register a new DLL under the default event source name.

Use the DLL path that you made a note of in the above step when re-registering the default event source name during an uninstall.

**FUJITSU Enterprise Postgres**



See

Refer to "Registering Event Log on Windows" in "Server Setup and Operation" in the PostgreSQL Documentation for information on how to register event source names.

## 4.3 Creating an Instance

There are two methods that can be used to create an instance:

- [4.3.1 Using WebAdmin](#)
- [4.3.2 Using the initdb Command](#)

### Creating multiple instances

Multiple instances can be created.

The memory allocated needs to be adjusted when multiple instances are created with WebAdmin (refer to "Parameters automatically set by WebAdmin according to the amount of memory" for details).

### Features that cannot be set up using WebAdmin

The feature below cannot be set up using WebAdmin. After creating the instance using WebAdmin, perform the additional setup tasks according to the manual for each feature described in the Operation Guide.

- Storage data protection using transparent data encryption



Note

- Instances created using the initdb command cannot be managed using WebAdmin.
- Always use WebAdmin to delete instances that were created using it. Because WebAdmin management information cannot be deleted, WebAdmin will determine that the instance is abnormal.
- Databases with the names 'template0' and 'template1' are automatically created when an instance is created. These databases are used as the templates for databases created later. Furthermore, a default database with the name 'postgres' is automatically created, which will be used with FUJITSU Enterprise Postgres commands. It is important that you do not delete these databases created by default.
- When an instance that uses WebAdmin is created successfully, the following Windows service is registered:

*fsep\_versi on\_edi ti on\_archi tecture\_userName\_i nstanceName*

The account and password of the instance administrator are registered in the Windows service.  
If the password for this account is changed, you must also change the password registered in the service.  
Change this at the Properties window registered in the Windows service.

- Refer to "[4.5.2 Configuring Automatic Start and Stop of an Instance](#)" for information on how to start and stop the operating system of the database server, and how to start and stop linked instances.

---

## 4.3.1 Using WebAdmin

This section describes how to create an instance using WebAdmin.

If WebAdmin is not set up when the installation is performed, or needs to be configured to use an external repository database, refer to "[C.1 Setting Up WebAdmin](#)" and then set up WebAdmin.

Use Windows(R) Internet Explorer 8.0, 9.0, 10.0 or 11.0 as the browser, and allow cookies and pop-up requests from the server on which FUJITSU Enterprise Postgres is installed.

Refer to "[Appendix B Recommended WebAdmin Environments](#)" for information on how to change the pop-up request settings and other recommended settings.



- WebAdmin does not run in Windows(R) safe mode.
- If the same instance is operated from multiple WebAdmin windows, it will not work correctly.
- For efficient use of WebAdmin, it is recommended not to use the browser's navigation buttons for [Back], [Forward] and context-sensitive menus.
- WebAdmin uses the labels "Data storage path", "Backup storage path" and "Transaction log path" to indicate "data storage destination", "backup data storage destination" and "transaction log storage destination" respectively. In this manual these terms are used interchangeably.
- If the browser was not operated for a fixed period (about 30 minutes), the session will time out and the login window will be displayed again for the next operation.
- Port access permissions  
If a port is blocked (access permissions have not been granted) by a firewall, enable use of the port by granting access. Refer to the vendor document for information on how to grant port access permissions.  
Consider the security risks carefully when opening ports.

### 4.3.1.1 Logging in to WebAdmin

This section describes how to log in to WebAdmin.

#### Activation URL for WebAdmin

In the browser address bar, type the activation URL of the WebAdmin window in the following format:

```
http://hostNameOrIpAddress:portNumber/
```

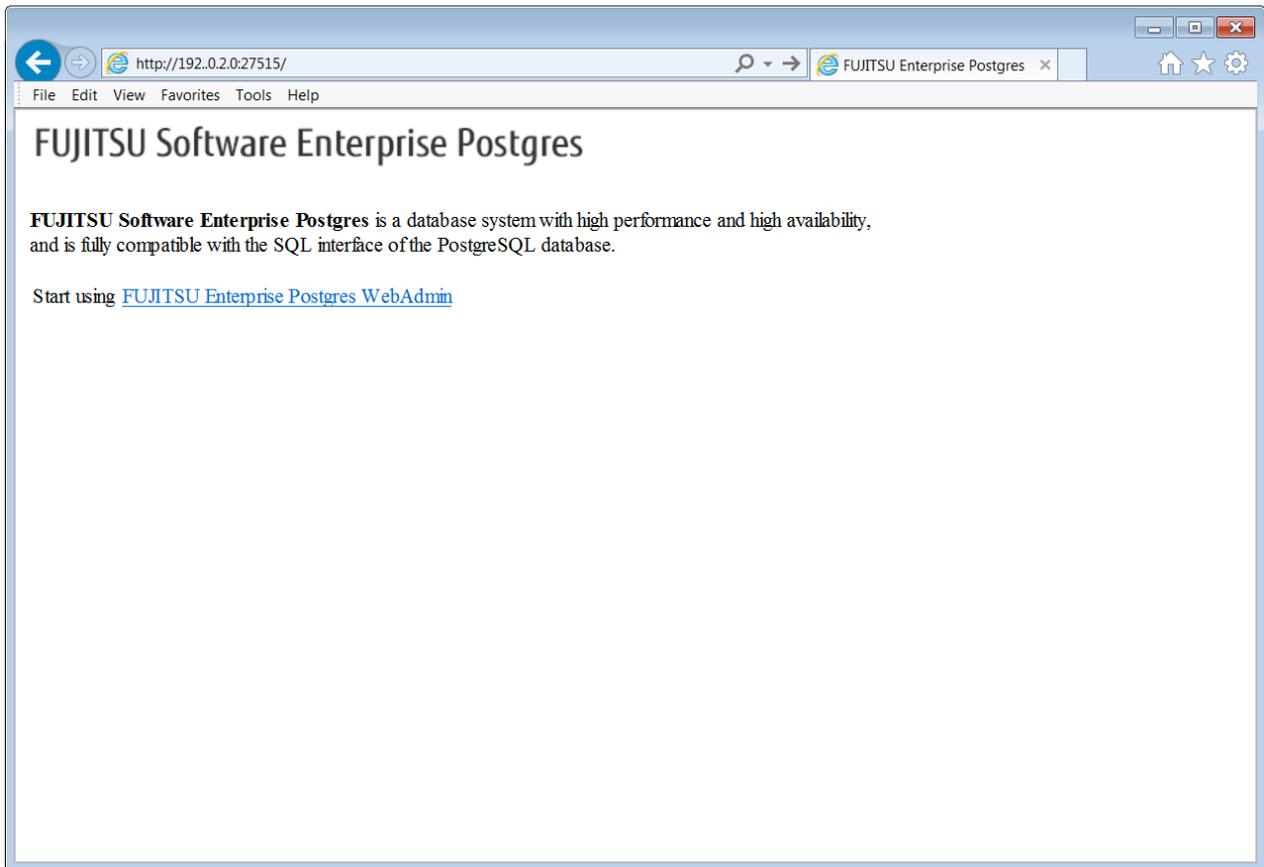
- *hostNameOrIpAddress*: Host name or IP address of the server where FUJITSU Enterprise Postgres is installed
- *portNumber*: Port number of WebAdmin. The default port number is 27515.

#### Example

For a server with IP address "192.0.2.0" and port number "27515":

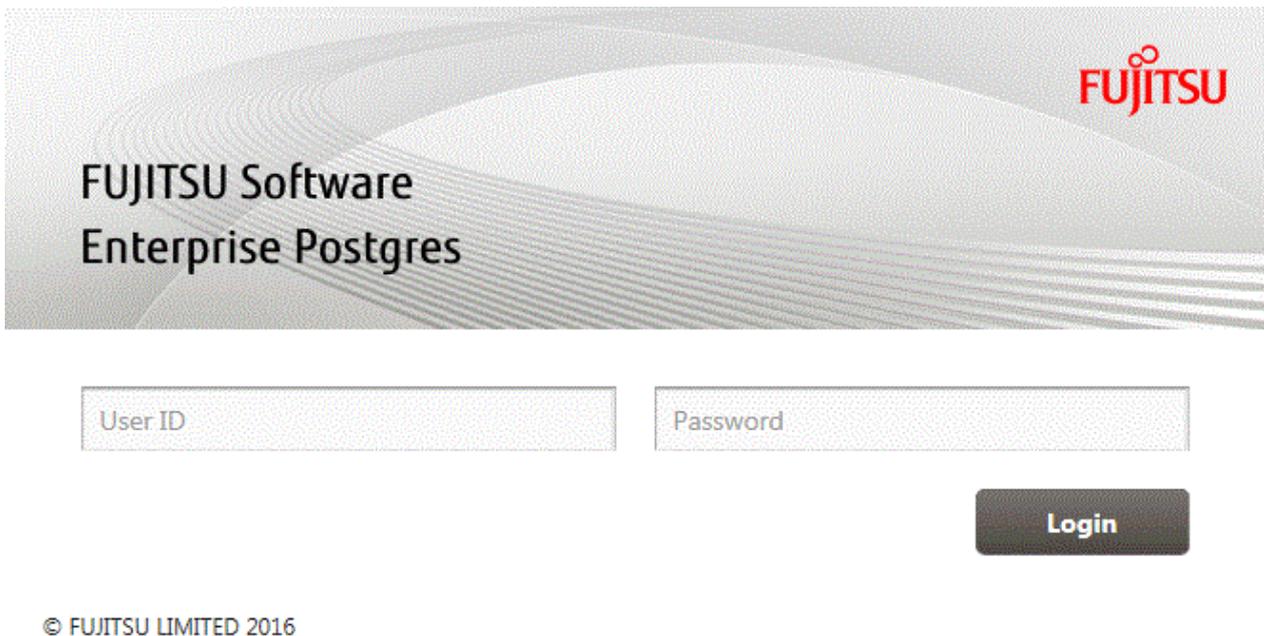
```
http://192.0.2.0:27515/
```

The activation URL window shown below is displayed.



### Logging in to the database server

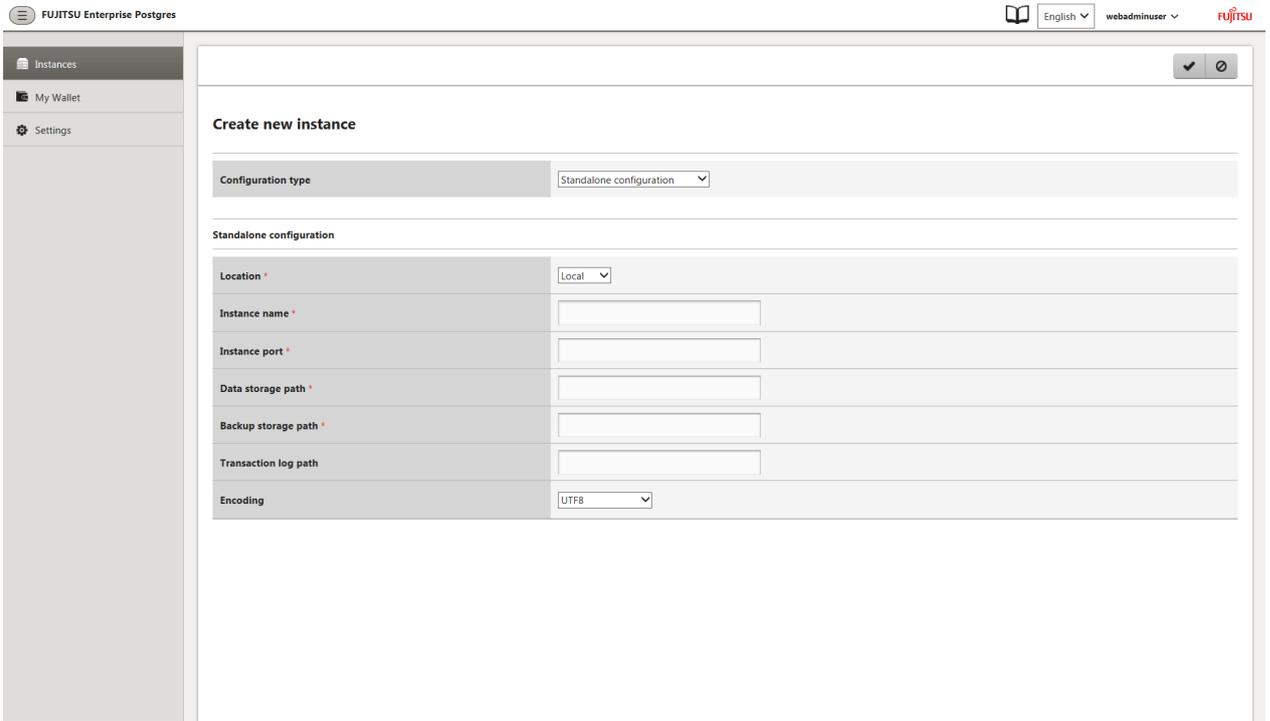
Click [FUJITSU Enterprise Postgres WebAdmin] in the activation URL window to activate WebAdmin and display the [Login] window. Enter the instance administrator user ID (operating system user account name) and password, and log in to WebAdmin.



### 4.3.1.2 Creating an Instance

This section describes how to create an instance.

1. Activate WebAdmin, and log in to the database server.
2. In the [Instances] tab, click .
3. Enter the information for the instance to be created.



The screenshot shows the 'Create new instance' form in the Fujitsu Enterprise Postgres WebAdmin interface. The form is titled 'Create new instance' and is located in the 'Instances' tab. The 'Configuration type' is set to 'Standalone configuration'. Under 'Standalone configuration', the 'Location' is set to 'Local'. The form includes several text input fields for 'Instance name', 'Instance port', 'Data storage path', 'Backup storage path', and 'Transaction log path'. The 'Encoding' is set to 'UTF8'.

Enter the following items:

- [Configuration type]: Whether to create a standalone instance or an instance which is part of a cluster
- [Location]: Whether to create the instance in the server that the current user is logged into, or in a remote server. The default is "Local", which will create the instance in the server machine where WebAdmin is currently running.
- [Instance name]: Name of the database instance to manage

The name must meet the conditions below:

- Maximum of 16 characters
- The first character must be an ASCII alphabetic character
- The other characters must be ASCII alphanumeric characters
- [Instance port]: Port number of the database server
- [Data storage path]: Directory where the database data will be stored
- [Backup storage path]: Directory where the database backup will be stored
- [Transaction log path]: Directory where the transaction log will be stored
- [Encoding]: Database encoding system

If "Remote" is selected for [Location], the following additional items must be entered:

- [Host name]: Name of the host where the instance is to be created
- [Operating system credential]: Operating system user name and password for the remote machine where the instance is to be created
- [Remote WebAdmin port for standalone]: Port in which WebAdmin is accessible in the remote machine

## Note

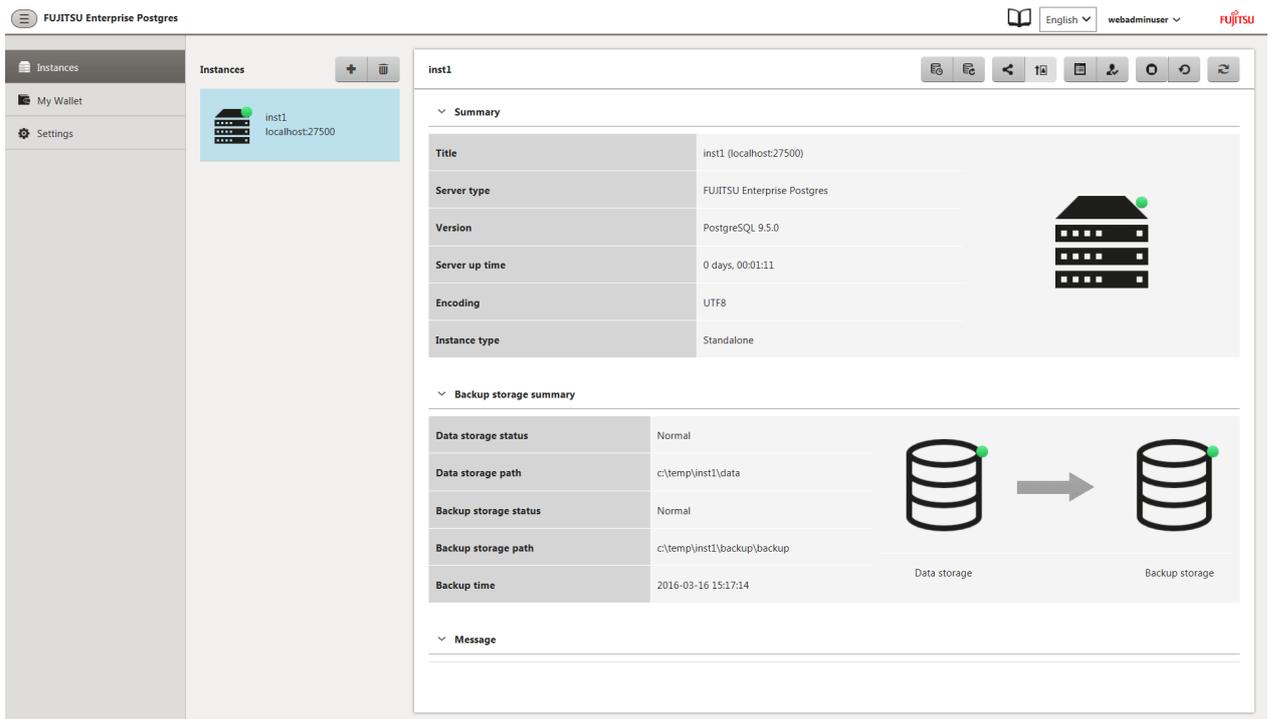
---

- Refer to "[4.2.2 Preparing Directories for Resource Deployment](#)" - "**Considerations when deploying resources**" for information on points to consider when determining the data storage path, backup storage path, and transaction log path.
  - Only the port number can be modified after the instance has been created.
  - Do not specify shortcuts for the data storage path, backup storage path, or transaction log path.
  - In the instance that is created using WebAdmin, the locale of the character set to be used in the database, and the locale of the collating sequence, are fixed using C.
  - The following characters can be used for the data storage path, backup storage path, and transaction log path:
    - \ (backslash)
    - - (hyphen)
    - \_ (underscore)
    - : (colon)
    - Space
    - A-Z, a-z, 0-9 (alphanumeric)
  - Instance administrator read and write permissions are required for the data storage path, backup storage path, and transaction log path.
  - For the port number, specify an unused port number in the following range:
    - Windows Server(R) 2008, Windows Server(R) 2008 R2, Windows Server(R) 2012 or Windows Server(R) 2012 R2: 1024 to 49151
  - Make a note of the port number for use in the Windows firewall settings.
  - Refer to "[4.5.2 Configuring Automatic Start and Stop of an Instance](#)" for information on configuring the automatic start and stop of instances.
- 

4. Click  to create the instance.

If the instance is created successfully, a message indicating the same will be displayed.

5. The instance will be started when it is created successfully.



6. Back up the basic information that was set

Back up the WebAdmin management information periodically to ensure operational continuity when a fault occurs on the system disk. Follow the procedure below to perform the backup.

- Stop the WebAdmin server. Refer to "[C.1.3 Stopping the Web Server Feature of WebAdmin](#)" for details.
- Back up the following directory:

```
instal\Dir\gui\data\fevwa
```

### Note

The following message is output during startup of an instance when the startup process is operating normally, therefore, the user does not need to be aware of this message.

```
FATAL: the database system is starting up (XXXXX)
```

### 4.3.1.3 Changing the Settings

You can change the following information that is set when instances are created.

You can change the character set and maximum number of connections, for example, to suit the operating and management environment for FUJITSU Enterprise Postgres.

- [Character set](#)
- [Client authentication](#)
- [Communication](#)
- [SQL options](#)
- [Used memory](#)
- [Streaming replication](#)

## Information

These settings are the same as the parameters that can be set in the files shown below. Refer to "[Appendix D Configuring Parameters](#)" for information on the equivalence relationship between the item name and the parameter.

- postgresql.conf
- pg\_hba.conf

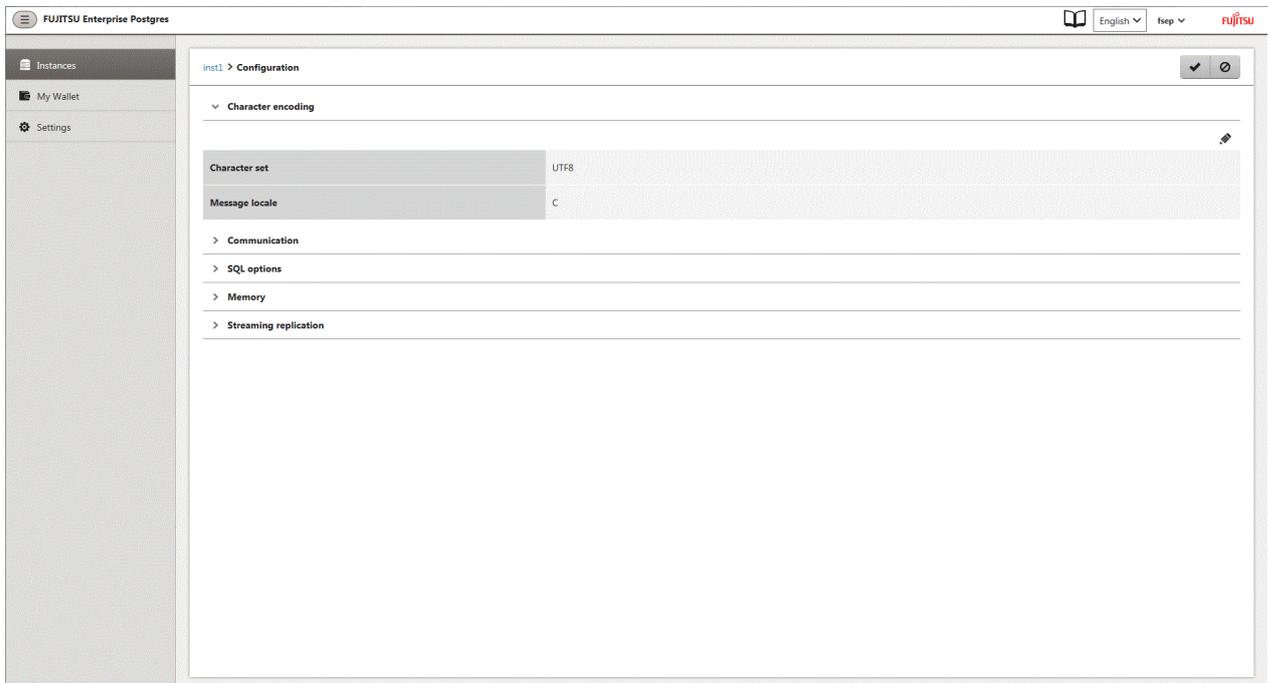
## Note

The files shown below can also be modified directly, however if a parameter not described in "[Appendix D Configuring Parameters](#)" was edited by mistake, WebAdmin may not run correctly.

- postgresql.conf
- pg\_hba.conf

### Changing the instance configuration

1. Start WebAdmin and log in to the database server.
2. In the [Instances] tab, click .
3. Click  on the section that needs to be modified. In the example below, the [Character encoding] section is being modified.
4. Edit [Character set] and [Message locale], and then click .



## See

Select a client-side encoding system that can be converted to/from the database encoding system. Refer to "PostgreSQL Documentation" - "Server Administration" - "Automatic Character Set Conversion Between Server and Client" for information on the encoding system combinations that can be converted.

### Changing client authentication

1. Start WebAdmin and log in to the database server.
2. In the [Instances] tab, click .

Click  to register new authentication information.

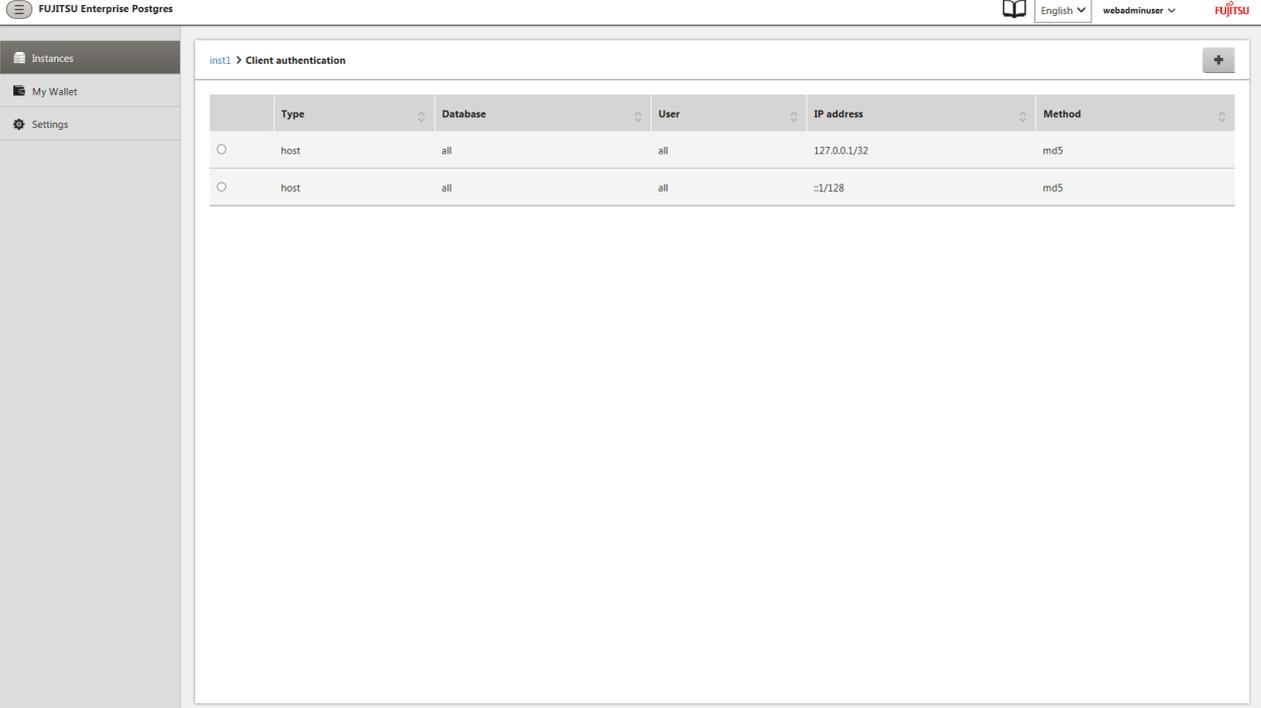
To change authentication information, select the information, and then click .

To delete authentication information, select the information, and then click .

## Note

When creating the instance, do not delete the entry below, because it is a connection required for WebAdmin to monitor the operational status of the database:

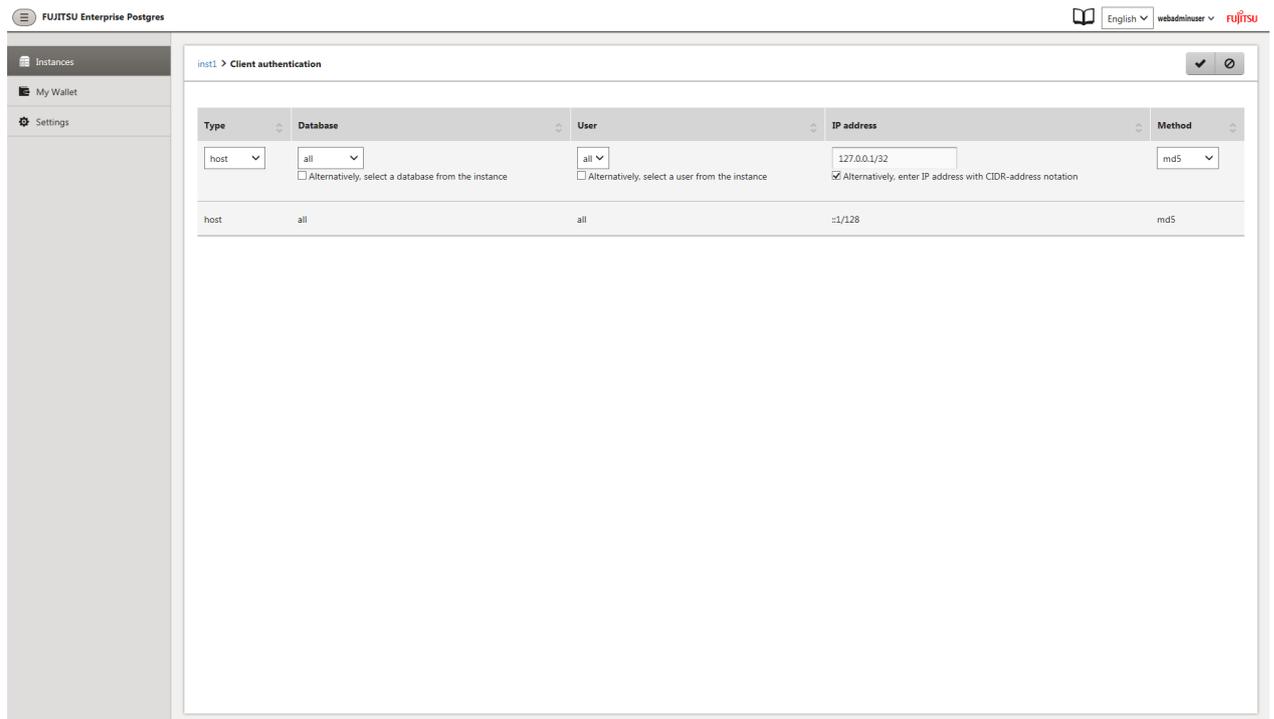
Type= host, Database=all, User=all, and Method=md5



The screenshot shows the 'Client authentication' configuration page for instance 'inst1'. The page includes a sidebar with 'Instances', 'My Wallet', and 'Settings' options. The main content area displays a table with the following data:

|                       | Type | Database | User | IP address   | Method |
|-----------------------|------|----------|------|--------------|--------|
| <input type="radio"/> | host | all      | all  | 127.0.0.1/32 | md5    |
| <input type="radio"/> | host | all      | all  | ::1/128      | md5    |

Click  - the window will change as shown below.



## 4.3.2 Using the initdb Command

This section describes the procedure to create an instance using the initdb command.

### Note

If a port is blocked (access permissions have not been granted) by a firewall, enable use of the port by granting access. Refer to the vendor document for information on how to grant port access permissions.

Consider the security risks carefully when opening ports.

### 4.3.2.1 Creating an Instance

Create an instance, with the database cluster storage destination specified in the PGDATA environment variable or in the `-D` option. Furthermore, the user that executed the initdb command becomes the instance administrator.

### Note

- Instances created using the initdb command cannot be managed using WebAdmin.
- If creating multiple instances, ensure that there is no duplication of port numbers or the directories that store database clusters.

### See

Refer to "initdb" in "Reference" in the PostgreSQL Documentation for information on the initdb command.

The procedure to create an instance is described below.

1. Use the OS user account that you want as the instance administrator.

Connect with the server using the OS user account that you want as the instance administrator.

## 2. Configure the environment variables

Configure the environment variables in the server with the newly created instance.

Set the following environment variables:

- PATH environment variables

Add installDir\bin and installDir\lib.

### Example

The following is a setting example for environment variables in which "C:\Program Files\Fujitsu\fsepv<xy>server64" is used as the installation folder:

Note that "<xy>" indicates the product version and level.

```
> SET PATH=C:\Program Files\Fujitsu\fsepv<xy>server64\bin;C:\Program Files\Fujitsu
\fsepv<xy>server64\lib;%PATH%
```

## 3. Create a database cluster

Create the database cluster with the initdb command, specifying the storage destination directory.

Specify the transaction log storage destination and the locale setting option as required.

### Example

```
> initdb -D D:\database\inst1 --xlogdir=E:\transaction\inst1 --lc-collate="C" --lc-ctype="C"
--encoding=UTF8
```

## Point

In some features, instance names are requested, and those names are required to uniquely identify the instance within the system. These features allow names that conform to WebAdmin naming conventions, so refer to the following points when determining the names:

- Maximum of 16 characters
- The first character must be ASCII alphabetic character
- The other characters must be ASCII alphanumeric characters

## Note

- To balance I/O load, consider deploying the transaction log storage destination to a disk device other than the database cluster storage destination and the backup data storage destination.
- Messages may not display correctly if a value other than "C" is specified as the display language for messages.
- Specify "C" for collation and character category. Performance deteriorates if you specify a value other than "C", although the behavior will follow the rules for particular languages, countries and regions. Furthermore, this may need to be revised when running applications on systems with different locales.

For example, specify as follows:

```
initdb --locale="C" --lc-messages="C"
initdb --lc-collate="C" --lc-ctype="C"
```

- Specify an encoding system other than SQL\_ASCII for the database. If SQL\_ASCII is used, there is no guarantee that the encryption system for data in the database will be consistent, depending on the application used to insert the data.



## See

Refer to "Locale Support" in "Localization" in "Server Administration" in the PostgreSQL Documentation for information on locales.

### 4. Set port number.

Specify a port number in the port parameter of postgresql.conf. Ensure that the specified port number is not already used for other software. If a port number is not specified, "27500" is selected.

Register the specified port numbers in the /etc/services file if WebAdmin is used to create other instances. WebAdmin uses the services file to check if port numbers specified as available candidates have been duplicated.

Register any name as the service name.



## Note

Make a note of the port number for use in the Windows firewall settings.

### 5. Set the corefile output destination.

Specify the output destination of the corefile, which can later be used to collect information for investigation, by setting the core\_directory and core\_contents parameters of postgresql.conf.



## See

Refer to "Parameters" in the Operation Guide for information on the settings for these parameters.

### 6. Set the backup storage destination.

Specify the backup data storage destination and other backup settings when backup is to be performed as a provision against database errors.



## See

Refer to "Backup Methods" in the Operation Guide for information on specifying backup settings.

### 7. Register an instance in the Windows service

Use the register mode of the pg\_ctl command to register an instance in the Windows service.

Specify the service name, user name, password and path to the instance in the pg\_ctl command, and register the instance in the Windows service.

#### Example

The following is a setting example, in which the service name to register is "inst1", the user name is "fepuser", and the storage destination directory of the database cluster is "D:\database\inst1":

```
> pg_ctl register -N "inst1" -U fepuser -P ***** -D D:\database\inst1 -w
```



## Note

- Registration should be performed by an instance administrator with "Administrator" privileges.
- For the following reasons, a user name and password must always be specified:

Because the Windows service is started up by the Network Service account, all user resources are created as resources of that account. This can result in error events such as failing to access database resources and not being able to perform backups/recovery.

Note that if not specifying a user name and password for security reasons, you should specify the account from the Windows services list immediately after registering the instance in Windows services.

- When entering the password that is specified in the `pg_ctl` command, for security reasons, you should be careful not to allow other users to access it.

.....

This completes registration of an instance in the Windows service.

Commands such as `sc query` can be used to check the registration status.

#### 8. Start an instance

Use the following procedure to start the service:

- a. Display the [Services] window.

In Windows, select [Administrative Tools], and then click [Services].

- b. Start the service

From the services list, select the instance name that you wish to start, and click [Start Service].

If using commands to start the service, specify the service name using either the `net start` command or `sc start` command from the command prompt.

## 4.4 Configuring Remote Connections

---

This section describes the settings required when connecting remotely to FUJITSU Enterprise Postgres from a database application or a client command.

### 4.4.1 When an Instance was Created with WebAdmin

---

#### Settings related to connection

The default is to accept connections from remote computers to the database.

Change "listen\_addresses" in `postgresql.conf` to change this.

Refer to "[Appendix D Configuring Parameters](#)" for more information on `postgresql.conf`.

#### Client Authentication Information settings

The following content is set by default when WebAdmin is used to create an instance.

- Authentication of remote connections from local machines is performed.

When changing Client Authentication Information, select [Client Authentication] from [Setting], and then change the settings.

### 4.4.2 When an Instance was Created with the `initdb` Command

---

#### Connection settings

The default setting only permits local connections from the client to the database. Remote connections are not accepted.

Change "listen\_addresses" in `postgresql.conf` to perform remote connection.

All remote connections will be allowed when changed as shown below.

Example

```
listen_addresses = '*'
```

Also, configure the parameters shown below in accordance with the applications and number of client command connections.

| Parameter name                 | Parameter description  |
|--------------------------------|--|
| superuser_reserved_connections | Number of connections reserved for database maintenance, for example backup or index rebuilding. If you need to simultaneously perform a large number of processes that exceed the default value, change this value accordingly. |
| max_connections                | Set the value as:<br><br><i>numberOfSimultaneousConnectionsToInstance + superuser_reserved_connections</i>   |

### Client authentication information settings

When trying to connect from a client to a database, settings are required to determine whether the instance permits connections from the client - if it does, then it is possible to make settings to determine if authentication is required.



See

Refer to "The pg\_hba.conf File" in "Server Administration" in the PostgreSQL Documentation for details.

## 4.4.3 Windows Firewall Settings

If the Windows firewall feature is to be enabled, you should enable a port number on the database server. The following explains how to enable a port number:

### Windows Server(R) 2008:

1. In the [Start] menu, click [Control Panel].
2. Click [Security] and then click [Windows Firewall].
3. In the [Windows Firewall] window, click [Change settings].
4. On the [Exceptions] tab, click [Add port].
5. In the [Add a Port] window, set the following:
  - a. In [Name], specify the desired name.
  - b. In [Port number], specify the Web server port number that was specified when creating the instance.
  - c. Select [TCP].
6. Click [OK].
7. On the [Exceptions] tab, in the [Program or port] list, check if the added port is enabled.
8. In the [Windows Firewall] window, click [OK].

### Windows Server(R) 2008 R2:

1. In the [Start] menu, click [Control Panel].
2. Click [System and Security], and then click [Windows Firewall].
3. In the [Windows Firewall] window, click [Advanced settings] on the left side of the window.
4. In the [Windows Firewall with Advanced Security] window, click [Inbound Rules] on the left side of the window.
5. Click [New Rule] on the right side of the window.
6. In the [New Inbound Rule Wizard] window, select [Port], and then click [Next].
7. Select [TCP] and [Specific local ports], then specify the Web server port number specified when creating the instance, and then click [Next].
8. Select [Allow the connection], and then click [Next].

9. Select the profiles for which this rule applies, and then click [Next].
10. In [Name], specify the desired name, and then click [Finish].
11. In the [Windows Firewall with Advanced Security] window, check if the added rule is enabled under [Inbound Rules] in the center of the window.

### Windows Server(R) 2012 or Windows Server(R) 2012 R2:

1. Right-click the [Start] screen, and then click [All apps] that is displayed in the bottom-right of the screen. In the [Apps] window, click [Control Panel].
2. Click [Windows Firewall].
3. In the [Windows Firewall] window, click [Advanced settings] on the left side of the window.
4. In the [Windows Firewall with Advanced Security] window, click [Inbound Rules] on the left side of the window.
5. Click [New Rule] on the right side of the window.
6. In the [New Inbound Rule Wizard] window, select [Port], and then click [Next].
7. Select [TCP] and [Specific local ports], then specify the Web server port number specified when creating the instance, and then click [Next].
8. Select [Allow the connection], and then click [Next].
9. Select the profiles for which this rule applies, and then click [Next].
10. In [Name], specify the desired name, and then click [Finish].
11. In the [Windows Firewall with Advanced Security] window, check if the added rule is enabled under [Inbound Rules] in the center of the window.

## 4.5 Other Settings

---

This section describes settings that are useful for operations.

### 4.5.1 Error Log Settings

---

This section explains the settings necessary to monitor errors in applications and operations, and to make discovering the causes easier.

Make error log settings only when instances are created with the initdb command.

When creating instances with WebAdmin, these settings are already made and hence do not need to be set. Furthermore, some parameters are used by WebAdmin, and if changed, may cause WebAdmin to no longer work properly. Refer to "[Appendix D Configuring Parameters](#)" for details.

Edit the following parameters in postgresql.conf:

| Parameter name    | Parameter description  | How to enable the settings  |
|-------------------|--|---|
| event_source      | Specify the event source name to be attached to messages, for identifying messages output to the event log when using multiple instances.  | <ul style="list-style-type: none"> <li>- Restart services from the Windows services window.</li> <li>- Use the net command or sc command to stop and start services.</li> </ul> |
| logging_collector | Specify "on" to ensure that messages are output by FUJITSU Enterprise Postgres to the server log file. The server log file is created in the pg_log directory in the database cluster. | <ul style="list-style-type: none"> <li>- Restart services from the Windows services window.</li> <li>- Use the net command or sc command to stop and start services.</li> </ul> |

| Parameter name  | Parameter description   | How to enable the settings       |
|-----------------|---|----------------------------------|
| log_destination | Specify " stderr, eventlog" to output messages from FUJITSU Enterprise Postgres to the screen and either the system log or the event log.   | reload option of the pg_ctl mode |
| log_line_prefix | Specify information to be added at the start of messages output by an instance. This information is useful for automatic monitoring of messages.<br><br>You can output the SQLSTATE value, output time, executing host, application name, and user ID.<br><br>Refer to "What To Log" in the PostgreSQL Documentation for details.<br><br>Example: log_line_prefix = '%e: %t [%p]: [%l-1] user = %u,db = %d,remote = %r app = %a ' | reload option of the pg_ctl mode |

### Point

- If you want fewer application errors being output to the eventlog, refer to "When To Log" and "What To Log" in the PostgreSQL Documentation for information on how to reduce the output messages.
- If you want to separate errors output from other software, refer to "Where To Log" in the PostgreSQL Documentation to change the output destination to the server log file rather than the system log.

## 4.5.2 Configuring Automatic Start and Stop of an Instance

You can automatically start or stop an instance when the operating system on the database server is started or stopped.

Use the following procedure to configure automatic start and stop of an instance.

Note that, if an instance is activated in a failover operation, the cluster system will control the start or stop, therefore this feature should not be used. Also, when performing database multiplexing, refer to "Enabling Automatic Start and Stop of Mirroring Controller and Multiplexed Instances" in the Cluster Operation Guide.

### When an instance was created with WebAdmin

When an instance is created with WebAdmin, the instance is registered in the Windows service and automatic start and stop is set for the instance.

To change the automatic start and stop setting for an instance, select the service for the applicable instance in the Windows services window, and in [Startup Type], select [Automatic] or [Manual].

### When an instance was created with the initdb command

When the startup type of the service is set to [Manual], change it to [Automatic]. By setting the startup type to [Automatic], the service will start up automatically when the Windows(R) system is started up, and will stop automatically when the Windows(R) system is shut down.

### Note

The settings should be performed by an instance administrator with Administrator privileges.

Use the following procedure to switch the service:

1. Display the [Services] window.  
In Windows, select [Administrative Tools], and then click [Services].

2. Switch the startup type

Select the FUJITSU Enterprise Postgres service name, display the [Properties] dialog box, and then switch the startup type from [Manual] to [Automatic].

The above setting can also be changed using the `sc config` command.

### 4.5.3 Settings when Using the features compatible with Oracle databases

---

The compatibility feature for Oracle databases enables FUJITSU Enterprise Postgres to be used without any special settings by creating a database instance. Note that settings are required only when using the SUBSTR function.



See

.....  
Refer to "Notes on SUBSTR" in the Application Development Guide for details.  
.....

## 4.6 Integration with Message-Monitoring Software

---

To monitor messages output by FUJITSU Enterprise Postgres using software, configure the product to monitor SQLSTATE, instead of the message text - this is because the latter may change when FUJITSU Enterprise Postgres is upgraded.

Configure FUJITSU Enterprise Postgres to output messages in a format that can be read by the message-monitoring software by specifying "%e" in the `log_line_prefix` parameter of `postgresql.conf` to output the SQLSTATE value.

A setting example is shown below - it outputs the output time, executing host, application name, and user ID, in addition to the SQLSTATE value.

Example

```
log_line_prefix = '%e: %t [%p]: [%l-1] user = %u,db = %d,remote = %r app = %a '
```



See

.....  
Refer to "What To Log" in the PostgreSQL Documentation for information on how to configure the settings.  
.....

## 4.7 Deleting Instances

---

This section explains how to delete instances.

- [4.7.1 Using WebAdmin](#)
- [4.7.2 Using Server Commands](#)



Note

- .....
- Always use WebAdmin to delete instances that were created using it. Because WebAdmin management information cannot be deleted, WebAdmin will determine that the instance is abnormal.
- .....

### 4.7.1 Using WebAdmin

---

This section explains how to delete instances using WebAdmin.

Use the following procedure to delete instances.

1. Stop the instance

In the [Instances] tab, select the instance to stop and click .

2. Back up files.

Before deleting the instance, back up any required files under the data storage destination, the backup data storage destination, and the transaction log storage destination.

3. Delete the instance

In the [Instances] tab, select the instance to delete and click .

### Note

Deleting an instance deletes only the following lowest-level directories. If they are not required, delete them manually.

- Data storage destination
- Backup data storage destination
- Transaction log storage destination (if different from the data storage destination)

## 4.7.2 Using Server Commands

---

This section explains how to delete instances using server commands.

Use the following procedure to delete instances.

1. Stop the instance

Stop the instance in Windows services, or use the `pg_ctl` command `stop mode`.

Use the following procedure to stop a service in Windows services:

- a. Display the [Services] window.

In Windows, select [Administrative Tools], and then click [Services].

- b. Stop the service

Select the instance name that you wish to stop from the services list, and click [Stop Service]. If you stop a service while applications and commands are running, FUJITSU Enterprise Postgres will force those applications and commands to close and will stop normally.

You can also stop a service by specifying the service name in the `net stop` command or `sc stop` command.

2. Back up files

Before deleting the instance, you should back up all necessary files contained in the data storage destination, backup data storage destination, and transaction log storage destination.

3. Delete the instance

Use a command such as `rmdir` to delete the following directories:

- Data storage destination directory
- Backup data storage destination directory
- Transaction log storage destination directory (if a different directory to the data storage destination directory was specified)

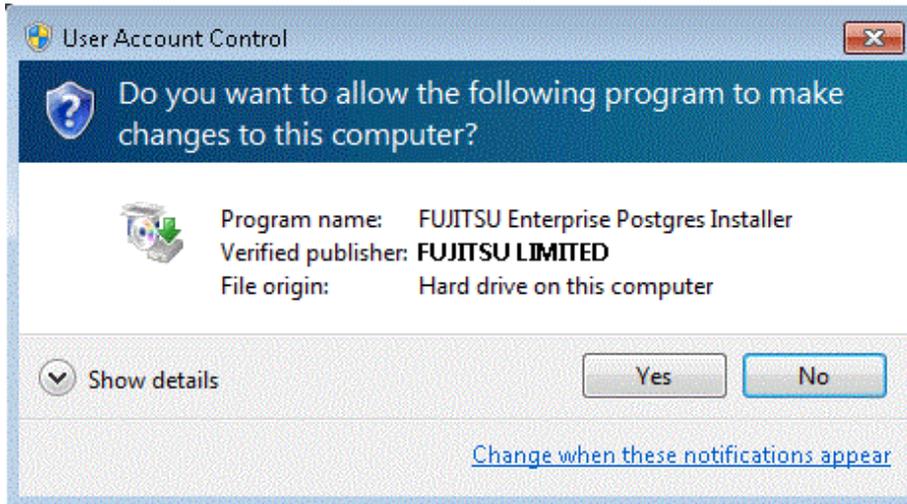
# Chapter 5 Uninstallation

This chapter explains the uninstallation of FUJITSU Enterprise Postgres.

Note that "<xy>" in paths indicates the product version and level.

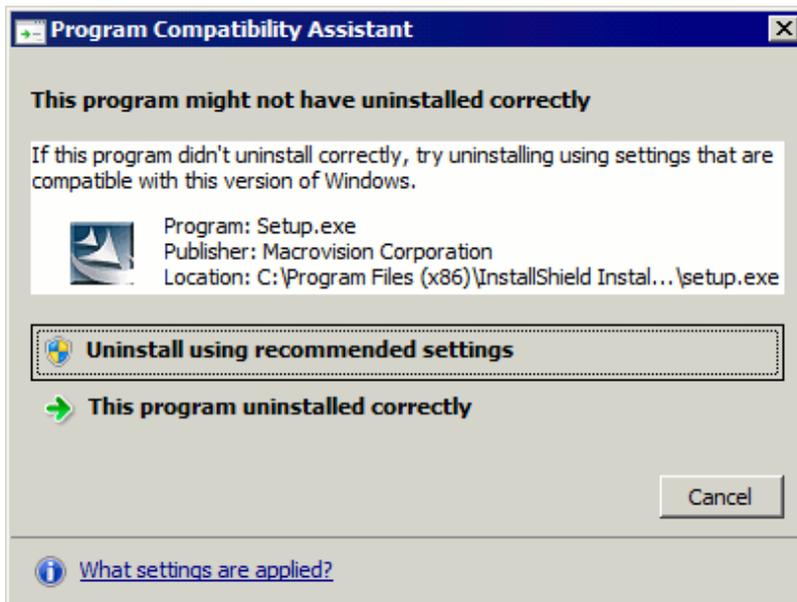
## Information

- If a [User Account Control] dialog box such as the following is displayed at the start of the uninstallation, click [Yes] to continue processing:



If [No] is clicked, permission to continue is denied and an [Error] dialog box will be displayed. To continue the uninstallation, click [Retry] in the [Error] dialog box. To end the operation, click [Cancel].

- If uninstallation is suspended or processing terminates abnormally, a dialog box of the Program Compatibility Assistant similar to the one shown below may be displayed. Click [This program uninstalled correctly] and continue operation.



## 5.1 Uninstallation in Interactive Mode

The uninstallation procedure is described below.

Note that "x.y.SPz" in sample windows indicates the version level of uninstalled products.

## Note

- If performing operation with WebAdmin, back up the following folder before uninstallation.  
Instances will not be recognized by WebAdmin even if FUJITSU Enterprise Postgres is reinstalled after uninstallation.  
If performing operation with WebAdmin after reinstalling FUJITSU Enterprise Postgres, replace the following backed up file after installation.

Follow the procedure below to perform the backup.

1. Stop the WebAdmin server. Refer to "[C.1.3 Stopping the Web Server Feature of WebAdmin](#)" for details.
2. Back up the following folder:

```
install\Folder\gui\data\fe_pwa
```

By replacing the above folder in the installation folder after installation, the instance will be recognized by WebAdmin, and the recognized instance will be set to automatically start and stop.

To disable the automatic start and stop setting for an instance, select the service for the applicable instance in the Windows services window, and in [Startup Type], select [Manual].

- If a PL/extJava environment has been built, delete the domain. Refer to "Setting up and Operating PL/extJava" in the Operation Guide for details.
- If using database multiplexing mode, refer to "Uninstalling in Database Multiplexing Mode" in the FUJITSU Enterprise Postgres Cluster Operation Guide before performing the uninstallation.

## See

Refer to the Installation and Setup Guide for Client when uninstalling the FUJITSU Enterprise Postgres client feature.

## Information

If an error occurs while the product is being uninstalled, refer to "[Appendix F Uninstall \(middleware\) Messages](#)" and take the required action.

### 1. Stop applications and the client program

Before starting the uninstallation, stop the following:

- Applications that use the product
- pgAdmin

### 2. Stop instances

Stop all instances that are using the product to be uninstalled.

Stopping of instances should be performed by the appropriate instance administrator.

When an instance was created with WebAdmin

In the [Instances] tab, select the instance to stop and click .

When an instance was created with the initdb command

Use the following procedure to stop a service:

- a. Display the [Services] window

In Windows, select [Administrative Tools], and then click [Services].

b. Stop the service

Select the instance name that you wish to stop from the services list, and click [Stop Service]. If you stop a service while applications and commands are running, FUJITSU Enterprise Postgres will force those applications and commands to close and will stop normally.

You can also stop a service by specifying the service name in the net stop command or sc stop command.

### 3. Stop WebAdmin

If you are using WebAdmin, stop WebAdmin.

Refer to "[C.1.3 Stopping the Web Server Feature of WebAdmin](#)" for details.

### 4. Unregister Windows services

Perform this step if the instance was created with the initdb command.

Unregister the instance registered in Windows services.

Use the unregister mode of the pg\_ctl command to specify the registered service name and unregister the instance from Windows services.

#### Example

The following is an example showing execution of this command on the registered service name "inst1".

```
> pg_ctl unregister -N "inst1"
```



#### Note

You should unregister services before uninstalling FUJITSU Enterprise Postgres. If you uninstall FUJITSU Enterprise Postgres while services are running, several files will remain after the uninstallation.

If you have carried out the uninstallation without unregistering services beforehand, use the server command sc delete to unregister the services.

### 5. Delete registrations related to the event log

If you are outputting to the event log, a DLL registration mentioned in "[4.2.5 Preparing for Output to the Event Log](#)" has been performed.

To prevent unnecessary issues from occurring, you should delete this registration. Refer to "Server Setup and Operation", "Registering Event Log on Windows" in the PostgreSQL Documentation for details.

The following is an example showing deletion of the DLL registration for a 64-bit product under the default event source name.

```
regsvr32 /u "c:\Program Files\Fujitsu\fsepv<xy>server64\lib\pgevent.dll"
```

#### If using multiple instances

DLL registration is performed so that you can output messages corresponding to the event source name assigned by the user, allowing you to identify messages output to the event log by instance.

Since it is necessary to delete the DLL registration for each instance, delete the DLL registration by event source name.

The following is an example showing deletion of the DLL of a 64-bit product registered under the event source name "Enterprise Postgres inst1".

```
regsvr32 /u /i:"Enterprise Postgres inst1" "C:\Program Files\Fujitsu\fsepv<xy>server64\lib\pgevent.dll"
```

Note that this step is not required if the instance was created with WebAdmin.

#### If installing multiple versions

If the instances you created using this package have been set to output error logs to the event log, use the DLL path name that you took note of previously as explained in "[4.2.5 Preparing for Output to the Event Log](#)" to reregister the default event source name.

## Note

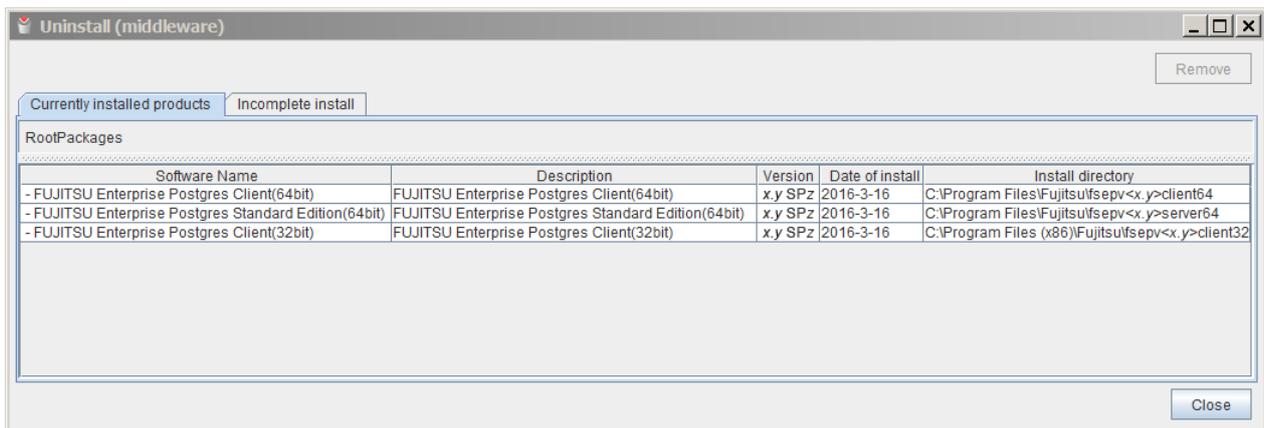
Ensure to delete DLLs before the uninstallation. If you perform the uninstallation without doing so, you may not be able to delete the DLLs at a later time.

### 6. Start the Uninstall (middleware) tool

In Windows, click [All Programs] or [All apps], then [Fujitsu], and then [Uninstall (middleware)].

### 7. Select the software

Select the product to be uninstalled from [Software Name], and then click [Remove].



### 8. Start the uninstallation

Click [Uninstall].



### 9. Finish the uninstallation

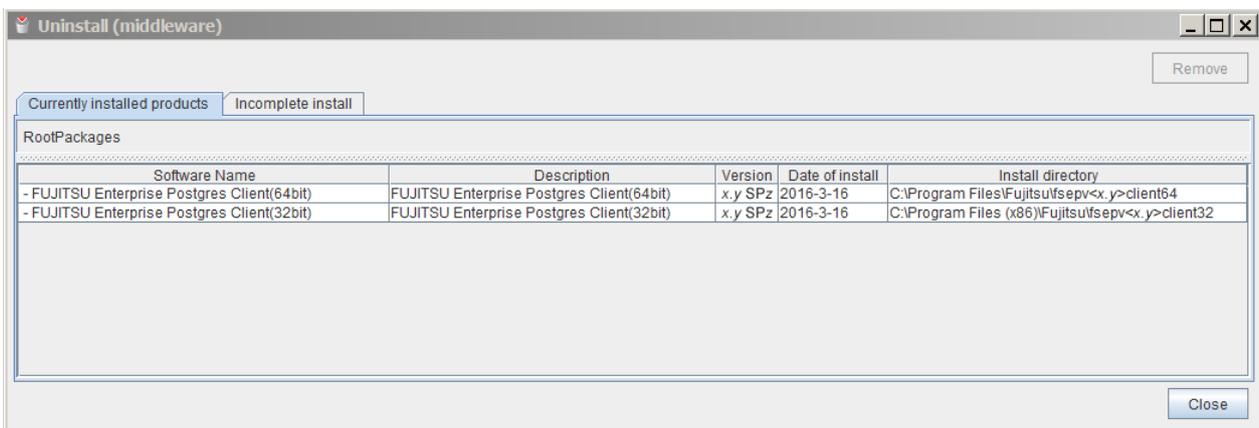
The uninstallation completion window will be displayed. Click [Finish].

The installation folder may remain after uninstallation. If it is not required, delete it.



## 10. Stop the Uninstall (middleware) tool

Click [Close].



## 5.2 Uninstallation in Silent Mode

The uninstallation procedure is described below.



- If performing operation with WebAdmin, back up the following folder before uninstallation. Instances will not be recognized by WebAdmin even if FUJITSU Enterprise Postgres is reinstalled after uninstallation. If performing operation with WebAdmin after reinstalling FUJITSU Enterprise Postgres, replace the following backed up file after installation.

Follow the procedure below to perform the backup.

1. Stop the WebAdmin server. Refer to "[C.1.3 Stopping the Web Server Feature of WebAdmin](#)" for details.

2. Back up the following folder:

```
install\Folder\gui\data\fepw
```

By replacing the above folder in the installation folder after installation, the instance will be recognized by WebAdmin, and the recognized instance will be set to automatically start and stop.

To disable the automatic start and stop setting for an instance, select the service for the applicable instance in the Windows services window, and in [Startup Type], select [Manual].

- If a PL/extJava environment has been built, delete the domain. Refer to "Setting up and Operating PL/extJava" in the Operation Guide for details.
- If using database multiplexing mode, refer to "Uninstalling in Database Multiplexing Mode" in the FUJITSU Enterprise Postgres Cluster Operation Guide before performing the uninstallation.



See

Refer to the Installation and Setup Guide for Client when uninstalling the FUJITSU Enterprise Postgres client feature.

## 1. Stop applications and the client program

Before starting the uninstallation, stop the following:

- Applications that use the product
- pgAdmin

## 2. Stop all instances

Stop all instances that are using the product to be uninstalled.

When an instance was created with WebAdmin

In the [Instances] tab, select the instance to stop and click .

When an instance was created with the initdb command

Use the following procedure to stop a service:

- a. Display the [Services] window.

In Windows, select [Administrative Tools], and then click [Services].

- b. Stop the service

Select the instance name that you wish to stop from the services list, and click [Stop Service]. If you stop a service while applications and commands are running, FUJITSU Enterprise Postgres will force those applications and commands to close and will stop normally.

You can also stop a service by specifying the service name in the net stop command or sc stop command.

## 3. Stop WebAdmin

If you are using WebAdmin, stop WebAdmin.

Refer to "[C.1.3 Stopping the Web Server Feature of WebAdmin](#)" for details.

## 4. Unregister Windows services

Perform this step if the instance was created with the initdb command.

Unregister the instance registered in Windows services.

Use the unregister mode of the pg\_ctl command to specify the registered service name and unregister the instance from Windows services.

## Example

The following is an example showing execution of this command for the registered service name "inst1".

```
> pg_ctl unregister -N "inst1"
```

## Note

You should unregister services before uninstalling FUJITSU Enterprise Postgres. If you uninstall FUJITSU Enterprise Postgres while services are running, several files will remain after the uninstallation.

If you have carried out the uninstallation without unregistering services beforehand, use the server command `sc delete` to unregister the services.

## 5. Delete registrations related to the event log

If you are outputting to the event log, a DLL registration mentioned in "4.2.5 Preparing for Output to the Event Log" has been performed.

To prevent unnecessary issues from occurring, you should delete this registration. Refer to "Server Setup and Operation", "Registering Event Log on Windows" in the PostgreSQL Documentation for details.

The following is an example showing deletion of the DLL registration for a 64-bit product under the default event source name.

```
regsvr32 /u "c:\Program Files\Fujitsu\fsepv<xy>server64\lib\pgevent.dll"
```

### If using multiple instances

DLL registration is performed so that you can output messages corresponding to the event source name assigned by the user, allowing you to identify messages output to the event log by instance.

Since it is necessary to delete the DLL registration for each instance, delete the DLL registration by event source name.

The following is an example showing deletion of the DLL of a 64-bit product registered under the event source name "Enterprise Postgres inst1".

```
regsvr32 /u /i:"Enterprise Postgres inst1" "c:\Program Files\Fujitsu\fsepv<xy>server64\lib\pgevent.dll"
```

Note that this step is not required if the instance was created with WebAdmin.

### If installing multiple versions

If the instances you created using this package have been set to output error logs to the event log, use the DLL path name that you took note of previously as explained in "4.2.5 Preparing for Output to the Event Log" to reregister the default event source name.

## Note

Ensure to delete DLLs before the uninstallation. If you perform the uninstallation without doing so, you may not be able to delete the DLLs at a later time.

## 6. Start the command prompt

In Windows, right-click [Command Prompt] and then select [Run as administrator].

## 7. Run the uninstaller

Execute the command below.

The installation directory may remain after uninstallation. If it is not required, delete it.

### Example

```
> install\Folder\suninst.bat
```

X: Drive on which the product is installed

## Note

In Windows(R)7, Windows Server(R) 2008 or Windows Server(R) 2008 R2, an empty folder may remain in the [Start] menu after uninstallation. In Windows, select [All Programs], right-click the following, and then click [Delete]. "x.y SPz" indicates the version level of the uninstalled product.

- FUJITSU Enterprise Postgres Client (32-bit) x.y SPz
- FUJITSU Enterprise Postgres Client (64-bit) x.y SPz

## 8. Check the results

Uninstaller results will be output to the log file.

Log file

xyz is the number part when the product version level is x.y SPz.

```
pathName:%TEMP%\fsep_SERVER64_0xyz_uninstall.log
```

Return values

The following return values are output:

| Return value | Description  |
|--------------|--|
| 0            | Uninstallation was successful.                                 |
| 64           | Failed to install because "Uninstall (middleware)" is running. |
| 74           | Failed to write product information (updating registry).       |
| 79           | Failed to read product information (viewing registry).         |
| 83           | Failed to delete the information from FJQSS.                   |
| 129          | Unsupported operating system.                                  |
| 144          | Not executed with administrator privileges.                    |
| 251          | An error occurred when running a system function.              |
| 255          | An internal inconsistency occurred.                            |

# Appendix A Installation in Silent Mode

This appendix provides specifications for installation in silent mode.

## A.1 Specification Format

The installation parameters CSV file, which is specified as the argument for the silent installer, has three columns per line in CSV format.

```
sectionName, parameterName, value
sectionName, parameterName, value
:
```

Enter the following settings in respective columns.

| Item                 | Settings  | Optional  |
|----------------------|---|-----------|
| <i>sectionName</i>   | Specify the section name. There are two types of section names:<br>"installInfo": Set the product information.<br>"parameters": Set the parameter information for this product. | Mandatory |
| <i>parameterName</i> | Specify the parameter name. Each section has a valid parameter.   | Mandatory |
| <i>value</i>         | Specify the value.  | Optional  |

### Note

- Blank lines cannot be included.
- Section names and parameter names cannot be omitted.
- Undefined parameters cannot be set in lines where the section name is "installInfo". Also, note that the same parameter cannot be specified multiple times.
- Specify at least one line with the section name "parameters".
- Undefined parameters specified in lines within the "parameters" section will be ignored during execution. Note that when the same parameter is specified multiple times, the settings in the lowest line will be valid.
- The setting values for lines where the section name is "installInfo" may contain alphanumeric characters (at least one), and symbols, excluding double quotation marks (") and commas (,).
- The following characters can be used for the setting value in the line of the section name "parameters":  
[a-zA-Z0-9], -, and \

### Information

The installation parameter CSV template is "(driveInWhichDvdIsSet)\sample\sample.csv".

## A.2 List of Parameters

This section describes the parameters that can be set for each section.

### installInfo section

The parameters that can be set in the installInfo section are shown below.

| No. | Type        | Parameter             |        | Description  |
|-----|-------------|-----------------------|--------|--|
| 1   | Software ID | <b>Parameter name</b> | Name   | Mandatory.<br>Specify the software identifier.<br>For this software, specify the following value:<br>"FUJITSU Enterprise Postgres" |
|     |             | <b>Value/Range</b>    | String |  |
|     |             | <b>Default value</b>  | None   |  |

## Information

- In addition to "Name", the following parameters can be used in the "installInfo" section.
  - softwareName
  - OS
  - Version
  - Edition
- Note that specifying a parameter name other than "Name" and the parameters listed above will result in an error.
- The values set in these parameters do not affect silent installation.

### Example

```
installInfo,Name,FUJITSU Enterprise Postgres
```

## parameters section

The parameters that can be set in the parameters section are shown below.

Note that "<xy>" indicates the product version and level.

| No. | Type  | Parameter             |  | Description  |
|-----|---|-----------------------|--|--|
| 1   | Whether to install the server                   | <b>Parameter name</b> | ServerInstallExecute                       | Optional.<br>Specify whether to run the installation of the server.<br>Y: Install<br>No: Do not install  |
|     |   | <b>Value/Range</b>    | Y or N                                     |  |
|     |   | <b>Default value</b>  | Y  |  |
| 2   | Installation destination of the server          | <b>Parameter name</b> | ServerInstallPath                          | Optional.<br>Specify the installation destination of the software.<br>The root folder (such as C:\) cannot be specified.<br>PL/extJava, specify the directory to be defined in the path name using up to 50 bytes. |
|     |   | <b>Value/Range</b>    | Path name                                  |  |
|     |   | <b>Default value</b>  | C:\Program Files\Fujitsu\fssep<xy>server64 |  |
| 3   | Whether to install the client (32-bit)          | <b>Parameter name</b> | Client32InstallExecute                     | Optional.<br>Specify whether to run the installation of the client (32-bit).<br>Y: Install<br>N: Do not install  |
|     |   | <b>Value/Range</b>    | Y or N                                     |  |
|     |   | <b>Default value</b>  | Y  |  |
| 4   | Installation destination of the client (32-bit) | <b>Parameter name</b> | Client32InstallPath                        | Optional.  |

| No. | Type  | Parameter             |  | Description   |
|-----|---|-----------------------|--|---|
|     |   | <b>Value/Range</b>    | Path name  | Specify the installation destination of the client (32-bit).<br>The root folder (such as C:\) cannot be specified.  |
|     |   | <b>Default value</b>  | C:\Program Files\Fujitsu<br>\fsepv<xy>client32 or C:<br>\Program Files (x86)\Fujitsu<br>\fsepv<xy>client32 |   |
| 5   | Whether to install the client (64-bit)          | <b>Parameter name</b> | Client64InstallExecute   | Optional.<br>Specify whether to run the installation of the client (64-bit).<br>Y: Install<br>N: Do not install<br>This parameter is ignored on 32-bit operating systems.                 |
|     |   | <b>Value/Range</b>    | Y or N   |   |
|     |   | <b>Default value</b>  | Y  |   |
| 6   | Installation destination of the client (64-bit) | <b>Parameter name</b> | Client64InstallPath  | Optional.<br>Specify the installation destination of the client (64-bit).<br>This parameter is ignored on 32-bit operating systems.<br>The root folder (such as C:\) cannot be specified. |
|     |   | <b>Value/Range</b>    | Path name  |   |
|     |   | <b>Default value</b>  | C:\Program Files\Fujitsu<br>\fsepv<xy>client64   |   |
| 7   | Whether to install WebAdmin                     | <b>Parameter name</b> | WebAdminInstallExecute   | Optional.<br>Specify whether to run the installation of WebAdmin in multi-server mode.<br>Y: Install<br>N: Do not install   |
|     |   | <b>Value/Range</b>    | Y or N   |   |
|     |   | <b>Default value</b>  | N  |   |
| 8   | Installation destination of WebAdmin (64-bit)   | <b>Parameter name</b> | WebAdminInstallPath  | Optional.<br>Specify the installation destination of WebAdmin.<br>This parameter is ignored on 32-bit operating systems.<br>The root folder (such as C:\) cannot be specified.            |
|     |   | <b>Value/Range</b>    | Path name  |   |
|     |   | <b>Default value</b>  | C:\Program Files\Fujitsu<br>\fsepv<xy>webadmin64   |   |
| 9   | Whether to set up WebAdmin                      | <b>Parameter name</b> | WebSetupExecute  | Optional.<br>Specify whether to set up WebAdmin.<br>Y: Install<br>N: Do not install   |
|     |   | <b>Value/Range</b>    | Y or N   |   |
|     |   | <b>Default value</b>  | Y  |   |
| 10  | Web server port number                          | <b>Parameter name</b> | WebPortNumber1   | Optional.<br>Specify the port number of the Web server.   |
|     |   | <b>Value/Range</b>    | 1024 to 49151  |   |
|     |   | <b>Default value</b>  | 27515  |   |
| 11  | WebAdmin internal port number                   | <b>Parameter name</b> | WebPortNumber2   | Optional.<br>Specify the WebAdmin internal port number.   |
|     |   | <b>Value/Range</b>    | 1024 to 49151  |   |
|     |   | <b>Default value</b>  | 27516  |   |

## Example

```
parameters,ServerInstallExecute,Y
parameters,ServerInstallPath,C:\Program Files\Fujitsu\fsepv<xy>server64
parameters,Client32InstallExecute,Y
parameters,Client32InstallPath,C:\Program Files (x86)\Fujitsu\fsepv<xy>client32
parameters,Client64InstallExecute,Y
parameters,Client64InstallPath,C:\Program Files\Fujitsu\fsepv<xy>client64
parameters,WebSetupExecute,Y
parameters,WebPortNumber1,27515
parameters,WebPortNumber2,27516
parameters,WebAdminInstallExecute,N
parameters,WebAdminInstallPath,C:\Program Files\Fujitsu\fsepv<xy>webadmin64
```

## A.3 Messages and Return Values

Messages are output when errors are detected during parametric analysis.

If an error is detected during installation of the product, a message is output to the log:

### Log file

xyz is the number part when the product version level is x.y SPz.

```
%TEMP%\fsep_SERVER64_media_0xyz_install.log
```

### Messages and return values

CSV file errors

The following messages are output if errors are detected while parsing CSV files.

| Return value | Message  | Explanation and actions   |
|--------------|--|---|
| 4            | CSV file error:code = 1, Invalid CSV error.                    | There is an error in the specification format of the CSV file.  |
| 4            | CSV file error:code = 2, installInfo/Name is required.         | Either installInfo or the Name parameter has not been specified.  |
| 4            | CSV file error:code = 3, Invalid installInfo key.              | There is an error in the installInfo specification.<br>Or the section name is invalid.  |
| 4            | CSV file error:code = 4, Duplicated installInfo key.           | The same parameter has been defined more than once in installInfo.  |
| 4            | CSV file error:code = 5, Invalid character length.             | No setting value is specified, or the specified string is too long.   |
| 4            | CSV file error:code = 6, Invalid character format or encoding. | An invalid format or character set is being used for the character string.  |
| 4            | CSV file error:code = 8, Parameter is required.                | There is no line in the "parameters" section.   |
| 20           | The input file does not exist.                                 | The input file does not exist.  |
| 21           | The value of @1@ is incorrect,the value is @2@.                | The value is incorrect. Specify the correct value.<br>The parameter name is displayed in @1@.<br>The specified parameter is displayed in @2@. |
| 22           | The value same at @1@ and @2@ is specified.                    | The same value is specified in different parameters.<br>Specify different values.<br>The parameter name is displayed in @1@ and @2@.          |

| Return value | Message   | Explanation and actions  |
|--------------|---|--|
| 23           | The @2@ of @1@ already exists.                                      | The path already exists. Specify a different path.<br>The parameter name is displayed in @1@.<br>The specified value is displayed in @2@.  |
| 24           | Drive @2@ of @1@ does not exist.                                    | The drive does not exist. Specify an existing drive.<br>The parameter name is displayed in @1@.<br>The specified value is displayed in @2@.  |
| 26           | Port number @1@ is already used in the service file(/etc/services). | The port number is already being used. Specify an unused port number.<br>The port number is displayed in @1@   |
| 28           | There is no product for installation.                               | No product was specified for installation. Specify "Y" for at least one of the following parameters:<br><br>- ServerInstallExecute<br>- Client32InstallExecute<br>- Client64InstallExecute |
| 29           | USAGE : silent.sh inputfile   | The argument specified in the command is incorrect. Specify the correct argument.  |

#### Product installer errors

The following return values are returned when errors occur while the product installer is running.

| Return value | Explanation  |
|--------------|--|
| 0            | Completed successfully.  |
| 3            | Failed to set up WebAdmin.   |
| 14           | The resources required for installation do not exist on the media.           |
| 32           | The same version of the same product is already installed.                   |
| 33           | Server product and WebAdmin product cannot be installed in the same machine. |
| 60           | An error occurred in Uninstall (middleware).                                 |
| 64           | Installation failed because Uninstall (middleware) is running.               |
| 65           | Failed to install Uninstall (middleware).                                    |
| 74           | Failed to write to the registry.   |
| 79           | Failed to read the registry.   |
| 85           | Different editions of the same generation are installed.                     |
| 86           | A new StopChange version of the same generation is installed.                |
| 88           | A conflicting product is installed.  |
| 129          | Unsupported operating system.  |
| 142          | The installation destination has insufficient disk capacity.                 |
| 144          | The command was not executed with administrator privileges.                  |
| 220          | Failed to create a directory in the installation directory.                  |
| 221          | Failed to create files in the installation directory.                        |
| 251          | An error occurred when running a system function.                            |

| Return value | Explanation                         |
|--------------|-------------------------------------|
| 255          | An internal inconsistency occurred. |

## A.4 CSV File Format

---

The format of CSV files is based on RFC4180, with the following specifications.

### Records

- Separate each record with a "CRLF" newline (operation is not guaranteed with only a "CR" or "LF" newline).
- Specify a newline at the end of a file.
- Separate each field within a record with a comma "," (comma: ASCII (single-byte character)).

| Format      | Record |     |     |
|-------------|--------|-----|-----|
| aaa,bbb,ccc | aaa    | bbb | ccc |

- If several commas are entered in succession, or if a comma precedes a newline, the data following the comma is regarded as empty.

| Format   | Record |     |     |
|----------|--------|-----|-----|
| aaa,,ccc | aaa    |     | ccc |
| aaa,bbb, | aaa    | bbb |     |

- Headers cannot be specified

| Format      | Record |        |         |
|-------------|--------|--------|---------|
|             | field1 | field2 | field 3 |
| aaa,bbb,ccc | aaa    | bbb    | ccc     |

## Appendix B Recommended WebAdmin Environments

This appendix describes the recommended WebAdmin environment. The following explanation is based on the assumption that Internet Explorer 8.0 or later is used unless otherwise stated.

### B.1 Recommended Browser Settings

---

- Use a display resolution of 1024 x 768 or higher, and 256 colors or more.
- Select [View] >> [Text size] >> [Medium].
- Select [View] >> [Zoom] >> [100%].
- Click [Tools] >> [Internet options] >> [General] >> [Fonts], and then:
  - Set [Webpage font] to [Times New Roman].
  - Set [Plain text font] to [Courier New].

### B.2 How to Set Up the Pop-up Blocker

---

If the Pop-up Blocker is enabled, use the procedure below to configure settings to allow pop-ups from the server where FUJITSU Enterprise Postgres is installed.

1. Click [Tools] >> [Internet options], and then select the [Privacy] tab.  
If [Turn on Pop-up Blocker] is not selected, the Pop-up Blocker feature will not operate, and therefore steps below are not required.
2. Click [Settings].
3. In the [Pop-up Blocker Settings] window, enter in the [Address of website to allow] the URL of the server where FUJITSU Enterprise Postgres is installed, and then click [Add].
4. Click [Close].
5. In the [Internet Options] window, click [OK].

# Appendix C Setting Up and Removing WebAdmin

This appendix describes how to set up and remove WebAdmin.

Note that "<xy>" in paths indicates the product version and level.

## C.1 Setting Up WebAdmin

This section explains how to set up WebAdmin.

### C.1.1 Setting Up WebAdmin

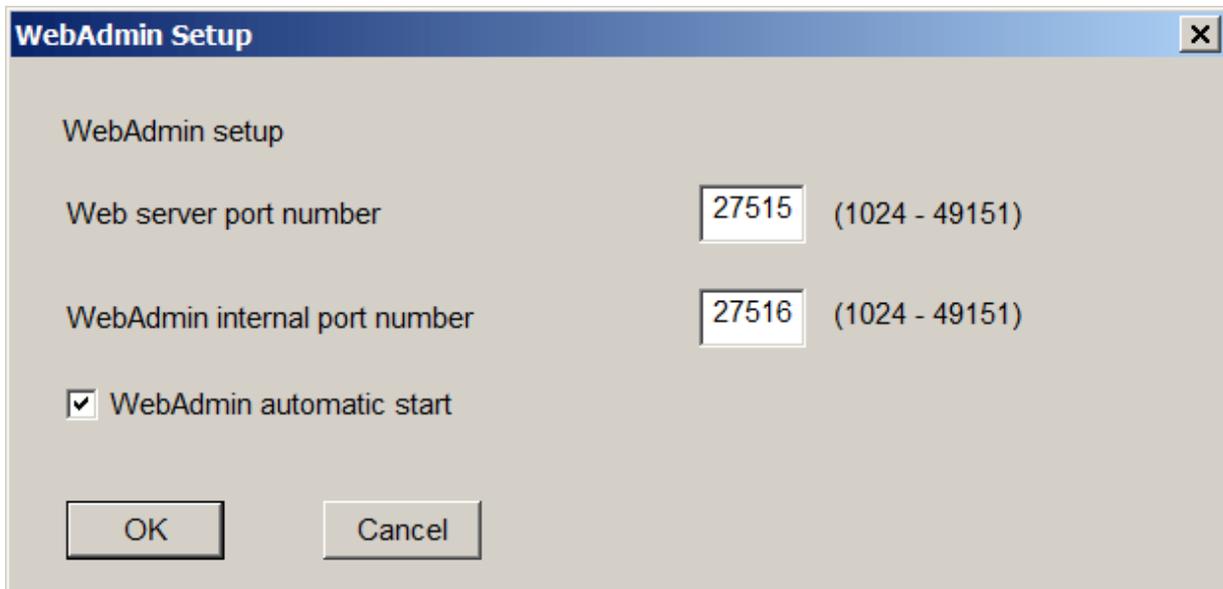
Follow the procedure below to set up WebAdmin.

1. Log in

Log in as a user that belongs to the Administrators group.

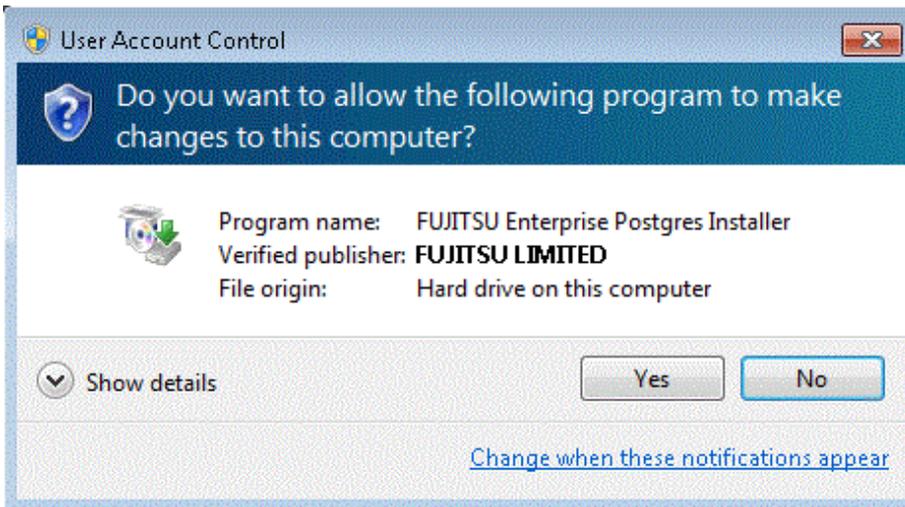
2. Display the setup window

In Windows, click [All Programs] or [All apps], then [Product name], and then [WebAdmin Setup].



 Note

If the same [User Account Control] dialog box as that shown below is displayed, click [Yes] to continue processing.



### 3. Specify the port number

Specify the following port numbers to be used in WebAdmin.

Refer to the services file. Only change to a different port number if the same port number is being used by another service.

Make a note of the Web server port number, because it will be required for activating the WebAdmin window.

| Item                          | Value (recommended value) |
|-------------------------------|---------------------------|
| Web server port number        | 27515                     |
| WebAdmin internal port number | 27516                     |
| WebAdmin automatic start      | Selected                  |

#### Web server port number

Specify an unused port number in the following range for the port number used for communication between the Web browser and Web server:

- Windows Server(R) 2008, Windows Server(R) 2008 R2, Windows Server(R) 2012 or Windows Server(R) 2012 R2: 1024 to 49151

The Web server port number is registered as a port number of the following service name in the services file. *xy* is the number part when the product version level is *x.y*.

64-bit product:

`fsep_xySPz_edition_64_WebAdmin_Port1`

32-bit product:

`fsep_xySPz_edition_32_WebAdmin_Port1`

#### WebAdmin internal port number

Specify an unused port number in the following range for the port number used for communication between the Web server and WebAdmin runtime environment:

- Windows Server(R) 2008, Windows Server(R) 2008 R2, Windows Server(R) 2012 or Windows Server(R) 2012 R2: 1024 to 49151

The WebAdmin internal port number is registered as a port number of the following service name in the services file. *xy* is the number part when the product version level is *x.y*.

64-bit product:

`fsep_xySPz_edition_64_WebAdmin_Port2`

32-bit product:

fsep\_xySPz\_edition\_32\_WebAdmin\_Port2

#### WebAdmin automatic start

Select whether or not to start WebAdmin when the machine is started.



- Make a note of the Web server port number for use in the Windows firewall settings.
- Unused port numbers  
In the operating system and other products, regardless of the information in the service file, unused port numbers may be automatically numbered and then used, or port numbers specified in environment files within products may also be used. Check the port numbers used by the OS and other products, and ensure that these are not duplicated.
- Access restrictions  
Prevent unauthorized access and maintain security by using a firewall product, or the packet filtering feature of a router device, to restrict access to the server IP address and the various specified port numbers.
- Port access permissions  
If a port is blocked (access permissions have not been granted) by a firewall, enable use of the port by granting access. Refer to the vendor document for information on how to grant port access permissions.  
Consider the security risks carefully when opening ports.
- Changing port numbers  
When using WebAdmin in multiserver mode, it is recommended not to change WebAdmin ports after creating instances. Otherwise, the created instances may not be accessible through WebAdmin after the port is changed.

#### 4. Prepare for setup

Click [OK] in the setup window, and after completing the WebAdmin setup, refer to "[4.2 Preparations for Setup](#)" and perform the required preparations for setting up FUJITSU Enterprise Postgres if using WebAdmin for operation.

## C.1.2 Activating the Web Server Feature of WebAdmin

---

Follow the procedure below to activate the Web server feature of WebAdmin.

### 1. Display the Services window

In Windows, select [Administrative Tools], and then click [Services].

### 2. Start the service

Select the displayed name "FUJITSU Enterprise Postgres WebAdmin *version*", and then click [Start Service].

You can also start the service by specifying the service name of the Web server feature of WebAdmin in the net start command or sc start command.

## C.1.3 Stopping the Web Server Feature of WebAdmin

---

Follow the procedure below to stop the Web server feature of WebAdmin.

### 1. Display the Services window

In Windows, select [Administrative Tools], and then click [Services].

### 2. Stop the service

Select the displayed name "FUJITSU Enterprise Postgres WebAdmin *version*", and then click [Stop Service].

You can also stop the service by specifying the service name of the Web server feature of WebAdmin in the net stop command or sc stop command.

## Note

- For efficient operation of WebAdmin, it is recommended that the Web server feature be stopped only during a scheduled maintenance period.
- When WebAdmin is used to create and manage instances in multiple servers, the Web server feature must be started and running on all servers at the same time.

## C.2 Removing WebAdmin

---

This section explains how to remove WebAdmin.

This removal procedure stops WebAdmin and ensures that it no longer starts automatically when the machine is restarted.

To remove the setup, execute the command shown below.

### Example

When FUJITSU Enterprise Postgres is installed in "C:\Program Files\Fujitsu\fsepv<xy>server64":

```
> C:
> cd C:\Program Files\Fujitsu\fsepv<xy>server64\gui\sbin
> WebAdminSetup --delete
```

## Note

- The removal of the WebAdmin setup must be performed by a user with administrator privileges (a user ID that belongs to the Administrators group).
- In Windows Server(R) 2008, Windows Server(R) 2008 R2, Windows Server(R) 2012 or , Windows Server(R) 2012 R2 commands that require administrator privileges must be executed from the [Administrator: Command Prompt] window. Right-click [Command Prompt], and then select [Run as administrator] from the context menu to display the [Administrator: Command Prompt] window.

## C.3 Using an External Repository for WebAdmin

---

WebAdmin can be configured to use an external database, where it can store the various metadata information it uses. WebAdmin will use this database as a repository to store the information it uses to manage all the created instances. This can be a FUJITSU Enterprise Postgres database or an Open Source PostgreSQL V9.2 or later database.

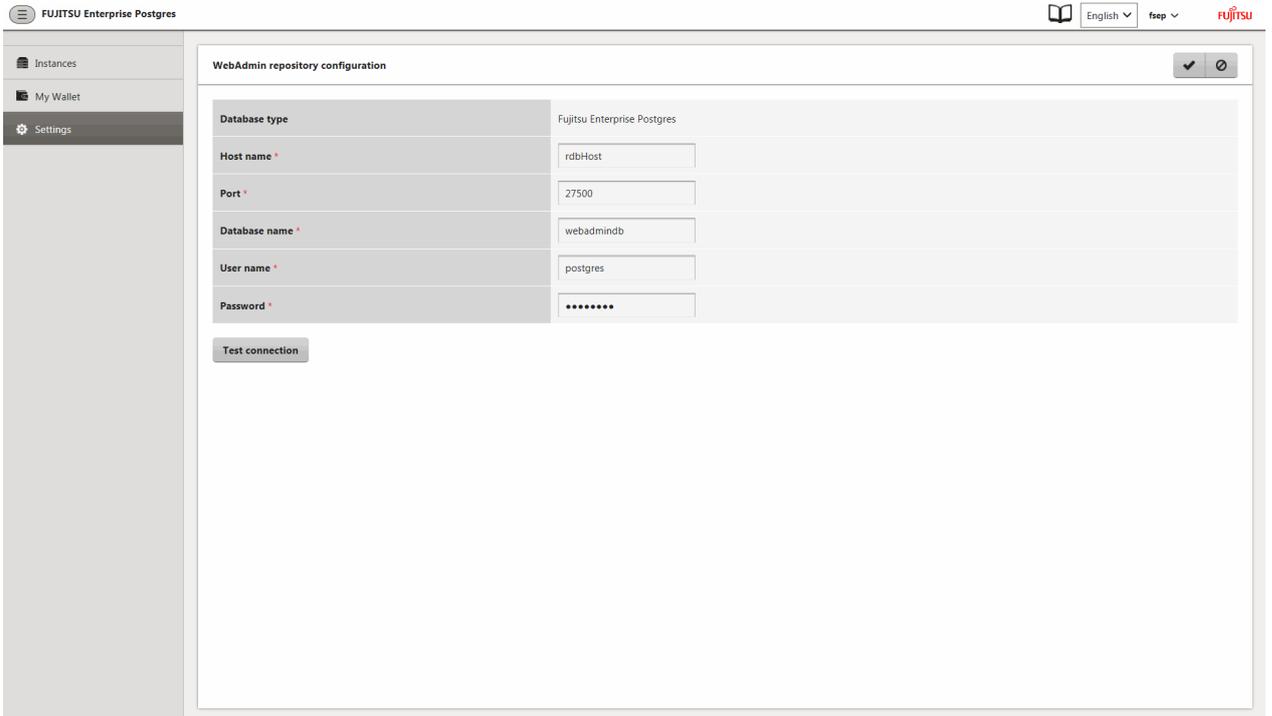
Using an external database as a WebAdmin repository provides you with more flexibility in managing WebAdmin. This repository can be managed, backed up and restored as needed using PgAdmin or command line tools, allowing users to have greater flexibility and control.

Follow the procedure below to set up the repository.

1. Activate WebAdmin, and log in to the database server.

2. Click the [Settings] tab.

Click  to enter the information.



|                 |   |
|-----------------|---|
| Database type   | Fujitsu Enterprise Postgres             |
| Host name *     | <input type="text" value="rdbHost"/>    |
| Port *          | <input type="text" value="27500"/>      |
| Database name * | <input type="text" value="webadmindb"/> |
| User name *     | <input type="text" value="postgres"/>   |
| Password *      | <input type="password" value="*****"/>  |

Enter the following items:

- [Host name]: Host name of the database server
- [Port]: Port number of the database server
- [Database name]: Name of the database
- [User name]: User name to access the database
- [Password]: Password of the database user

### Note

- Database type  
It is recommended to use a FUJITSU Enterprise Postgres database as a repository. A compatible PostgreSQL database can also be used as an alternative.
- It is recommended to click [Test connection] to ensure that the details entered are valid and WebAdmin is able to connect to the target database.

3. Click  to register the repository details.

### Note

- Once the repository is set up, it can be changed any number of times by the user logged into WebAdmin. When a repository is changed:
  - It is recommended to preload the backup into this database.
  - If the data is not preloaded, WebAdmin will create a new repository.
- The database repository can be set up even after WebAdmin was already used to create instances. In that scenario, the instances already created are retained and can continue to be operated on.

- If the instance used as a repository is stopped, WebAdmin will be unusable. For this reason, it is recommended to be familiar with starting an instance from the command line. If the instance is stopped for any reason, start it from the command line and WebAdmin will be usable again.



# Appendix D Configuring Parameters

WebAdmin operates and manages databases according to the contents of the following configuration files:

- [postgresql.conf](#)

Contains various items of information that define the operating environment of FUJITSU Enterprise Postgres.

- [pg\\_hba.conf](#)

Contains various items of information related to client authentication.

These configuration files are deployed to a data storage destination. Data is written to them when the instance is created by WebAdmin and when settings are changed, and data is read from them when the instance is started and when information from the [Setting] menu is displayed.

Direct editing of each configuration file is possible with a text editor.



See

Refer to "Server Configuration" and "Client Authentication" in "Server Administration" in the PostgreSQL Documentation for information on the parameters.

## postgresql.conf

Parameters that can be changed in WebAdmin

The postgresql.conf parameters that can be changed in WebAdmin are shown below:

| Tab            | WebAdmin item                            | Parameter                     |
|----------------|--|-------------------------------|
| Character Code | Character set                            | client_encoding               |
|                | Message locale                           | lc_messages (*1)              |
| Communication  | Port number                              | port                          |
|                | Max connection                           | max_connections               |
| SQL Options    | Interpreting NULL values                 | transform_null_equals         |
|                | Date output format                       | DateStyle (*2)                |
|                | Interval output format                   | IntervalStyle                 |
|                | The number of digits for floating values | extra_float_digits            |
|                | Transaction isolation levels             | default_transaction_isolation |
|                | Currency format                          | lc_monetary                   |
|                | Date and time format                     | lc_time                       |
| Memory         | Numerical value format                   | lc_numeric                    |
|                | Sort memory (Unit: KB)                   | work_mem                      |
|                | Share buffer (Unit: KB)                  | shared_buffers                |
| Replication    | WAL level                                | wal_level                     |
|                | Maximum WAL senders                      | max_wal_senders               |
|                | WAL keep segments                        | wal_keep_segments             |
|                | Hot standby                              | hot_standby                   |
|                | Synchronous standby names                | synchronous_standby_names     |

\*1: In the current version, you can only specify "C".

\*2: If you specify "Postgres" as the output format, dates will be output in the "12-17-1997" format, not the "Wed Dec 17 1997" format used in the PostgreSQL Documentation.

## Note

- Calculate the maximum number of connections using the formula below:

$$\text{maximumNumberOfConnections} = \text{maximumNumberOfConnectionsFromApplications} + 3 (*1)$$

\*1: 3 is the default number of connections required by the system.

Calculate the maximum number of connections using the following formula when changing either `max_wal_senders` (using streaming replication) or `superuser_reserved_connections` (connections reserved for use by the superuser) in `postgresql.conf`.

$$\text{maximumNumberOfConnections} = \text{maximumNumberOfConnectionsFromApplications} + \text{superuser_reserved_connections} + \text{max_wal_senders}$$

Refer to "[Appendix D Configuring Parameters](#)" for more information on `postgresql.conf`.

- Also check if the memory used exceeds the memory installed (refer to "[Parameters automatically set by WebAdmin according to the amount of memory](#)").

## Parameters set by WebAdmin

Parameters set by WebAdmin during instance startup are shown below (they will be ignored even if specified in `postgresql.conf`):

| Parameter                             | Value  |
|---------------------------------------|--|
| <code>event_source</code>             | <code>'fsep_version_userName_instanceName'</code>  |
| <code>listen_addresses</code>         | *  |
| <code>log_destination</code>          | <code>'stderr,eventlog'</code>   |
| <code>logging_collector</code>        | on   |
| <code>log_line_prefix</code>          | <code>'%e: %t [%p]: [%l-1] user = %u,db = %d,remote = %r app = %a'</code>  |
| <code>log_directory</code>            | <code>'userProfileFolder\localSettingsFolder\Fujitsu\fsep_version\instanceName\log'</code><br>Example: If using Windows Server(R) 2008 R2, <code>userProfileFolder\localSettingsFolder</code> will be "C:\Users\userName\AppData\Local". |
| <code>log_filename (*1)(*2)</code>    | <code>'logfile-%a.log'</code>  |
| <code>log_truncate_on_rotation</code> | on   |
| <code>log_rotation_age</code>         | 1d   |

\*1: The server logs are split into files based on the day of the week, and are rotated after each week.

\*2: If the date changes while the instance is stopped, old logs are not deleted and continue to exist. Manually delete old logs that are no longer required to release disk space.

## Parameters automatically set by WebAdmin according to the amount of memory

The `postgresql.conf` parameters automatically set according to the amount of installed memory, during the creation of instances by WebAdmin, are shown below:

| Parameter                         | Value  |
|-----------------------------------|--|
| <code>shared_buffers</code>       | 30% of the machine's installed memory                                    |
| <code>work_mem</code>             | 30% of the machine's installed memory / <code>max_connections</code> / 2 |
| <code>effective_cache_size</code> | 75% of the machine's installed memory                                    |

| Parameter            | Value  |
|----------------------|--|
| maintenance_work_mem | 10% of the machine's installed memory / (1 + autovacuum_max_workers) |

When determining the values to be configured in the above parameters, you must take into account any anticipated increases in access volume or effects on performance during business operations, such as the number of applications and commands that will access the instance, and the content of processes. Also, note that in addition to FUJITSU Enterprise Postgres, other software may be running on the actual database server. You will need to determine the degree of priority for the database and other software, as well as the memory allocation size.

WebAdmin automatically configures complex parameter settings such as those mentioned above, based on the size of the internal memory of the machine. This enables maximum leverage of the machine memory to facilitate resistance against fluctuations during business operations.

Accordingly, the effects of the above-mentioned factors must be estimated and taken into account when determining and configuring parameter values, so that memory resources can be effectively allocated among other software or instances, and so that adverse effects can be mutually avoided. Refer to "Memory" in "Resource Consumption", and "Planner Cost Constants" in "Query Planning", under "Server Administration" in the PostgreSQL Documentation for information on parameter values and required considerations.

Parameter values can be modified using the WebAdmin [Setting] menu, or edited directly using a text editor.

If adding an instance, determine the parameter values, including for existing instances, and make changes accordingly.

### Note

- Do not directly edit the following postgresql.conf parameters with a text editor, otherwise WebAdmin may not work properly if you make a mistake):
  - port
  - archive\_mode
  - archive\_command
  - wal\_level
  - wal\_sync\_method
  - log\_line\_prefix
  - log\_destination
  - logging\_collector
  - log\_directory
  - log\_file\_mode
  - log\_filename
  - log\_truncate\_on\_rotation
  - log\_rotation\_age
  - event\_source
  - backup\_destination
- You must take care with the following parameter:
  - superuser\_reserved\_connections

Set it to a number that includes the 3 connections required in WebAdmin (the default is 3).

### Parameters automatically set by WebAdmin for streaming replication

The postgresql.conf parameters automatically set when a streaming replication standby is created, are shown below. These changes are performed in both the master as well as the standby instance.

| Parameter            | Value       |
|----------------------|-------------|
| wal_level (*1)       | hot_standby |
| max_wal_senders (*1) | 5           |
| hot_standby          | on          |

\*1: These values are set only if the master and standby instance are created at the same time. If only the standby instance is created, you need to set these values before the standby instance is created.



See

Streaming replication parameters need to be tuned according to the requirements for replication performance and reliability. Refer to "Log-Shipping Standby Servers" in "Server Administration" in the PostgreSQL Documentation for information on tuning streaming replication parameters.

### pg\_hba.conf

Refer to "Client Authentication" in "Server Administration" in the PostgreSQL Documentation for information on content that can be configured in pg\_hba.conf.



Note

- Use the following client authentication settings to allow the instance administrator to connect to the database using WebAdmin:
  - The connection type: "host"
  - The IP address is a loopback address ("127.0.0.1/32")
- If you specify an item or value that cannot be set by WebAdmin when editing the pg\_hba.conf file with a text editor, it will not be possible to reference that line from WebAdmin.

# Appendix E Uninstall (middleware)

## E.1 Features that are Installed

### [Windows]

| Feature     | Package name | Component name        | Remarks   | Selectively installed? |
|-------------|--------------|-----------------------|---|------------------------|
| Common tool | FJSVcir      | CIRuntime Application | Controls the installation and uninstallation of Fujitsu middleware products.<br><br>Manages the installation information of Fujitsu middleware products and includes a management function for viewing installation information and launching the uninstaller of each product. ("Uninstall (middleware)") | No                     |

### [Linux]

| Feature     | Package name | Component name        | Remarks   | Selectively installed? |
|-------------|--------------|-----------------------|---|------------------------|
| Common tool | FJSVcir      | CIRuntime Application | Controls the installation and uninstallation of Fujitsu middleware products.<br><br>Manages the installation information of Fujitsu middleware products and includes a management function for viewing installation information and launching the uninstaller of each product. ("Uninstall (middleware)") | No                     |

## E.2 Notes

### E.2.1 Notes on the Uninstall (middleware) Tool

"Uninstall (middleware)" is a tool used by Fujitsu middleware products. It performs information management for middleware products, and also, launching the uninstaller for removing these products from the installed systems.



#### Note

- To uninstall FUJITSU Enterprise Postgres, uninstall from "Uninstall (middleware)".
- This tool manages information about other Fujitsu middleware products as well as FUJITSU Enterprise Postgres. For this reason, do not uninstall it unless absolutely necessary. If you have accidentally uninstalled this tool, re-install it as described below.

#### [Windows]

1. Log on to the machine to be installed using a user name belonging to the Administrators group, or switch to an account with administrator privileges.
2. Insert the server program DVD in the drive device.
3. Execute the installation command.

```
z:\CIR\Windows\cirinst.exe
```

In the example above, for z, specify the drive name of the drive where the DVD has been inserted.

[Linux]

1. Log in as a superuser to the installation target machine, or switch to a user with administrative privileges.
2. Insert the product media in the drive.
3. Execute the installation command.

```
# /media/dvd/CIR/Linux/cirinst.sh
```

In the example above, /media/dvd is the DVD mount point.

- If you uninstall this tool as described below.

1. Check that there are no Fujitsu middleware products installed in the system.  
You can check this by using "Uninstall (middleware)", which is launched by the command below.

[Windows]

Select [All Programs] > [Fujitsu] > [Uninstall (middleware)]

[Linux]

```
/opt/FJSVcir/cir/bin/cimanager.sh -c
```

-c : CUI

2. If no Fujitsu middleware products have been installed, then issue the command below.

[Windows]

```
%SystemDrive%\FujitsuF4CR\bin\cirremove.exe
```

[Linux]

```
# /opt/FJSVcir/bin/cirremove.sh
```

3. At the uninstallation confirmation prompt, enter "y".

```
This software is a common tool of Fujitsu products.Are you sure you want to remove it?[y/n]:
```

Uninstallation will start.

.....

# Appendix F Uninstall (middleware) Messages

## F.1 Messages output by FJSVcir

---

### **FSP\_FJSVCIR\_CIRINST: ERROR: 101: CIRINST101: Administrator privilege is required.**

#### Description

The user does not have administrator privileges.

#### Action method

Login with administrator privileges and run the command again.

---

### **FSP\_FJSVCIR\_CIRINST: ERROR: 102: CIRINST102: Failed to create %s**

#### Parameters

%s: Directory name

#### Description

Failed to create a directory during the installation.

#### Action method

Creating the directory might have failed for some reason. Run the installer again, or run cirinst command again. If the problem persists, check the system log.

---

### **FSP\_FJSVCIR\_CIRINST: ERROR: 103: CIRINST103: It is required at least %dMB**

#### Parameters

%d: Disk spaces

#### Description

Insufficient disk space.

#### Action method

Confirm that the system has sufficient disk spaces.

---

### **[Windows] FSP\_FJSVCIR\_CIRINST: ERROR: 104: CIRINST104: Failed to copy CIR files.**

---

### **[Linux] FSP\_FJSVCIR\_CIRINST: ERROR: 104: CIRINST104: Failed to copy CIR installer files.**

#### Description

Failed to copy files required for the installation.

#### Action method

Copying the files failed for some reason. Run the installer again, or run cirinst command again. If the problem persists, check the system log.

---

### **FSP\_FJSVCIR\_CIRINST: ERROR: 105: CIRINST105: Failed to copy JRE.**

#### Description

Failed to copy JRE required for installation.

#### Action method

Copying the files failed for some reason. Run the installer again, or run cirinst command again. If the problem persists, check the system log.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 106: CIRINST106: Failed to copy CIR****Description**

Failed to copy files during the installation.

**Action method**

Copying the files failed for some reason. Run the installer again, or run cirinst command again. If the problem persists, check the system log.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 107: CIRINST107: invalid option.****Description**

An invalid option was specified.

**Action method**

Specify a valid option. [-c]: CUI

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 108: CIRINST108: JRE which should be deployed is not bundled.****Description**

An appropriate JRE for this system is not bundled.

**Action method**

Confirm that the product supports the platform.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 109: CIRINST109: Unsupported OS.****Description**

Unsupported operating system.

**Action method**

Confirm that the product supports the operating system.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 201: CIRINST201: Administrator privilege is required.****Description**

The user does not have administrator privileges.

**Action method**

Login with administrator privileges and run the command again.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 203: CIRINST203: Failed to delete files.****Description**

Failed to delete FJSVcir files.

**Action method**

Deleting the files failed for some reason. Run cirremove command again. If the problem persists, check the system log.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 205: CIRINST205: invalid option.****Description**

Invalid option is specified.

**Action method**

No option is supported. Retry without any options.

---

### Specified installation parameters file was not found.

#### Description

Specified installation parameters file was not found. (silent mode)

#### Action method

Specify the installation parameters file.

---

### It failed to install. See log for details

#### Description

An error occurred during install. (silent mode)

#### Action method

Collect the files stored in the following directories.

[UNIX]

/var/opt/FJSVCir/cir/logs/cirlog0.log.0

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\logs\cirlog0.log.0

---

### Parameters are invalid. Please specify valid parameters.

#### Description

Invalid option is specified. (silent mode)

#### Action method

Specify a valid option.

---

### Internal data is broken.

#### Description

Internal data used by this product is corrupt.

#### Action method

Collect the files stored in the following directories and contact Fujitsu technical support:

[UNIX]

/var/opt/FJSCIR/cir/

/etc/opt/FJSCIR/cir/CIR.properties

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\

---

## F.2 Messages output by Uninstall (middleware)

---

### It has already been running in another process.

#### Description

An attempt was made to start Uninstall (middleware) more than once. Alternatively, an attempt was made to start Uninstall (middleware) while the installer was starting.

#### Action method

End any Uninstall (middleware) that have already started. Alternatively, start Uninstall (middleware) after the installer has ended.

---

#### **Specified option is invalid.**

##### Description

An invalid option was specified.

#### Action method

Specify valid options and run the command again.

---

#### **Please enter a valid option.**

##### Description

An invalid character was entered. Valid characters are y, n, or item numbers.

#### Action method

Enter a valid character.

---

#### **Failed to uninstall of the following software packages:**

##### Description

Failed to uninstall the software listed in this message.

#### Action method

Confirm the information shown after this message and take the appropriate action.

---

#### **Unable to uninstall the software as it is referred from more than one software.**

##### Description

Failed to uninstall the software because it is used by other software.

#### Action method

No specific action is required.

---

#### **Unable to uninstall the software as the software is mandatory.**

##### Description

Failed to uninstall the software because it is required by another program.

#### Action method

No specific action is required.

---

#### **Internal data is broken.**

##### Description

Internal data used by this product is corrupt.

#### Action method

Collect the files stored in the following directories and contact Fujitsu technical support:

[UNIX]

/var/opt/FJSVCIR/cir/

/etc/opt/FJSVCIR/cir/CIR.properties

---

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\

---

**Unable to uninstall the software you were about to uninstall as the existence of the software is a precondition for the operation of another software.**

#### Description

Failed to uninstall the software because it is required by another program.

#### Action method

No specific action is required.

---

**The program terminated abnormally.**

#### Description

The program has terminated abnormally.

#### Action method

Collect the files stored in the following directories and contact Fujitsu technical support:

[UNIX]

/var/opt/FJ SVCIR/cir/

/etc/opt/FJ SVCIR/cir/CIR.properties

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\

---

**An unexpected error has occurred during uninstall.**

#### Description

An error occurred during uninstall.

#### Action method

Collect the files stored in the following directories and contact Fujitsu technical support:

[UNIX]

/var/opt/FJ SVCIR/cir/

/etc/opt/FJ SVCIR/cir/CIR.properties

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\

---

**It failed to uninstall. See log for details.**

#### Description

An error occurred during uninstall. (silent mode)

#### Action method

Collect the files stored in the following directories.

[UNIX]

/var/opt/FJ SVCir/cir/logs/cirlog0.log.0

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\logs\cirlog0.log.0

---

### **Failed to initialize the temp directory.**

#### **Description**

Can not start Uninstall (middleware) because failed to initialize the temp directory.

#### **Action method**

Run Uninstall (middleware) again. If the problem persists, check whether other processes have accessed the files in the following directories.

[UNIX]

/var/opt/FJSVcir/cir/temp/meta\_db

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\temp\meta\_db

---

### **[Notice]Need to restart for uninstall completion.**

#### **Description**

Uninstallation was completed. (silent mode)

#### **Action method**

Restart the system.

---

# Appendix G Estimating Database Disk Space Requirements

This appendix describes how to estimate database disk space requirements.

## G.1 Estimating Table Size Requirements

The following tables provide the formulas for estimating table size requirements.

Table G.1 Estimation formula when the record length is 2032 bytes or less

| Item   | Estimation formula (bytes)   |
|--|--|
| (1) Record length                                | $27(*1) + \text{NULL map} + \text{OID} + \text{column data}$<br>NULL map: $\text{Number of columns} / 8 (*2)$<br>OID: 4 for a table "WITH OID". The default is 0.<br>Column data: Sum of column lengths<br>*1: Record head section<br>*2: Round the result up to the next integer.<br><ul style="list-style-type: none"> <li>- Because the column data is placed in boundaries of 8 bytes, you need to make an adjustment so that the sum of the record head section, NULL map and OID is a multiple of 8.<br/>               For example, if the calculated length is <math>27 + 1 / 8</math> (rounded up) + 0 = 28 bytes, add 4 to make the length 32 bytes.</li> <li>- Because the data of each column is placed in boundaries of the defined data type, take the boundary of each data type into account for the length of the column data.<br/>               For example, the length of the column data in the table below will not be the sum of the data types, which is 37 bytes, but will instead be 64 bytes following boundary adjustment.<br/>               Definition: create table tb1(c1 char(1), c2 long, c3 int, c4 box)<br/>               Estimation: CHAR type 1 byte + boundary adjustment of 7 bytes for LONG type 8 bytes + LONG type 8 bytes + INT type 4 bytes + boundary adjustment of 12 bytes for BOX type 32 bytes + BOX type 32 bytes = 64 bytes</li> <li>- Because each record is placed in boundaries of 8 bytes, you need to make an adjustment so that the length of the column data is a multiple of 8.</li> <li>- If the calculated record length exceeds 2,032 bytes, the variable length data in the record might be compressed automatically. If so, use the estimation formulas in "<a href="#">Table G.2 Estimation formula when the record length exceeds 2032 bytes</a>" to estimate the table size.</li> </ul> |
| (2) Number of records per page                   | $8168 (*1) / ((1) \text{ record length} + 4 (*2))$<br>*1: Page length (8192) - page head (24)<br>*2: Pointer length (4)<br><ul style="list-style-type: none"> <li>- The result will be rounded down to the next integer.</li> </ul>  |
| (3) Number of pages required for storing records | Total number of records / (2) number of records per page<br><ul style="list-style-type: none"> <li>- The result will be rounded up to the next integer.</li> </ul>   |
| (4) Amount of space                              | $(3) \text{ Number of pages required for storing records} \times \text{page length} \times \text{safety factor} (*1)$<br>*1: Specify 2.0 or higher.<br><ul style="list-style-type: none"> <li>- This is the safety factor assumed if vacuuming is performed for garbage collection in tables and indexes.</li> </ul>   |

Table G.2 Estimation formula when the record length exceeds 2032 bytes

| Item                | Estimation formula (bytes)  |
|---------------------|---|
| (4) Amount of space | Total number of records x (1) record length x safety factor (*1)<br>*1: Specify 2.0 or higher.<br>- This is the safety factor assumed if vacuuming is performed for garbage collection in tables and indexes. |

## G.2 Estimating Index Size Requirements

This section provides the formulas for estimating index size requirements.

FUJITSU Enterprise Postgres provides six index types: B-tree, Hash, GiST, GIN, SP-GiST, and VCI. If you do not specify the index type in the CREATE INDEX statement, a B-tree index is generated.

The following describes how to estimate a B-tree index. Refer to "[G.7 Estimating VCI Disk Space Requirements](#)" for information on how to estimate VCI.

A B-tree index is saved as a fixed-size page of 8 KB. The page types are meta, root, leaf, internal, deleted, and empty. Since leaf pages usually account for the highest proportion of space required, you need to calculate the requirements for these only.

Table G.3 Estimation formula when the key data length is 512 bytes or less

| Item   | Estimation formula (bytes)   |
|--|--|
| (1) Entry length                                 | 8 (*1) + key data length (*2)<br>*1: Entry head<br>*2: The key data length depends on its data type (refer to " <a href="#">G.3 Sizes of Data Types</a> " for details).<br>Because each entry is placed in boundaries of 8 bytes, you need to make an adjustment so that the length of the key data is a multiple of 8.<br>For example, if the calculated length is 28 bytes, add 4 to make the length 32 bytes.<br>- If the key data length exceeds 512 bytes, key data may be automatically compressed. In this case, use the estimation formula given in " <a href="#">Table G.4 Estimation formula when the key data length exceeds 512 bytes</a> " to estimate the key data length. |
| (2) Page size requirement                        | 8152 (*1)<br>*1: Page length (8192) - page header (24) - special data (16) = 8152  |
| (3) Number of entries per page                   | (2) Page size requirement / ((1) entry length + 4 (*1))<br>*1: Pointer length<br>- Result of (3) number of entries per page will be rounded down to the nearest integer.   |
| (4) Number of pages required for storing indexes | Total number of records / (3) number of entries per page<br>- Result of (4) number of pages required for storing indexes will be rounded up to the nearest integer.  |
| (5) Space requirement                            | (4) Number of pages required for storing indexes x 8192 (*1) / usage rate (*2)<br>*1: Page length<br>*2: Specify 0.7 or lower.   |

Table G.4 Estimation formula when the key data length exceeds 512 bytes

| Item                  | Estimation formula (bytes)   |
|-----------------------|--|
| (5) Space requirement | Total number of records x key data length x compression ratio (*1) / usage rate (*2)<br>*1: The compression ratio depends on the data value, so specify 1. |

| Item | Estimation formula (bytes)                  |
|------|---|
|      | *2: Specify 0.7 or lower as the usage rate. |

## G.3 Sizes of Data Types

---

This section lists the sizes of the data types.

### G.3.1 Sizes of Fixed-Length Data Types

---

The following table lists the sizes of fixed-length data types.

| Data type                   | Size (bytes)        |
|-----------------------------|---------------------|
| SMALLINT (INT2)             | 2                   |
| INTEGER (INT4)              | 4                   |
| BIGINT (INT8)               | 8                   |
| REAL                        | 4                   |
| DOUBLE PRECISION            | 8                   |
| SERIAL (SERIAL4)            | 4                   |
| BIGSERIAL (SERIAL8)         | 8                   |
| MONEY                       | 8                   |
| FLOAT                       | 8                   |
| FLOAT (1-24)                | 4                   |
| FLOAT (25-53)               | 8                   |
| TIMESTAMP WITHOUT TIME ZONE | 8                   |
| TIMESTAMP WITH TIME ZONE    | 8                   |
| DATE                        | 4                   |
| TIME WITHOUT TIME ZONE      | 8                   |
| TIME WITH TIME ZONE         | 12                  |
| INTERVAL                    | 12                  |
| BOOLEAN                     | 1                   |
| CIDR                        | IPv4: 7<br>IPv6: 19 |
| INET                        | IPv4: 7<br>IPv6: 19 |
| MACADDR                     | 6                   |
| POINT                       | 16                  |
| LINE                        | 32                  |
| LSEG                        | 32                  |
| BOX                         | 32                  |
| CIRCLE                      | 24                  |

### G.3.2 Sizes of Variable-Length Data Types

---

The following table lists the sizes of variable-length data types.

| Data type  | Size (bytes)   | Remarks  |
|--|--|--|
| path   | Length of size portion + 12 + 16 x number of vertices                            | 1) When carrying out division, round to the next integer.<br>2) If the real data length is less than 127, then the length of the size portion is 1 byte, otherwise it is 4 bytes.<br>3) The number of bytes per character depends on the character set (refer to " <a href="#">G.3.4 Number of Bytes per Character</a> " for details). |
| polygon  | Length of size portion + 36 + 16 x number of vertices                            |  |
| decimal  | Length of size portion + 2 + (integer precision / 4 + decimal precision / 4) x 2 |  |
| numeric  |  |  |
| bytea  | Length of size portion + real data length  |  |
| character varying( <i>n</i> ), varchar( <i>n</i> ) | Length of size portion + number of characters x number of bytes per character    |  |
| character( <i>n</i> ), char( <i>n</i> )            | Length of size portion + <i>n</i> x number of bytes per character                |  |
| text   | Length of size portion + number of characters x number of bytes per character    |  |

### G.3.3 Sizes of Array Data Types

The following table lists the sizes of array data types.

| Data type | Size (bytes)  | Remarks  |
|-----------|---|--|
| Array     | Length of size portion + 12 + 8 x number of dimensions + data size of each item | If the real data length is less than 127, then the length of the size portion is 1 byte, otherwise it is 4 bytes.<br>- Example of estimation when array data is "ARRAY[[1,2,3], [1,2,3]]"<br>Number of dimensions: 2<br>INTEGER data size: 4<br>Total size = 1+12+8x2+6x4 = 53 |

### G.3.4 Number of Bytes per Character

The following table lists the number of bytes per character.

The given values relate to the common character sets EUC-JP and UTF8.

| Character type              | Character set | Number of bytes per character |
|-----------------------------|---------------|-------------------------------|
| ASCII                       | EUC_JP        | 1                             |
| Halfwidth katakana          | EUC_JP        | 2                             |
| JIS X 0208 kanji characters | EUC_JP        | 2                             |
| JIS X 0212 kanji characters | EUC_JP        | 3                             |
| ASCII                       | UTF8          | 1                             |
| Halfwidth katakana          | UTF8          | 3                             |
| JIS X 0208 kanji characters | UTF8          | 3                             |
| JIS X 0212 kanji characters | UTF8          | 3                             |

## G.4 Estimating Transaction Log Space Requirements

This section provides the formula for estimating transaction log space requirements.

```
Transaction log space requirements = ( checkpoint_segments x 3 + 1 ) x 16 MB
```

However, if the update volume is extremely high (for example, due to a large data load and batch processing), disk writing at a checkpoint may not be able to keep up with the load, and a higher number of transaction logs than indicated here may temporarily be accumulated.

## G.5 Estimating Archive Log Space Requirements

---

This section explains how to estimate archive log space requirements.

The archive log is an archive of the transaction logs from the time of a previous backup to the present, so it fluctuates depending on the backup period and the content of update transactions.

The longer the backup period and the more update transactions, the greater the space required for the archive log.

Therefore, measure the actual archive log space by using a test environment to simulate backup scheduling and database update in a real operating environment.

## G.6 Estimating Backup Disk Space Requirements

---

This section provides the formula for estimating backup disk space requirements.

```
Backup disk space requirements = size of the database cluster + transaction log space requirements  
+ archive log space requirements
```

## G.7 Estimating VCI Disk Space Requirements

---

This section provides the formula for estimating VCI disk space requirements.

```
Disk space = (number of rows in tables) x (number of bytes per row) x (compression ratio) + (WOS size)
```

Number of bytes per row

```
Number of bytes per row = (19 + (number of columns specified in CREATE INDEX) / 8  
+ (number of bytes per single column value)) x 1.1
```

Note: Round up the result to the nearest integer.

Compression ratio

Specify a value between 0 and 1. Since compression ratio depends on the data being compressed, use actual data or test data that simulates it, then compare the value with the estimation result. As a guide, the compression ratio measured with the Fujitsu sample data is shown below:

- Data with high degree of randomness (difficult to compress): Up to approximately 0.9 times.
- Data with high degree of similarity (easy to compress): Up to approximately 0.5 times.

WOS size

```
WOS size = (number of WOS rows) / 185 x 8096
```

One row is added to the number of WOS rows for each INSERT and DELETE, and two rows are added for UPDATE. On the other hand, the number decreases to 520,000 rows or less during conversion to ROS performed by the ROS control daemon.

# Appendix H Estimating Memory Requirements

This appendix explains how to estimate the memory.

## H.1 FUJITSU Enterprise Postgres Memory Requirements

This section describes the formulas for estimating FUJITSU Enterprise Postgres memory requirements.

Use the following formula to obtain a rough estimate of memory required for FUJITSU Enterprise Postgres:

$$fujitsuEnterprisePostgresRequiredMemory = sharedMemoryAmount + LocalMemoryAmount$$

### Shared memory amount

Refer to "Shared Memory and Semaphores" under "Server Administration" in the PostgreSQL Documentation for information on shared memory.

However, note that if instances have been created using WebAdmin, the parameters below will be configured automatically when the instances are created. Take this into account when calculating the shared memory size.

| Parameter name            | Set value   |
|---------------------------|---|
| shared_buffers            | 30 percent of the internal memory of the machine. |
| max_connections           | 100   |
| max_prepared_transactions | 100   |

### Local memory amount

$$\begin{aligned}
LocalMemoryAmount = & processStackArea \\
& + memoryUsedInDbSessionsThatUseTempTables \\
& + memoryUsedInDbSessionsThatPerformSortAndHashTableOperations \\
& + memoryUsedInMaintenanceOperations \\
& + baseMemoryUsedInEachProcess \\
& + memoryUsedPreparingForDataAccess
\end{aligned}$$

### Process stack area

$$\begin{aligned}
processStackArea \\
= & max\_stack\_depth \times (max\_connections + autovacuum\_max\_workers + 9)
\end{aligned}$$

This formula evaluates to the maximum value.

Actually it is used according to the growth of the stack.

In the formula above, 9 is the number of processes that perform roles specific to servers.

### Memory used in database sessions that use temporary tables

$$\begin{aligned}
memoryUsedInDbSessionsThatUseTempTables \\
= & temp\_buffers \times max\_connections
\end{aligned}$$

This formula evaluates to the maximum value.

Memory is gradually used as temporary buffers are used, and is released when the session ends.

### Memory used in database sessions that perform sort and hash table operations

$$\begin{aligned}
memoryUsedInDbSessionsThatPerformSortAndHashTableOperations \\
= & work\_mem \times max\_connections
\end{aligned}$$

This formula evaluates to the maximum value.

Memory is gradually used as operations such as sort are performed, and is released when the query ends.

### Memory used in maintenance operations

$$\begin{aligned} & \text{memoryUsedInMaintenanceOperations} \\ & = \text{maintenance\_work\_mem} \times (\text{numOfSessionsPerformingMaintenance} + \text{autovacuum\_max\_workers}) \end{aligned}$$

Note that 'maintenance operations' are operations such as VACUUM, CREATE INDEX, and ALTER TABLE ADD FOREIGN KEY.

### Base memory used in each process

$$\begin{aligned} & \text{baseMemoryUsedInEachProcess} \\ & = 3\text{MB} \times (\text{max\_connections} + \text{autovacuum\_max\_workers} + 9) \end{aligned}$$

This formula evaluates to the memory used when server processes are running.

In the formula above, 9 is the number of processes that perform roles specific to servers.

### Memory used preparing for data access

$$\begin{aligned} & \text{memoryUsedPreparingForDataAccess} \\ & = \text{variationAmount} \times (\text{max\_connections} + \text{autovacuum\_max\_workers} + 4) \end{aligned}$$

where  $\text{variationAmount} = \text{shared\_buffers} / 8\text{KB} \times 4 \text{ bytes}$   
(note that 8KB is the page length, and 4 bytes is the size of page management data)

This formula evaluates to the memory required to access the database cache in the shared memory.

In the formula above, among the processes that perform roles specific to servers, 4 is the number of processes that access the database.

## H.2 Database Multiplexing Memory Requirements

This section describes the formula for estimating database multiplexing memory requirements.

Use the following formula to obtain a rough estimate of memory required for database multiplexing:

$$\begin{aligned} & \text{Memory usage of the database multiplexing feature} \\ & = \text{Peak memory usage of the Mirroring Controller processes} \\ & \quad + \text{Peak memory usage of the Mirroring Controller commands} \end{aligned}$$

Peak memory usage of the Mirroring Controller processes=150 MB

Peak memory usage of the Mirroring Controller commands=50 MB \* Number of commands executed simultaneously

## H.3 PL/extJava Memory Requirements

This section describes the formula for estimating PL/extJava memory requirements.

Use the following formula to obtain a rough estimate of memory required for PL/extJava:

$$\text{memoryUsedByPLExtJavaInMegabytes} = 600 + (\text{numOfServerInstances(JavaVMs)} \times 500)$$



### Note

- Creating a container will create one server instance (Java VM).
- The number of server instances (Java VMs) may fluctuate based on the following actions:
  - Adding a container (one server instance (Java VM) will be added)
  - Adding a server instance (Java VM) to a container
  - Deleting a server instance (Java VM) from a container

## H.4 Parallel Scan Memory Requirements

---

This section describes the formulas for estimating parallel scan memory requirements.

Use the following formula to obtain a rough estimate of memory requirements:

$$\begin{aligned} \text{memUsedByParallelScan} = & \\ & (\text{sharedMemForParallelProcesses} \quad + \\ & \text{sharedMemForInterprocessCommunication} + \\ & \text{LocalMemForParallelProcesses} \\ & ) \\ & \times \text{maxNumOfSimultaneousStatementsForParallelScan} \end{aligned}$$

### Shared memory amount for parallel processes

$$\begin{aligned} \text{sharedMemForParallelProcesses} = & \\ & (\text{baseMemOfSharedMemInEachParallelProcess} + \text{max_locks_per_transaction} \times \text{lockInfoSize}) \\ & \times \text{max\_parallel\_degree} \end{aligned}$$

Base shared memory amount used in each parallel process

$$\text{baseSharedMemInEachParallelProcess} = 1800 \text{ bytes}$$

Lock information size

$$\text{lockInfoSize} = 272 \text{ bytes}$$

### Shared memory amount for interprocess communication

$$\begin{aligned} \text{sharedMemForInterprocessCommunication} = & \text{memForSharingScanProcesses} + \\ & \text{memForExchangingScanResults} \end{aligned}$$

Memory amount for sharing scan processes

$$\text{memForSharingScanProcesses} = 1 \text{ MB}$$

Memory amount for exchanging scan results

$$\text{memForExchangingScanResults} = 128 \text{ KB} \times \text{max\_parallel\_degree}$$

### Local memory amount for parallel processes

$$\begin{aligned} \text{LocalMemForParallelProcesses} = & (\text{baseLocalMemInEachParallelProcess} + \text{work\_mem}) \\ & \times \text{max\_parallel\_degree} \end{aligned}$$

Base local memory amount used in each parallel process

$$\text{baseLocalMemInEachParallelProcess} = 3 \text{ MB}$$

## H.5 VCI Memory Requirements

---

This section describes the formula for estimating VCI memory requirements.

Use the following formula to obtain a rough estimate of memory requirements:

$$memUsedByVci = memForData + memForEachProcess$$

## Memory required to store data in memory

Secure the space estimated using the formula below on the stable buffer (part of shared\_buffer).

$$memForData = (numOfRowsInTables) \times (numOfBytesPerRow) + (wosSize)$$

Number of bytes per row

$$numOfBytesPerRow = (19 + (numOfColumnsInCreateIndexStatement) / 8 + (numOfBytesPerSingleColumnValue)) \times 1.1$$

Note: Round up the result to the nearest integer.

WOS size

$$wosSize = (numOfWosRows) / 185 \times 8096$$

One row is added to the number of WOS rows for each INSERT and DELETE, and two rows are added for UPDATE. On the other hand, the number decreases to 520,000 rows or less during conversion to ROS performed by the ROS control daemon.

## Memory required for each process

$$memForEachProcess = memUsedPerScanning + memUsedForVciMaintenance + memUsedByCreateIndexStatement$$

Memory used per scanning

- Parallel scan

$$memUsedPerScanning = vci.shared_work_mem + (numOfParallelWorkers + 1) \times vci.maintenance_work_mem$$

Note: The number of parallel workers used by VCI simultaneously in the entire instance is equal to or less than vci.max\_parallel\_degree.

- Non-parallel scan

$$memUsedPerScanning = vci.max_local_ros + vci.maintenance_work_mem$$

### Note

- vci.shared\_work\_mem, and vci.max\_local\_ros are used to create local ROS. If local ROS exceeds these sizes, execute a query without using VCI according to the conventional plan.
- vci.maintenance\_work\_mem specifies the memory size to be secured dynamically. If it exceeds the specified value, a disk temporary file is used for operation.

Memory used for VCI maintenance

$$memUsedForVciMaintenance = vci.maintenance_work_mem \times vci.control_max_workers$$

Memory used by CREATE INDEX

$$memUsedByCreateIndexStatement = vci.maintenance_work_mem$$

 Note

vci.maintenance\_work\_mem specifies the memory to be secured dynamically. If it exceeds the specified value, a disk temporary file is used for operation.

# Appendix I Quantitative Limits

This appendix lists the quantitative limits of FUJITSU Enterprise Postgres.

Table I.1 Length of identifier

| Item                            | Limit                         |
|---------------------------------|-------------------------------|
| Database name                   | Up to 63 bytes (*1) (*2) (*3) |
| Schema name                     | Up to 63 bytes (*1) (*2)      |
| Table name                      | Up to 63 bytes (*1) (*2)      |
| View name                       | Up to 63 bytes (*1) (*2)      |
| Index name                      | Up to 63 bytes (*1) (*2)      |
| Table space name                | Up to 63 bytes (*1) (*2)      |
| Cursor name                     | Up to 63 bytes (*1) (*2)      |
| Function name                   | Up to 63 bytes (*1) (*2)      |
| Aggregate function name         | Up to 63 bytes (*1) (*2)      |
| Trigger name                    | Up to 63 bytes (*1) (*2)      |
| Constraint name                 | Up to 63 bytes (*1) (*2)      |
| Conversion name                 | Up to 63 bytes (*1) (*2)      |
| Role name                       | Up to 63 bytes (*1) (*2) (*4) |
| Cast name                       | Up to 63 bytes (*1) (*2)      |
| Collation sequence name         | Up to 63 bytes (*1) (*2)      |
| Encoding method conversion name | Up to 63 bytes (*1) (*2)      |
| Domain name                     | Up to 63 bytes (*1) (*2)      |
| Extension name                  | Up to 63 bytes (*1) (*2)      |
| Operator name                   | Up to 63 bytes (*1) (*2)      |
| Operator class name             | Up to 63 bytes (*1) (*2)      |
| Operator family name            | Up to 63 bytes (*1) (*2)      |
| Rewrite rule name               | Up to 63 bytes (*1) (*2)      |
| Sequence name                   | Up to 63 bytes (*1) (*2)      |
| Text search settings name       | Up to 63 bytes (*1) (*2)      |
| Text search dictionary name     | Up to 63 bytes (*1) (*2)      |
| Text search parser name         | Up to 63 bytes (*1) (*2)      |
| Text search template name       | Up to 63 bytes (*1) (*2)      |
| Data type name                  | Up to 63 bytes (*1) (*2)      |
| Enumerator type label           | Up to 63 bytes (*1) (*2)      |

\*1: This is the character string byte length when converted by the server character set character code.

\*2: If an identifier that exceeds 63 bytes in length is specified, the excess characters are truncated and it is processed.

\*3: Names of databases that use PL/extJava must be 28 bytes or less.

\*4: Names of roles for connecting from the PL/extJava application server must be 8 bytes or less.

Table I.2 Database object

| Item  | Limit                        |
|---|------------------------------|
| Number of databases   | Less than 4,294,967,296 (*1) |
| Number of schemas   | Less than 4,294,967,296 (*1) |
| Number of tables  | Less than 4,294,967,296 (*1) |
| Number of views   | Less than 4,294,967,296 (*1) |
| Number of indexes   | Less than 4,294,967,296 (*1) |
| Number of table spaces  | Less than 4,294,967,296 (*1) |
| Number of functions   | Less than 4,294,967,296 (*1) |
| Number of aggregate functions   | Less than 4,294,967,296 (*1) |
| Number of triggers  | Less than 4,294,967,296 (*1) |
| Number of constraints   | Less than 4,294,967,296 (*1) |
| Number of conversion  | Less than 4,294,967,296 (*1) |
| Number of roles   | Less than 4,294,967,296 (*1) |
| Number of casts   | Less than 4,294,967,296 (*1) |
| Number of collation sequences   | Less than 4,294,967,296 (*1) |
| Number of encoding method conversions   | Less than 4,294,967,296 (*1) |
| Number of domains   | Less than 4,294,967,296 (*1) |
| Number of extensions  | Less than 4,294,967,296 (*1) |
| Number of operators   | Less than 4,294,967,296 (*1) |
| Number of operator classes  | Less than 4,294,967,296 (*1) |
| Number of operator families   | Less than 4,294,967,296 (*1) |
| Number of rewrite rules   | Less than 4,294,967,296 (*1) |
| Number of sequences   | Less than 4,294,967,296 (*1) |
| Number of text search settings  | Less than 4,294,967,296 (*1) |
| Number of text search dictionaries  | Less than 4,294,967,296 (*1) |
| Number of text search parsers   | Less than 4,294,967,296 (*1) |
| Number of text search templates   | Less than 4,294,967,296 (*1) |
| Number of data types  | Less than 4,294,967,296 (*1) |
| Number of enumerator type labels  | Less than 4,294,967,296 (*1) |
| Number of default access privileges defined in the ALTER DEFAULT PRIVILEGES statement | Less than 4,294,967,296 (*1) |
| Number of large objects   | Less than 4,294,967,296 (*1) |
| Number of rows in tables defined by WITH OIDS   | Less than 4,294,967,296 (*1) |
| Number of index access methods  | Less than 4,294,967,296 (*1) |

\*1: The total number of all database objects must be less than 4,294,967,296.

Table I.3 Schema element

| Item   | Limit   |
|--|---|
| Number of columns that can be defined in one table | From 250 to 1600 (according to the data type) |
| Table row length                                   | Up to 400 gigabytes                           |

| Item   | Limit                           |
|--|---------------------------------|
| Number of columns comprising a unique constraint                           | Up to 32 columns                |
| Data length comprising a unique constraint                                 | Less than 2,000 bytes (*1) (*2) |
| Table size   | Up to 32 terabyte               |
| Search condition character string length in a trigger definition statement | Up to 800 megabytes (*1) (*2)   |
| Item size  | Up to 1 gigabyte                |

\*1: Operation might proceed correctly even if operations are performed with a quantity outside the limits.

\*2: This is the character string byte length when converted by the server character set character code.

Table I.4 Index

| Item   | Limit                      |
|--|----------------------------|
| Number of columns comprising a key (including VCI) | Up to 32 columns           |
| Key length (other than VCI)                        | Less than 2,000 bytes (*1) |

\*1: This is the character string byte length when converted by the server character set character code.

Table I.5 Data types and attributes that can be handled

| Item         |                             | Limit  |  |
|--------------|-----------------------------|--|--|
| Character    | Data length                 | Data types and attributes that can be handled (*1)   |  |
|              | Specification length (n)    | Up to 10,485,760 characters (*1)   |  |
| Numeric      | External decimal expression | Up to 131,072 digits before the decimal point, and up to 16,383 digits after the decimal point |  |
|              | Internal binary expression  | 2 bytes  | From -32,768 to 32,767   |
|              |                             | 4 bytes  | From -2,147,483,648 to 2,147,483,647   |
|              |                             | 8 bytes  | From -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807                                   |
|              | Internal decimal expression |  | Up to 13,1072 digits before the decimal point, and up to 16,383 digits after the decimal point |
|              | Floating point expression   | 4 bytes  | From -3.4E+38 to -7.1E-46, 0, or from 7.1E-46 to 3.4E+38                                       |
|              |                             | 8 bytes  | From -1.7E+308 to -2.5E-324, 0, or from 2.5E-324 to 1.7E+308                                   |
| bytea        |                             | Up to one gigabyte minus 53 bytes  |  |
| Large object |                             | Up to two gigabytes  |  |

\*1: This is the character string byte length when converted by the server character set character code.

Table I.6 Function definition

| Item   | Limit     |
|--|-----------|
| Number of arguments that can be specified                                  | Up to 100 |
| Number of variable names that can be specified in the declarations section | No limit  |

| Item   | Limit    |
|--|----------|
| Number of SQL statements or control statements that can be specified in a function processing implementation | No limit |

Table I.7 Data operation statement

| Item   | Limit                             |
|--|-----------------------------------|
| Maximum number of connections for one process in an application (remote access)  | 4,000 connections                 |
| Number of expressions that can be specified in a selection list  | Up to 1,664                       |
| Number of tables that can be specified in a FROM clause  | No limit                          |
| Number of unique expressions that can be specified in a selection list/DISTINCT clause/ORDER BY clause/GROUP BY clause within one SELECT statement | Up to 1,664                       |
| Number of expressions that can be specified in a GROUP BY clause   | No limit                          |
| Number of expressions that can be specified in an ORDER BY clause  | No limit                          |
| Number of SELECT statements that can be specified in a UNION clause/INTERSECT clause/EXCEPT clause   | Up to 4,000 (*1)                  |
| Number of nestings in joined tables that can be specified in one view  | Up to 4,000 (*1)                  |
| Number of functions or operator expressions that can be specified in one expression  | Up to 4,000 (*1)                  |
| Number of expressions that can be specified in one row constructor   | Up to 1,664                       |
| Number of expressions that can be specified in an UPDATE statement SET clause  | Up to 1,664                       |
| Number of expressions that can be specified in one row of a VALUES list  | Up to 1,664                       |
| Number of expressions that can be specified in a RETURNING clause  | Up to 1,664                       |
| Total expression length that can be specified in the argument list of one function specification   | Up to 800 megabytes (*2)          |
| Number of cursors that can be processed simultaneously by one session  | No limit                          |
| Character string length of one SQL statement   | Up to 800 megabytes (*1) (*3)     |
| Number of input parameter specifications that can be specified in one dynamic SQL statement  | No limit                          |
| Number of tokens that can be specified in one SQL statement  | Up to 10,000                      |
| Number of values that can be specified as a list in a WHERE clause IN syntax   | No limit                          |
| Number of expressions that can be specified in a USING clause  | No limit                          |
| Number of JOINS that can be specified in a joined table  | Up to 4,000 (*1)                  |
| Number of expressions that can be specified in COALESCE  | No limit                          |
| Number of WHEN clauses that can be specified for CASE in a simple format or a searched format  | No limit                          |
| Data size per record that can be updated or inserted by one SQL statement  | Up to one gigabyte minus 53 bytes |
| Number of objects that can share a lock simultaneously   | Up to 256,000 (*1)                |

\*1: Operation might proceed correctly even if operations are performed with a quantity outside the limits.

\*2: The total number of all database objects must be less than 4,294,967,296.

\*3: This is the character string byte length when converted by the server character set character code.

Table I.8 Data size

| <b>Item</b>  | <b>Limit</b>             |
|--|--------------------------|
| Data size per record for input data files (COPY statement, psql command \copy meta command)  | Up to 800 megabytes (*1) |
| Data size per record for output data files (COPY statement, psql command \copy meta command) | Up to 800 megabytes (*1) |

\*1: Operation might proceed correctly even if operations are performed with a quantity outside the limits.

# Appendix J Determining the Preferred WebAdmin Configuration

This appendix describes the two different configurations in which WebAdmin can be used and how to select the most suitable configuration.

## J.1 WebAdmin Configurations

---

WebAdmin can be installed in two configurations:

- Single-server
- Multiserver

### J.1.1 Single-Server Configuration

---

In this configuration, WebAdmin can be used to create, manage and monitor instances only on the server machine in which it is installed.

This configuration is the same WebAdmin configuration that was available in FUJITSU Enterprise Postgres V9.4 and earlier.

### J.1.2 Multiserver Configuration

---

In this configuration, a single WebAdmin installation can be used to create, manage and monitor instances on multiple server machines.

This new configuration can be used to create a centralized platform, to manage and monitor a cluster of FUJITSU Enterprise Postgres Server instances.

## J.2 Installing WebAdmin in a Single-Server Configuration

---

To install WebAdmin in a single-server configuration, the FUJITSU Enterprise Postgres Server component and WebAdmin must be installed in the same machine.

The example below shows the option that needs to be selected during installation, to configure WebAdmin in a single-server configuration.

Example

**Installation product**

Please select the product you want to install.



Select the product you want to install. Please click the [Next] button and continue the process.

FUJITSU Enterprise Postgres Standard Edition(64bit) x.y SPz

FUJITSU Enterprise Postgres Client(32bit) x.y SPz

FUJITSU Enterprise Postgres Client(64bit) x.y SPz

FUJITSU Enterprise Postgres WebAdmin(64bit) x.y SPz

Note: Server product and WebAdmin product cannot be installed in the same machine.

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Cancel

 **Information**

The first and last options (FUJITSU Enterprise Postgres Server component and WebAdmin component respectively), cannot be selected together. The last option is used to install WebAdmin in a multiserver configuration.

## J.3 Installing WebAdmin in a Multiserver Configuration

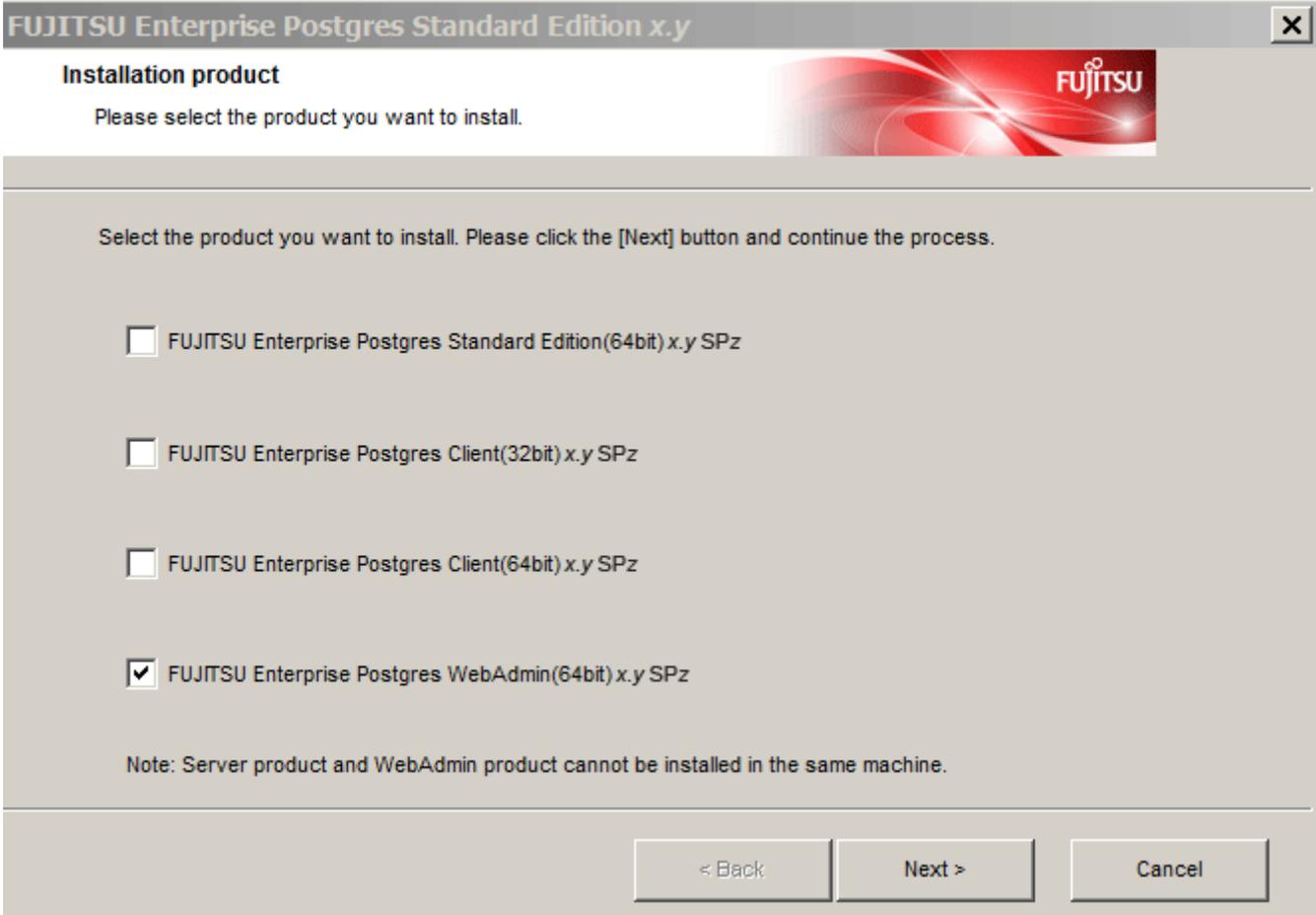
To install WebAdmin in a multiserver configuration, it is only necessary that the FUJITSU Enterprise Postgres WebAdmin component is installed in a single server machine.

The FUJITSU Enterprise Postgres Server component can then be installed in any number of different server machines.

1. Install WebAdmin

The example below shows the option that needs to be selected during installation, to configure WebAdmin in a multiserver configuration.

Example



2. Install the FUJITSU Enterprise Postgres Server component in a different server

The example below shows the option that needs to be selected during installation, to only install the FUJITSU Enterprise Postgres Server component.

Example

**Installation product**

Please select the product you want to install.



Select the product you want to install. Please click the [Next] button and continue the process.

FUJITSU Enterprise Postgres Standard Edition(64bit) x.y SPz

FUJITSU Enterprise Postgres Client(32bit) x.y SPz

FUJITSU Enterprise Postgres Client(64bit) x.y SPz

FUJITSU Enterprise Postgres WebAdmin(64bit) x.y SPz

Note: Server product and WebAdmin product cannot be installed in the same machine.

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Cancel

 **Note**

- Once WebAdmin is installed separately, it is not possible to install the FUJITSU Enterprise Postgres Server component on the same machine at a later time. To achieve this, uninstall WebAdmin and then install WebAdmin and the Server component together by selecting the first option from the installer.
- When the FUJITSU Enterprise Postgres Server component is installed separately, it is still necessary to provide WebAdmin port numbers. These port numbers will be used by the WebAdmin component to communicate with multiple servers to perform various operations.
- When only WebAdmin is installed in a server machine (without the FUJITSU Enterprise Postgres Server component), it is not possible to create database instances in that machine. Both WebAdmin and the FUJITSU Enterprise Postgres Server component must be installed together to create database instances on the machine on which they are installed.

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# FUJITSU Enterprise Postgres 9.5



## Installation and Setup Guide for Client

Windows/Linux

J2UL-2117-02ENZO(00)  
June 2016

# Preface

---

## Purpose of This Document

This document describes how to install and set up the "FUJITSU Enterprise Postgres client feature".

## Intended Readers

This document is intended for those who install and operate FUJITSU Enterprise Postgres.

Readers of this document are assumed to have general knowledge of:

W

- PostgreSQL

- SQL

- Windows

L

- PostgreSQL

- SQL

- Linux

## Structure of This Document

This document is structured as follows:

### [Chapter 1 Overview of Installation](#)

Describes the features that can be installed, and provides an overview of installation methods

### [Chapter 2 Installation and Uninstallation of the Windows Client](#)

Describes how to install the FUJITSU Enterprise Postgres client feature (Windows client)

### [Chapter 3 Installation and Uninstallation of the Linux Client](#)

Describes how to install the FUJITSU Enterprise Postgres client feature (Linux Client)

### [Chapter 4 Setup](#)

Describes the setup procedures to be performed after installation completes

### [Appendix A Installation in Silent Mode](#)

Provides specifications for installation in silent mode

### [Appendix B Uninstall \(middleware\)](#)

Describes the Uninstall (middleware) tool.

### [Appendix C Uninstall \(middleware\) Messages](#)

Describes the messages output by the Uninstall (middleware).

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# Chapter 1 Overview of Installation

This chapter provides an overview of FUJITSU Enterprise Postgres installation.

## 1.1 Features that Can Be Installed

FUJITSU Enterprise Postgres provides features to enable access to the database from a variety of platforms and languages, as the connection environment for the client and the database server.

The FUJITSU Enterprise Postgres client package must be installed on the client system to use these features.

The following table shows the relationship between the platforms and the features provided by client packages.

| Platform | features |      |                    |                    |                                   |                                | pgAdmin |
|----------|----------|------|--------------------|--------------------|-----------------------------------|--------------------------------|---------|
|          | JDBC     | ODBC | .NET Data Provider | C language (libpq) | Embedded SQL (ECPG) in C language | Embedded SQL (ECOBPG) in COBOL |         |
| Windows  | Y        | Y    | Y                  | Y                  | Y                                 | Y                              | Y       |
| Linux    | Y        | Y    |                    | Y                  | Y                                 | Y                              |         |

Y: Supported

## 1.2 Installation Types

The following three installation types are available for FUJITSU Enterprise Postgres:

- New installation
- Reinstallation
- Multi-version installation

### 1.2.1 New Installation

In initial installation, the FUJITSU Enterprise Postgres client feature is installed for the first time.

### 1.2.2 Reinstallation

Perform reinstallation to repair installed program files that have become unusable for any reason.

### 1.2.3 Upgrade Installation

Perform upgrade installation to upgrade installed program files to the latest version.

### 1.2.4 Multi-Version Installation

Perform multi-version installation to install different versions to the installed program files separately.

## 1.3 Installation Procedure

The following installation procedures are available for FUJITSU Enterprise Postgres:

- Installation in interactive mode
- Installation in silent mode

Select the installation procedure that corresponds to your environment.

### **1.3.1 Installation in Interactive Mode**

---

Interactive mode enables installation to be performed while the required information is entered interactively.

In interactive mode installation, the FUJITSU Enterprise Postgres installer automatically determines the installation state of FUJITSU Enterprise Postgres. Install FUJITSU Enterprise Postgres using one of the following installation types in accordance with the installation state:

- New installation
- Reinstallation
- Multi-version installation

### **1.3.2 Installation in Silent Mode**

---

Silent mode enables installation to be performed without the need to enter any information interactively.

New installations and multi-version installations can be performed in silent mode.

## **1.4 Uninstallation**

---

Uninstallation removes the system files of the installed FUJITSU Enterprise Postgres client feature.

# Chapter 2 Installation and Uninstallation of the Windows Client

This chapter explains how to install and uninstall the Windows client.

## 2.1 Operating Environment

---

This section describes the operating environment required to use the Windows client.

### 2.1.1 Required Operating System

---

One of the following operating systems is required to use the Windows client:

- Windows Vista(R) Home Basic
- Windows Vista(R) Home Premium
- Windows Vista(R) Business
- Windows Vista(R) Enterprise
- Windows Vista(R) Ultimate
- Windows(R) 7 Home Premium
- Windows(R) 7 Professional
- Windows(R) 7 Enterprise
- Windows(R) 7 Ultimate
- Windows(R) 8
- Windows(R) 8 Pro
- Windows(R) 8 Enterprise
- Windows(R) 8.1
- Windows(R) 8.1 Pro
- Windows(R) 8.1 Enterprise
- Windows(R) 10 Home
- Windows(R) 10 Education
- Windows(R) 10 Pro
- Windows(R) 10 Enterprise
- Microsoft(R) Windows Server(R) 2008 Standard
- Microsoft(R) Windows Server(R) 2008 Enterprise
- Microsoft(R) Windows Server(R) 2008 Datacenter
- Microsoft(R) Windows Server(R) 2008 Foundation
- Microsoft(R) Windows(R) Web Server 2008
- Microsoft(R) Windows Server(R) 2008 Standard without Hyper-V
- Microsoft(R) Windows Server(R) 2008 Enterprise without Hyper-V
- Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V
- Microsoft(R) Windows Server(R) 2008 R2 Datacenter

- Microsoft(R) Windows Server(R) 2008 R2 Enterprise
- Microsoft(R) Windows Server(R) 2008 R2 Standard
- Microsoft(R) Windows Server(R) 2008 R2 Foundation
- Microsoft(R) Windows(R) Web Server 2008 R2
- Microsoft(R) Windows Server(R) 2012 Datacenter
- Microsoft(R) Windows Server(R) 2012 Standard
- Microsoft(R) Windows Server(R) 2012 Essentials
- Microsoft(R) Windows Server(R) 2012 Foundation
- Microsoft(R) Windows Server(R) 2012 R2 Datacenter
- Microsoft(R) Windows Server(R) 2012 R2 Standard
- Microsoft(R) Windows Server(R) 2012 R2 Foundation

## 2.1.2 Related Software

---

The following table lists the software compatible (that can operate) with the Windows client.

Before using any of these, confirm that the OS supports the software.

Table 2.1 Related software

| No. | Software name   | Version                             |
|-----|-----------------|-------------------------------------|
| 1   | Visual Studio   | 2008<br>2010<br>2012<br>2013        |
| 2   | .NET Framework  | 3.5 SP1 or later<br>4<br>4.5<br>4.6 |
| 3   | C compiler (*1) | -                                   |
| 4   | JDK or JRE      | Java SE 6 or later                  |
| 5   | NetCOBOL        | (*2)                                |

\*1: Only operations using the C compiler provided with the operating system are guaranteed.

\*2: NetCOBOL is available in the following editions:

- NetCOBOL Standard Edition V7.0L10 or later
- NetCOBOL Professional Edition V7.0L10 or later
- NetCOBOL Enterprise Edition V7.0L10 or later

### Note

Either the JDK or JRE included with Interstage Application Server, or the Oracle JDK or JRE can be used. It is recommended that the JDK or JRE included with Interstage Application Server is used.

The following table lists servers that can be connected to the Windows client.

Table 2.2 Connectable servers

| OS      | Software name  |
|---------|--|
| Windows | - FUJITSU Software Enterprise Postgres Advanced Edition 9.5 or later |
| Linux   | - FUJITSU Software Enterprise Postgres Standard Edition 9.4 or later |

### 2.1.3 Excluded Software

---

There is no excluded software.

### 2.1.4 Hardware Environment

---

The following hardware is required to use the Windows client.

#### Memory

At least 256 MB of memory is required.

#### Mandatory hardware

None.

### 2.1.5 Disk Space Required for Installation

---

The capacity given below is required for new installation of the Windows client.

At the Windows client installation destination:

170 MB

System folder:

100 MB

### 2.1.6 Supported System Environment

---

This section describes the supported system environment.

#### TCP/IP protocol

FUJITSU Enterprise Postgres supports version 4 and 6 (IPv4 and IPv6) of TCP/IP protocols.



#### Note

Do not use link-local addresses if TCP/IP protocol version 6 addresses are used.

#### File system

You can install FUJITSU Enterprise Postgres only if the system folder is an NTFS volume.

### 2.1.7 Versions of Open-Source Software Used as the Base for FUJITSU Enterprise Postgres Drivers

---

The following table lists the versions of open-source software used as the base for the various FUJITSU Enterprise Postgres drivers.

| Driver             | Open-source software version |
|--------------------|------------------------------|
| .NET Data Provider | Npgsql 2.27                  |

| Driver | Open-source software version |
|--------|------------------------------|
| JDBC   | pgjdbc 9.4-1201              |
| ODBC   | psqlodbc 09.05.0100          |
| libpq  | PostgreSQL 9.5.2             |

## 2.2 Installation

This section explains how to install the Windows client.

### 2.2.1 Pre-installation Tasks

This section describes the operations to be performed before installing the Windows client.

Note that "x.y.SPz" in sample windows indicates the version level of installed products.

#### hosts file settings

Using an editor, add the IP address and server name of the connected server to the \System32\drivers\etc\hosts file in the Folder where Windows is installed.

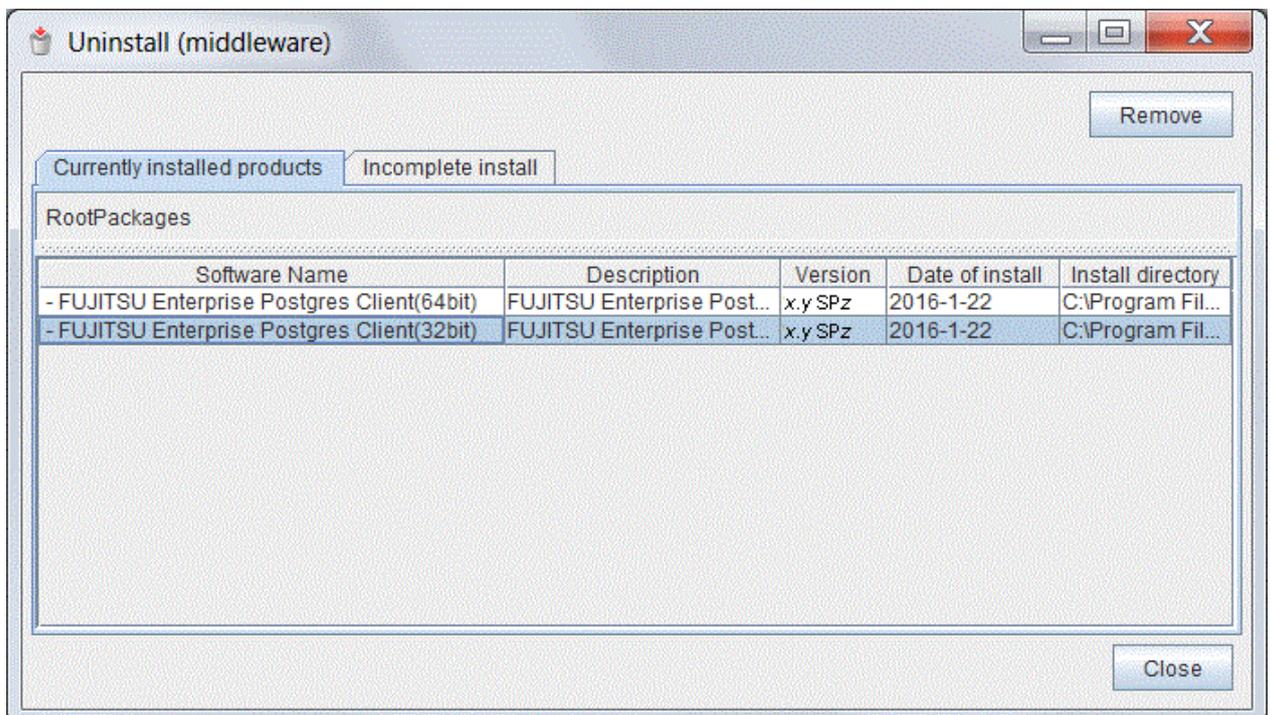


For Windows Vista(R), Windows(R) 7, Windows(R) 8, Windows(R) 8.1, or Windows(R) 10 assign write privileges in advance to the user responsible for editing the hosts file.

#### Check the installed product and determine the installation method

Using the operation shown below, start Uninstall (middleware), and check the installed products.

In Windows, click [All Programs] or [All apps], then [Fujitsu], and then [Uninstall (middleware)].



If the Windows client is already installed, determine the installation method to use:

- Reinstallation
- Multi-version installation

## Remove applied updates

If you perform reinstallation as the installation method, remove applied updates using the procedure shown below.



If a product is installed without removing applied updates, the following problems will occur:

- Performing reinstallation

If an update with the same update and version number is applied, an error informing you that the update has already been applied is displayed.

### 1. Display the applied updates

Execute the following command to display the applied updates:

Example

```
C:\Program Files (x86)\Fujitsu\UpdateAdvisor\UpdateAdvisorMW>uam showup
```

### 2. Remove the updates

Execute the command below to remove the updates. If an update with the same update number was applied more than once, the updates are removed in order, starting from the highest version number.

Example

```
C:\Program Files (x86)\Fujitsu\UpdateAdvisor\UpdateAdvisorMW>uam remove -i update-number
```

## Confirm service

The Windows Installer service must be running.

## 2.2.2 Pre-installation Considerations

---

This section describes points that the user must take into account prior to installation.

- In any of the following cases, the command given below must be executed to switch to installation mode before performing installation. After installation is complete, the next command given below must be executed to switch to execution mode.
  - A terminal server is installed in application server mode on Windows Server 2008
  - A remote desktop service is installed in application server mode on Windows Server 2008 R2, Windows Server 2012 or Windows Server 2012 R2

Before installation:

```
CHANGE USER /INSTALL
```

After installation:

```
CHANGE USER /EXECUTE
```

- The following window may be displayed when the installation program is executed.



If the above window is displayed, follow the procedure below:

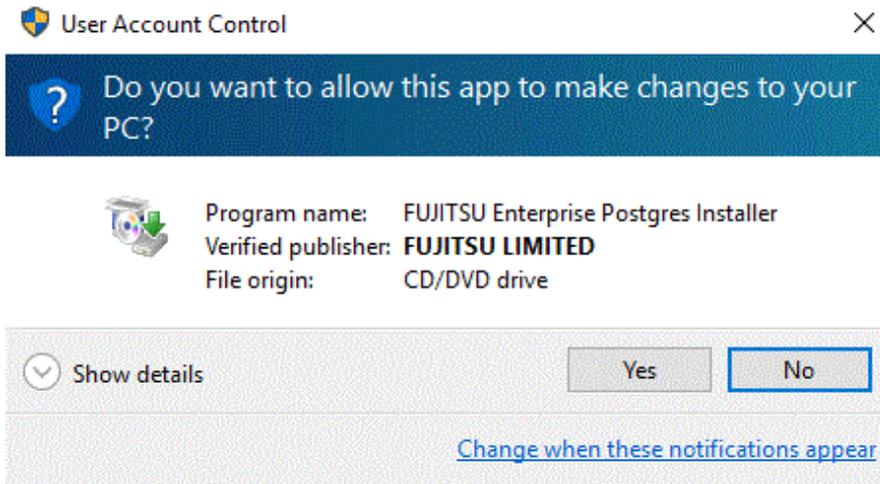
1. Perform the steps in the installation procedure until the [InstallShield Wizard Complete] window is displayed.
2. Click [Next] in the [InstallShield Wizard Complete] window.
3. The following window is displayed. Click [Finish].



4. Restart the system.

## Information

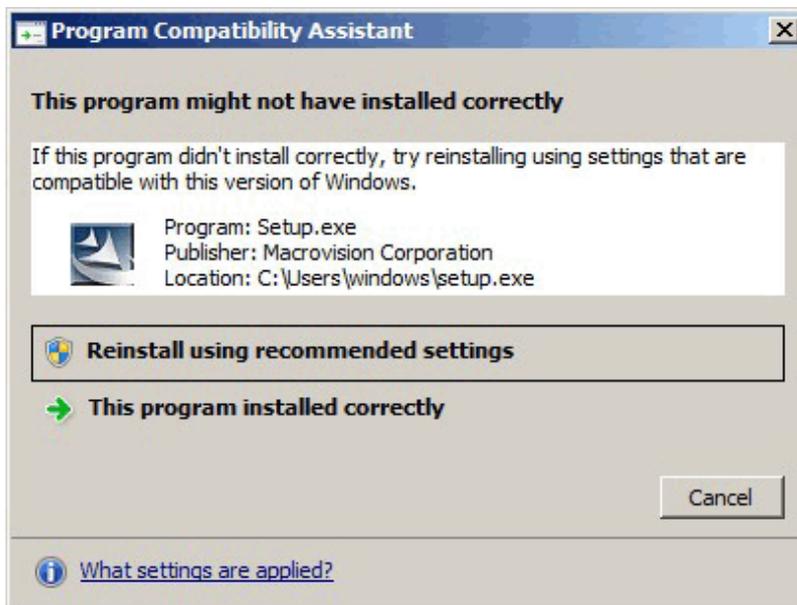
- If a [User Account Control] dialog box, such as the one shown below, is displayed when installation or uninstallation starts, click [Yes] to continue the operation.



If [No] is clicked, the [Error] dialog box will be displayed because continuing is not permitted.

Click [Retry] in the displayed [Error] dialog box to proceed with installation or uninstallation. To end operations, click [Cancel].

- If installation or uninstallation is suspended or processing terminates abnormally, a dialog box of the program compatibility assistant similar to the one below may be displayed. If this happens, click [This program installed correctly] or [This program uninstalled correctly] and continue operation.



## 2.2.3 Installation in Interactive Mode

The installation procedure is described below.

Note that "x.y.SPz" in sample windows indicates the version level of products to install.

### 1. Stop applications and the client program

If the installation method is one of the following, the applications and the client program must be stopped:

- Reinstallation

Before starting the installation, stop the following:

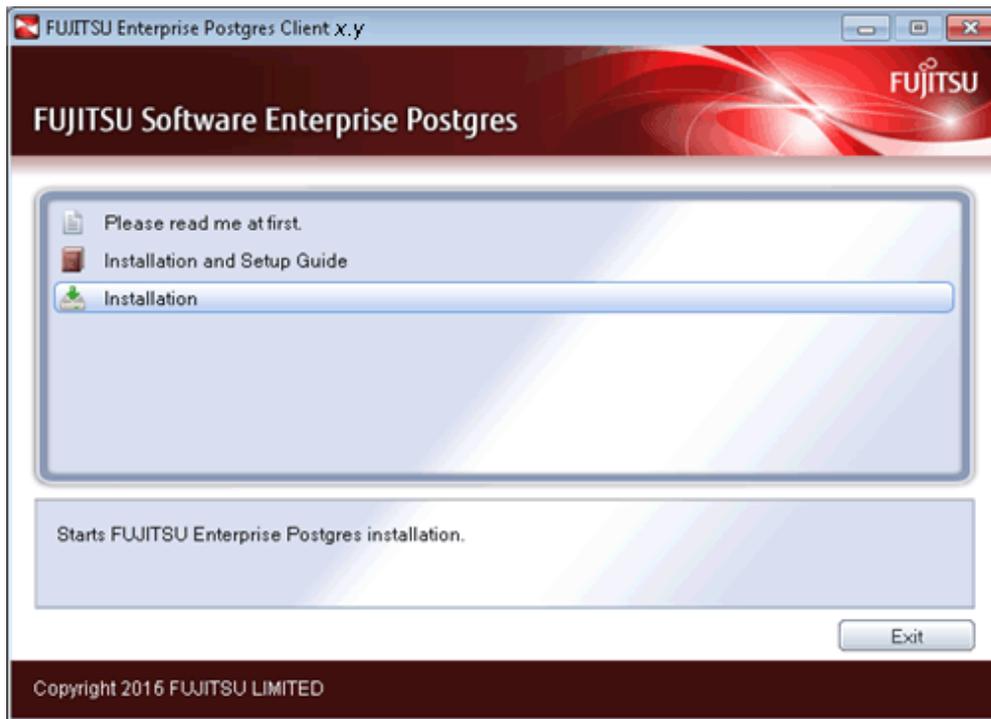
- Applications that use the product
- pgAdmin

## 2. Insert the DVD

Insert the client program DVD in the DVD drive.

## 3. Run the installation

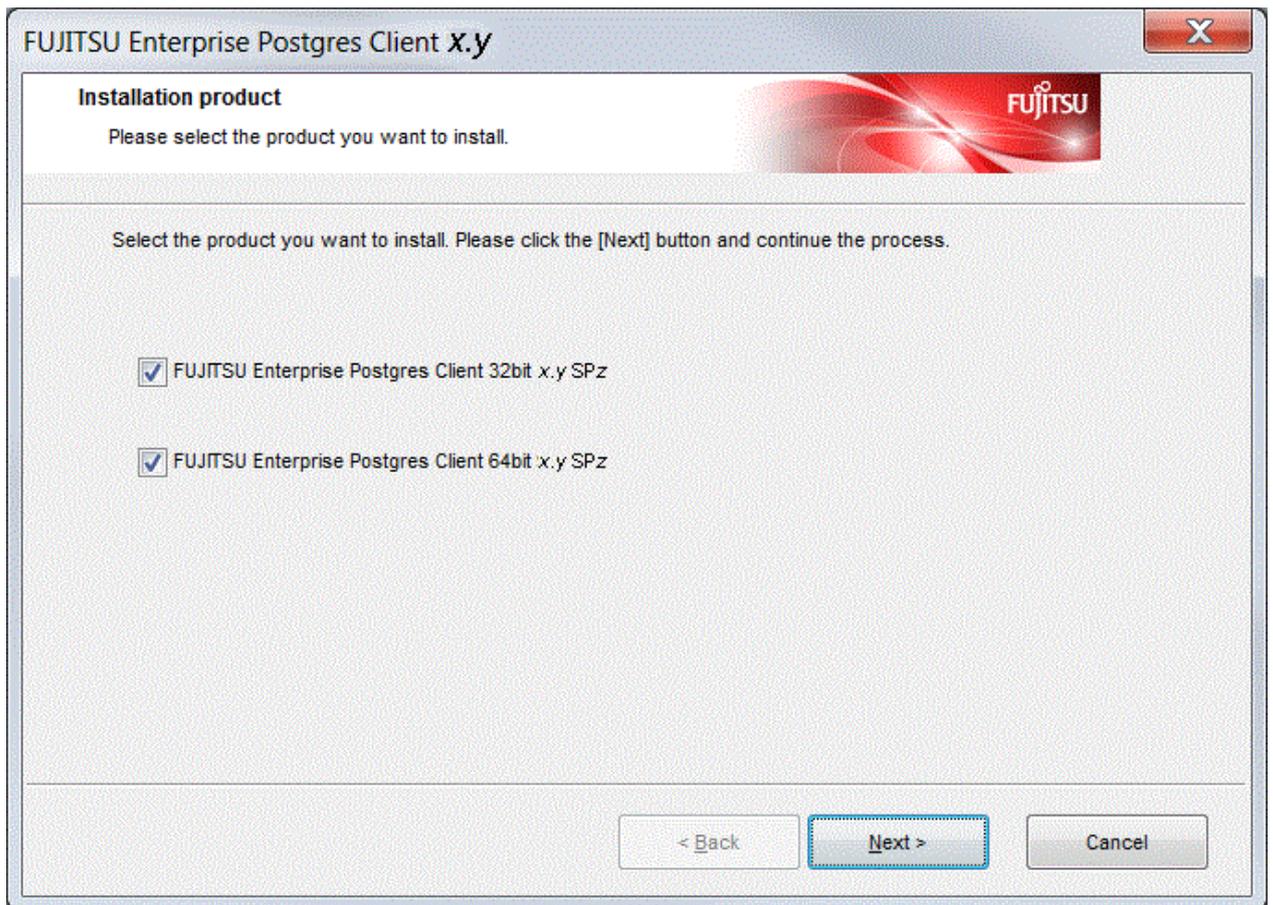
The installation menu is displayed. Click [Installation].



## 4. Select the product to install

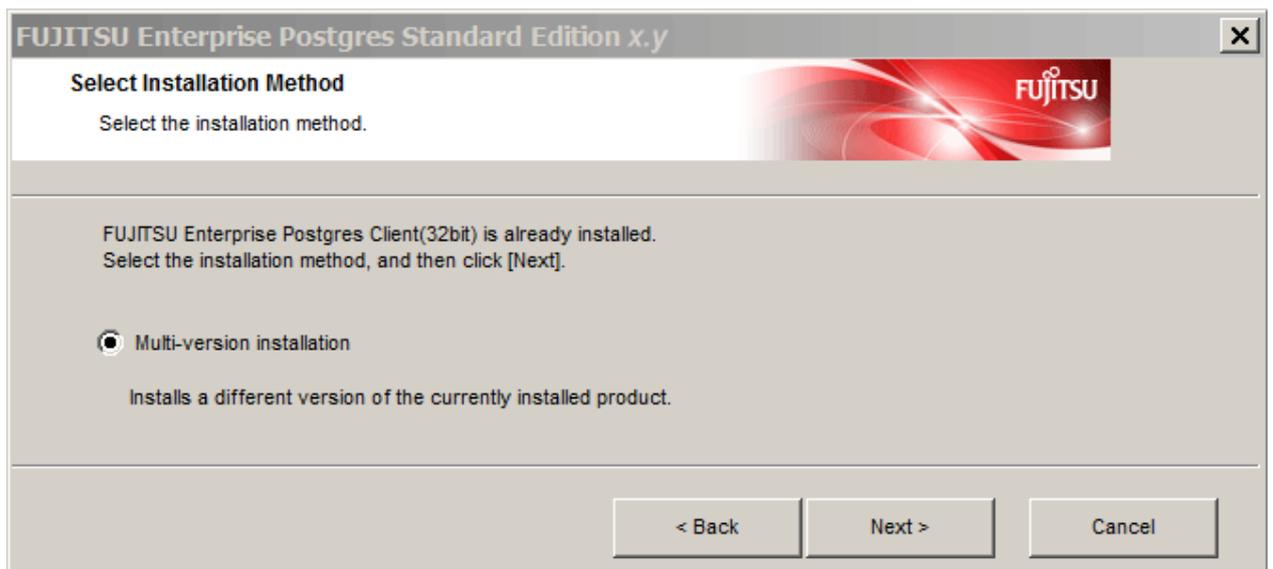
Select the product to install, and then click [Next].

If a selected product can only be reinstalled, refer to "[7. Check the settings](#)".



### Information

If multi-version installation is possible, the [Select Installation Method] window is displayed for each selected product. Select "Multi-version installation" and click [Next].

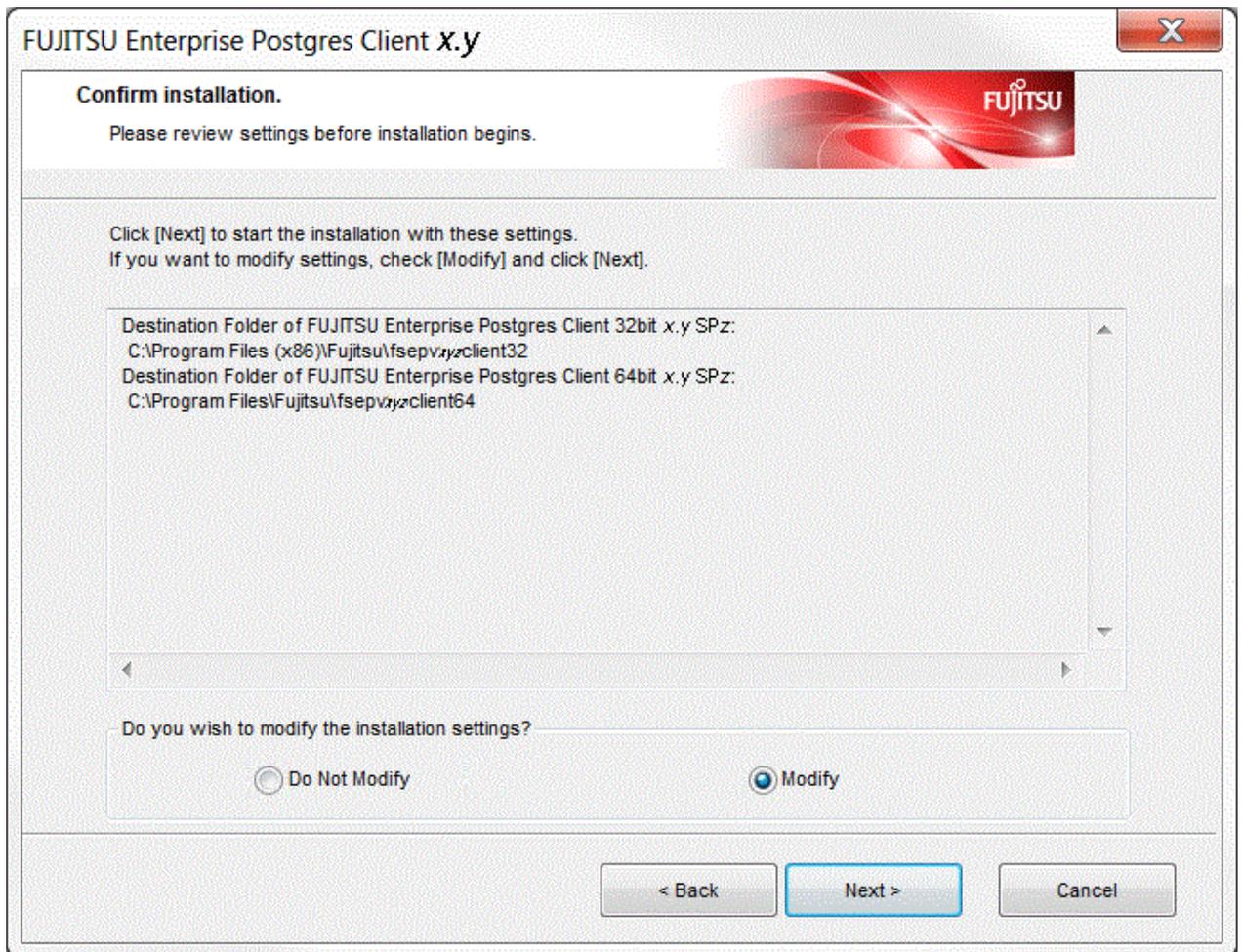


## 5. Confirm the contents for installation

The [Confirm installation] window will be displayed.

If the settings are correct, click [Next] to start installation. Proceed to "[8. Completion of installation](#)".

To modify the settings, select [Modify] and click [Next].

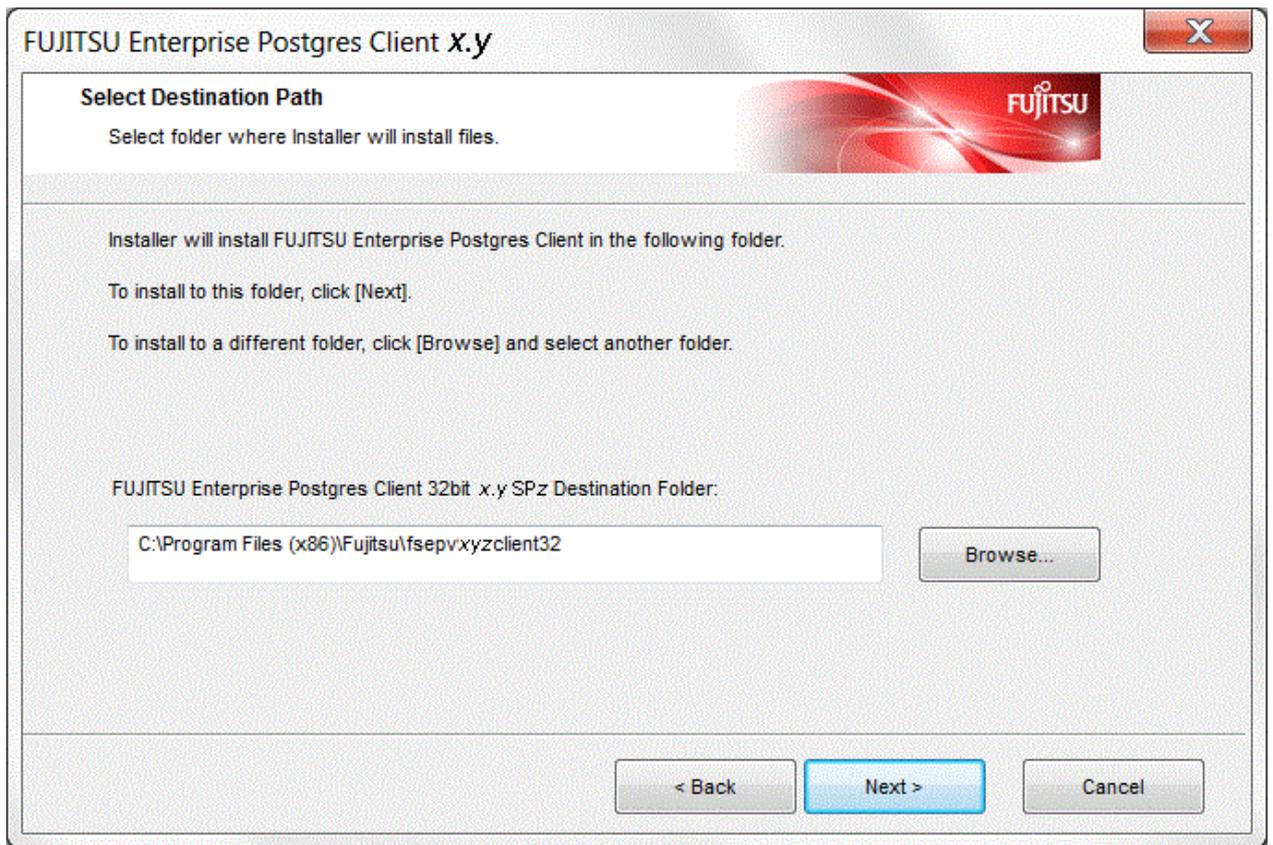


## 6. Select the installation destination

If the installation method is one of the following, the [Select Destination Path] window is displayed for each product:

- New installation
- Multi-version installation

Select the installation destination, and then click [Next].

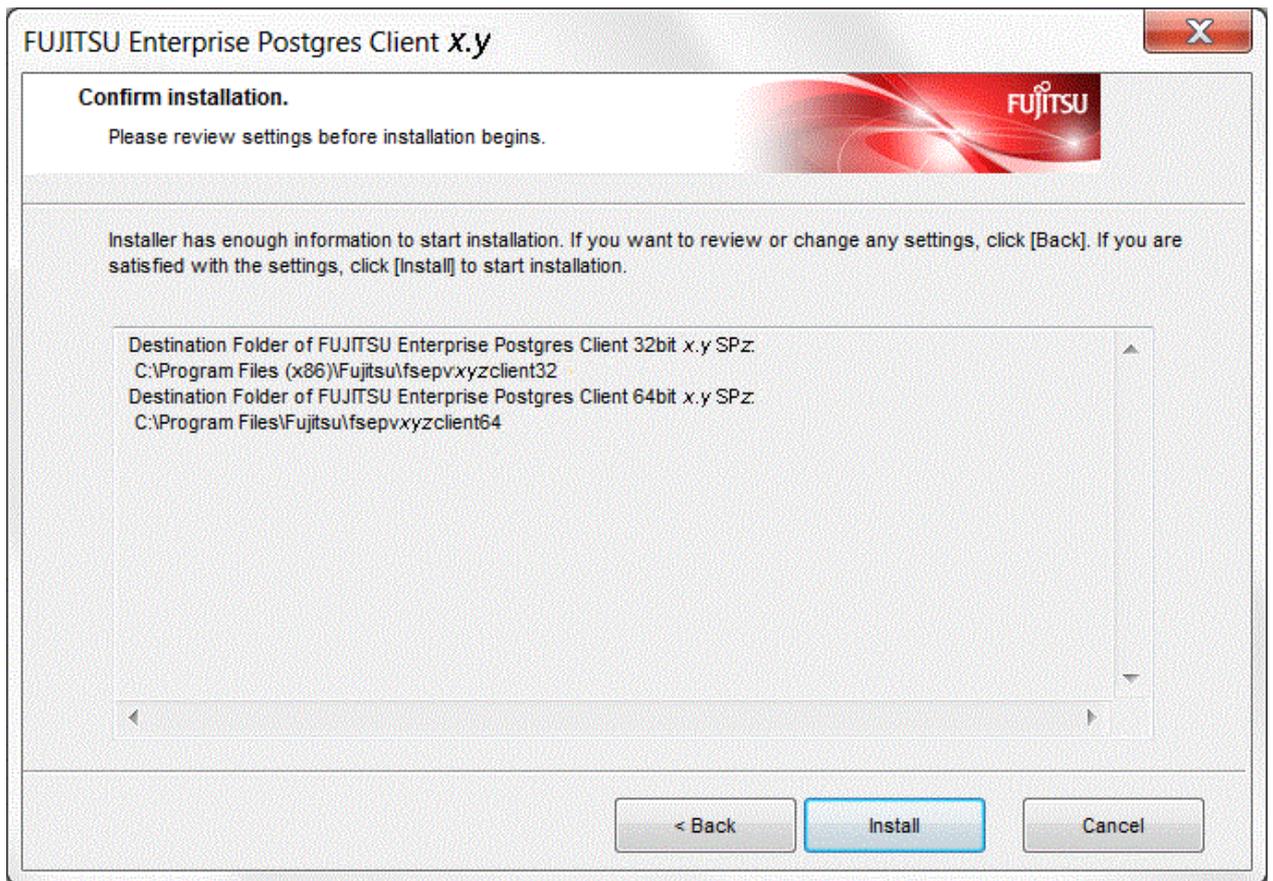


## 7. Check the settings

The [Confirm installation] window will be displayed.

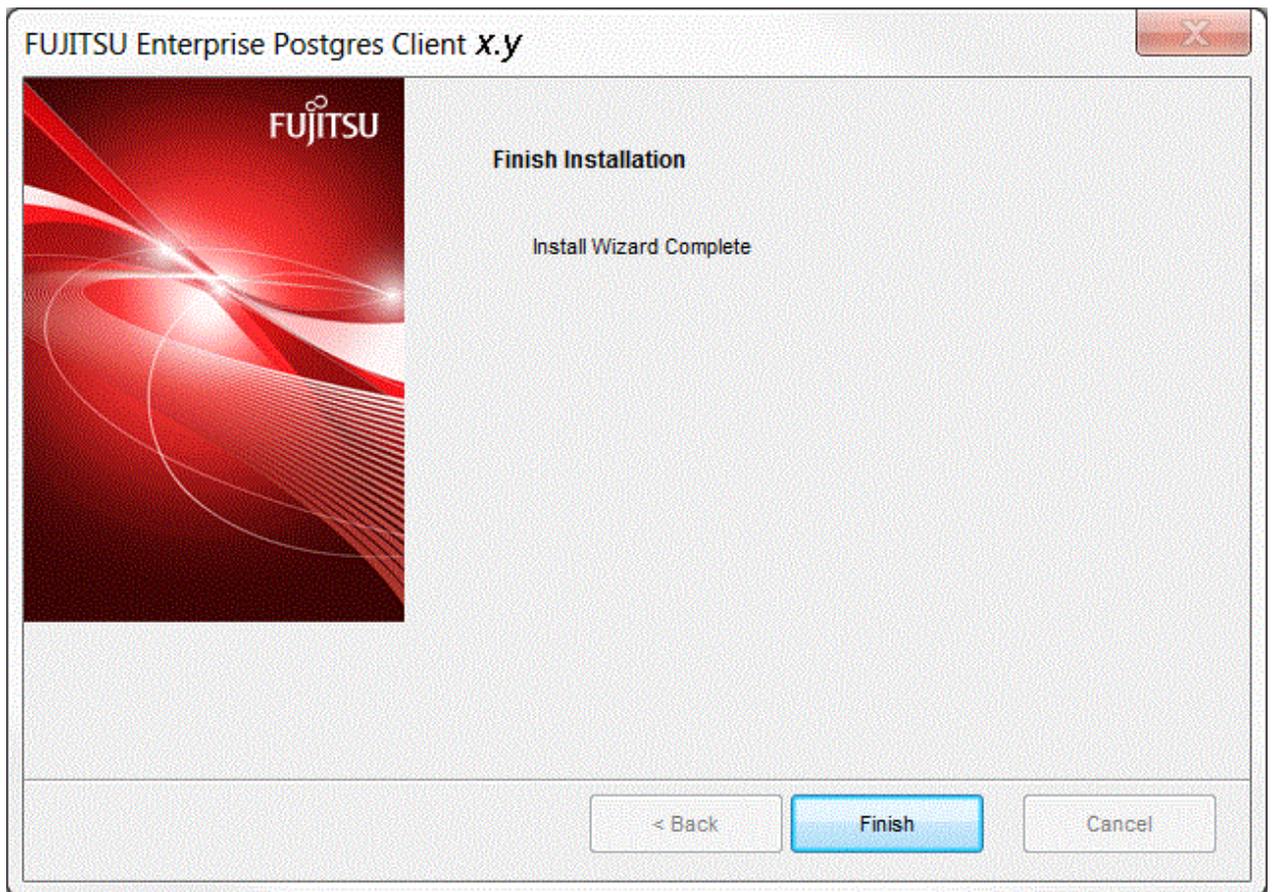
If the settings are correct, click [Install] to start installation.

To modify the settings again, click [Back].



## 8. Completion of installation

The completion window is displayed. Click [Finish].



### Note

If subsequently installing .NET Framework 3.5 SP1 or later, or .NET Framework 4.0 or later

If you intend to subsequently install .NET Framework 3.5 or .NET Framework 4.0 or later, install .NET Framework and then run the `pgx_NpgsqlRegister.exe` command to set up Fujitsu Npgsql .NET Data Provider.

The `pgx_NpgsqlRegister.exe` command is installed in `fujitsuEnterprisePostgresClientFeatureInstallationFolder\DOTNET\bin`.

Refer to "2.4 Registering .NET Data Provider" for details.

## 2.2.4 Installation in Silent Mode

Installation in silent mode can be performed only when the installation method is one of the following:

- New installation
- Multi-version installation

The installation procedure is described below.

### 1. Insert the DVD

Insert the client program DVD in the DVD drive.

The [Install Menu] window is displayed. Click [Finish].

### 2. Create an installation parameters CSV file

Consider the server type or features that will be required for system operations, and then create an installation parameters CSV file that uses the following specification format.

```
sectionName, parameterName, value
sectionName, parameterName, value
:
```

Refer to "[Appendix A Installation in Silent Mode](#)" for information on section names, parameter names, and values that can be specified.

### Information

The template for the installation parameters CSV file is "Z:\sample\sample\_windows.csv (Z is the drive on which the DVD is mounted.).

## 3. Start the command prompt

In Windows, right-click [Command Prompt] and then select [Run as administrator].

## 4. Run the installation

Execute the following command:

```
Z:\>silent.bat c:\temp\inspara.csv
```

Z: The drive on which the DVD is mounted.

c:\temp\inspara.csv: The installation parameter CSV file name.

If the silent installer ends in an error, a message is output to the log file and return values are returned. Refer to "[Appendix A Installation in Silent Mode](#)" for details.

## 2.3 Uninstallation

This section describes the procedure for uninstalling the Windows client.

### Note

- Before uninstalling the product, close the product program and all applications that are using it.
- Log in using an account that has administrator privileges and then execute the command, or switch to an account that has administrator privileges and then uninstall the product.

### 2.3.1 Uninstallation in Interactive Mode

The uninstallation procedure is described below.

Note that "x.y.SPz" in the following sample window indicates the version level of products to uninstall.

### Information

If an error occurs while the product is being uninstalled, refer to "[Appendix C Uninstall \(middleware\) Messages](#)" and take the required action.

## 1. Stop applications and the client program

Before starting the uninstallation, stop the following:

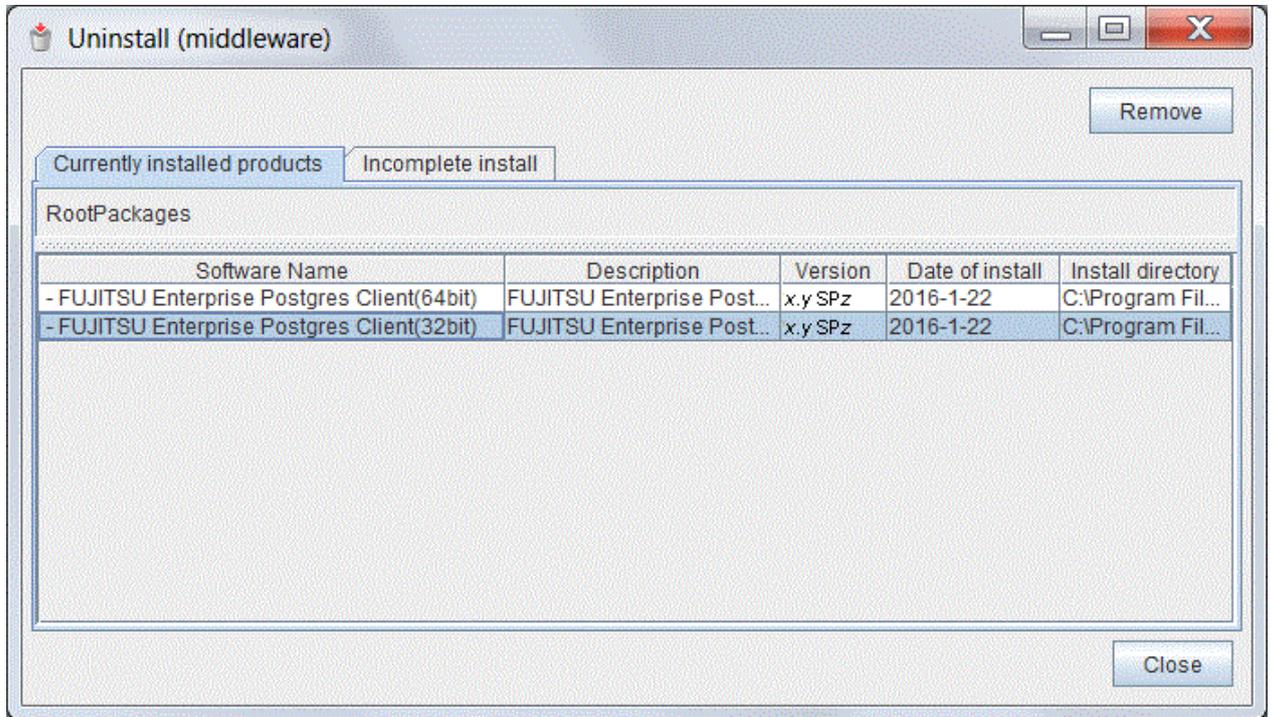
- Applications that use the product
- pgAdmin

## 2. Start the Uninstall (middleware) tool

In Windows, click [All Programs] or [All apps], then [Fujitsu], and then [Uninstall (middleware)].

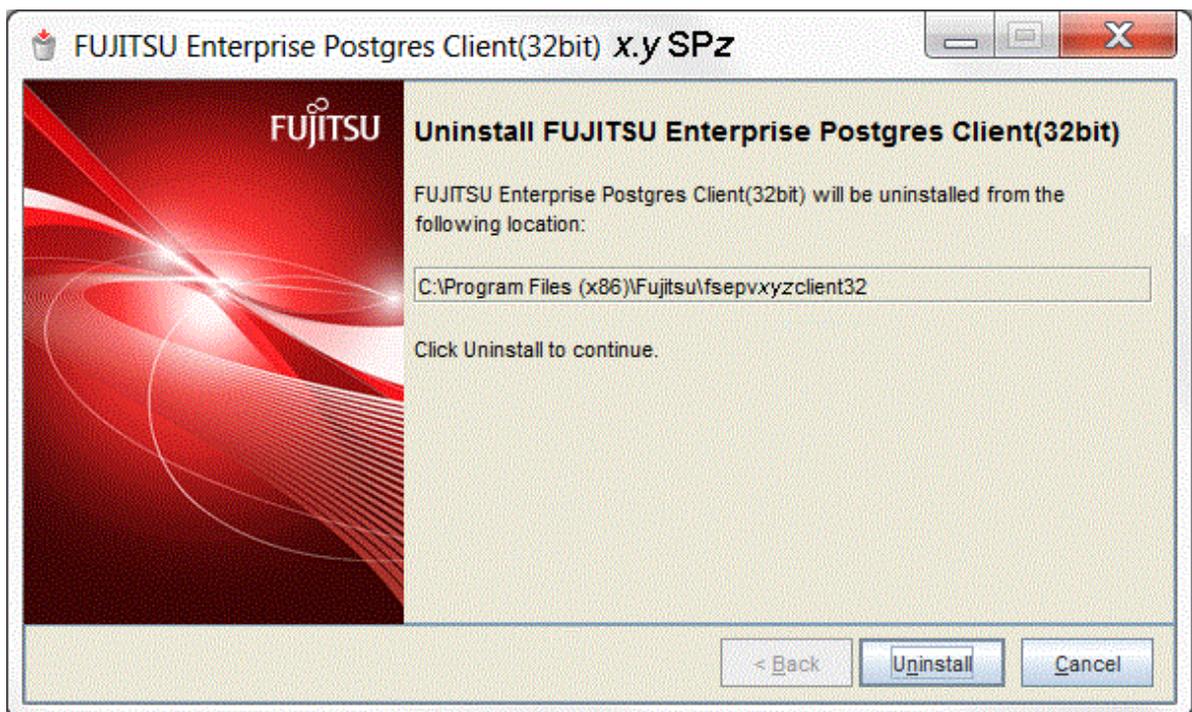
## 3. Select the software

Select the product to be uninstalled from [Software Name], and then click [Remove].



## 4. Start the uninstallation

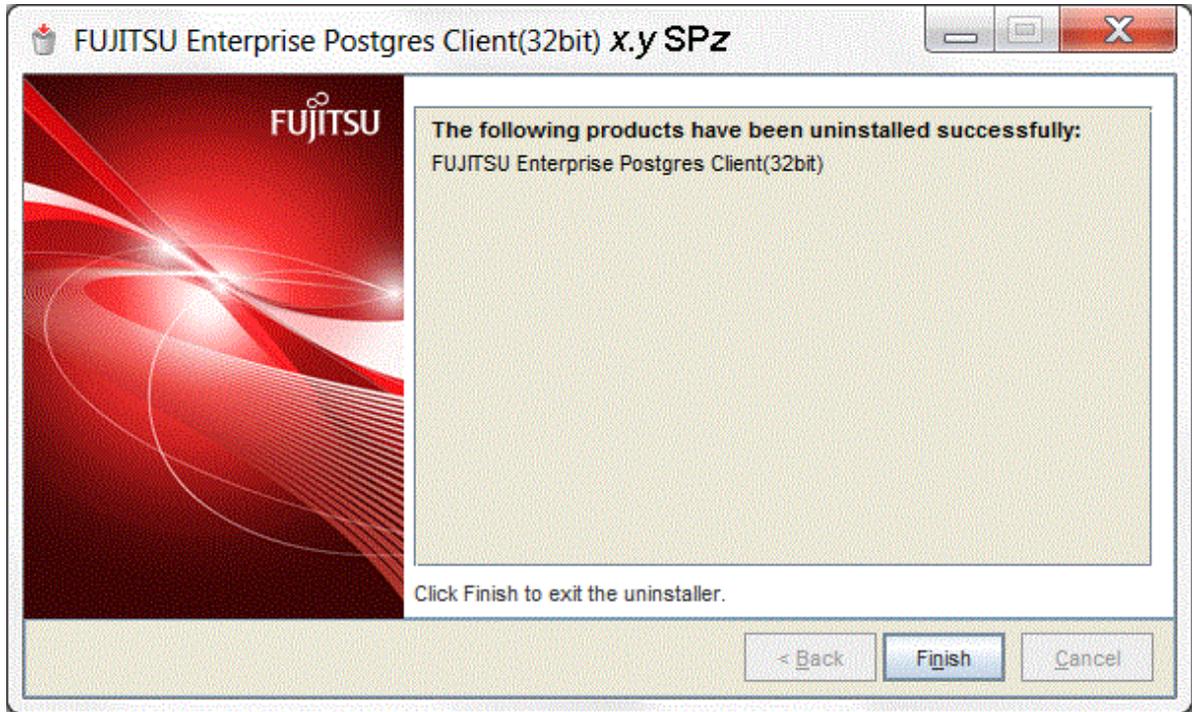
Click [Uninstall].



## 5. Finish the uninstallation

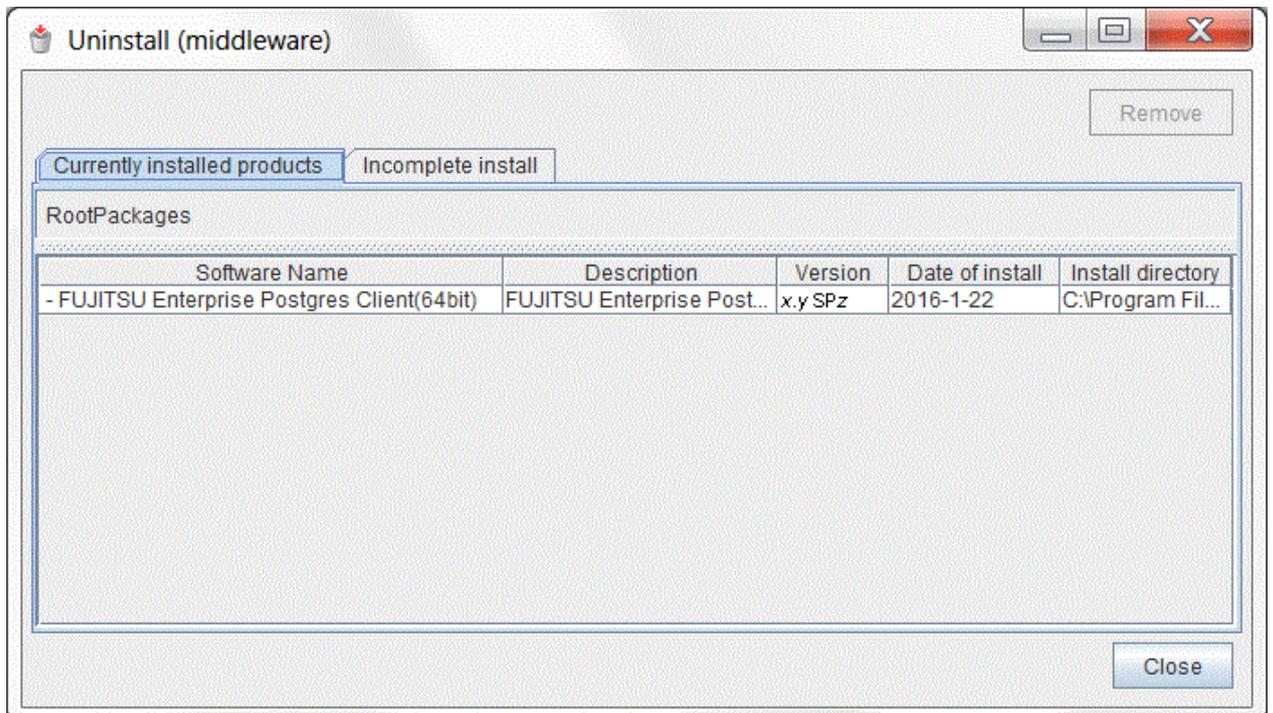
The uninstallation completion window is displayed. Click [Finish].

The installation Folder may remain after uninstallation. If it is not required, delete it.



## 6. Stop the Uninstall (middleware) tool

Click [Close].



## 2.3.2 Uninstallation in Silent Mode

---

The uninstallation procedure is described below.

### 1. Stop applications and the client program

Before starting the uninstallation, stop the following:

- Applications that use the product
- pgAdmin

### 2. Start the command prompt

In Windows, right-click [Command Prompt] and then select [Run as administrator].

### 3. Start the uninstaller

Execute the command below.

The installation folder may remain after uninstallation. If it is not required, delete it.

Example

```
x:> installationFolder\suninst.bat
```

X: Drive where the product is installed



On Windows(R) 7, Windows Server(R) 2008, and Windows Server(R) 2008 R2, an empty folder may remain in the [Start] menu after the uninstallation - if this happens, then click [Start], point to [All Programs], right-click one of the options below, and then click [Delete]: The notation "x.ySPz" indicates the version and level of the FUJITSU Enterprise Postgres client feature.

- FUJITSU Enterprise Postgres Client (32bit) x.ySPz
- FUJITSU Enterprise Postgres Client (64bit) x.ySPz

### 4. Check the uninstallation results

The uninstaller result is output to the log file.

Log file

xyz is the number part when the version is x.ySPz.

64-bit product:

```
Path name: %TEMP%\fsep_CLIENT64_0xyz_uninstall.log
```

32-bit product:

```
Path name: %TEMP%\fsep_CLIENT32_0xyz_uninstall.log
```

Return values

The following return values are returned:

| Return values | Meaning  |
|---------------|--|
| 0             | Uninstallation completed successfully.                           |
| 64            | Uninstallation failed because Uninstall (middleware) is running. |
| 74            | Failed to write product information (updating the registry).     |

| Return values | Meaning   |
|---------------|---|
| 79            | Failed to read product information (viewing the registry).  |
| 144           | The command was not executed with administrator privileges. |
| 251           | An error occurred when running a system function.           |
| 255           | An internal inconsistency occurred.                         |

## 2.4 Registering .NET Data Provider

---

This section explains how to register the .NET Data Provider feature using a command.

The command is installed in *fujitsuEnterprisePostgresClientFeatureInstallationFolder\DOTNET\bin*, when the FUJITSU Enterprise Postgres client feature is installed.

### Name

`pgx_NpgsqlRegister -- Register the .NET Data Provider GAC`

### Overview

`pgx_NpgsqlRegister [option...]`

### Description

Execute this command to register the .NET Data Provider GAC in the following cases:

- To install .NET Framework 3.5 SP1, or .NET Framework 4.0 or later, after installing the Windows client
- To apply a .NET Data Provider update using the FUJITSU Enterprise Postgres update patch.
- If the installation of the Windows client returns an error because the registration of .NET Data Provider has not completed

### Options

`/x86`

Specify this option to perform the setup on the 32-bit product.

`/x64`

Specify this option to perform the setup on the 64-bit product.

### Diagnostics

| Return value | Explanation   |
|--------------|---|
| 0            | Completed successfully.   |
| 1            | .NET Data Provider that will run on NET Framework 3.5 SP1 was registered normally. To run it on .NET Framework 4.0 or later, install the desired version of .NET Framework, and then execute the command again. |
| 2            | .NET Data Provider that will run on .NET Framework 4.0 or later was registered normally. To run it on .NET Framework 3.5 SP1, install .NET Framework 3.5 SP1, and then execute the command again.               |
| 105          | The logged user does not have execute permission to this folder.  |
| 201          | The command was not executed with administrator privileges.   |
| 202          | The specified option is invalid.  |
| 203          | The Windows client is not installed.  |

| Return value | Explanation   |
|--------------|---|
| 204          | .NET Framework 3.5 SP1, or .NET Framework 4.0 or later, is not installed. Install the missing software, and then execute the command again. |
| 401          | Failed to set the machine.config file. Ensure that the machine.config file exists.  |
| 402          |   |
| 403          |   |
| 404          |   |

### Comments

Execute this command with administrator privileges.

### Examples

To perform the setup on the 32-bit product

```
> pgx_NpgsqlRegister.exe /x86
```

To perform the setup on the 64-bit product

```
> pgx_NpgsqlRegister.exe /x64
```

# Chapter 3 Installation and Uninstallation of the Linux Client

This chapter explains how to install and uninstall the Linux client.

## 3.1 Operating Environment

This section describes the operating environment required to use the Linux client.

### 3.1.1 Required Operating System

One of the following operating systems is required to use the Linux client:

- RHEL6(Intel64)
- RHEL6(x86) (\*1)
- RHEL7

\*1) For RHEL6(x86), ensure that the kernel version is not any of the following:

- RHSA-2013:0911 (kernel-2.6.32-358.11.1.el6)
- RHSA-2013:1051 (kernel-2.6.32-358.14.1.el6)



#### Information

Select the x86\_64 architecture package when installing the 64-bit product.

Select the i386 to i686 architecture packages when installing the 32-bit product.

- The following packages are required for operations on RHEL6 (x86).

| Package name       | Remarks                          |
|--------------------|----------------------------------|
| glibc              | -                                |
| libgcc             | -                                |
| libstdc++          | -                                |
| libtool-ltdl       | -                                |
| ncurses-libs       | -                                |
| nss-softokn-freebl | -                                |
| redhat-lsb         | -                                |
| unixODBC           | Required when using ODBC drivers |
| unzip              | -                                |
| xz-libs            | -                                |
| zlib               | -                                |

- The following packages are required for operations on RHEL6 (Intel64).

| Package name | Remarks |
|--------------|---------|
| glibc        | -       |
| libgcc       | -       |
| libstdc++    | -       |
| libtool-ltdl | -       |

| Package name       | Remarks                          |
|--------------------|----------------------------------|
| ncurses-libs       | -                                |
| nss-softokn-freebl | -                                |
| redhat-lsb         | -                                |
| unixODBC           | Required when using ODBC drivers |
| unzip              | -                                |
| xz-libs            | -                                |
| zlib               | -                                |

- The following packages are required for operations on RHEL7.

| Package name       | Remarks                          |
|--------------------|----------------------------------|
| glibc              | -                                |
| libgcc             | -                                |
| libstdc++          | -                                |
| libtool-ltdl       | -                                |
| ncurses-libs       | -                                |
| nss-softokn-freebl | -                                |
| redhat-lsb         | -                                |
| unixODBC           | Required when using ODBC drivers |
| unzip              | -                                |
| xz-libs            | -                                |
| zlib               | -                                |

### 3.1.2 Related Software

The following table lists the software required to use the Linux client.

Table 3.1 Related software

| No. | Software name   | Package name                  | Version            |
|-----|-----------------|-------------------------------|--------------------|
| 1   | C compiler (*1) | gcc<br>Other related packages | -                  |
| 2   | JDK or JRE      | -                             | Java SE 6 or later |
| 3   | NetCOBOL        | -                             | (*2)               |

\*1: Only operations using the C compiler provided with the operating system are guaranteed.

\*2: NetCOBOL is available in the following editions:

- NetCOBOL Standard Edition V7.0L10 or later



Either the JDK or JRE included with Interstage Application Server, or the Oracle JDK or JRE can be used. It is recommended that the JDK or JRE included with Interstage Application Server is used.

The following table lists servers that can be connected to the Linux client.

Table 3.2 Connectable servers

| OS      | Software name  |
|---------|--|
| Windows | - FUJITSU Software Enterprise Postgres Advanced Edition 9.5 or later |
| Linux   | - FUJITSU Software Enterprise Postgres Standard Edition 9.4 or later |

### 3.1.3 Excluded Software

---

There is no excluded software.

### 3.1.4 Required Patches

---

There are no required patches.

### 3.1.5 Hardware Environment

---

The following hardware is required to use the Linux client.

#### Memory

At least 70 MB of memory is required.

#### Mandatory hardware

None.

### 3.1.6 Disk Space Required for Installation

---

The following table lists the disk space requirements of the corresponding directories for new installation of the Linux client. If necessary, increase the size of the file system.

Table 3.3 Disk space required for installation

| Directory                                       | Required disk space<br>Unit: MB |
|---|---------------------------------|
| /etc  | 1 + 1 (*1)                      |
| /var  | 1 + 4 (*1)                      |
| /opt  | 85 (*1)                         |
| Installation destination of the client (32-bit) | 95                              |
| Installation destination of the client (64-bit) | 100                             |

\*1: Uninstall (middleware) must be installed.

### 3.1.7 Supported System Environment

---

This section describes the supported system environment.

#### TCP/IP protocol

FUJITSU Enterprise Postgres supports version 4 and 6 (IPv4 and IPv6) of TCP/IP protocols.



Do not use link-local addresses if TCP/IP protocol version 6 addresses are used.

## 3.1.8 Versions of Open-Source Software Used as the Base for FUJITSU Enterprise Postgres Drivers

---

The following table lists the versions of open-source software used as the base for the various FUJITSU Enterprise Postgres drivers.

| Driver | Open-source software version |
|--------|------------------------------|
| JDBC   | pgjdbc 9.4-1201              |
| ODBC   | psqlodbc 09.05.0100          |
| libpq  | PostgreSQL 9.5.2             |

## 3.2 Installation

---

This section explains how to install the Linux client.

### 3.2.1 Pre-installation Tasks

---

Check the system environment for the following before the Linux client is installed.

#### Check the disk capacity

Check if sufficient free disk space is available for installing the Linux client.

Refer to "[Table 3.3 Disk space required for installation](#)" for information on disk space requirements.

If sufficient free disk space is unavailable, reconfigure disk partitions.

#### Check the installed product and determine the installation method

Using the operation shown below, start Uninstall (middleware), and check the installed products.

Example

```
# /opt/FJSVcir/cimanager.sh
Loading Uninstaller...

Currently installed products
1. FUJITSU Enterprise Postgres Client(64bit)  x.y SPZ  (*1)
2. FUJITSU Enterprise Postgres Client(32bit)  x.y SPZ  (*1)

Type [number] to select the software you want to uninstall.
[number,q]
=>q

Exiting Uninstaller.
```

\*1: The notation "x.y SPZ" indicates the version and level of the FUJITSU Enterprise Postgres client feature.

If the Linux client is already installed, determine the installation method to use:

- Reinstallation
- Multi-version installation

#### Remove applied updates

If you perform reinstallation or upgrade installation as the installation method, remove applied updates using the procedure shown below.

## Note

If a product is installed without removing applied updates, the following will occur:

- Performing reinstallation

If an update with the same update and version number is applied, an error informing you that the update has already been applied is displayed.

Perform the reinstallation after removing the update.

### 1. Display the applied updates

Execute the following command to display the applied updates:

Example

```
# /opt/FJSVfupde/bin/uam showup
```

### 2. Remove the updates

Execute the command below to remove the updates. If an update with the same update number was applied more than once, the updates are removed in order, starting from the highest version number.

Example

```
# /opt/FJSVfupde/bin/uam remove -i update-number
```

## 3.2.2 Installation in Interactive Mode

Install according to the following procedure:

The notation "*x.y*SPz" displayed in the window example of each procedure indicates the version and level of the FUJITSU Enterprise Postgres client feature, and similarly, "<*xy*>" in paths indicates the product version and level.

## Note

The following characters can be used as input values:

Alphanumeric characters, hyphens and forward slashes

### 1. Stop applications and the client program

If the installation method is one of the following, the applications and the client program must be stopped:

- Reinstallation

Before starting the installation, stop the following:

- Applications that use the product

### 2. Change to the superuser

Run the following command to switch to the superuser on the system.

```
$ su -  
Password:*****
```

### 3. Mount the DVD drive

Insert the client program DVD in the DVD drive, and then execute the following command:

## Example

```
# mount -t iso9660 -r -o loop /dev/dvd /media/dvd
```

/dev/dvd is the DVD drive device, and /media/dvd is the mount point (which must already exist before calling the command).

## Note

If the DVD was mounted automatically using the automatic mount daemon (autofs), "noexec" is set as the mount option, so the installer may fail to start. In this case, use the mount command to remount the DVD correctly, and then run the installation. Note that the mount options of a mounted DVD can be checked by executing the mount command without any arguments.

## 4. Run the installation

Execute the following command:

### Example

```
# cd /media/dvd
# ./install.sh
```

In the example above, /media/dvd is the DVD mount point, and /home/work/inspara.csv is the installation parameter CSV.

## 5. Select the product to install

The list of installation target products is displayed as shown below.

Type the number for the product to be installed, or "all", and press Enter.

```
The following products can be installed:
1: FUJITSU Enterprise Postgres Client (32bit) x.y SPZ
2: FUJITSU Enterprise Postgres Client (64bit) x.y SPZ

Select the product to be installed.
To select multiple products, separate using commas (,). (Example: 1,2)
[number,all,q](The default value is all): all

Selected product
FUJITSU Enterprise Postgres Client (32bit) x.y SPZ
FUJITSU Enterprise Postgres Client (64bit) x.y SPZ

Do you want to install the above product?
y: Proceed to the next step
n: Select the product again
q: Quit without installing
[y,n,q](The default value is y): y
```

## Information

- To execute a 32-bit application in a 64-bit environment, FUJITSU Enterprise Postgres Client (32bit) is required.
- The window below is displayed for each product that that was selected but has already been installed.

To perform a reinstallation, type the number for the product and press Enter.

```
Select the method to install client product (32bit).
If performing a reinstallation, select the number of the product to be reinstalled.

1: FUJITSU Enterprise Postgres Client (32bit) x.y SPZ      (*1)
```

```
q: Quit without installing
[number,q]:
```

\*1: Output if the installed product can undergo reinstallation.

To perform a multi-version installation, type "m" and press Enter.

```
An older version of the same product is already installed.
Select m for multi-version installation.

m: Multi-version installation          (*1)
q: Quit without installing
[m,q]:
```

\*1: Output if the installed product can undergo multi-version installation.

.....

## 6. Check the settings

The window for checking the installation information is displayed as shown below.

If there is no problem with the settings, type "y" and press Enter to start the installation (refer to "9. Display the installation status").

To change the settings, type "c" and press Enter.

```
Product to be installed
FUJITSU Enterprise Postgres Client (32bit) X.Y SPZ
  New installation
FUJITSU Enterprise Postgres Client (64bit) X.Y SPZ
  New installation

Installation directory information
FUJITSU Enterprise Postgres Client (32bit) X.Y SPZ
  /opt/fsepv<XY>client32
FUJITSU Enterprise Postgres Client (64bit) X.Y SPZ
  /opt/fsepv<XY>client64

Start installation using the above information?
y: Start the installation
c: Change the information          (*1)
q: Quit without installing
[y,c,q](The default value is y): c    (*1)
```

\*1: This option is not displayed if there is no information that can be modified.

If the user types "c", then the window mentioned in the next step is displayed.

## 7. Enter the installation directory

If the installation method is one of the following, the window below is displayed for each product:

- New installation
- Multi-version installation

Enter the directory and press Enter.

```
FUJITSU Enterprise Postgres Client (32bit) X.Y SPZ : Specify the installation directory.
[directory name,q](The default value is /opt/fsepv<XY>client32): /opt/fsepcl32
```

## 8. Check the changed settings

The changed settings are displayed as shown below.

If there is no problem with the settings, type "y" and press Enter.

To change the settings again, enter "c" and press Enter.

```

Product to be installed
FUJITSU Enterprise Postgres Client (32bit) x.y SPZ
  New installation
FUJITSU Enterprise Postgres Client (64bit) x.y SPZ
  New installation

Installation directory information
FUJITSU Enterprise Postgres Client (32bit) x.y SPZ
  /opt/fsepcl32
FUJITSU Enterprise Postgres Client (64bit) x.y SPZ
  /opt/fsepcl64

Start installation using the above information?
y: Start the installation
c: Change the information
q: Quit without installing
[y,c,q](The default value is y): y

```

## 9. Display the installation status

The installation completion status is displayed as shown below:

```

Starting installation.

FUJITSU Enterprise Postgres Client (32bit) x.y SPZ Installation

Installation is complete.

FUJITSU Enterprise Postgres Client (64bit) x.y SPZ Installation

Installation is complete.

```

## 10. Finish the installation

Upon completion, a message is displayed showing the status.

If installation was successful, a message like the one shown below is displayed:

```

Installed successfully.

```



### Note

If an error occurs during the installation, read the error message and remove the cause of the error, and then reexecute the install.sh command.

## 3.2.3 Installation in Silent Mode

Installation in silent mode can be performed only when the installation method is one of the following:

- New installation
- Multi-version installation

The installation procedure is described below.

### 1. Change to the superuser

Run the following command to switch to the superuser on the system.

```

$ su -
Password:*****

```

## 2. Mount the DVD drive

Insert the client program DVD in the DVD drive, and then execute the following command:

Example

```
# mount -t iso9660 -r -o loop /dev/dvd /media/dvd
```

/dev/dvd is the DVD drive device, and /media/dvd is the mount point (which must already exist before calling the command).

### Note

If the DVD was mounted automatically using the automatic mount daemon (autofs), "noexec" is set as the mount option, so the installer may fail to start. In this case, use the mount command to remount the DVD correctly, and then run the installation. Note that the mount options of a mounted DVD can be checked by executing the mount command without any arguments.

## 3. Create an installation parameters CSV file

Consider the features that will be required for system operations, and then create an installation parameters CSV file that uses the following specification format.

```
sectionName, parameterName, value  
sectionName, parameterName, value  
:
```

Refer to "[Appendix A Installation in Silent Mode](#)" for information on the installation parameters CSV file.

### Information

The templates for the installation parameters CSV file is "*mountPoint/sample/sample\_linux.csv*"

## 4. Run the installation

Execute the following command:

Example

```
# cd /media/dvd  
# ./silent.sh /home/work/inspara.csv
```

In the example above, /media/dvd is the DVD mount point, and /home/work/inspara.csv is the installation parameter CSV.

If the silent installer ends in an error, a message is output to the log file and return values are returned. Refer to "[Appendix A Installation in Silent Mode](#)" for details.

## 3.3 Uninstallation

---

This section describes the procedure for uninstalling the Linux client.

### Note

Before uninstalling the product, close the product program and all applications that are using it.

### 3.3.1 Uninstallation in Interactive Mode

---

Uninstall according to the following procedure:

The notation "x.ySPz" displayed in the window example of each procedure indicates the version and level of the FUJITSU Enterprise Postgres client feature.

#### Information

If an error occurs while the product is being uninstalled, refer to "[Appendix C Uninstall \(middleware\) Messages](#)" and take the required action.

#### 1. Stop applications and the client program

Before starting the uninstallation, stop the following:

- Applications that use the product

#### 2. Change to the superuser

Run the following command to switch to the superuser on the system.

```
$ su -  
Password:*****
```

#### 3. Start the Uninstall (middleware)

Execute the following command:

```
# /opt/FJSCvcir/cimanager.sh -c
```

#### 4. Select the product

Enter the number for the product to be uninstalled, and press Enter.

```
Loading Uninstaller...  
  
Currently installed products  
1. FUJITSU Enterprise Postgres Client(64bit)  x.y SPz  
2. FUJITSU Enterprise Postgres Client(32bit)  x.y SPz  
  
Type [number] to select the software you want to uninstall.  
[number,q]  
=>1
```

#### 5. Start the uninstallation

To start the uninstallation, type "y" and press Enter.

To display the list of products again, type "b" and press Enter.

```
FUJITSU Enterprise Postgres Client(64bit)  
  Description: FUJITSU Enterprise Postgres Client(64bit)  
  Version: x.y SPZ  
  Manufacturer: Fujitsu Limited.  
  Install directory: /opt/fsepcl64  
  Date of install: 2015-6-2  
  
Starting the uninstall of the software. Are you sure you want to continue?
```

```
[y,b,q]
=>y
```

## 6. Finish the uninstallation

The installation directory may remain after uninstallation. If it is not required, delete it.

```
Uninstalling...

FUJITSU Enterprise Postgres Client(64bit) is being uninstalled now.
 100% #####

The following products have been uninstalled successfully:
  FUJITSU Enterprise Postgres Client(64bit)

Uninstallation of "FUJITSU Enterprise Postgres Client (64bit) x.y SPz" has completed
successfully.

Exiting Uninstaller.
```

## 3.3.2 Uninstallation in Silent Mode

Uninstall according to the following procedure:

### 1. Stop applications and the client program

Before starting the uninstallation, stop the following:

- Applications that use the product

### 2. Change to the superuser

Run the following command to switch to the superuser on the system.

```
$ su -
Password:*****
```

### 3. Run the uninstallation

Execute the following command:

The installation directory may remain after uninstallation. If it is not required, delete it.

Example

```
# /opt/fsepv<xy>client64/setup/suninst.sh
```

In the example above, /opt/fsepv<xy>client64 is the installation directory, and "<xy>" indicates the product version and level.

### 4. Check the uninstallation results

The uninstaller result is output to the log file.

Log file

xyz is the number part when the product version level is x.y SPz.

64-bit products

```
Path name: /var/log/fsep_CLIENT64_0XYZ_uninstall.log
```

### 32-bit products

```
Path name:/var/log/fsep_CLIENT32_0XYZ_uninstall.log
```

### Return values

The following return values are output:

| <b>Return value</b> | <b>Meaning</b>   |
|---------------------|--|
| 0                   | Completed successfully.  |
| 13                  | Processing was interrupted.  |
| 15                  | The resources required for uninstallation do not exist.                              |
| 19                  | A process is running.  |
| 60                  | An error occurred in Uninstall (middleware).   |
| 62                  | Uninstall (middleware) was started.  |
| 63                  | Uninstall (middleware) has not been installed, or there are no execution privileges. |
| 99                  | A system error has occurred.   |
| 100                 | The command argument is invalid.   |
| 106                 | The command was not executed with administrator privileges.                          |

# Chapter 4 Setup

This chapter describes the setup procedures to be performed after installation completes.

## 4.1 Configuring Environment Variables

Configure the following environment variables when using client commands.

W

### 4.1.1 Windows

PATH environment variable

Add "*installationFolder*\bin".

PGLOCALEDIR environment variable

Add "*installationFolder*\share\locale".

Examples of environment variable configurations are shown below.

Example

```
> SET PATH=%ProgramFiles%\Fujitsu\fsepclient32\bin;%PATH%
> SET PGLOCALEDIR=%ProgramFiles%\Fujitsu\fsepclient32\share\locale
```

L

### 4.1.2 Linux

PATH environment variable

Add "*installationDirectory*/bin".

MANPATH environment variable

Add "*installationDirectory*/share/man".

PGLOCALEDIR environment variable

Add "*installationDirectory*/share/locale".

LD\_LIBRARY\_PATH environment variable

Add "*installationDirectory*/lib".

Examples of environment variable configurations are shown below.

Example

This example is specific to 64-bit Linux.

Note that "<xy>" indicates the product version and level.

```
$ PATH=/opt/fsepv<xy>client64/bin:$PATH ; export PATH
$ MANPATH=/opt/fsepv<xy>client64/share/man:$MANPATH ; export MANPATH
$ PGLOCALEDIR=/opt/fsepv<xy>client64/share/locale ; export PGLOCALEDIR
$ LD_LIBRARY_PATH=/opt/fsepv<xy>client64/lib:$LD_LIBRARY_PATH ; export LD_LIBRARY_PATH
```

# Appendix A Installation in Silent Mode

This appendix provides specifications for installation in silent mode.

Note that "<xy>" in paths indicates the product version and level.

## A.1 Specification Format

The installation parameters CSV file, which is specified as the argument for the silent installer, has three columns per line in CSV format.

```
sectionName, parameterName, value
sectionName, parameterName, value
:
```

Enter the following settings in respective columns.

| Item                 | Settings  | Optional  |
|----------------------|---|-----------|
| <i>sectionName</i>   | Specify the section name. There are two types of section names:<br>"installInfo": Set the product information.<br>"parameters": Set the parameter information for this product. | Mandatory |
| <i>parameterName</i> | Specify the parameter name. Each section has a valid parameter.   | Mandatory |
| <i>value</i>         | Specify the value.  | Optional  |

### Note

- Blank lines cannot be included.
- Section names and parameter names cannot be omitted.
- Undefined parameters cannot be set in lines where the section name is "installInfo". Also, note that the same parameter cannot be specified multiple times.
- Specify at least one line with the section name "parameters".
- Undefined parameters specified in lines within the "parameters" section will be ignored during execution. Note that when the same parameter is specified multiple times, the settings in the lowest line will be valid.
- The setting values for lines where the section name is "installInfo" may contain alphanumeric characters (at least one), and symbols, excluding double quotation marks (") and commas (,).
- Do not use the following halfwidth characters in the setting values for lines with the section name "parameters".

W

Windows: # \$ & ' = ^ ~ | @ ` [ ] ; < > / tab

L

Linux: " # \$ & = ' ( ) ^ ~ \ | @ ` [ ] { } ; : < > tab

### Information

The templates for the installation parameters CSV file are as follows:

W

- Windows client: Z:\sample\sample\_windows.csv (where Z is the drive on which the DVD is mounted.)

L

- Linux client: *mountPoint*/sample/sample\_linux.csv

## A.2 List of Parameters

This section describes the parameters that can be set for each section.

### installInfo section

The parameters that can be set in the installInfo section are shown below.

| No. | Type        | Parameter             |        | Description  |
|-----|-------------|-----------------------|--------|--|
| 1   | Software ID | <b>Parameter name</b> | Name   | Mandatory.<br>Specify the software identifier.<br>For this software, specify the following value:<br>"FUJITSU Enterprise Postgres" |
|     |             | <b>Value/Range</b>    | String |  |
|     |             | <b>Default value</b>  | None   |  |

### Information

- In addition to "Name", the following parameters can be used in the "installInfo" section.
  - softwareName
  - OS
  - Version
  - Edition
- Note that specifying a parameter name other than "Name" and the parameters listed above will result in an error.
- The values set in these parameters do not affect silent installation.

### Example

```
installInfo,Name,FUJITSU Enterprise Postgres
```

### parameters section

The parameters that can be set in the parameters section are shown below.

| No. | Parameter             |   | Description  |
|-----|-----------------------|---|--|
| 1   | <b>Parameter name</b> | Client32InstallExecute  | Optional.<br>Specify whether to run the installation of the client (32-bit).<br>Y: Install<br>N: Do not install  |
|     | <b>Value/Range</b>    | Y or N  |  |
|     | <b>Default value</b>  | Y   |  |
| 2   | <b>Parameter name</b> | Client32InstallPath   | Optional.<br>Specify the installation destination of the client (32-bit).<br><b>W</b> A root folder (such as C:\) cannot be specified.<br><b>L</b> A root directory cannot be specified. |
|     | <b>Value/Range</b>    | Path name   |  |
|     | <b>Default value</b>  | <b>W</b> Windows(32-bit)<br>%ProgramFiles%\Fujitsu<br>\fsepclientx32<br>Windows(64-bit)<br>%ProgramFiles(x86)%<br>\Fujitsu\fsepclient32 |  |

| No. | Parameter             |   | Description   |
|-----|-----------------------|---|---|
|     |                       | <b>L</b> Linux<br>/opt/fsepv<xy>client32  |   |
| 3   | <b>Parameter name</b> | Client64InstallExecute  | Optional.<br>Specify whether to run the installation of the client (64-bit).<br>Y: Install<br>N: Do not install<br><br>This parameter is ignored on 32-bit operating systems. |
|     | <b>Value/Range</b>    | Y or N  |   |
|     | <b>Default value</b>  | Y   |   |
| 4   | <b>Parameter name</b> | Client64InstallPath   | Optional.<br>Specify the installation destination of the client (64-bit).<br><br>This parameter is ignored on 32-bit operating systems.                                       |
|     | <b>Value/Range</b>    | Path name   |   |
|     | <b>Default value</b>  | <b>W</b> Windows(64-bit)<br>%ProgramFiles%\Fujitsu<br>\fsepclient64<br><b>L</b> Linux<br>/opt/fsepv<xy>client64 |   |
|     |                       |   | <b>W</b> A root folder (such as C:\) cannot be specified.<br><b>L</b> A root directory cannot be specified.   |

#### Example

```
parameters,Client32InstallExecute,Y
parameters,Client32InstallPath,/opt/fsepv<xy>client32
parameters,Client64InstallExecute,Y
parameters,Client64InstallPath,/opt/fsepv<xy>client64
```

## A.3 Messages and Return Values

Messages are output when errors are detected during parametric analysis.

If an error occurs during installation of the product, a message is output to the log.

### Log file

xyz is the number part when the product version level is x.y.SPz.

**W**

#### Windows

```
Path name: %TEMP%\fsep_CLIENT_media_0xyz.log
```

**L**

#### Linux

```
Path name: /var/log/fsep_CLIENT_media_0xyz_install.log
```

### Messages and return values

#### CSV file errors

The following messages are output if errors are detected while parsing CSV files.

| Return value | Message                                     | Explanation and actions  |
|--------------|---|--|
| 4            | CSV file error:code = 1, Invalid CSV error. | There is an error in the specification format of the CSV file. |

| Return value | Message  | Explanation and actions  |
|--------------|--|--|
| 4            | CSV file error:code = 2, installInfo/Name is required.   | There is an error in the specification format of the CSV file.   |
| 4            | CSV file error:code = 3, Invalid installInfo key.  | There is an error in the installInfo specification. Or the section name is invalid.  |
| 4            | CSV file error:code = 4, Duplicated installInfo key.   | The same parameter has been defined more than once in installInfo.   |
| 4            | CSV file error:code = 5, Invalid character length.   | No setting value has been specified, or the specified string is too long.  |
| 4            | CSV file error:code = 6, Invalid character format or encoding.   | An invalid character has been specified in the installation parameters CSV file.   |
| 4            | CSV file error:code = 8, Parameter is required.  | The "parameters" section has no lines.   |
| 20           | The input file does not exist.   | The input file does not exist.   |
| 21           | The value of @1@ is incorrect,the value is @2@.  | The value is incorrect. Specify the correct value.<br>The parameter name is displayed in @1@.<br>The specified value is displayed in @2@.            |
| 22           | The value same at @1@ and @2@ is specified.  | The same value is specified in different parameters. Specify different values.<br>The parameter name is displayed in @1@ and @2@.                    |
| 23           | The @2@ of @1@ already exists.   | The path already exists. Specify a different path.<br>he parameter name is displayed in @1@.<br>The specified value is displayed in @2@.             |
| 24           | Drive @2@ of @1@ does not exist.   | he drive does not exist. Specify an existing drive.<br>The parameter name is displayed in @1@.<br>The specified value is displayed in @2@.           |
| 28           | There is no product for installation.  | There is no product to be installed. Specify "Y" for either or both of the following parameters:<br>Client32InstallExecute<br>Client64InstallExecute |
| 29           | <p><b>W</b> Windows<br/>USAGE : silent.bat inputfile</p> <p><b>L</b> Linux<br/>USAGE : silent.sh inputfile</p> | The argument specified in the command is incorrect. Specify the correct argument.  |

#### Product installer errors

The following return values are returned when errors occur while the product installer is running.

#### W

#### Windows

| Return value | Explanation                                |
|--------------|--|
| 0            | Completed successfully.                    |
| 1            | Failed to register .NET Data Provider. (*) |
| 2            | Failed to register the ODBC drivers.       |

| Return value | Explanation  |
|--------------|--|
| 14           | The resources required for installation do not exist on the media. |
| 32           | The same version of the same product is already installed.         |
| 60           | An error occurred in Uninstall (middleware).                       |
| 64           | Failed to install because Uninstall (middleware) is running.       |
| 65           | Failed to install Uninstall (middleware).                          |
| 74           | Failed to write to the registry.                                   |
| 79           | Failed to load the registry.                                       |
| 88           | An excluded product is installed.                                  |
| 129          | The operating system is not supported.                             |
| 142          | Insufficient disk space at the installation destination.           |
| 144          | The command was not executed with administrator privileges.        |
| 220          | Failed to create a Folder in the installation Folder.              |
| 221          | Failed to create files in the installation Folder.                 |
| 251          | An error occurred when running a system function.                  |
| 255          | An internal inconsistency occurred.                                |

\*1: Refer to "[2.4 Registering .NET Data Provider](#)", and then register .NET Data Provider.

## L

### Linux

| Return value | Explanation  |
|--------------|--|
| 0            | Completed successfully.  |
| 11           | A product that cannot coexist with FUJITSU Enterprise Postgres has been installed. |
| 12           | The operating system is not supported.   |
| 13           | Processing was interrupted.  |
| 14           | The resources required for installation do not exist on the media.                 |
| 15           | The resources required for installation do not exist.                              |
| 16           | Unable to change the permission because the directory does not exist.              |
| 19           | A process is running.  |
| 30           | Failed to copy the installation resources.   |
| 32           | The same version of the same product is already installed.                         |
| 60           | An error occurred in Uninstall (middleware).                                       |
| 61           | Failed to install Uninstall (middleware).  |
| 62           | Uninstall (middleware) was started.  |
| 99           | A system error occurred.   |
| 106          | The command was not executed with administrator privileges.                        |

## A.4 CSV File Format

The format of CSV files is based on RFC4180, with the following specifications.

## Records

- Separate each record with a "CRLF" newline (operation is not guaranteed with only a "CR" or "LF" newline).
- Specify a newline at the end of a file.
- Separate each field within a record with a halfwidth comma ",".

| Format      | Record |     |     |
|-------------|--------|-----|-----|
| aaa,bbb,ccc | aaa    | bbb | ccc |

- If several commas are entered in succession, or if a comma precedes a newline, the data following the comma is regarded as empty.

| Format   | Record |     |     |
|----------|--------|-----|-----|
| aaa,,ccc | aaa    |     | ccc |
| aaa,bbb, | aaa    | bbb |     |

- You cannot specify a header.

| Format      | Record |        |         |
|-------------|--------|--------|---------|
|             | field1 | field2 | field 3 |
| aaa,bbb,ccc | aaa    | bbb    | ccc     |

## Double quotation marks

- Enclose fields that contain newlines, double quotation marks, or commas in double quotation marks.

| Format                | Record |         |     |
|-----------------------|--------|---------|-----|
| "aaa","bb<br>b","ccc" | aaa    | bb<br>b | ccc |
| "aaa","bb,b","ccc"    | aaa    | bb,b    | ccc |

- If a double quotation mark is used in a field enclosed with double quotation marks, the first double quotation mark is regarded as an escape character.

| Format              | Record |      |     |
|---------------------|--------|------|-----|
| "aaa","bb""b","ccc" | aaa    | bb"b | ccc |



### Note

An error occurs in the following cases:

- Each space, tab, or whitespace character is recognized as one character, and will cause a parameter error.
- A space is entered before or after a field enclosed with double quotation marks.

|                         |
|-------------------------|
| "zzz ", "yyy ", " xxx " |
|-------------------------|

- The number of fields differs between records.

|                 |
|-----------------|
| aaa,bbb         |
| aaa,bbb,ccc     |
| aaa,bbb,ccc,ddd |

- Fields enclosed with double quotation marks and fields not enclosed with double quotation marks are both used.

```
aaa,"bbb",ccc  
"xxx",yy,"zzz"
```

- The double quotation escape characters are not positioned correctly.

```
"aaa","bb""b","ccc"
```

- Double quotation marks enclose the entire field.

```
"aaa,bbb,ccc"
```



# Appendix B Uninstall (middleware)

## B.1 Features that are Installed

W

[Windows]

| Feature     | Package name | Component name        | Remarks   | Selectively installed? |
|-------------|--------------|-----------------------|---|------------------------|
| Common tool | FJSVcir      | CIRuntime Application | Controls the installation and uninstallation of Fujitsu middleware products.<br>Manages the installation information of Fujitsu middleware products and includes a management function for viewing installation information and launching the uninstaller of each product. ("Uninstall (middleware)") | No                     |

L

[Linux]

| Feature     | Package name | Component name        | Remarks   | Selectively installed? |
|-------------|--------------|-----------------------|---|------------------------|
| Common tool | FJSVcir      | CIRuntime Application | Controls the installation and uninstallation of Fujitsu middleware products.<br>Manages the installation information of Fujitsu middleware products and includes a management function for viewing installation information and launching the uninstaller of each product. ("Uninstall (middleware)") | No                     |

## B.2 Notes

### B.2.1 Notes on the Uninstall (middleware) Tool

"Uninstall (middleware)" is a tool used by Fujitsu middleware products. It performs information management for middleware products, and also, launching the uninstaller for removing these products from the installed systems.



- To uninstall FUJITSU Enterprise Postgres, uninstall from "Uninstall (middleware)".

This tool manages information about other Fujitsu middleware products as well as FUJITSU Enterprise Postgres. For this reason, do not uninstall it unless absolutely necessary. If you have accidentally uninstalled this tool, re-install it as described below.

[Windows]

1. Log on to the machine to be installed using a user name belonging to the Administrators group, or switch to an account with administrator privileges.
2. Insert the server program DVD in the drive device.
3. Execute the installation command.

```
z:\CIR\Windows\cirinst.exe
```

In the example above, z is the drive on which the DVD is mounted.

[Linux]

1. Log in as a superuser to the installation target machine, or switch to a user with administrative privileges.
2. Insert the product media in the drive.
3. Execute the installation command.

```
# /media/dvd/CIR/Linux/cirinst.sh
```

- If you uninstall this tool as described below.

1. Check that there are no Fujitsu middleware products installed in the system.  
You can check this by using "Uninstall (middleware)", which is launched by the command below.

[Windows]

Select [All Programs] > [Fujitsu] > [Uninstall (middleware)]

[Linux]

```
/opt/FJSVcir/cir/bin/cimanager.sh -c
```

-c : CUI

2. If no Fujitsu middleware products have been installed, then issue the command below.

[Windows]

```
%SystemDrive%\FujitsuF4CR\bin\cirremove.exe
```

[Linux]

```
# /opt/FJSVcir/bin/cirremove.sh
```

3. At the uninstallation confirmation prompt, enter "y".

```
This software is a common tool of Fujitsu products.Are you sure you want to remove  
it?[y/n]:
```

Uninstallation will start.

---

# Appendix C Uninstall (middleware) Messages

## C.1 Messages output by FJSVcir

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 101: CIRINST101: Administrator privilege is required.**

Description

The user does not have administrator privileges.

Action method

Login with administrator privileges and run the command again.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 102: CIRINST102: Failed to create %s**

Parameters

%s: Directory name

Description

Failed to create a directory during the installation.

Action method

Creating the directory might have failed for some reason. Run the installer again, or run cirinst command again. If the problem persists, check the system log.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 103: CIRINST103: It is required at least %dMB**

Parameters

%d: Disk spaces

Description

Insufficient disk space.

Action method

Confirm that the system has sufficient disk spaces.

---

**[Windows] FSP\_FJSVCIR\_CIRINST: ERROR: 104: CIRINST104: Failed to copy CIR files.**

---

**[Linux] FSP\_FJSVCIR\_CIRINST: ERROR: 104: CIRINST104: Failed to copy CIR installer files.**

Description

Failed to copy files required for the installation.

Action method

Copying the files failed for some reason. Run the installer again, or run cirinst command again. If the problem persists, check the system log.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 105: CIRINST105: Failed to copy JRE.**

Description

Failed to copy JRE required for installation.

Action method

Copying the files failed for some reason. Run the installer again, or run cirinst command again. If the problem persists, check the system log.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 106: CIRINST106: Failed to copy CIR****Description**

Failed to copy files during the installation.

**Action method**

Copying the files failed for some reason. Run the installer again, or run cirinst command again. If the problem persists, check the system log.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 107: CIRINST107: invalid option.****Description**

An invalid option was specified.

**Action method**

Specify a valid option. [-c]: CUI

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 108: CIRINST108: JRE which should be deployed is not bundled.****Description**

An appropriate JRE for this system is not bundled.

**Action method**

Confirm that the product supports the platform.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 109: CIRINST109: Unsupported OS.****Description**

Unsupported operating system.

**Action method**

Confirm that the product supports the operating system.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 185: CIRINST185: lsb\_release was not found. Please install the package below.  
- redhat-lsb****Description**

lsb\_release command was not found.

**Action method**

Add redhat-lsb package and then execute install again.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 186: CIRINST186: lsb\_release was not found.****Description**

lsb\_release command was not found.

**Action method**

Add the relevant package and then execute install again.

---

**FSP\_FJSVCIR\_CIRINST: ERROR: 201: CIRINST201: Administrator privilege is required.****Description**

The user does not have administrator privileges.

#### Action method

Login with administrator privileges and run the command again.

---

#### **FSP\_FJSVCIR\_CIRINST: ERROR: 203: CIRINST203: Failed to delete files.**

#### Description

Failed to delete FJSVcir files.

#### Action method

Deleting the files failed for some reason. Run cirremove command again. If the problem persists, check the system log.

---

#### **FSP\_FJSVCIR\_CIRINST: ERROR: 205: CIRINST205: invalid option.**

#### Description

Invalid option is specified.

#### Action method

No option is supported. Retry without any options.

---

#### **Specified installation parameters file was not found.**

#### Description

Specified installation parameters file was not found. (silent mode)

#### Action method

Specify the installation parameters file.

---

#### **It failed to install. See log for details**

#### Description

An error occurred during install. (silent mode)

#### Action method

Collect the files stored in the following directories.

[UNIX]

/var/opt/FJSVcir/cir/logs/cirlog0.log.0

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\logs\cirlog0.log.0

---

#### **Parameters are invalid. Please specify valid parameters.**

#### Description

Invalid option is specified. (silent mode)

#### Action method

Specify a valid option.

---

#### **Internal data is broken.**

#### Description

Internal data used by this product is corrupt.

#### Action method

Collect the files stored in the following directories and contact Fujitsu technical support:

[UNIX]

/var/opt/FJ SVCIR/cir/  
/etc/opt/FJ SVCIR/cir/CIR.properties

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\

## C.2 Messages output by Uninstall (middleware)

---

### It has already been running in another process.

#### Description

An attempt was made to start Uninstall (middleware) more than once. Alternatively, an attempt was made to start Uninstall (middleware) while the installer was starting.

#### Action method

End any Uninstall (middleware) that have already started. Alternatively, start Uninstall (middleware) after the installer has ended.

---

### Specified option is invalid.

#### Description

An invalid option was specified.

#### Action method

Specify valid options and run the command again.

---

### Please enter a valid option.

#### Description

An invalid character was entered. Valid characters are y, n, or item numbers.

#### Action method

Enter a valid character.

---

### Failed to uninstall of the following software packages:

#### Description

Failed to uninstall the software listed in this message.

#### Action method

Confirm the information shown after this message and take the appropriate action.

---

### Unable to uninstall the software as it is referred from more than one software.

#### Description

Failed to uninstall the software because it is used by other software.

#### Action method

No specific action is required.

---

### Unable to uninstall the software as the software is mandatory.

## Description

Failed to uninstall the software because it is required by another program.

## Action method

No specific action is required.

---

## Internal data is broken.

## Description

Internal data used by this product is corrupt.

## Action method

Collect the files stored in the following directories and contact Fujitsu technical support:

[UNIX]

/var/opt/FJ SVCIR/cir/

/etc/opt/FJ SVCIR/cir/CIR.properties

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\  

---

## Unable to uninstall the software you were about to uninstall as the existence of the software is a precondition for the operation of another software.

## Description

Failed to uninstall the software because it is required by another program.

## Action method

No specific action is required.

---

## The program terminated abnormally.

## Description

The program has terminated abnormally.

## Action method

Collect the files stored in the following directories and contact Fujitsu technical support:

[UNIX]

/var/opt/FJ SVCIR/cir/

/etc/opt/FJ SVCIR/cir/CIR.properties

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\  

---

## An unexpected error has occurred during uninstall.

## Description

An error occurred during uninstall.

## Action method

Collect the files stored in the following directories and contact Fujitsu technical support:

[UNIX]

/var/opt/FJ SVCIR/cir/  
/etc/opt/FJ SVCIR/cir/CIR.properties

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\

---

### **It failed to uninstall. See log for details.**

#### **Description**

An error occurred during uninstall. (silent mode)

#### **Action method**

Collect the files stored in the following directories.

[UNIX]

/var/opt/FJ SVcir/cir/logs/cirlog0.log.0

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\logs\cirlog0.log.0

---

### **Failed to initialize the temp directory.**

#### **Description**

Can not start Uninstall (middleware) because failed to initialize the temp directory.

#### **Action method**

Run Uninstall (middleware) again. If the problem persists, check whether other processes have accessed the files in the following directories.

[UNIX]

/var/opt/FJ SVcir/cir/temp/meta\_db

[Windows]

%ProgramData%\Fujitsu\FujitsuF4CR\cir\temp\meta\_db

---

### **[Notice]Need to restart for uninstall completion.**

#### **Description**

Uninstallation was completed. (silent mode)

#### **Action method**

Restart the system.

---

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---

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# FUJITSU Enterprise Postgres 9.5



## DevOps

- [Application Development Guide >](#)
- [Operation Guide >](#)
- [Cluster Operation Guide >](#)

# FUJITSU Enterprise Postgres 9.5



## Application Development Guide

Windows/Linux

J2UL-2119-01ENZO(00)  
June 2016

# Preface

---

## Purpose of this document

This is a guide for the developers of FUJITSU Enterprise Postgres applications.

## Intended readers

This document is intended for developers of applications that use FUJITSU Enterprise Postgres. Of the interfaces provided by FUJITSU Enterprise Postgres, this guide describes the PostgreSQL extended interface.

Readers of this document are also assumed to have general knowledge of:

**L**

- PostgreSQL

- SQL

- Linux

**W**

- PostgreSQL

- SQL

- Windows

## Structure of this document

This document is structured as follows:

### [Chapter 1 Overview of the Application Development Function](#)

Provides an overview of FUJITSU Enterprise Postgres application development.

### [Chapter 2 JDBC Driver](#)

Explains how to use JDBC drivers.

### [Chapter 3 ODBC Driver](#)

Explains how to use ODBC drivers.

### [Chapter 4 .NET Data Provider](#)

Explains how to use .NET Data Provider.

### [Chapter 5 C Library \(libpq\)](#)

Explains how to use C applications.

### [Chapter 6 Embedded SQL in C](#)

Explains how to use embedded SQL in C.

### [Chapter 7 Embedded SQL in COBOL](#)

Explains how to use embedded SQL in COBOL.

### [Chapter 8 SQL References](#)

Explains the SQL statements which were extended in FUJITSU Enterprise Postgres development.

### [Chapter 9 Compatibility with Oracle Databases](#)

Explains features that are compatible with Oracle databases.

### [Chapter 10 Java Applications using PL/extJava](#)

Explains the development of Java applications using PL/extJava.

### [Chapter 11 Application Connection Switch Feature](#)

Explains the application connection switch feature.

## [Chapter 12 Performance Tuning](#)

Explains how to tune application performance.

## [Chapter 13 Parallel Scan](#)

Explains the parallel scan feature.

## [Chapter 14 Scan Using a Vertical Columnar Index \(VCI\)](#)

Explains how to perform scan using a Vertical Columnar Index (VCI).

## [Appendix A Precautions when Developing Applications](#)

Provides some points to note about application development.

## [Appendix B Conversion Procedures Required due to Differences from Oracle Database](#)

Explains how to convert from an Oracle database to FUJITSU Enterprise Postgres, within the scope noted in "Compatibility with Oracle Databases" from the following perspectives.

## [Appendix C Tables Used by the Features Compatible with Oracle Databases](#)

Explains the tables used by the features compatible with Oracle databases.

## [Appendix D ECOBPG - Embedded SQL in COBOL](#)

Explains application development using embedded SQL in COBOL.

## [Appendix E Quantitative Limits](#)

This appendix explains limitations.

## [Appendix F Reference](#)

Provides a reference for each interface.

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## **Issue date and version**

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# Chapter 1 Overview of the Application Development Function

The interface for application development provided by FUJITSU Enterprise Postgres is perfectly compatible with PostgreSQL.

Along with the PostgreSQL interface, FUJITSU Enterprise Postgres also provides the following extended interfaces:

- Support for National Characters

In order to secure portability from mainframes and databases of other companies, FUJITSU Enterprise Postgres provides data types that support national characters. The national characters are usable from the client application languages.

Refer to "[1.1 Support for National Characters](#)" for details.

- Integration with Visual Studio

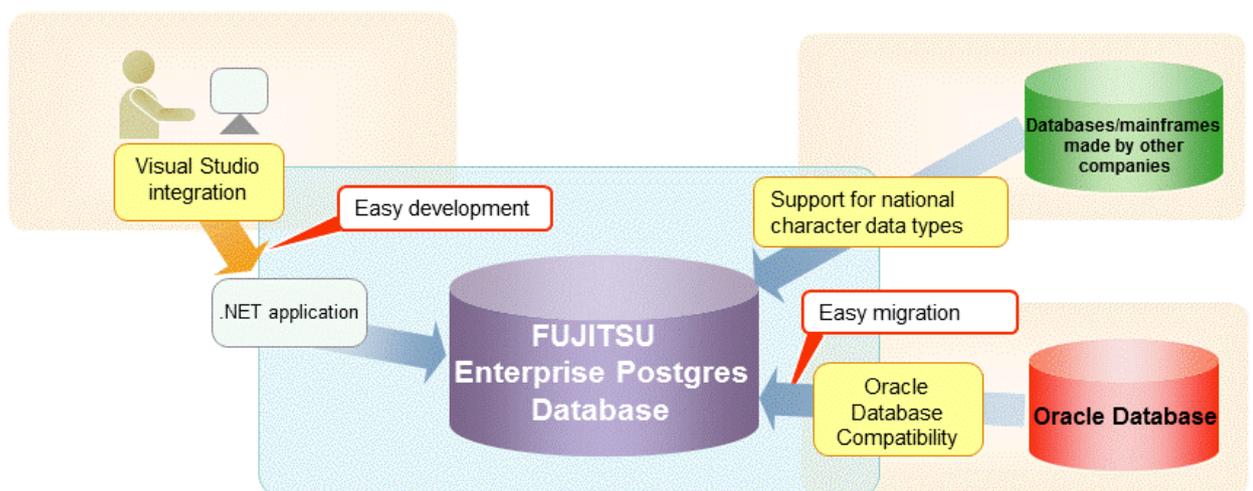
By integrating with Visual Studio, applications can be created using a standard framework for the building of a database server.

Refer to "[1.2 Integration with Visual Studio](#)" for details.

- Compatibility with Oracle Databases

Compatibility with Oracle databases is offered. Use of the compatible features means that the revisions to existing applications can be isolated, and migration to open interfaces is made simpler.

Refer to "[1.3 Compatibility with Oracle Database](#)" for details.



- Java applications using PL/extJava

Using PL/extJava, it is possible to reduce network traffic and improve the job processing time by performing business logic, implemented via stored functions, on the database server instead of on the client.

Refer to "[Chapter 10 Java Applications using PL/extJava](#)" for details.

- Application connection switch feature

The application connection switch feature is provided to enable automatic connection to the target server when there are multiple servers with redundant configurations.

Refer to "[1.4 Application Connection Switch Feature](#)" for details.

- Performance tuning

The following features are provided to control SQL statement query plans:

- Optimizer hints
- Locked statistics

Refer to "[12.1 Enhanced Query Plan Stability](#)" for details.

- Parallel scan

Scans becomes faster through the use of free resources within the server to parallelize particular SQL statements.

Refer to "[Chapter 13 Parallel Scan](#)" for details.

- Scanning using a Vertical Columnar Index (VCI)

Scans becomes faster during aggregation of many rows by providing the features below:

- Vertical columnar index (VCI)
- In-memory data

Refer to "[Chapter 14 Scan Using a Vertical Columnar Index \(VCI\)](#)" for details.

## 1.1 Support for National Characters

---

NCHAR type is provided as the data type to deal with national characters.

The NCHAR type can be used with FUJITSU Enterprise Postgres pgAdmin.

### Point

---

- NCHAR can only be used when the character set of the database is UTF-8.
  - NCHAR can be used in the places where CHAR can be used (function arguments, etc.).
  - For applications handling NCHAR type data in the database, the data format is the same as CHAR type. Therefore, applications handling data in NCHAR type columns can also be used to handle data stored in CHAR type columns.
- 

### Note

---

Note the following in order to cast NCHAR type data as CHAR type.

- When comparing NCHAR type data where the length differs, ASCII spaces are used to fill in the length of the shorter NCHAR type data so that it can be processed as CHAR type data.
  - Depending on the character set, the data size may increase by between 1.5 and 2 times.
-

## 1.1.1 Literal

---

### Syntax

```
{ N | n } '[national character [ ... ] ]'
```

### General rules

National character string literals consist of an 'N' or 'n', and the national character is enclosed in single quotation marks ('). Example: N'ABCDEF'

The data type is national character string type.

## 1.1.2 Data Type

---

### Syntax

```
{ NATIONAL CHARACTER | NATIONAL CHAR | NCHAR } [ VARYING ] [(length) ]
```

The data type of the NCHAR type column is as follows:

| Data type specification format         | Explanation  |
|--|--|
| NATIONAL CHARACTER( <i>n</i> )         | National character string with a fixed length of <i>n</i> characters                   |
| NATIONAL CHAR( <i>n</i> )              | This will be the same as (1) if ( <i>n</i> ) is omitted.                               |
| NCHAR( <i>n</i> )                      | <i>n</i> is a whole number larger than 0.  |
| NATIONAL CHARACTER VARYING( <i>n</i> ) | National character string with a variable length with a maximum of <i>n</i> characters |
| NATIONAL CHAR VARYING( <i>n</i> )      | Any length of national character string can be accepted when this is omitted.          |
| NCHAR VARYING( <i>n</i> )              | <i>n</i> is a whole number larger than 0.  |

### General rules

NCHAR is the national character string type data type. The length is the number of characters.

The length of the national character string type is as follows:

- When VARYING is not specified, the length of national character strings is fixed and will be the specified length.
- When VARYING is specified, the length of national character strings will be variable.  
In this case, the lower limit will be 0 and the upper limit will be the value specified for length.
- NATIONAL CHARACTER, NATIONAL CHAR, and NCHAR each have the same meaning.

When the national character string to be stored is shorter than the declared upper limit, the NCHAR value is filled with spaces, whereas NCHAR VARYING is stored as is.

The upper limit for character storage is approximately 1GB.

## 1.1.3 Functions and Operator

---

### Comparison operator

When a NCHAR type or NCHAR VARYING type is specified in a comparison operator, comparison is only possible between NCHAR types or NCHAR VARYING types.

### String functions and operators

All of the string functions and operators that can be specified by a CHAR type can also be specified by a NCHAR type. The behavior of these string functions and operators is also the same as with CHAR type.

Pattern matching (LIKE, SIMILAR TO regular expression, POSIX regular expression)

The patterns specified when pattern matching with NCHAR types and NCHAR VARYING types specify the percent sign (%) and the underline (\_).

The underline (\_) means a match with one national character. The percent sign (%) means a match with any number of national characters 0 or over.

## 1.2 Integration with Visual Studio

---

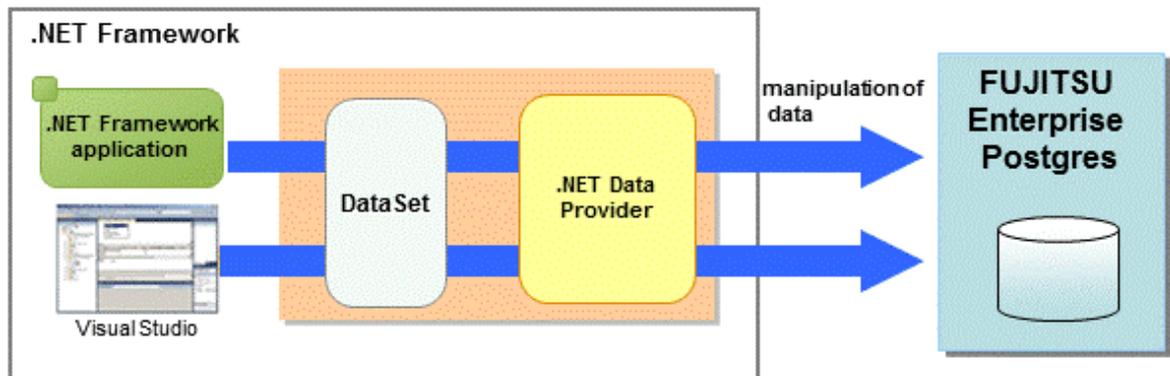
When developing an application to access database server resources, you can create applications and build database server environments integrated with Microsoft Visual Studio.

Refer to "[Chapter 4 .NET Data Provider](#)" for information on integration with Visual Studio.

### 1.2.1 Relationship between .NET Framework and FUJITSU Enterprise Postgres

---

FUJITSU Enterprise Postgres provides .NET Data Provider, which is an interface for ADO.NET of .NET Framework. This enables you to select FUJITSU Enterprise Postgres as the connection destination database of ADO.NET and use the intuitive and efficient application development features of Visual Studio.



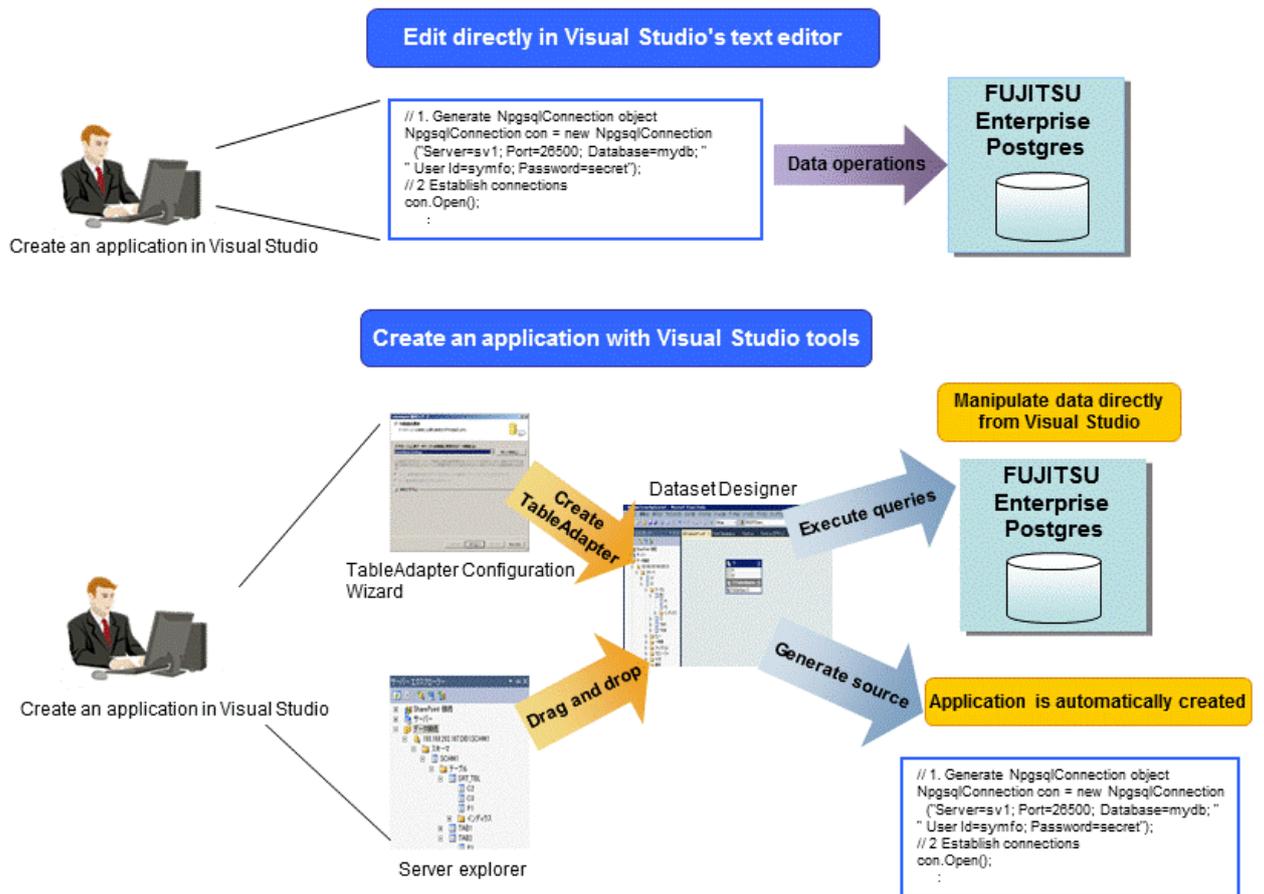
The following provides an overview of application development integrated with Visual Studio.

**Edit directory in Visual Studio's text editor**

By using a component specified in Visual Studio, applications to access database resources can be created manually.

**Create an application with Visual Studio tools**

By using basic drag-and-drop operations in the tools provided in Visual Studio, programs to access database resources can be generated automatically.

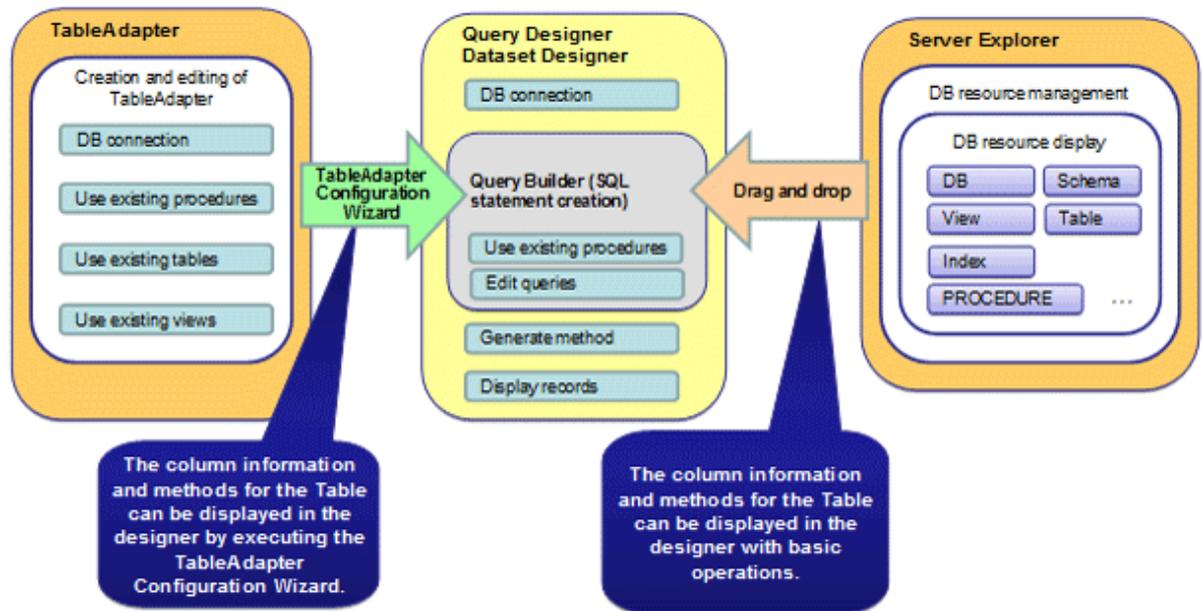


## 1.2.2 Automatic Application Generation

The Visual Studio tools used to automatically generate applications include TableAdapter and Server Explorer, which enable the following:

- Data manipulation of database resources with TableAdapter
- Management of database resources with Server Explorer

Whether you use TableAdapter or the Server Explorer, programs can be created with basic operations like drag and drop with the resources and tools that comprise Visual Studio.



The following features are available with TableAdapter and Server Explorer:

- Manipulation of database resources with TableAdapter
  - Generating queries using existing tables/views
  - Generating methods using existing tables/views
  - Generating queries using procedures
  - Generating methods using procedures
- Management of database resources with Server Explorer
  - Listing of database resources
  - Generating queries using existing tables/views
  - Generating methods using existing tables/views
  - Generating queries using procedures
  - Generating methods using procedures

### 1.3 Compatibility with Oracle Database

---

The following features have been extended in order to enhance compatibility with Oracle databases:

- Query (external join operator (+), DUAL table)
- Function (DECODE, SUBSTR, NVL)
- Built-in package (DBMS\_OUTPUT, UTL\_FILE, DBMS\_SQL)

Refer to "[Chapter 9 Compatibility with Oracle Databases](#)" for information on the features compatible with Oracle databases.

### 1.4 Application Connection Switch Feature

---

The application connection switch feature enables automatic connection to the target server when there are multiple servers with redundant configurations.

Refer to "[Chapter 11 Application Connection Switch Feature](#)" for information on the application connection switch feature.

## 1.4.1 Integration with Database Multiplexing

---

The application connection switch feature is provided to enable automatic connection to the appropriate server when there are multiple servers with redundant configurations.



Refer to "Database Multiplexing Mode" in the Cluster Operation Guide for information on database multiplexing.

## 1.5 Notes on Application Compatibility

---

FUJITSU Enterprise Postgres upgrades contain feature improvements and enhancements that may affect the applications.

Accordingly, note the points below when developing applications, to ensure compatibility after upgrade.

- Checking execution results
- Referencing system catalogs
- Using functions

### 1.5.1 Checking Execution Results

---

Refer to SQLSTATE output in messages to check the SQL statements used in applications and the execution results of commands used during development.



Refer to Messages for information on the message content and number.

Refer to "PostgreSQL Error Codes" under "Appendixes" in the PostgreSQL Documentation for information on SQLSTATE.

### 1.5.2 Referencing System Catalogs

---

System catalogs can be used to obtain information about the FUJITSU Enterprise Postgres system and database objects.

However, system catalogs may change when the FUJITSU Enterprise Postgres version is upgraded. Also, there are many system catalogs that return information that is inherent to FUJITSU Enterprise Postgres.

Accordingly, reference the information schema defined in standard SQL (`information_schema`) wherever possible. Note also that queries specifying "\*" in the selection list must be avoided to prevent columns being added.



Refer to "The Information Schema" under "Client Interfaces" in the PostgreSQL Documentation for details.

The system catalog must be referenced to obtain information not found in the information schema. Instead of directly referencing the system catalog in the application, define a view for that purpose. Note, however, that when defining the view, the column name must be clearly specified after the view name.

An example of defining and using a view is shown below.



```
CREATE VIEW my_tablespace_view(spcname) AS SELECT spcname FROM pg_tablespace;  
SELECT * FROM my_tablespace_view V1, pg_tables T1 WHERE V1.spcname = T1.tablespace;
```

If changes are made to a system catalog, the user will be able to take action by simply making changes to the view, without the need to make changes to the application.

The following shows an example of taking action by redefining a view as if no changes were made.

The `pg_tablespace` system catalog is redefined in response to the column name being changed from `spcname` to `spacename`.

### Example

```
DROP VIEW my_tablespace_view;  
CREATE VIEW my_tablespace_view(spcname) AS SELECT spacename FROM pg_tablespace;
```

## 1.5.3 Using Functions

The default functions provided with FUJITSU Enterprise Postgres enable a variety of operations and manipulations to be performed, and information to be obtained, using SQL statements.

However, it is possible that internal FUJITSU Enterprise Postgres functions, such as those relating to statistical information or for obtaining system-related information, may change as FUJITSU Enterprise Postgres versions are upgraded.

Accordingly, when using these functions, define them as new functions and then use the newly-defined functions in the applications.

An example of defining and using a function is shown below.

### Example

```
CREATE FUNCTION my_func(releid regclass) RETURNS bigint LANGUAGE SQL AS 'SELECT  
pg_relation_size(releid)';  
SELECT my_func(2619);
```

If changes are made to a function, the user will be able to take action by simply redefining the function, without the need to make changes to the application.

The following shows an example of taking action by redefining a function as if no changes were made.

The `pg_relation_size` function is redefined after arguments are added.

### Example

```
DROP FUNCTION my_func(regclass);  
CREATE FUNCTION my_func(releid regclass) RETURNS bigint LANGUAGE SQL AS 'SELECT  
pg_relation_size(releid, $$main$$)';
```

# Chapter 2 JDBC Driver

This section describes how to use JDBC drivers.

## 2.1 Development Environment

This section describes application development using JDBC drivers and the runtime environment.

### 2.1.1 Combining with JDK or JRE

Refer to Installation and Setup Guide for Client for information on combining with JDK or JRE where JDBC drivers can operate.

## 2.2 Setup

This section describes the environment settings required to use JDBC drivers and how to encrypt communication data.

### 2.2.1 Environment Settings

Configuration of the CLASSPATH environment variable is required as part of the runtime environment for JDBC drivers.

The name of the JDBC driver file is as follows:

- If using JDK 6 or JRE 6

```
postgresql-jdbc4.jar
```

- If using JDK 7, JRE 7, JDK 8, or JRE 8

```
postgresql-jdbc41.jar
```

The examples below show how to set the CLASSPATH environment variable if JDK 6 or JRE 6 is used.

If JDK 7, JRE 7, JDK 8, or JRE 8 is used, only the name of the JDBC driver file will be different. The method for configuring the CLASSPATH environment variable is the same.

Note that "<xy>" indicates the product version and level.



- Linux (32-bit)

- Setting example (TC shell)

```
setenv CLASSPATH /opt/fsepv<xy>client32/jdbc/lib/postgresql-jdbc4.jar:${CLASSPATH}
```

- Setting example (bash)

```
CLASSPATH=/opt/fsepv<xy>client32/jdbc/lib/postgresql-jdbc4.jar:$CLASSPATH;export CLASSPATH
```

- Linux (64-bit)

- Setting example (TC shell)

```
setenv CLASSPATH /opt/fsepv<xy>client64/jdbc/lib/postgresql-jdbc4.jar:${CLASSPATH}
```

- Setting example (bash)

```
CLASSPATH=/opt/fsepv<xy>client64/jdbc/lib/postgresql-jdbc4.jar:$CLASSPATH;export CLASSPATH
```

- Windows (32-bit)

- Setting example

```
set CLASSPATH=C:\Program Files\Fujitsu\fsepclient32\JDBC\lib\postgresql-jdbc4.jar;
%CLASSPATH%
```

- Windows (64-bit)

- Setting example (when FUJITSU Enterprise Postgres Client 32-bit is installed)

```
set CLASSPATH=C:\Program Files (x86)\Fujitsu\fsepclient32\JDBC\lib\postgresql-
jdbc4.jar;%CLASSPATH%
```

- Setting example (when FUJITSU Enterprise Postgres Client 64-bit is installed)

```
set CLASSPATH=C:\Program Files\Fujitsu\fsepclient64\JDBC\lib\postgresql-jdbc4.jar;
%CLASSPATH%
```

## 2.2.2 Message Language and Encoding System Used by Applications Settings

---

If the JDBC driver is used, it will automatically set the encoding system on the client to UTF-8, so there is no need to configure this.



See

Refer to "Automatic Character Set Conversion Between Server and Client" in "Server Administration" in the PostgreSQL Documentation for information on encoding systems.

### Language settings

You must match the language settings for the application runtime environment with the message locale settings of the database server.

Set language in the "user.language" system property.



Example

Example of running a Java command with system property specified

```
java -Duser.language=en TestClass1
```

## 2.2.3 Settings for Encrypting Communication Data

---

When using the communication data encryption feature to connect to the database server, set as follows:

Settings for encrypting communication data for connection to the server

This section describes how to create applications for encrypting communication data.

Set the property of the SSL parameter to "true" to encrypt. The default for the SSL parameter is "false".



Example

- Setting example 1

```
String url = "jdbc:postgresql://sv1/test";
Properties props = new Properties();
```

```
props.setProperty("user", "fsepuser");
props.setProperty("password", "secret");
props.setProperty("ssl", "true");
Connection conn = DriverManager.getConnection(url, props);
```

- Setting example 2

```
String url = "jdbc:postgresql://sv1/test?user=fsepuser&password=secret&ssl=true";
Connection conn = DriverManager.getConnection(url);
```

To prevent spoofing of the database server, you need to use the keytool command included with Java to import the CA certificate to the Java keystore.

Refer to JDK documentation and the Oracle website for details.

### Note

There is no need to set the ssl parameter if the connection string of the DriverManager class is specified, or if the sslmode parameter is specified in the data source, such as when the application connection switch feature is used. If the ssl parameter is set, the value in the sslmode parameter will be enabled.

### See

Refer to "Secure TCP/IP Connections with SSL" in "Server Administration" in the PostgreSQL Documentation for information on encrypting communication data.

## 2.3 Connecting to the Database

This section explains how to connect to a database.

- [Using the DriverManager Class](#)
- [Using the PGConnectionPoolDataSource Class](#)
- [Using the PGXADataSource Class](#)

### Note

Do not specify "V2" for the "protocolVersion" of the connection string.

### 2.3.1 Using the DriverManager Class

To connect to the database using the DriverManager class, first load the JDBC driver, then specify the connection string as a URI in the API of the DriverManager class.

Load the JDBC driver

Specify org.postgresql.Driver.

Connection string

URI connection is performed as follows:

```
jdbc:postgresql://host:port/database?
user=user&password=password1&loginTimeout=loginTimeout&socketTimeout=socketTimeout
```

| Argument      | Description  |
|---------------|--|
| host          | Specify the host name for the connection destination.  |
| port          | Specify the port number for the database server.<br>The default is "27500".  |
| database      | Specify the database name.   |
| user          | Specify the username that will connect with the database.<br>If this is omitted, the username logged into the operating system that is executing the application will be used.   |
| password      | Specify a password when authentication is required.  |
| loginTimeout  | Specify the timeout for connections (in units of seconds).<br>Specify a value between 0 and 2147483647. There is no limit set if you set 0 or an invalid value.<br>An error occurs when a connection cannot be established within the specified time.  |
| socketTimeout | Specify the timeout for communication with the server (in units of seconds).<br>Specify a value between 0 and 2147483647. There is no limit set if you set 0 or an invalid value.<br>An error occurs when data is not received from the server within the specified time.  |
| maxStatements | Specify the number of statements to be cached.<br>Specify an integer value between 0 and 2147483647. The default is 0.<br>The statement caching feature will be disabled if 0 is specified. An error will not occur if an invalid value is specified, however, the behavior will be as if 0 has been specified.<br>Refer to " <a href="#">2.4.2 Statement Caching Feature</a> " for information on this feature. |



## Example

Code examples for applications

```
import java.sql.*;
...
Class.forName("org.postgresql.Driver");
String url = "jdbc:postgresql://sv1:27500/mydb?
user=myuser&password=myuser01&loginTimeout=20&socketTimeout=20&maxStatements=20";
Connection con = DriverManager.getConnection(url);
```

## 2.3.2 Using the PGConnectionPoolDataSource Class

To connect to databases using data sources, specify the connection information in the properties of the data source.

Method description

| Argument        | Description   |
|-----------------|---|
| setServerName   | Specify the host name for the connection destination.                       |
| setPortNumber   | Specify the port number for the database server.<br>The default is "27500". |
| setDatabaseName | Specify the database name.  |
| setUser         | Specify the username of the database.                                       |

| Argument         | Description  |
|------------------|--|
|                  | By default, the name used will be that of the user on the operating system that is executing the application.  |
| setPassword      | Specify a password for server authentication.  |
| setLoginTimeout  | Specify the timeout for connections (in units of seconds).<br>Specify a value between 0 and 2147483647. There is no limit set if you set 0 or an invalid value.<br>An error occurs when a connection cannot be established within the specified time.  |
| setSocketTimeout | Specify the timeout for communication with the server (in units of seconds).<br>Specify a value between 0 and 2147483647. There is no limit set if you set 0 or an invalid value.<br>An error occurs when data is not received from the server within the specified time.  |
| setMaxStatements | Specify the number of statements to be cached.<br>Specify an integer value between 0 and 2147483647. The default is 0.<br>The statement caching feature will be disabled if 0 is specified. An error will not occur if an invalid value is specified, however, the behavior will be as if 0 has been specified.<br>Refer to " <a href="#">2.4.2 Statement Caching Feature</a> " for information on this feature. |



## Example

Code examples for applications

```
import java.sql.*;
import org.postgresql.ds.PGConnectionPoolDataSource;
...
PGConnectionPoolDataSource source = new PGConnectionPoolDataSource();
source.setServerName("sv1");
source.setPortNumber(27500);
source.setDatabaseName("mydb");
source.setUser("myuser");
source.setPassword("myuser01");
source.setLoginTimeout(20);
source.setSocketTimeout(20);
source.setMaxStatements(20);
...
Connection con = source.getConnection();
```

### 2.3.3 Using the PGXADataSource Class

To connect to databases using data sources, specify the connection information in the properties of the data source.

Method description

| Argument        | Description   |
|-----------------|---|
| setServerName   | Specify the host name for the connection destination.                       |
| setPortNumber   | Specify the port number for the database server.<br>The default is "27500". |
| setDatabaseName | Specify the database name.  |
| setUser         | Specify the username that will connect with the database.                   |

| Argument         | Description  |
|------------------|--|
|                  | If this is omitted, the name used will be that of the user on the operating system that is executing the application.  |
| setPassword      | Specify a password when authentication by a password is required.  |
| setLoginTimeout  | Specify the timeout for connections.<br><br>The units are seconds. Specify a value between 0 and 2147483647. There is no limit set if you set 0 or an invalid value.<br><br>An error occurs when a connection cannot be established within the specified time.   |
| setSocketTimeout | Specify the timeout for communication with the server.<br><br>The units are seconds. Specify a value between 0 and 2147483647. There is no limit set if you set 0 or an invalid value.<br><br>An error occurs when data is not received from the server within the specified time.   |
| setMaxStatements | Specify the number of statements to be cached.<br><br>Specify an integer value between 0 and 2147483647. The default is 0.<br><br>The statement caching feature will be disabled if 0 is specified. An error will not occur if an invalid value is specified, however, the behavior will be as if 0 has been specified.<br><br>Refer to " <a href="#">2.4.2 Statement Caching Feature</a> " for information on this feature. |



## Example

Code examples for applications

```
import java.sql.*;
import org.postgresql.xa.PGXADatasource;
...
PGXADatasource source = new PGXADatasource();
source.setServerName("sv1");
source.setPortNumber(27500);
source.setDatabaseName("mydb");
source.setUser("myuser");
source.setPassword("myuser01");
source.setLoginTimeout(20);
source.setSocketTimeout(20);
source.setMaxStatements(20);
...
Connection con = source.getConnection();
```

## 2.4 Application Development

This section describes the data types required when developing applications that will be connected with FUJITSU Enterprise Postgres.

### 2.4.1 Relationship between the Application Data Types and Database Data Types

The following table shows the correspondence between data types in applications and data types in databases.

| Data type on the server                     | Java data type                     | Data types prescribed by java.sql.Types |
|---|------------------------------------|---|
| character                                   | String                             | java.sql.Types.CHAR                     |
| national character                          | String                             | java.sql.Types.NCHAR                    |
| character varying                           | String                             | java.sql.Types.VARCHAR                  |
| national character varying                  | String                             | java.sql.Types.NVARCHAR                 |
| text  | String                             | java.sql.Types.VARCHAR                  |
| bytea                                       | byte[]                             | java.sql.Types.BINARY                   |
| smallint                                    | short                              | java.sql.Types.SMALLINT                 |
| integer                                     | int                                | java.sql.Types.INTEGER                  |
| bigint                                      | long                               | java.sql.Types.BIGINT                   |
| smallserial                                 | short                              | java.sql.Types.SMALLINT                 |
| serial                                      | int                                | java.sql.Types.INTEGER                  |
| bigserial                                   | long                               | java.sql.Types.BIGINT                   |
| real  | float                              | java.sql.Types.REAL                     |
| double precision                            | double                             | java.sql.Types.DOUBLE                   |
| numeric                                     | java.math.BigDecimal               | java.sql.Types.NUMERIC                  |
| decimal                                     | java.math.BigDecimal               | java.sql.Types.DECIMAL                  |
| money                                       | String                             | java.sql.Types.OTHER                    |
| date  | java.sql.Date                      | java.sql.Types.DATE                     |
| time with time zone                         | java.sql.Time                      | java.sql.Types.TIME                     |
| time without time zone                      | java.sql.Time                      | java.sql.Types.TIME                     |
| timestamp without time zone                 | java.sql.Timestamp                 | java.sql.Types.TIMESTAMP                |
| timestamp with time zone                    | java.sql.Timestamp                 | java.sql.Types.TIMESTAMP                |
| interval                                    | org.postgresql.util.PGInterval     | java.sql.Types.OTHER                    |
| boolean                                     | boolean                            | java.sql.Types.BIT                      |
| bit   | boolean                            | java.sql.Types.BIT                      |
| bit varying                                 | org.postgresql.util.Pgobject       | java.sql.Types.OTHER                    |
| oid   | long                               | java.sql.Types.BIGINT                   |
| xml   | java.sql.SQLXML                    | java.sql.Types.SQLXML                   |
| array                                       | java.sql.Array                     | java.sql.Types.ARRAY                    |
| uuid  | java.util.UUID                     | java.sql.Types.OTHER                    |
| point                                       | org.postgresql.geometric.Pgpoint   | java.sql.Types.OTHER                    |
| box   | org.postgresql.geometric.Pgbox     | java.sql.Types.OTHER                    |
| lseg  | org.postgresql.geometric.Pglseg    | java.sql.Types.OTHER                    |
| path  | org.postgresql.geometric.Pgpath    | java.sql.Types.OTHER                    |
| polygon                                     | org.postgresql.geometric.PGpolygon | java.sql.Types.OTHER                    |
| circle                                      | org.postgresql.geometric.PGcircle  | java.sql.Types.OTHER                    |
| json  | org.postgresql.util.PGobject       | java.sql.Types.OTHER                    |
| Network address type<br>(inet,cidr,macaddr) | org.postgresql.util.PGobject       | java.sql.Types.OTHER                    |

| Data type on the server                           | Java data type               | Data types prescribed by java.sql.Types |
|---|------------------------------|---|
| Types related to text searches (svector, tsquery) | org.postgresql.util.PGobject | java.sql.Types.OTHER                    |
| Enumerated type                                   | org.postgresql.util.PGobject | java.sql.Types.OTHER                    |
| Composite type                                    | org.postgresql.util.PGobject | java.sql.Types.OTHER                    |
| Range type  | org.postgresql.util.PGobject | java.sql.Types.OTHER                    |

All data types allow the use of the getString() method to acquire string values.

## 2.4.2 Statement Caching Feature

The statement caching feature caches SQL statements for each individual connection. This means that when an SQL statement with an identical string is next executed, the analysis and creation of the statement can be skipped. This improves performance in cases such as when an SQL statement with an identical string is executed within a loop or method that is executed repeatedly. Furthermore, the statement caching feature can be combined with the connection pooling feature to further enhance performance.

The mechanism used by the statement caching feature is described below:

- When determining if an SQL statement contains an identical string, the check is case-sensitive.
- Only SQL statements prepared using the prepareStatement method or the prepareCall method are targets for statement caching.
- When the close method of the PreparedStatement class or the CallableStatement class is executed, the specified SQL statement is registered in the cache. When the prepareStatement method or the prepareCall method is executed, the feature checks if the specified SQL statement exists in the cache. If it exists, the analysis and creation processes for the statement can be skipped.
- Specify the upper limit of the cache using the setMaxStatements method of the PGConnectionPoolDataSource class or the PGXADataSource class. The statement will not be cached unless a valid value other than 0 is specified. If the upper limit of the cache is reached, the least recently used cache will be discarded (this is known as a Least Recently Used (LRU) system).
- If "false" is specified in the setPoolable(boolean) method of the PreparedStatement class, the SQL statement will not be registered in the cache, even if the close method of the prepared SQL statement is executed.

### Cache registration controls

You can configure whether to cache SQL statements using the setPoolable(boolean) method of the PreparedStatement class when the statement caching feature is enabled.

Values that can be configured are shown below:

false

SQL statements will not be cached, even when the statement caching feature is enabled.

true

SQL statements will be cached if the statement caching feature is enabled.

### Number of caches

Specify the number of SQL statements with different strings per connection.



- The specified values may become unsuitable when changes are made to the application, so periodically execute pg\_stat\_statement to check and update to suitable values if required.

- Cached SQL statement information will consume a certain amount of memory, so consideration must be given to the upper limit for memory consumption. A guide to estimating the memory consumed by the statement caching feature is shown below:

- Client

$$\text{connsPerAppProc} \times \text{numOfCaches} \times 2 \text{ KB } (*1)$$

- Server

$$\text{maxConnsPerAppProc} \times \text{numOfCaches} \times 10 \text{ KB } (*1)$$

\*1: Approximate memory consumption per SQL statement

## 2.4.3 Creating Applications during Cluster Operations

This section explains points to consider when creating applications during cluster operations.



See

Refer to the Cluster Operation Guide for information on cluster operations.

### 2.4.3.1 Errors when an Application Connection Switch Occurs and Corresponding Actions

If an application connection switch occurs during cluster operations, explicitly close the connection and then reestablish the connection or reexecute the application.

The table below shows errors that may occur during a switch, and the corresponding action to take.

| State  |                                     | Error information (*2) | Action  |
|--|-------------------------------------|------------------------|---|
| Node failure (server failure) or FUJITSU Enterprise Postgres system failure (*1) | Failure occurs during access        | 57P01<br>08006         | After the switch is complete, reestablish the connection, or reexecute the application. |
|  | Accessed during node/system failure | 08001                  |   |
| Switch to the standby node (standby server) (*1)                                 | Switched during access              | 57P01<br>08006         |   |
|  | Accessed during switch              | 08001                  |   |

\*1: Terms enclosed in () are terms used in database multiplexing mode.

\*2: Return value of the getSQLState method of SQLException.

### 2.4.3.2 Notes when Creating Applications during Failover Operations in Shared Disk Mode

In the application, specify the same IP address as the one that was used when creating GIs or takeover network resources. This will enable the application to be executed if a state transition occurs, simply by reexecuting the application without modification.



See

.....  
Refer to "Creating GIs or Takeover Network Resources" in the Cluster Operation Guide for details.  
.....

# Chapter 3 ODBC Driver

This section describes application development using ODBC drivers.

## 3.1 Development Environment

Applications using ODBC drivers can be developed using ODBC interface compatible applications, such as Access, Excel, and Visual Basic.

Refer to the manuals for the programming languages corresponding to the ODBC interface for information about the environment for development.

FUJITSU Enterprise Postgres supports ODBC 3.5.

## 3.2 Setup

You need to set up PsqLODBC, which is an ODBC driver, in order to use applications that use ODBC drivers with FUJITSU Enterprise Postgres. PsqLODBC is included in the FUJITSU Enterprise Postgres client package.

The following describes how to register the ODBC drivers and the ODBC data source.



### 3.2.1 Registering ODBC Drivers

When using the ODBC driver on a Linux platform, register the ODBC driver using the following procedure:

1. Installing the ODBC driver manager (unixODBC)



#### Information

- FUJITSU Enterprise Postgres supports unixODBC Version 2.3 or later.

You can download unixODBC from the following site:

<http://www.unixodbc.org/>

- To execute unixODBC, you must first install libtool 2.2.6 or later.

You can download libtool from the following website:

<http://www.gnu.org/software/libtool/>

#### [Note]

- ODBC driver operation is supported.
- unixODBC operation is not supported.

2. Registering ODBC drivers

Edit the ODBC driver manager (unixODBC) `odbcinst.ini` file.



#### Information

[location of the `odbcinst.ini` file]

```
unixodbcinstalldir/etc/odbcinst.ini
```

Set the following content:

| Definition name | Description                      | Setting value  |
|-----------------|----------------------------------|--|
| [Driver name]   | ODBC driver name                 | <p>Set the name of the ODBC driver.</p> <p>Select the two strings below that correspond to the application type. Concatenate the strings with no spaces, enclose in "[ ]", and then specify this as the driver name.</p> <p> <b>Note</b></p> <p>.....</p> <p>The placeholders shown below are enclosed in angle brackets '&lt;&gt;' to avoid confusion with literal text. Do not include the angle brackets in the string.</p> <p>.....</p> <ul style="list-style-type: none"> <li>- Application architecture <ul style="list-style-type: none"> <li>- For data sources used by 32-bit applications<br/>"FUJITSUEnterprisePostgres&lt;fujitsuEnterprisePostgresClientVersAndLvl&gt;"</li> <li>- For data sources used by 64-bit applications<br/>"FUJITSUEnterprisePostgres&lt;fujitsuEnterprisePostgresClientVersAndLvl&gt;x64"</li> </ul> </li> <li>- Encoding system used by the application <ul style="list-style-type: none"> <li>- In Unicode (only UTF-8 can be used)<br/>"unicode"</li> <li>- Other than Unicode<br/>"ansi"</li> </ul> </li> </ul> <p>Example: In a 32-bit application, where the encoding system used by the application is Unicode:<br/>"[FUJITSUEnterprisePostgres&lt;fujitsuEnterprisePostgresClientVersAndLvl&gt;unicode]"</p> |
| Description     | Description of the ODBC driver   | Specify a supplementary description for the current data source. Any description may be set.   |
| Driver          | Path of the ODBC driver (32-bit) | <p>Set the path of the ODBC driver (32-bit).</p> <ul style="list-style-type: none"> <li>- If the encoding system is Unicode: <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px 0;"> <i>fujitsuEnterprisePostgresClientInstallDir/odbc/lib/psqlodbcw.so</i> </div> </li> <li>- If the encoding system is other than Unicode: <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px 0;"> <i>fujitsuEnterprisePostgresClientInstallDir/odbc/lib/psqlodbc.a.so</i> </div> </li> </ul>  |
| Driver64        | Path of the ODBC driver (64-bit) | <p>Set the path of the ODBC driver (64-bit). Setting is not required when you are using a 32-bit operating system.</p> <ul style="list-style-type: none"> <li>- If the encoding system is Unicode: <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px 0;"> <i>fujitsuEnterprisePostgresClientInstallDir/odbc/lib/psqlodbcw.so</i> </div> </li> </ul>   |

| Definition name | Description                                       | Setting value  |
|-----------------|---|--|
|                 |   | - If the encoding system is other than Unicode:<br><div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> <i>fujitsuEnterprisePostgresClientInstallDir/odbc/lib/psqlodbc.so</i> </div> |
| FileUsage       | Use of the data source file                       | Specify 1.   |
| Threading       | Level of atomicity secured for connection pooling | Specify 2.   |

### Example

Note that "<xy>" indicates the product version and level.

- Setting example when using 32-bit ODBC driver on 32-bit Linux

```
[FUJITSU Enterprise Postgres9.5unicode]
Description = FUJITSU Enterprise Postgres 9.5 unicode driver
Driver      = /opt/fsepv<xy>client32/odbc/lib/psqlodbcw.so
FileUsage   = 1
Threading   = 2
```

- Setting example when using 64-bit ODBC driver on 64-bit Linux

```
[FUJITSU Enterprise Postgres9.5x64unicode]
Description = FUJITSU Enterprise Postgres 9.5 x64 unicode driver
Driver64    = /opt/fsepv<xy>client64/odbc/lib/psqlodbcw.so
FileUsage   = 1
Threading   = 2
```

- Setting example when using both 32-bit and 64-bit ODBC drivers on 64-bit Linux

```
[FUJITSU Enterprise Postgres9.5unicode]
Description = FUJITSU Enterprise Postgres 9.5 unicode driver
Driver      = /opt/fsepv<xy>client32/odbc/lib/psqlodbcw.so
FileUsage   = 1
Threading   = 2

[FUJITSU Enterprise Postgres9.5x64unicode]
Description = FUJITSU Enterprise Postgres 9.5 x64 unicode driver
Driver64    = /opt/fsepv<xy>client64/odbc/lib/psqlodbcw.so
FileUsage   = 1
Threading   = 2
```

## W

### 3.2.2 Registering ODBC Data Sources(for Windows(R))

This section describes how to register ODBC data sources.

There are the following two ways to register ODBC data sources on Windows(R).

#### 3.2.2.1 Registering using GUI

This section describes how to start the [ODBC Data Source Administrator] and register ODBC data sources.

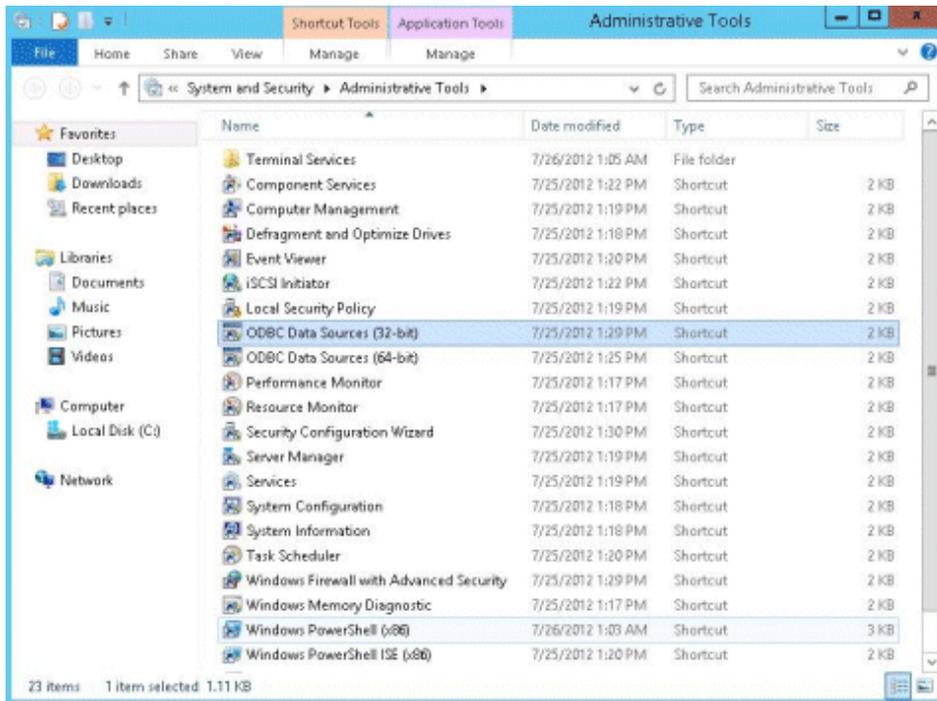
Use the following procedure to register ODBC data sources:

1. Start the [ODBC Data Source Administrator].

Select [Start] >> [Control Panel] >> [Administrative Tools] >> [ODBC Data Source Administrator].

## Example

This is an example of starting [ODBC Data Sources (32-bit)] from [Administrative Tools] in Windows Server(R) 2012.

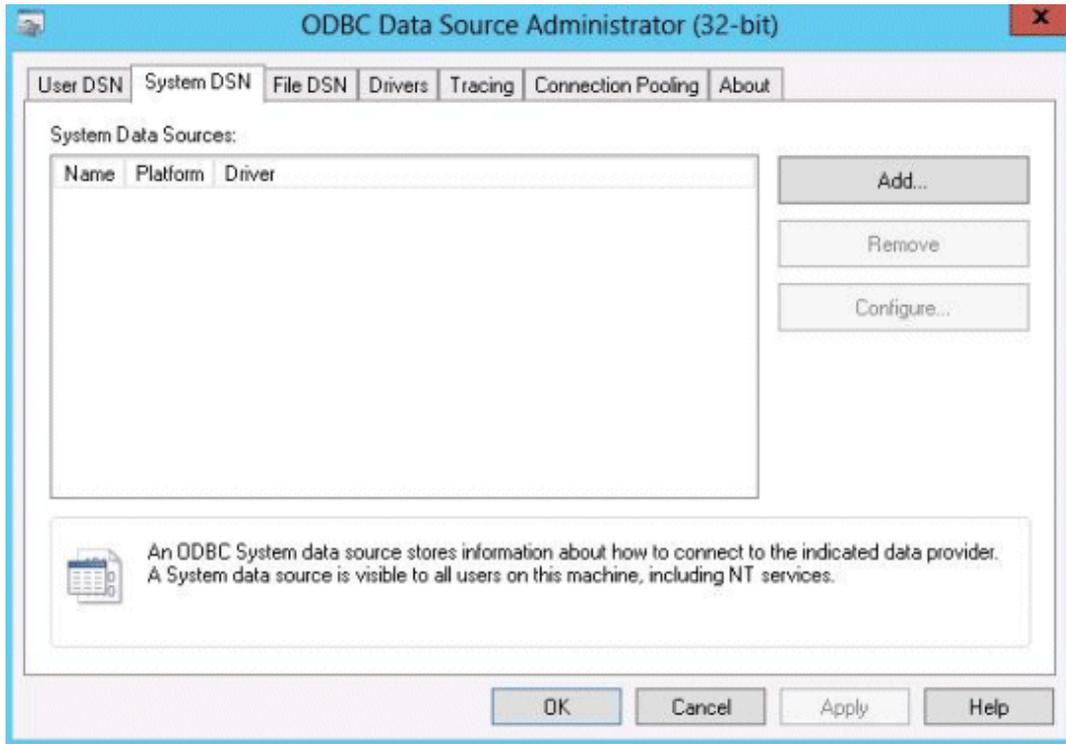


## Note

To register data sources for 32-bit applications in Windows(R) for 64-bit, execute the ODBC administrator (odbcad32.exe) for 32-bit, as shown below.

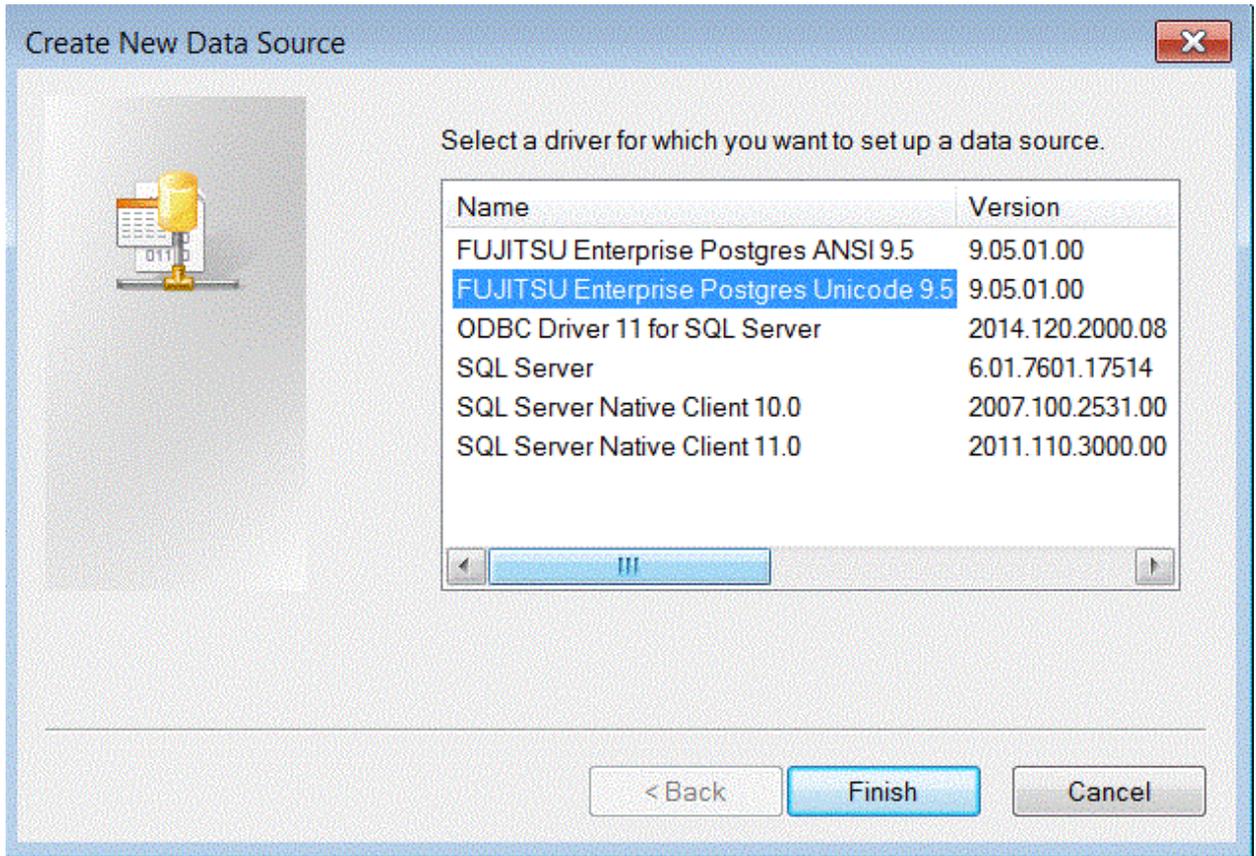
```
%SYSTEMDRIVE%\WINDOWS\SysWOW64\odbcad32.exe
```

2. When only the current user is to use the ODBC data source, select [User DSN]. When all users using the same computer are to use the ODBC data source, select [System DSN].

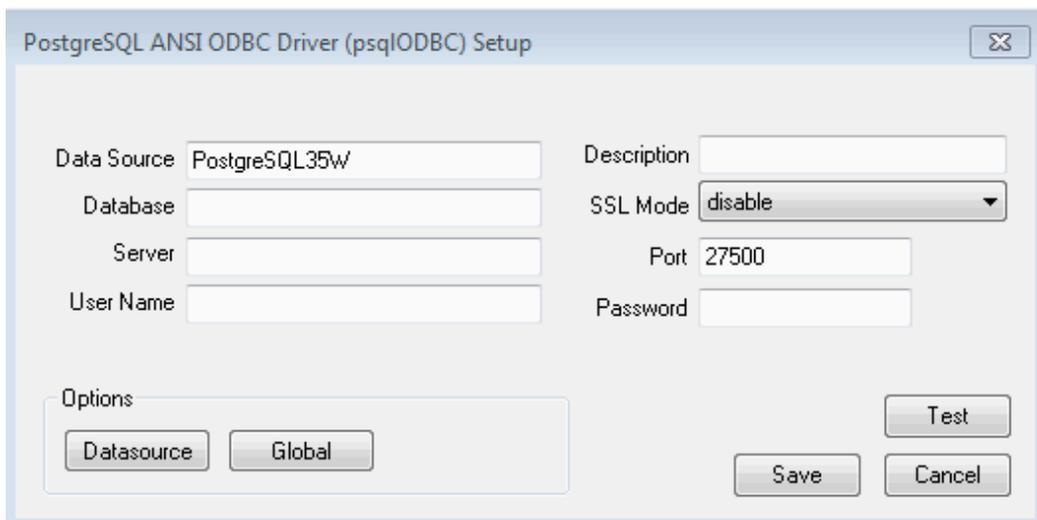


3. Click [Add].
4. Select one of the following drivers from the list of available ODBC drivers displayed in [Create New Data Source], and then click [Finish]. The notation "x.y" indicates the version and level of the FUJITSU Enterprise Postgres client feature.
  - FUJITSU Enterprise Postgres Unicode x.y  
Select this driver if using Unicode as the application encoding system.

- FUJITSU Enterprise Postgres ANSI x.y  
Select this driver if using other than Unicode as the application encoding system.



5. The [PostgreSQL ANSI ODBC Driver (psqlODBC) Setup] window is displayed. Enter or select the required items, then click [Save].



Set the following content:

| Definition name | Setting value   |
|-----------------|---|
| Data Source     | Specify the data source name to be registered in the ODBC driver manager. The application will select the name specified here and connect with the FUJITSU Enterprise Postgres database. This parameter cannot be omitted. Specify the following characters up to 32 bytes. <ul style="list-style-type: none"> <li>- National characters</li> <li>- Alphanumerics</li> <li>- "_", "&lt;", "&gt;", "+", "~", " ", "~", " ", "&amp;", " ", "#", "\$", "%", "-", "^", ":", "/", "."</li> </ul>   |
| Description     | Specify a supplementary description for the current data source. Specify characters up to 255 bytes. <ul style="list-style-type: none"> <li>- National characters</li> <li>- Alphanumerics</li> </ul>   |
| Database        | Specify the database name to be connected.  |
| SSLMode         | Specify to encrypt communications. The default is "disable".<br>The setting values for SSLMode are as follows: <ul style="list-style-type: none"> <li>- disable: Connect without SSL</li> <li>- allow: Connect without SSL, and if it fails, connect using SSL</li> <li>- prefer: Connect using SSL, and if it fails, connect without SSL</li> <li>- require: Connect always using SSL</li> <li>- verify-ca: Connect using SSL, and use a certificate issued by a trusted CA (*1)</li> <li>- verify-full: Connect using SSL, and use a certificate issued by a trusted CA to verify if the server host name matches the certificate (*1)</li> </ul> |
| Server          | Specify the host name of the database server to connect to, using up to 18 bytes. This parameter cannot be omitted.   |
| Port            | Specify the port number to be used for remote access. The default value is "27500".   |
| Username(*2)    | Specify the user that will access the database.   |
| Password(*2)    | Specify the password for the user that will access the database.  |

\*1: If specifying either "verify-ca" or "verify-full", use the system environment variable PGSSLROOTCERT of your operating system to specify the CA certificate file as shown below.

Example:

|  |
|--|
| Variable name: PGSSLROOTCERT<br>Variable value: <i>cACertificateFile</i> |
|--|

\*2: In consideration of security, specify the Username and the Password by the application.

### 3.2.2.2 Registering using commands

This section describes how to use commands to register ODBC data sources.

Use the following tools from Microsoft to register ODBC data sources.

- ODBCConf.exe
- Add-OdbcDsn (can be used with Windows(R) 8 or later, or Windows Server(R) 2012 or later.)

Refer to the Microsoft Developer Network (MSDN) Library for information on how to use these tools.

## When using ODBCConf.exe

ODBCConf.exe is a tool supported on all Windows(R) platforms.

Specification format

```
ODBCConf.exe /A { dataSourceType "odbcDriverName" "optionName=value[ |
optionName=value...]" } [/LV fileName]
```

Refer to the Microsoft MSDN library for information on the format and parameters.

Description

Set the following content:

| Definition name  | Setting value  |
|------------------|--|
| Data source type | <p>Specify the data source type.</p> <ul style="list-style-type: none"> <li>- "CONFIGSYSDSN": A system data source is created. This requires user admin rights. The data source can be used by all users of the same computer.</li> <li>- "CONFIGDSN": A user data source is created. The data source can be used by the current user only.</li> </ul> <p> <b>Note</b></p> <p>.....</p> <p>When CONFIGSYSDSN is specified as the data source type, it is necessary to execute the command in the command prompt in administrator mode.</p> <p>.....</p>   |
| ODBC driver name | <p>Specify an ODBC driver name that has already been registered on the system.</p> <p>Specify one of the following.</p> <p> <b>Note</b></p> <p>.....</p> <p>The placeholders shown below are enclosed in angle brackets '&lt;&gt;' to avoid confusion with literal text. Do not include the angle brackets in the string.</p> <p>.....</p> <ul style="list-style-type: none"> <li>- "FUJITSU Enterprise Postgres Unicode<br/>&lt;fujitsuEnterprisePostgresClientVersAndLvl&gt;"<br/>Specify this driver name if using Unicode as the application encoding system.</li> <li>- "FUJITSU Enterprise Postgres ANSI<br/>&lt;fujitsuEnterprisePostgresClientVersAndLvl&gt;"<br/>Specify this driver name if using other than Unicode as the application encoding system.</li> </ul> |
| Option name      | <p>The following items must be set:</p> <ul style="list-style-type: none"> <li>- "DSN": Specify the data source name.</li> <li>- "Servername": Specify the host name for the database server.</li> <li>- "Port": Specify the port number for connection to the database</li> <li>- "Database": Specify the database name.</li> </ul> <p>Specify the following values as required:</p> <ul style="list-style-type: none"> <li>- "UID": User ID</li> <li>- "Password": Password</li> </ul>   |

| Definition name | Setting value  |
|-----------------|--|
|                 | - "SSLMode": Specify to encrypt communications. The default is "disable". Refer to the SSLMode explanation in the table under step 5 of " <a href="#">3.2.2.1 Registering using GUI</a> " for information on how to configure SSLMode. |
| File Name       | You can output process information to a file when creating a data source. This operand can be omitted.   |

### Example

```
ODBCConf.exe /A {CONFIGSYSDSN "FUJITSU Enterprise Postgres Unicode 9.5" "DSN=odbcconf1|
Servername=sv1|Port=27500|Database=db01|SSLMode=verify-ca"} /Lv log.txt
```

### Note

In consideration of security, specify the UID and the Password by the application.

## When using Add-OdbcDsn

Add-OdbcDsn is used in the PowerShell command interface.

Specification format

```
Add-OdbcDsn dataSourceName -DriverName "odbcDriverName" -DsnType dataSourceType -
Platform oSArchitecture -SetPropertyValue @"(optionName=value" [, "optionName=value" ...])
```

Refer to the Microsoft MSDN library for information on the format and parameters.

Description

Set the following content:

| Definition name  | Setting value  |
|------------------|--|
| Data source name | Specify any name for the data source name.   |
| ODBC driver name | Specify an ODBC driver name that has already been registered on the system. Specify one of the following.<br><br><div style="border: 1px solid orange; padding: 2px; margin-bottom: 5px;">  Note </div> <p>The placeholders shown below are enclosed in angle brackets '&lt;&gt;' to avoid confusion with literal text. Do not include the angle brackets in the string.</p> <ul style="list-style-type: none"> <li>- "FUJITSU Enterprise Postgres Unicode<br/>&lt;fujitsuEnterprisePostgresClientVersAndLvl&gt;"<br/>Specify this driver name if using Unicode as the application encoding system.</li> <li>- "FUJITSU Enterprise Postgres ANSI<br/>&lt;fujitsuEnterprisePostgresClientVersAndLvl&gt;"<br/>Specify this driver name if using other than Unicode as the application encoding system.</li> </ul> |
| Data source type | Specify the data source type.  |

| Definition name | Setting value  |
|-----------------|--|
|                 | <ul style="list-style-type: none"> <li>- "System": A system data source is created. Requires user admin rights. The data source can be used by all users of the same computer.</li> <li>- "User": A user data source is created. The data source can be used by the current user only.</li> </ul> <p> <b>Note</b></p> <p>When System is specified as the data source type, it is necessary to execute the command in the administrator mode of the command prompt.</p>  |
| OS architecture | <p>Specify the OS architecture of the system.</p> <ul style="list-style-type: none"> <li>- "32-bit": 32-bit system</li> <li>- "64-bit": 64-bit system</li> </ul>   |
| Option name     | <p>The following items must be set:</p> <ul style="list-style-type: none"> <li>- "Servername": Specify the host name for the database server.</li> <li>- "Port": Specify the port number for connection to the database</li> <li>- "Database": Specify the database name.</li> </ul> <p>Specify the following values as required:</p> <ul style="list-style-type: none"> <li>- "SSLMode": Specify to encrypt communications. The default is "disable". Refer to the SSLMode explanation in the table under step 5 of "<a href="#">3.2.2.1 Registering using GUI</a>" for information on how to configure SSLMode.</li> </ul> <p> <b>Note</b></p> <p>When using Add-OdbcDsn, the strings "UID" and "Password" cannot be set as option names. These can only be used when using ODBCConf.exe.</p> |

### Example

```
Add-OdbcDsn odbcps1 -DriverName "FUJITSU Enterprise Postgres Unicode 9.5" -DsnType System
-Platform 32-bit -SetPropertyValue @("Servername=sv1", "Port=27500", "Database=db01",
"SSLMode=verify-ca")
```

## 3.2.3 Registering ODBC Data Sources(for Linux)

This section describes how to register ODBC data sources on Linux.

### 1. Registering data sources

Edit the odbc.ini definition file for the data source.

### Information

Edit the file in the installation directory for the ODBC driver manager (unixODBC)

```
unixodbc/instal/Dir/etc/odbc.ini
```

Or

Create a new file in the HOME directory

```
~/ .odbc.ini
```

## Point

If *unixOdbcInstallDir* is edited, these will be used as the shared settings for all users that log into the system. If created in the HOME directory (~/.), the settings are used only by the single user.

Set the following content:

| Definition name    | Setting value   |
|--------------------|---|
| [Data source name] | Set the name for the ODBC data source.  |
| Description        | Set a description for the ODBC data source. Any description may be set.   |
| Driver             | <p>Set the following as the name of the ODBC driver. Do not change this value.</p> <p>Select the two strings below that correspond to the application type. Concatenate the strings with no spaces and then specify this as the driver name.</p> <p> <b>Note</b></p> <p>The placeholders shown below are enclosed in angle brackets '&lt;&gt;' to avoid confusion with literal text. Do not include the angle brackets in the string.</p> <ul style="list-style-type: none"> <li>- Application architecture <ul style="list-style-type: none"> <li>- For data sources used by 32-bit applications <pre>"FUJITSU Enterprise Postgres&lt;fujitsuEnterprisePostgresClientVersAndLvl&gt;"</pre> </li> <li>- For data sources used by 64-bit applications <pre>"FUJITSU Enterprise Postgres&lt;fujitsuEnterprisePostgresClientVersAndLvl&gt;x64"</pre> </li> </ul> </li> <li>- Encoding system used by the application <ul style="list-style-type: none"> <li>- In Unicode (only UTF-8 can be used) <pre>"unicode"</pre> </li> <li>- Other than Unicode <pre>"ansi"</pre> </li> </ul> </li> </ul> <p>Example: In a 32-bit application, where the encoding system used by the application is Unicode:</p> <pre>"FUJITSU Enterprise Postgres&lt;fujitsuEnterprisePostgresClientVersAndLvl&gt;unicode"</pre> |
| Database           | Specify the database name to be connected.  |
| Servename          | Specify the host name for the database server.  |
| Username           | Specify the user ID that will connect with the database.  |
| Password           | Specify the password for the user that will connect to the database.  |
| Port               | Specify the port number for the database server.  |

| Definition name | Setting value   |
|-----------------|---|
|                 | The default is "27500".   |
| SSLMode         | The setting values for SSLMode are as follows: <ul style="list-style-type: none"> <li>- disable: Connect without SSL</li> <li>- allow: Connect without SSL, and if it fails, connect using SSL</li> <li>- prefer: Connect using SSL, and if it fails, connect without SSL</li> <li>- require: Connect always using SSL</li> <li>- verify-ca: Connect using SSL, and use a certificate issued by a trusted CA (*1)</li> <li>- verify-full: Connect using SSL, and use a certificate issued by a trusted CA to verify if the server host name matches the certificate (*1)</li> </ul> |
| ReadOnly        | Specify whether to set the database as read-only. <ul style="list-style-type: none"> <li>- 1: Set read-only</li> <li>- 0: Do not set read-only</li> </ul>   |

\*1: If specifying either "verify-ca" or "verify-full", use the environment variable PGSSLROOTCERT to specify the CA certificate file as shown below.

Example

```
export PGSSLROOTCERT=cACertificateFileStorageDir/root.crt
```

Example:

Linux 32-bit

```
[MyDataSource]
Description      = FUJITSU Enterprise Postgres
Driver           = FUJITSU Enterprise Postgres9.5ansi
Database         = db01
Servername       = sv1
Port             = 27500
ReadOnly         = 0
```



In consideration of security, specify the UserName and the Password by the application.

## 2. Environment variable settings

To execute applications that use ODBC drivers, all of the following settings must be configured in the LD\_LIBRARY\_PATH environment variable:

- *fujitsuEnterprisePostgresClientInstallDir/lib*
- *unixOdbcInstallDir(\*1)/lib*
- *libtoolInstallDir(\*1)/lib*

\*1: If the installation directory is not specified when unixODBC and libtool are installed, they will be installed in /usr/local.

## 3.2.4 Message Language and Encoding System Used by Applications Settings

This section explains the language settings for the application runtime environment and the encoding settings for the application.

### Language settings

You must match the language settings for the application runtime environment with the message locale settings of the database server.



#### - Linux

The language settings are made with the LANG environment variable or with the setlocale function in the source code.

#### - LANG environment variable settings

Apart from LANG, other environment variables for specifying language are LC\_ALL and LC\_MESSAGES. When multiple of these environment variables are set, the order of priority will be 1. LC\_ALL, 2. LC\_MESSAGES, and 3. LANG.



#### Example

Example of specifying "en\_US.UTF-8" with the LANG environment variable (Bash)

```
> LANG=en_US.UTF-8; export LANG
```

#### - Settings for setlocale

Set the language of the application using the setlocale function in the source code.



#### Example

Example of specifying "en\_US.UTF-8" with the setlocale function

```
setlocale(LC_ALL, "en_US.UTF-8");
```



#### Information

Refer to the documentation for the operating system for information on using the setlocale function.



#### - Windows(R)

Follows the locale of the OS.

### Encoding System Settings

Ensure that the encoding system that is embedded in the application and passed to the database, and the encoding system setting of the runtime environment, are the same. The encoding system cannot be converted correctly on the database server.

Use one of the following methods to set the encoding system for the application:

- Set the PGCLIENTENCODING environment variable in the runtime environment.
- Set the client\_encoding keyword in the connection string.
- Use the PQsetClientEncoding function.



Refer to "Supported Character Sets" in "Server Administration" in the PostgreSQL Documentation for information on the strings that represent the encoding system that can be set.

For example, when using "Unicode" and "8 bit", set the string "UTF8".



#### Setting the "PGCLIENTENCODING" environment variable



An example of setting when the encoding of the client is "UTF8" (Bash)

```
> PGCLIENTENCODING=UTF8; export PGCLIENTENCODING
```



An example of setting when the encoding of the client is "UTF8"

```
> set PGCLIENTENCODING=UTF8
```



Text may be garbled when outputting results to the command prompt. Review the font settings for the command prompt if this occurs.

## 3.3 Connecting to the Database

Refer to the manual for the programming language corresponding to the ODBC interface, i.e. Access, Excel, or Visual Basic, for example.

## 3.4 Application Development

This section describes how to develop applications using ODBC drivers.



### 3.4.1 Compiling Applications (for Windows (R))

Refer to the manual for the programming language corresponding to the ODBC interface, i.e. Access, Excel, or Visual Basic, for example.



The cl command expects input to be a program that uses one of the following code pages, so convert the program to these code pages and then compile and link it (refer to the Microsoft documentation for details).

- ANSI console code pages (example: UTF8)
- UTF-16 little-endian with or without BOM (Byte Order Mark)
- UTF-16 big-endian with or without BOM
- UTF-8 with BOM

The `cl` command converts strings in a program to an ANSI console code page before generating a module, so the data sent to and received from the database server becomes an ANSI console code page. Therefore, set the coding system corresponding to the ANSI console code page as the coding system of the client.

Refer to "Character Set Support" in "Server Administration" in the PostgreSQL Documentation for information on how to set the client encoding system.

## 3.4.2 Compiling Applications (for Linux)

Specify the following options when compiling applications.

Table 3.1 Include file and library path

| Architecture | Option                   | How to specify the option                          |
|--------------|--------------------------|--|
| 32-bit       | Path of the include file | <code>-I <i>unixOdbc32bitIncludeFileDir</i></code> |
|              | Path of the library      | <code>-L <i>unixOdbc32bitLibraryDir</i></code>     |
| 64-bit       | Path of the include file | <code>-I <i>unixOdbc64bitIncludeFileDir</i></code> |
|              | Path of the library      | <code>-L <i>unixOdbc64bitLibraryDir</i></code>     |

Table 3.2 ODBC library

| Type of library | Library name            |
|-----------------|-------------------------|
| Dynamic library | <code>libodbc.so</code> |

### Note

Specify `-m64` when creating a 64-bit application. Specify `-m32` when creating a 32-bit application.

### Example

The following are examples of compiling ODBC applications:

- Linux 64-bit

```
gcc -m64 -I/usr/local/include(*1) -L/usr/local/lib(*1) -lodbc testproc.c -o testproc
```

- Linux 32-bit

```
gcc -m32 -I/usr/local/include(*1) -L/usr/local/lib(*1) -lodbc testproc.c -o testproc
```

\*1: This is an example of building and installing from the source without specifying an installation directory for unixODBC. If you wish to specify a location, set the installation directory.

## 3.4.3 Creating Applications during Cluster Operations

This section explains points to consider when creating applications during cluster operations.

### See

Refer to the Cluster Operation Guide for information on cluster operations.

### 3.4.3.1 Errors when an Application Connection Switch Occurs and Corresponding Actions

If an application connection switch occurs during cluster operations, explicitly close the connection and then reestablish the connection or reexecute the application.

The table below shows errors that may occur during a switch, and the corresponding action to take.

| State  |                                     | Error information (*2) | Action  |
|--|-------------------------------------|------------------------|---|
| Node failure (server failure) or FUJITSU Enterprise Postgres system failure (*1) | Failure occurs during access        | 57P01<br>08S01         | After the switch is complete, reestablish the connection, or reexecute the application. |
|  | Accessed during node/system failure | 08001                  |   |
| Switch to the standby node (standby server) (*1)                                 | Switched during access              | 57P01<br>08S01         |   |
|  | Accessed during switch              | 08001                  |   |

\*1: Terms enclosed in () are terms used in database multiplexing mode.

\*2: Return value of SQLSTATE.

### 3.4.3.2 Notes when Creating Applications during Failover Operations in Shared Disk Mode

In the application, specify the same IP address as the one that was used when creating GIs or takeover network resources. This will enable the application to be executed if a state transition occurs, simply by reexecuting the application without modification.



See

.....  
 Refer to "Creating GIs or Takeover Network Resources" in the Cluster Operation Guide for details.  
 .....

# Chapter 4 .NET Data Provider

This chapter describes how to configure for the purpose of creating .NET applications with Visual Studio.

## 4.1 Development Environment

.NET Data Provider can operate in the following environments:

|   |   |                                 |
|---|---|---------------------------------|
| .NET Framework environment for the development and running of applications                  | .NET Framework 4.6<br>.NET Framework 4.5<br>.NET Framework 4<br>.NET Framework 3.5 SP1 or later |                                 |
| Integrated development environment for applications running in a .NET Framework environment | Visual Studio 2013<br>Visual Studio 2012<br>Visual Studio 2010<br>Visual Studio 2008            |                                 |
| Combinations when TableAdapter is used  | Visual Studio 2013  | .NET Framework 4.6              |
|   | Visual Studio 2012  | .NET Framework 4.5              |
|   | Visual Studio 2010  | .NET Framework 4                |
|   | Visual Studio 2008  | .NET Framework 3.5 SP1 or later |
| Available development languages   | C#<br>Visual Basic .NET   |                                 |

## 4.2 Setup

This section explains how to setup .NET Data Provider.

### 4.2.1 Setting Up .NET Data Provider

You need to make the .NET Data Provider available for use to create applications with Visual Studio.

Add the reference to Fujitsu Npgsql .NET Data Provider for each Visual Studio project using the procedure below. The following describes the setup procedure in Visual Studio 2010:

1. In a Windows application, select [Add Reference] from the [Project] menu.  
In a Web application, select [Add Reference] from the [Web Site] menu.
2. Select "Fujitsu Npgsql .NET Data Provider" in the [Component Name] column of the [.NET] tab, and then click [OK].



Point

There are two versions of "Fujitsu Npgsql .NET Data Provider". Decide the version of "Fujitsu Npgsql .NET Data Provider" to add according to the version of .NET Framework you will use. The notation "*x.y.z*" indicates the version and level of the FUJITSU Enterprise Postgres client feature.

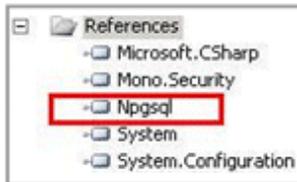
| Version of .NET Data Provider | Description   |
|-------------------------------|---|
| 2. <i>x.y.z</i>               | Specify when the version of .NET Framework is 3.5.SP1 or later. |
| 4. <i>x.y.z</i>               | Specify when the version of .NET Framework is 4.0 or later.     |

## Information

When .NET Data Provider setup is complete, the following names will be displayed in [References] in Visual Studio Solution Explorer.

- Npgsql

Example



## 4.2.2 Setting Up the Visual Studio Integration Add-On

TableAdapter is available for use when you use Visual Studio integration. Visual Studio integration is provided as a Visual Studio .NET add-on ("Npgsql Development Tools for .NET").

A user with administrator privileges can register Npgsql Development Tools for .NET as an add-on by executing `pgx_ndtregister.exe` as administrator.

Stored location of `pgx_ndtregister.exe`

The `pgx_ndtregister.exe` command is stored in the following location:

```
fujitsuEnterprisePostgresClientInstallationDir\DOTNET\BIN\
```

Using `pgx_ndtregister.exe`

```
> pgx_ndtregister.exe [-x86 | -x64]
```

Options

-x86

Use if registering a 32-bit add-on.

-x64

Use if registering a 64-bit add-on.

If no option is specified, a 32-bit add-on is registered.

## Note

Execute this command after installing Visual Studio .NET.

## 4.2.3 Message Language and Encoding System Used by Applications Settings

If the .NET Data Provider is used, it will automatically set the encoding system on the client to UTF-8, so there is no need to configure this.

## See

Refer to "Automatic Character Set Conversion Between Server and Client" in "Server Administration" in the PostgreSQL Documentation for information on encoding systems.

## Language settings

You must match the language settings for the application runtime environment with the message locale settings of the database server.

Set language using the "System.Globalization.CultureInfo.CreateSpecificCulture" method.

### Example

Code example for changing the locale in a C# application

```
System.Threading.Thread.CurrentThread.CurrentUICulture =  
    System.Globalization.CultureInfo.CreateSpecificCulture("en");
```

## 4.3 Connecting to the Database

---

This section explains how to connect to a database.

- [Using NpgsqlConnection](#)
- [Using NpgsqlConnectionStringBuilder](#)
- [Using the ProviderFactory Class](#)

### 4.3.1 Using NpgsqlConnection

---

Connect to the database by specifying the connection string.

#### Example

Code examples for applications

```
using Npgsql;  
  
NpgsqlConnection conn = new NpgsqlConnection("Server=sv1;Port=27500;Database=mydb; User  
Id=myuser;Password=myuser01; Timeout=20;CommandTimeout=20;");
```

Refer to "[4.3.4 Connection String](#)" for information on database connection strings.

### 4.3.2 Using NpgsqlConnectionStringBuilder

---

Generate connection strings by specifying the connection information in the properties of the NpgsqlConnectionStringBuilder object.

#### Example

Code examples for applications

```
using Npgsql;  
  
NpgsqlConnectionStringBuilder sb = new NpgsqlConnectionStringBuilder();  
sb.Host = "sv1";  
sb.Port = 27500;  
sb.Database = "mydb";  
sb.UserName = "myuser";  
sb.Password = "myuser01";  
sb.Timeout = 20;
```

```
sb.CommandTimeout = 20;
NpgsqlConnection conn = new NpgsqlConnection(sb.ConnectionString);
```

Refer to ["4.3.4 Connection String"](#) for information on database connection strings.

### 4.3.3 Using the ProviderFactory Class

Obtain the `NpgsqlConnection` object from the provider factory.

#### Example

Code examples for applications

```
using System.Data.Common;

DbProviderFactory factory = DbProviderFactories.GetFactory("Fujitsu.Npgsql");
DbConnection conn = factory.CreateConnection();
conn.ConnectionString = "Server=sv1;Port=27500;Database=mydb; User
Id=myuser;Password=myuser01; Timeout=20;CommandTimeout=20;";
```

Refer to ["4.3.4 Connection String"](#) for information on database connection strings.

### 4.3.4 Connection String

Specify the following connection information to connect to the database.

```
Server=127.0.0.1;Port=27500;Database=mydb;User Id=myuser;Password=myuser01;...;
(1)           (2)           (3)           (4)           (5)           (6)
```

- (1) Specify the host name or IP address of the server to be connected. This must be specified.
- (2) Specify the port number for the database server. The default is "27500".
- (3) Specify the database name to be connected.
- (4) Specify the user ID that will connect with the database.
- (5) Specify the password for the user that will connect to the database.
- (6) Refer to the following for information on how to specify other connection information.

The following shows the keywords that are available to specify in the connection string in .NET Data Provider (Npgsql):

Note that some settings require care if using an Oracle database-compatible feature (refer to ["9.2.2 Notes when Integrating with the Interface for Application Development"](#) for details).

| Keyword                       | Default value | Description   |
|-------------------------------|---------------|---|
| Server, Host (*1)             | None          | Specify the host name or IP address of the server to be connected.<br>Specify up to 63 bytes when specifying a host name.<br>A host name or IP address must be specified. |
| Port                          | 27500         | Specify the port number for the database server.  |
| User Id, User, UID, UserName, | None          | Specify the user ID that will connect with the database.  |

| Keyword                 | Default value | Description  |
|-------------------------|---------------|--|
| User Name, UserId (*1)  |               |  |
| Password, Pwd, Psw (*1) | None          | Specify the password for the user ID that will connect to the database.  |
| Database, DB (*1)       | User name     | Specify the database name to be connected.   |
| SearchPath              | (*2)          | Specify the default schema name of the SQL statements used in the application.<br><br>*2: If omitted, the value set in the search_path parameter in postgresql.conf on the server will be used.  |
| Timeout                 | 15            | Specify the timeout for connections.<br><br>Specify a value between 0 and 1024 (in seconds). There is no limit if you specify 0. The default is 15 seconds. An error occurs when a connection cannot be established within the specified time.   |
| ConnectionLifeTime      | 15            | For specifying the retention time of the connection, starting from the time of connection to the server and including the period the connection is to be retained in the connection pool.<br><br>Specify in the range between 0 and 2147483647 (in seconds).<br><br>If "0" is specified, there will be no limit on the retention time.           |
| Pooling                 | True          | Specify whether to use connection pooling or not.<br><br>- Connection pooling is used if you specify True.<br><br>Connection pooling is not used if you specify False.   |
| MaxPoolSize             | 20            | Maximum size of a connection pool. If the request exceeds this limit, it will wait until the another connection closes and the pool is available.<br><br>Specify in the range between 0 and 1024. Connection pooling is not used if you specify 0.   |
| MinPoolSize             | 1             | Minimum size of a connection pool. When you specify MinPoolSize, NpgsqlConnection will pre-allocate connections with the specified number of servers.<br><br>Specify in the range from 0 to the value specified at MaxPoolSize. When you specify 0, NpgsqlConnection will not pre-allocate connections with the specified number of servers.     |
| SSL                     | False         | Specify whether to encrypt the communication route between the client and server with the SSL protocol.<br><br>- Encryption is performed when True is specified.<br><br>- Encryption is not performed when False is specified.   |
| Sslmode                 | Disable       | Specify one of the following values for the SSL connection control mode:<br><br>- Prefer: SSL is used for connection wherever possible.<br><br>- Require: An exception is thrown when SSL connection is not possible.<br><br>- Allow: Not yet supported. Connection is performed without SSL.<br><br>- Disable: SSL connection is not performed. |

| Keyword                                   | Default value | Description  |
|---|---------------|--|
| Enlist                                    | True          | Specify whether to have connections participate in transactions with the transaction scope declared: <ul style="list-style-type: none"> <li>- Connections will participate in transactions when True is specified.</li> <li>- Connections will not participate in transactions when False is specified.</li> </ul>   |
| CommandTimeout                            | 20            | Specify the timeout for communication with the server.<br>Specify a value between 0 and 2147483647 (in seconds). There is no limit set if you set 0 or a negative value. The default is 20 seconds. An error occurs when data is not received from the server within the specified time.   |
| Compatible                                | (*3)          | Any effects from operational changes when performing future Npgsql version upgrades can be kept to a minimum by specifying the version of Npgsql that Fujitsu Npgsql .NET Data Provider is based on.<br>Refer to the Installation and Setup Guide for Client for the version of Npgsql that Fujitsu Npgsql .NET Data Provider is based on.<br>*3: If omitted, the version of Npgsql that Fujitsu Npgsql .NET Data Provider is based on will be set.  |
| IntegratedSecurity                        | False         | Set this when using Windows Integrated Security.   |
| Protocol                                  | 3             | Specify the protocol version to use.<br>You must specify 3.  |
| SyncNotification                          | False         | Specify whether Npgsql will use synchronized notification.   |
| Use Extended Types, UseExtendedTypes (*1) | False         | This option determines how Npgsql data and time types are used by DataAdapter. Data and time types include the "System.DateTime" type of .NET and "NpgsqlTimeStamp" ("NpgsqlTimeStamp" has functionality and range that exceeds "System.DateTime"). Both can be used, whatever value is set. If the value set is "True", however, it is possible to pass a specific Npgsql type for the relevant field of DataAdapter. If the value set is "False", on the other hand, DataAdapter requests "System.DateTime".   |
| PreloadReader, Preload Reader (*1)        | False         | If True is specified, the entire result set will be loaded to DataReader before ExecuteReader() returns.<br>Performance may decline when "True" is set (especially noticeable when the recordset is large).<br>According to ADO.NET documentation, other operations are not possible while IDbConnection is being used, as it is used to get IDataReader.<br>Npgsql enforces this rule. While NpgsqlDataReader is open, most operations except for the NpgsqlDataReader on the NpgsqlConnection that is trying to get the NpgsqlConnection will return an InvalidOperationException. (If NpgsqlDataReader is called at the end of the resultset(s), then Npgsql relaxes the rules and allows use of the connection even if it is not closed. This is because the connection is not being used by any resources at this point.) |

\*1: Only those keywords listed below can be used when using NpgsqlConnectionStringBuilder.

- Host

- UserName
- Password
- Database
- UseExtendedTypes
- PreloadReader

## 4.4 Application Development

---

This section explains the range of support provided with Visual Studio integration.

### 4.4.1 Data Types

---

A variety of data types can be used with FUJITSU Enterprise Postgres.

Data types belonging to base data types are supported whether you automatically generate applications using tools in Visual Studio (Query Builder in TableAdapter and Server Explorer), or create applications yourself (with DataProvider).

Table 4.1 List of supported data types

| Data Types                  | Supported   |                                   |
|-----------------------------|---|-----------------------------------|
|                             | Operation in the Visual Studio integration window | Fujitsu Npgsql .NET Data Provider |
| character                   | Y   | Y                                 |
| character varying           | Y   | Y                                 |
| national character          | Y   | Y                                 |
| national character varying  | Y   | Y                                 |
| text                        | Y   | Y                                 |
| bytea                       | N   | Y                                 |
| smallint                    | Y   | Y                                 |
| integer                     | Y   | Y                                 |
| bigint                      | Conditional (*1)                                  | Y                                 |
| smallserial                 | Y   | Y                                 |
| serial                      | Y   | Y                                 |
| bigserial                   | Conditional (*1)                                  | Y                                 |
| real                        | Y   | Y                                 |
| double precision            | Y   | Y                                 |
| numeric                     | Y   | Y                                 |
| decimal                     | Y   | Y                                 |
| money                       | N   | N                                 |
| date                        | Y   | Y                                 |
| time with time zone         | Conditional (*2)                                  | Conditional (*2,*3)               |
| time without time zone      | Conditional (*2)                                  | Conditional (*2)                  |
| timestamp without time zone | Y   | Y                                 |
| timestamp with time zone    | Y   | Y                                 |

| Data Types   | Supported   |                                   |
|--|---|-----------------------------------|
|  | Operation in the Visual Studio integration window | Fujitsu Npgsql .NET Data Provider |
| interval   | Conditional (*4)                                  | Y                                 |
| boolean  | Y   | Y                                 |
| bit  | Conditional (*5)                                  | Conditional (*5)                  |
| bit varying  | N   | N                                 |
| uuid   | Conditional (*4)                                  | Y                                 |
| inet   | Conditional (*4, *6)                              | Conditional (*6)                  |
| macaddr  | N   | Y                                 |
| cidr   | N   | N                                 |
| Geometric data type (point,lseg,box,path,polygon,circle) | N   | Y                                 |
| array  | N   | Y                                 |
| oid  | N   | N                                 |
| xml  | Y   | Y                                 |
| json   | N   | N                                 |
| Types related to text searches(tsvector,tsquery)         | N   | N                                 |
| Enumerated type  | N   | N                                 |
| Composite type   | N   | N                                 |
| Range type   | N   | N                                 |

Y: Supported

N: Not supported

\*1: When used as a dynamic parameter, only data values in the int32 range can be substituted.

\*2: As shown below, "time with time zone" and "time without time zone" values display the date portion as additional information. However, the actual data comprises the time data only, so with the exception of this displayed format, there are no other resulting issues.

Example:

Composition of table (t1)

| col1 (time with time zone) | col2 (time without time zone) |
|----------------------------|-------------------------------|
| 10:21:30 +08:00            | 10:21:30                      |
| 23:34:03 +08:00            | 23:34:03                      |
| 17:23:54 +08:00            | 17:23:54                      |

"time with time zone" values display the execution date in the date portion, while "time without time zone" values display "0001/01/01" in the date portion.

```
SELECT *
FROM t1;
col1 | col2
-----+-----
2014/09/03 10:21:30 +08:00 | 0001/01/01 10:21:30
```

```
2014/09/03 23:34:03 +08:00 | 0001/01/01 23:34:03
2014/09/03 17:23:54 +08:00 | 0001/01/01 17:23:54
```

\*3: When used as a dynamic parameter, it is not possible to substitute parameter values in DataGridView automatically generated by DDEX.

The example here shows c3 being made the "time with time zone" data type.

```
DataRow dr = ds.Tables[0].Rows[ds.Tables[0].Rows.Count - 1];
dr["c3"] = new DateTimeOffset(2000, 1, 1, 0, 0, 0, new TimeSpan(9, 0, 0));
```

\*4: Only lengths of 2 or longer are supported.

\*5: Only single hosts are supported.

\*6: When updating this data type, set the values as shown below:

## 4.4.2 Relationship between Application Data Types and Database Data Types

The data types available for SQL data types are as follows:

### List of data types belonging to base data types

Data types belonging to these base data types are supported whether you automatically generate applications using tools in Visual Studio (Query Builder in TableAdapter and Server Explorer), or create applications yourself (with Data Provider).

| SQL data types             | Npgsql                |                          |
|----------------------------|-----------------------|--------------------------|
|                            | Data type             | .NET CLS data type       |
| character                  | NpgsqlDbType.Char     | System.String            |
| character varying          | NpgsqlDbType.Varchar  | System.String            |
| national character         | NpgsqlDbType.NChar    | System.String            |
| national character varying | NpgsqlDbType.NVarchar | System.String            |
| text                       | NpgsqlDbType.Text     | System.String            |
| bytea                      | NpgsqlDbType.Bytea    | System.Byte[]            |
| smallint                   | NpgsqlDbType.Smallint | System.Int16             |
| integer                    | NpgsqlDbType.Integer  | System.Int32             |
| bigint                     | NpgsqlDbType.Bigint   | System.Int64             |
| smallserial                | NpgsqlDbType.Smallint | System.Int16             |
| serial                     | NpgsqlDbType.Integer  | System.Int32             |
| bigserial                  | NpgsqlDbType.Bigint   | System.Int64             |
| real                       | NpgsqlDbType.Real     | System.Single            |
| double precision           | NpgsqlDbType.Double   | System.Double            |
| numeric                    | NpgsqlDbType.Numeric  | System.Decimal           |
| decimal                    | NpgsqlDbType.Numeric  | System.Decimal           |
| date                       | NpgsqlDbType.Date     | System.DateTime          |
|                            |                       | NpgsqlTypes.NpgsqlDate   |
| time with time zone        | NpgsqlDbType.TimeTZ   | System.DateTimeOffset    |
|                            |                       | NpgsqlTypes.NpgsqlTimeTZ |
| time without time zone     | NpgsqlDbType.Time     | System.DateTime          |

| SQL data types              | Npgsql                   |   |
|-----------------------------|--------------------------|---|
|                             | Data type                | .NET CLS data type                            |
|                             |                          | NpgsqlTypes.NpgsqlTime                        |
| timestamp without time zone | NpgsqlDbType.Timestamp   | System.DateTime                               |
|                             |                          | NpgsqlTypes.NpgsqlTimeStamp                   |
| timestamp with time zone    | NpgsqlDbType.TimestampTZ | System.DateTime                               |
|                             |                          | NpgsqlTypes.NpgsqlTimeStampTZ                 |
| interval                    | NpgsqlDbType.Interval    | System.String/System.TimeSpan(*1)             |
| boolean                     | NpgsqlDbType.Boolean     | System.Boolean                                |
| bit                         | NpgsqlDbType.Bit         | System.Boolean                                |
|                             |                          | NpgsqlTypes.BitString                         |
| uuid                        | NpgsqlDbType.Uuid        | System.Guid                                   |
| inet                        | NpgsqlDbType.Inet        | NpgsqlTypes.NpgsqlInet                        |
|                             |                          | System.Net.IPAddress                          |
| macaddr                     | NpgsqlDbType.MacAddr     | NpgsqlTypes.NpgsqlMacAddress                  |
|                             |                          | System.Net.NetworkInformation.PhysicalAddress |
| box                         | NpgsqlDbType.Box         | NpgsqlTypes.NpgsqlBox                         |
| circle                      | NpgsqlDbType.Circle      | NpgsqlTypes.NpgsqlCircle                      |
| lseg                        | NpgsqlDbType.LSeg        | NpgsqlTypes.NpgsqlLSeg                        |
| path                        | NpgsqlDbType.Path        | NpgsqlTypes.NpgsqlPath                        |
| point                       | NpgsqlDbType.Point       | NpgsqlTypes.NpgsqlPoint                       |
| polygon                     | NpgsqlDbType.Polygon     | NpgsqlTypes.NpgsqlPolygon                     |
| array                       | NpgsqlDbType.Array       | System.Array                                  |

\*1: The .NET CLS data types that can be used vary depending on the SQL interval type.  
If using interval year/interval month/interval year to month, use System.String.  
For other data types, use System.TimeSpan.

### 4.4.3 Creating Applications during Cluster Operations

This section explains points to consider when creating applications during cluster operations.



Refer to the Cluster Operation Guide for information on cluster operations.

#### 4.4.3.1 Errors when an Application Connection Switch Occurs and Corresponding Actions

If an application connection switch occurs during cluster operations, explicitly close the connection and then reestablish the connection or reexecute the application.

The table below shows errors that may occur during a switch, and the corresponding action to take.

| State                               |                              | Error information               | Action  |
|-------------------------------------|------------------------------|---------------------------------|---|
| Node failure (server failure)<br>or | Failure occurs during access | 57P01 (*2)<br>Empty string (*2) | After the switch is complete, reestablish the |

| State  |                                     | Error information  | Action                                    |
|--|-------------------------------------|--|---|
| FUJITSU Enterprise Postgres system failure (*1)  |                                     | NullReferenceException is generated                                    | connection, or reexecute the application. |
|  | Accessed during node/system failure | Empty string (*2)  |   |
| Switch to the standby node (standby server) (*1) | Switched during access              | 57P01 (*2)<br>Empty string (*2)<br>NullReferenceException is generated |   |
|  | Accessed during switch              | Empty string (*2)  |   |

\*1: Terms enclosed in ( ) are terms used in database multiplexing mode.

\*2: This is the return value of the NpgsqlException attribute Code.

### 4.4.3.2 Notes when Creating Applications during Cluster Operations in Shared Disk Mode

In the application, specify the same IP address as the one that was used when creating GIs or takeover network resources. This will enable the application to be executed if a state transition occurs, simply by reexecuting the application without modification.



See

Refer to "Creating GIs or Takeover Network Resources" in the Cluster Operation Guide for details.

## 4.4.4 Notes

### Notes on TableAdapter

- If [SELECT which returns a single value] is selected when adding a query to a TableAdapter, it will not be possible to execute the SQL statement displayed on the window - therefore, correct the SQL statement.
- If there is more than one Function with the same name, it will not be possible to create a TableAdapter using that Function.
- When defining Function, ensure that the OUT parameter is the last one defined.  
If the OUT parameter is not the last one defined, it will not be possible to enter any parameter values after the OUT parameter for the TableAdapter DataPreview.
  - Example incorrect definition: func(out p1 integer, inout p2 integer)
  - Example correct definition: func(inout p2 integer, out p1 integer)

### Notes on the Query Builder

- Prefix named parameters with "@".
- Uppercase object names cannot be used, even when enclosed in double quotation marks.  
To use uppercase object names enclosed in double quotation marks, include them in SQL statements and enter these in the [Generate the SQL statements] window rather than in the Query Builder.
- SQL statements that specify date or time data literals cannot be used. To use these, enter the SQL statements directly in the [Generate the SQL statements] window rather than in the Query Builder.

- SQL statements cannot be correctly generated if the SQL statement specified in Filter matches any of the conditions below:
  - It uses PostgreSQL intrinsic operators such as << or ::.
  - It uses functions with keywords such as AS, FROM, IN, OVER.  
Example: extract(field from timestamp), RANK() OVER
  - It uses functions with the same names as those prescribed in SQL conventions, but that require different arguments.

### Notes on Server Explorer

- The temporary table is not displayed.
- The database object function (FUNCTION) is displayed as a procedure.

### Notes on metadata

- The CommandBehavior.KeyInfo argument must be specified if executing ExecuteReader before obtaining metadata using GetSchemaTable.

#### Example

```
NpgsqlDataReader ndr=cmd.ExecuteReader(CommandBehavior.KeyInfo);
DataTable dt = dr.GetSchemaTable();
```

### Notes on automatically generating update-type SQL statements

- If the SQL statement includes a query (which cannot be updated) that matches any of the conditions below, an update-type SQL statement will be generated (note that it may not be possible to execute this SQL statement in some cases):
  - It includes derived tables
  - It includes the same column name as the select list

Update-type SQL statements will be automatically generated in the following cases:

- If update statements are obtained using NpgsqlCommandBuilder
- If data is updated using NpgsqlDataAdapter
- If data is updated using TableAdapter

### Notes on distributed transactions

- Applications using transaction scope can use distributed transactions by linking with Microsoft Distributed Transaction Coordinator (MSDTC). In this case, note the following:
  - Ensure that the value of max\_prepared\_transactions is greater than max\_connection, so that "PREPARE TRANSACTION" can be issued for each transaction that simultaneously connects to the database server.
  - If each transaction in the transaction scope accesses the same resource using different connections, the database server will perceive it as requests from different applications, and a deadlock may occur. By configuring a timeout value for the transaction scope beforehand, the deadlock can be broken.

# Chapter 5 C Library (libpq)

This chapter describes how to use C libraries.

## 5.1 Development Environment

Install the FUJITSU Enterprise Postgres Client package for the architecture to be developed and executed.



Refer to Installation and Setup Guide for Client for information on the C compiler required for C application development.

## 5.2 Setup

This section describes the environment settings required to use C libraries and how to encrypt data for communication.

### 5.2.1 Environment Settings

To execute an application that uses libpq, set the environment variable as shown below.



#### Linux

- Required for compile/link
  - LD\_LIBRARY\_PATH  
*fujitsuEnterprisePostgresClientInstallDir/lib*
- Required for execution of the application
  - PGLOCALEDIR  
*fujitsuEnterprisePostgresClientInstallDir/share/locale*



When the 32-bit version client package is installed.

Note that "<xy>" indicates the product version and level.

```
> LD_LIBRARY_PATH=/opt/fsepv<xy>client32/lib:$LD_LIBRARY_PATH;export LD_LIBRARY_PATH
> PGLOCALEDIR=/opt/fsepv<xy>client32/share/locale;export PGLOCALEDIR
```



#### Windows (R)

- Required for compile/link
  - LIB  
*fujitsuEnterprisePostgresClientInstallDir\lib*
  - INCLUDE  
*fujitsuEnterprisePostgresClientInstallDir\include*
- Required for execution of the application
  - PATH  
*fujitsuEnterprisePostgresClientInstallDir\lib*
  - PGLOCALEDIR  
*fujitsuEnterprisePostgresClientInstallDir\share\locale*

### Example

When the 32-bit version client package is installed on a 64-bit operating system.

```
> SET PATH=%ProgramFiles(x86)%\Fujitsu\fsepclient32\lib;%PATH%
> SET LIB=%ProgramFiles(x86)%\Fujitsu\fsepclient32\lib;%LIB%
> SET INCLUDE=%ProgramFiles(x86)%\Fujitsu\fsepclient32\include;%INCLUDE%
> SET PGLOCALEDIR=%ProgramFiles(x86)%\Fujitsu\fsepclient32\share\locale
```

## 5.2.2 Message Language and Encoding System Used by Applications Settings

This section explains the language settings for the application runtime environment and the encoding settings for the application.

### Language settings

You must match the language settings for the application runtime environment with the message locale settings of the database server.

#### L

- Linux

The language settings are made with the LANG environment variable or with the setlocale function in the source code.

- LANG environment variable settings

Apart from LANG, other environment variables for specifying language are LC\_ALL and LC\_MESSAGES. When multiple of these environment variables are set, the order of priority will be 1. LC\_ALL, 2. LC\_MESSAGES, and 3. LANG.

### Example

Example of specifying "en\_US.UTF-8" with the LANG environment variable (Bash)

```
> LANG=en_US.UTF-8; export LANG
```

- Settings for setlocale

Set the language of the application using the setlocale function in the source code.

### Example

Example of specifying "en\_US.UTF-8" with the setlocale function

```
setlocale(LC_ALL, "en_US.UTF-8");
```

### Information

Refer to the documentation for the operating system for information on using the setlocale function.

#### W

- Windows(R)

Follows the locale of the OS.

## Encoding System Settings

Ensure that the encoding system that is embedded in the application and passed to the database, and the encoding system setting of the runtime environment, are the same. The encoding system cannot be converted correctly on the database server.

Use one of the following methods to set the encoding system for the application:

- Set the PGCLIENTENCODING environment variable in the runtime environment.
- Set the client\_encoding keyword in the connection string.
- Use the PQsetClientEncoding function.



Refer to "Supported Character Sets" in "Server Administration" in the PostgreSQL Documentation for information on the strings that represent the encoding system that can be set.

For example, when using "Unicode" and "8 bit", set the string "UTF8".



Text may be garbled when outputting results to the command prompt. Review the font settings for the command prompt if this occurs.

## 5.2.3 Settings for Encrypting Communication Data

---

Set in one of the following ways when performing remote access using communication data encryption:

When setting from outside with environment variables

Specify "require", "verify-ca", or "verify-full" in the PGSSLMODE environment variable.

In addition, the parameters for the PGSSLROOTCERT and PGSSLCRL environment variables need to be set to prevent spoofing of the database server.



Refer to "Environment Variables" in "Client Interfaces" in the PostgreSQL Documentation for information on environment variables.

When specifying in the connection URI

Specify "require", "verify-ca", or "verify-full" in the "sslmode" parameter of the connection URI.

In addition, the parameters for the sslcert, sslkey, sslrootcert, and sslcrl need to be set to prevent spoofing of the database server.



Refer to "Secure TCP/IP Connections with SSL" in "Server Administration" in the PostgreSQL Documentation for information on encrypting communication data.

## 5.3 Connecting with the Database

---

## Point

Use the connection service file to specify the connection destination. In the connection service file, a name (service name) is defined as a set, comprising information such as connection destination information and various types of tuning information set for connections. By using the service name defined in the connection service file when connecting to databases, it is no longer necessary to modify applications when the connection information changes.

Refer to "Client Interfaces", "The Connection Service File" in the PostgreSQL Documentation for details.

## See

Refer to "Database Connection Control Functions" in "Client Interfaces" in the PostgreSQL Documentation.

In addition, refer to "6.3 Connecting with the Database" in "Embedded SQL in C" for information on connection string.

## 5.4 Application Development

### See

Refer to "libpq - C Library" in "Client Interfaces" in the PostgreSQL Documentation for information on developing applications.

However, if you are using the C library, there are the following differences to the PostgreSQL C library (libpq).

### 5.4.1 Compiling Applications

Specify the following options when compiling applications:

**L** - Linux

Table 5.1 Include file and library path

| Option                   | How to specify the option   |
|--------------------------|---|
| Path of the include file | <code>-I/fujitsuEnterprisePostgresClientInstallDir/include</code> |
| Path of the library      | <code>-L/fujitsuEnterprisePostgresClientInstallDir/lib</code>     |

**L** Table 5.2 C Library (libpq library)

| Type of library | Library name |
|-----------------|--------------|
| Dynamic library | libpq.so     |
| Static library  | libpq.a      |

**W** - Windows(R)

If the include file and the library path have been set in the environment variable, there is no need to specify the options shown below for the compile.

**W** Table 5.3 Include file and library path

| Option                   | How to specify the option                                      |
|--------------------------|--|
| Path of the include file | <code>fujitsuEnterprisePostgresClientInstallDir\include</code> |
| Path of the library      | <code>fujitsuEnterprisePostgresClientInstallDir\lib</code>     |

Table 5.4 C Library (libpq library)

| Type of library   | Library name |
|-------------------|--------------|
| Library for links | libpq.lib    |
| Dynamic library   | libpq.dll    |

## 5.4.2 Creating Applications during Cluster Operations

This section explains points to consider when creating applications during cluster operations.



See

Refer to the Cluster Operation Guide for information on cluster operations.

### 5.4.2.1 Errors when an Application Connection Switch Occurs and Corresponding Actions

If an application connection switch occurs during cluster operations, explicitly close the connection and then reestablish the connection or reexecute the application.

The table below shows errors that may occur during a switch, and the corresponding action to take.

| State  |                                     | Error information (*2)                         | Action  |
|--|-------------------------------------|--|---|
| Node failure (server failure) or FUJITSU Enterprise Postgres system failure (*1) | Failure occurs during access        | PGRES_FATAL_ERROR(*2)<br>57P01(*3)<br>NULL(*3) | After the switch is complete, reestablish the connection, or reexecute the application. |
|  | Accessed during node/system failure | CONNECTION_BAD(*4)                             |   |
| Switch to the standby node (standby server) (*1)                                 | Switched during access              | PGRES_FATAL_ERROR(*2)<br>57P01(*3)<br>NULL(*3) |   |
|  | Accessed during switch              | CONNECTION_BAD(*4)                             |   |

\*1: Terms enclosed in () are terms used in database multiplexing mode.

\*2: Return value of PQresultStatus().

\*3: Return value of PQresultErrorField() PG\_DIAG\_SQLSTATE.

\*4: Return value of PQstatus().

### 5.4.2.2 Notes when Creating Applications during Failover Operations in Shared Disk Mode

In the application, specify the same IP address as the one that was used when creating GIs or takeover network resources. This will enable the application to be executed if a state transition occurs, simply by reexecuting the application without modification.



See

.....  
Refer to "Creating GIs or Takeover Network Resources" in the Cluster Operation Guide for details.  
.....

# Chapter 6 Embedded SQL in C

This chapter describes application development using embedded SQL in C.

## 6.1 Development Environment

Install the FUJITSU Enterprise Postgres Client package for the architecture to be developed and executed.



Refer to Installation and Setup Guide for Client for information on the C compiler required for C application development.



C++ is not supported. Create a library by implementing embedded SQL in C, and call it from C++.

## 6.2 Setup

### 6.2.1 Environment Settings

When using embedded SQL in C, the same environment settings as when using the C library (libpq) are required.

Refer to "5.2.1 Environment Settings" in "C Library (libpq)" for information on the environment settings for the library for C.

Additionally, set the following path for the precompiler ecpg:



Linux

```
fujitsuEnterprisePostgresClientInstallDir/bin
```



Windows(R)

```
fujitsuEnterprisePostgresClientInstallDir\bin
```

### 6.2.2 Message Language and Encoding System Used by Applications Settings

The message language and the encoding System Settings Used by Applications settings are the same as when using the library for C.

However, in embedded SQL, the PQsetClientEncoding function cannot be used in the encoding system settings. In embedded SQL, use the SET command to specify the encoding system in client\_encoding.

Refer to "5.2.2 Message Language and Encoding System Used by Applications Settings" in "C Library (libpq)" for information on the settings for the library for C.

### 6.2.3 Settings for Encrypting Communication Data

When encrypting the communication data, the same environment settings as when using the C library (libpq) are required.

Refer to "5.2.3 Settings for Encrypting Communication Data" in "C Library (libpq)" for information on the environment settings for the C library.

## 6.3 Connecting with the Database

### Point

- It is recommended to use a connection service file to specify connection destinations. In the connection service file, a name (service name) is defined as a set, comprising information such as connection destination information and various types of tuning information set for connections. By using the service name defined in the connection service file when connecting to databases, it is no longer necessary to modify applications when the connection information changes. Refer to "The Connection Service File" in "Client Interfaces" in the PostgreSQL Documentation for information.
- If using a connection service file, perform either of the procedures below:
  - Set the service name as a string literal or host variable, as follows:  
`tcp:postgresql://?service=my_service`
  - Set the service name in the environment variable PGSERVICE, and use `CONNECT TO DEFAULT`

Use the `CONNECT` statement shown below to create a connection to the database server.

### Format

```
EXEC SQL CONNECT TO target [AS connection-name] [USER user-name];
```

#### target

Write in one of the following formats:

- `dbname@host:port`
- `tcp:postgresql://host:port/dbname[?options]`
- `unix:postgresql://host[:port][/dbname][?options]`  
(Definition method when using the UNIX domain socket)
- SQL string literal containing one of the above formats
- Reference to a character variable containing one of the above formats
- `DEFAULT`

#### user-name

Write in one of the following formats:

- `username`
- `username/password`
- `username IDENTIFIED BY password`
- `username USING password`

### Description of the arguments

| Argument        | Description   |
|-----------------|---|
| dbname          | Specify the database name.  |
| host            | Specify the host name for the connection destination.   |
| port            | Specify the port number for the database server.<br>The default is "27500".   |
| connection-name | Specify connection names to identify connections when multiple connections are to be processed within a single program. |

| Argument | Description   |
|----------|---|
| username | <p>Specify the user that will connect with the database.</p> <p>If this is omitted, the name used will be that of the user on the operating system that is executing the application.</p>   |
| password | <p>Specify a password when authentication is required.</p>  |
| options  | <p>Specify the following parameter when specifying a time for timeout. Connect parameters with &amp; when specifying more than one. The following shows the values specified for each parameter.</p> <ul style="list-style-type: none"> <li>- connect_timeout <p>Specify the timeout for connections.</p> <p>Specify a value between 0 and 2147483647 (in seconds). There is no limit set if you set 0 or an invalid value. If "1" is specified, the behavior will be the same as when "2" was specified. An error occurs when a connection cannot be established within the specified time.</p> </li> <li>- keepalives <p>This enables keepalive.</p> <p>Keepalive is disabled if 0 is specified. Keepalive is enabling when any other value is specified. The default is keepalive enabled. Keepalive causes an error to occur when it is determined that the connection with the database is disabled.</p> </li> <li>- keepalives_idle <p>Specify the time until the system starts sending keepalive messages when communication with the database is not being performed.</p> <ul style="list-style-type: none"> <li>- Linux <p>Specify a value between 1 and 32767 (in seconds). The default value of the system is used if this is not specified.</p> </li> <li>- Windows(R) <p>Specify a value between 1 and 2147483647 (in seconds). 7200 will be set as default if a value outside this range is specified or if nothing is specified.</p> </li> </ul> </li> <li>- keepalives_interval <p>Specify the interval between resends when there is no response to keepalive messages.</p> <ul style="list-style-type: none"> <li>- Linux <p>Specify a value between 1 and 32767 (in seconds). The default value of the system is used if this is not specified.</p> </li> <li>- Windows(R) <p>Specify a value between 1 and 2147483647 (in seconds). 1 will be set as default if a value outside this range is specified or if nothing is specified.</p> </li> </ul> </li> <li>- keepalives_count <p>Specify the number of resends for keepalive messages.</p> <ul style="list-style-type: none"> <li>- Linux <p>Specify a value between 1 and 127. The default value of the system is used if this is not specified.</p> </li> <li>- Windows(R) <p>The system default value is used irrespective of what is specified for this parameter.</p> </li> </ul> </li> </ul> |

## Code examples for applications

```
EXEC SQL CONNECT TO tcp:postgresql://sv1:27500/mydb?
connect_timeout=20&keepalives_idle=20&keepalives_interval=5&keepalives_count=2&keepalives=
1 USER myuser/myuser01;
```

## 6.4 Application Development

Refer to "ECPG - Embedded SQL in C" in "Client Interfaces" in the PostgreSQL Documentation for information on developing applications.

However, when using embedded SQL in C, there are the following differences to the embedded SQL (ECPG) in PostgreSQL C.

### 6.4.1 Support for National Character Data Types

This section describes how to use the national character data types using the SQL embedded C preprocessor.

The following explains the C language variable types corresponding to the NCHAR type:

Specify the number of characters specified for the NCHAR type multiple by 4, plus 1 for the length of the host variable.

| Data Type                              | Host variable type             |
|--|--------------------------------|
| NATIONAL CHARACTER( <i>n</i> )         | NCHAR variable name [nx4+1]    |
| NATIONAL CHARACTER VARYING( <i>n</i> ) | NVARCHAR variable name [nx4+1] |



See

Refer to "Handling Character Strings" in "Client Interfaces" in the PostgreSQL documentation for information on using character string types.

### 6.4.2 Compiling Applications

Append the extension "pgc" to the name of the source file for the embedded SQL in C.

When the pgc file is precompiled using the ecpg command, C source files will be created, so use the C compiler for the compile.

#### Precompiling example

```
ecpg testproc.pgc
```

If an optimizer hint block comment is specified for the SQL statement, specify the following option in the ecpg command:

--enable-hint

Enables the optimizer hint block comment (hereafter, referred to as the "hint clause"). If this option is not specified, the hint clause will be removed as a result of the ecpg precompile and be disabled.

The SQL statements that can be specified in the hint clause are SELECT, INSERT, UPDATE, and DELETE.

The locations in which the hint clause can be specified are immediately after one of the SELECT, INSERT, UPDATE, DELETE, or WITH keywords. A syntax error will occur if any other location is specified.

Example of specifying the hint clause

```
EXEC SQL SELECT /*+ IndexScan(prod ix01) */ name_id INTO :name_id FROM prod WHERE id
= 1;
```

Refer to "12.1.1 Optimizer Hints" for information on optimizer hints.

## Note

Take the following points into account when using embedded SQL source files:

- Multibyte codes expressed in SJIS or UTF-16 cannot be included in statements or host variable declarations specified in EXEC SQL.
- Do not use UTF-8 with a byte order mark (BOM), because an error may occur during compilation if the BOM character is incorrectly recognized as the source code.
- Multibyte characters cannot be used in host variable names.
- It is not possible to use a TYPE name that contains multibyte characters, even though it can be defined.

Specify the following options when compiling a C application output with precompiling.

**L**

Linux

**L**

Table 6.1 Include file and library path

| Option                   | How to specify the option                                   |
|--------------------------|---|
| Path of the include file | <i>-I/fujitsuEnterprisePostgresClientInstallDir/include</i> |
| Path of the library      | <i>-L/fujitsuEnterprisePostgresClientInstallDir/lib</i>     |

**L**

Table 6.2 C Library

| Type of library | Library name  | Note                           |
|-----------------|---------------|--------------------------------|
| Dynamic library | libecpg.so    |                                |
|                 | libpgtypes.so | When using the pgtypes library |
| Static library  | libecpg.a     |                                |
|                 | libpgtypes.a  | When using the pgtypes library |

**W**

Windows(R)

If the include file and the library path have been set in the environment variable, there is no need to specify the options shown below for the compile.

**W**

Table 6.3 Include file and library path

| Type of option           | How to specify the option                                |
|--------------------------|--|
| Path of the include file | <i>fujitsuEnterprisePostgresClientInstallDir\include</i> |
| Path of the library      | <i>fujitsuEnterprisePostgresClientInstallDir\lib</i>     |

**W**

Table 6.4 C Library

| Type of library   | Library name   | Note                           |
|-------------------|----------------|--------------------------------|
| Library for links | libecpg.lib    |                                |
|                   | libpgtypes.lib | When using the pgtypes library |
| Dynamic library   | libecpg.dll    |                                |
|                   | libpgtypes.dll | When using the pgtypes library |

## Note

- The libecpg library in Windows(R) is created by "release" and "multithreaded" options. When using the ECPGdebug function included in this library, compile using the "release" and "multithreaded" flags in all programs that use this library. When you do this, use the "dynamic" flag if you are using libecpg.dll, and use the "static" flag if you are using libecpg.lib.

Refer to "Library Functions" in "Client Interfaces" in the PostgreSQL Documentation for information on the ECPGdebug function.

- The `cl` command expects input to be a program that uses one of the following code pages, so convert the program to these code pages and then compile and link it (refer to the Microsoft documentation for details).
  - ANSI console code pages (example: Shift-JIS for Japanese)
  - UTF-16 little-endian with or without BOM (Byte Order Mark)
  - UTF-16 big-endian with or without BOM
  - UTF-8 with BOM

The `cl` command converts strings in a program to an ANSI console code page before generating a module, so the data sent to and received from the database server becomes an ANSI console code page. Therefore, set the coding system corresponding to the ANSI console code page as the coding system of the client.

Refer to "Character Set Support" in "Server Administration" in the PostgreSQL Documentation for information on how to set the client encoding system.

(Example: To use environment variables in Japanese, set SJIS in PGCLIENTENCODING.)

## 6.4.3 Bulk INSERT

Bulk INSERT can be used to input multiple rows of data into the table using a single ECPG statement that uses the newly introduced 'FOR' clause.

This functionality allows the user to make use of the data stored in host array variables, resulting in 'C' client programs that are simpler and easier to maintain.

### Synopsis

The syntax of the bulk INSERT statement is given below:

```
EXEC SQL [ AT connection ] [ FOR {number_of_rows/ARRAY_SIZE} ]
INSERT INTO table_name [ ( column_name [, ...] ) ]
{ VALUES ( { expression | DEFAULT } [, ...] ) [, ...] | query }
[ RETURNING * | output_expression [ [ AS ] output_name ] [, ...]
INTO output_host_var [ [ INDICATOR ] indicator_var ] [, ...]
```

When the above bulk INSERT command is used, ECPG inserts '*number\_of\_rows*' number of rows into the table, using the data that is stored in the '*expression*'.

### FOR Clause

The 'FOR' clause indicates to ECPG that the given INSERT statement is a bulk insert statement. The 'FOR' clause currently only support INSERT statements. When a 'FOR' clause specified, ECPG executes the INSERT statement for '*number\_of\_rows*' number of times, iterating through the host array variables.

The 'FOR' clause can iterate through all the array elements or can be limited to process only a fixed number of array elements. The value for '*number\_of\_rows*' should be greater than zero.

The 'FOR' clause can accept an integer host variable or an integer literal as its parameter. It can also accept the constant 'ARRAY\_SIZE' in which case all the elements in the host array variable are inserted into the table.

Given below are examples of acceptable bulk INSERT statements.

```
int number_of_rows = 10;
int id[25];
char name[25][10];

EXEC SQL FOR :number_of_rows /* will process 10 rows */
INSERT INTO prod (name, id) VALUES (:name, :id);

EXEC SQL FOR ARRAY_SIZE /* will process 25 rows */
INSERT INTO prod (name, id) VALUES (:name, :id);
```

When 'FOR' clause is specified, the 'expression' can be a host array variable, host variable, constant number or string.

The value given for the 'number\_of\_rows' should be greater than zero. Value which is less than or equal to zero will result in a run-time error.

When 'FOR ARRAY\_SIZE' is specified, the values clause should consist of at least one host array variable. 'SELECT' queries cannot be used for input values when using 'FOR ARRAY\_SIZE'.

When the value given for the 'number\_of\_rows' is greater than one, the specified 'SELECT' query should returns only one row. More than one returned row will result in an error.

### Values Clause

The VALUES clause includes the input data that is to be inserted into the table. When working with FOR clause, the values in the 'expression' can be host array variables, host variable, constant number, string or pointers.



For more detailed usage of the INSERT statement, please refer to the ECOBPG section of the PostgreSQL documentation.

### Error Messages

Given below are the error messages that are output when bulk INSERT functionality is not used correctly.

#### Invalid value for number\_of\_rows

ECPG error

invalid statement name "FOR value should be positive integer"

Cause

The value given for number\_of\_rows is less than or equal to 0.

Solution

Specify a value that is more than or equal to 1 for number\_of\_rows.

#### Invalid input for ARRAY\_SIZE

ECPG error

invalid statement name "Host array variable is needed when using FOR ARRAY\_SIZE"

Cause

A host array is not specified in the values clause when using the ARRAY\_SIZE keyword.

## Solution

At least one host array variable should be included in the values clause

## Too many rows from SELECT... INTO

### ECPG error

SELECT...INTO returns too many rows

### Cause

The number of rows returned by the 'SELECT ... INTO' query in the INSERT statement is more than one.

### Solution

When the value of 'number\_of\_rows' is more than one, the maximum number of rows that can be returned by the 'SELECT ... INTO' query in the INSERT statement is one.

## Limitations

The limitations when using bulk INSERT are given below.

- Array of structures should not be used as an input in the 'VALUES' clause. Attempted use will result in junk data being inserted into the table.
- Array of pointers should not be used as an input in the 'VALUES' clause. Attempted use will result in junk data being inserted into the table.
- ECPG supports the use of 'WITH' clause in single INSERT statements. 'WITH' clause cannot be used in bulk INSERT statements.
- ECPG does not calculate the size of the pointer variable. So when a pointer variable is used that includes multiple elements, the 'number\_of\_rows' should be less than or equal to the number of elements in the pointer. Otherwise, junk data will be inserted into the table.

## Samples

Given below are some sample usages of the bulk INSERT functionality.

### Basic Bulk INSERT

```
int in_f1[4] = {1,2,3,4};  
...  
EXEC SQL FOR 3 INSERT INTO target (f1) VALUES (:in_f1);
```

The number of rows to insert indicated by the FOR clause is 3, so the data in the first 3 elements of the host array variable are inserted into the table. The contents of the target table will be:

```
f1  
----  
 1  
 2  
 3  
(3 rows)
```

Also a host integer variable can be used to indicate the number of rows that will be inserted in FOR clause, which will produce the same result as above:

```
int num = 3;  
int in_f1[4] = {1,2,3,4};  
...  
EXEC SQL FOR :num INSERT INTO target (f1) VALUES (:in_f1);
```

## Inserting constant values

Constant values can also be bulk INSERTed into the table as follows:

```
EXEC SQL FOR 3 INSERT INTO target (f1,f2) VALUES (DEFAULT,'hello');
```

Assuming the 'DEFAULT' value for the 'f1' column is '0', the contents of the target table will be:

```
f1 | f2
---+-----
 0 | hello
 0 | hello
 0 | hello
(3 rows)
```

## Using ARRAY\_SIZE

'FOR ARRAY\_SIZE' can be used to insert the entire contents of a host array variable, without explicitly specifying the size, into the table.

```
int in_f1[4] = {1,2,3,4};
...
EXEC SQL FOR ARRAY_SIZE INSERT INTO target (f1) VALUES (:in_f1);
```

In the above example, four rows are inserted into the table.



If there are multiple host array variables specified as input values, then the number of rows inserted is same as the smallest array size. The example given below demonstrates this usage.

```
int in_f1[4] = {1,2,3,4};
char in_f3[3][10] = {"one", "two", "three"};
...
EXEC SQL FOR ARRAY_SIZE INSERT INTO target (f1,f3) VALUES (:in_f1,:in_f3);
```

In the above example, the array sizes are 3 and 4. Given that the smallest array size is 3, only three rows are inserted into the table. The table contents are given below.

```
f1 | f3
---+-----
 1 | one
 2 | two
 3 | three
(3 rows)
```

## Using Pointers as Input

Pointers that contain multiple elements can be used in bulk INSERT.

```
int *in_pfl = NULL;
in_pfl = (int*)malloc(4*sizeof(int));
in_pfl[0]=1;
in_pfl[1]=2;
in_pfl[2]=3;
in_pfl[3]=4;
...
EXEC SQL FOR 4 INSERT INTO target (f1) values (:in_pfl);
```

The above example will insert four rows into the target table.

## Using SELECT query

When using bulk INSERT, the input values can be got from the results of a SELECT statement. For ex.,

```
EXEC SQL FOR 4 INSERT INTO target(f1) SELECT age FROM source WHERE name LIKE 'foo';
```

Assuming that the 'SELECT' query returns one row, the same row will be inserted into the target table four times.



If the 'SELECT' query returns more than one row, the INSERT statement will throw an error.

```
EXEC SQL FOR 1 INSERT INTO target(f1) SELECT age FROM source;
```

In the above example, all the rows returned by the 'SELECT' statement will be inserted into the table. In this context '1' has the meaning of 'returned row equivalent'.

## Using RETURNING clause

Bulk INSERT supports the same RETURNING clause syntax as normal INSERT. An example is given below.

```
int out_f1[4];
int in_f1[4] = {1,2,3,4};
...
EXEC SQL FOR 3 INSERT INTO target (f1) VALUES (:in_f1) RETURNING f1 INTO :out_f1;
```

After the execution of the above INSERT statement, the 'out\_f1' array will have 3 elements with the values of '1','2' and '3'.

## 6.4.4 DECLARE STATEMENT

This section describes the DECLARE STATEMENT statement.

### Synopsis

```
EXEC SQL [ AT connection_name ] DECLARE statement_name STATEMENT
```

### Description

DECLARE STATEMENT declares SQL statement identifier. SQL statement identifier is associated with connection. DELARE CURSOR with a SQL statement identifier can be written before PREPARE.

### Parameters

connection\_name

A database connection name established by the CONNECT command.

If AT clause is omitted, a SQL statement identifier is associated with the DEFAULT connection.

statement\_name

An identifier for SQL statement identifier which is SQL identifier or host variable.

### Examples

```
EXEC SQL CONNECT TO postgres AS con1
EXEC SQL AT con1 DECLARE sql_stmt STATEMENT
EXEC SQL DECLARE cursor_name CURSOR FOR sql_stmt
EXEC SQL PREPARE sql_stmt FROM :dyn_string
EXEC SQL OPEN cursor_name
```

```
EXEC SQL FETCH cursor_name INTO :column1
EXEC SQL CLOSE cursor_name
```

### Note

- An SQL statement with a SQL statement identifier must use a same connection as the connection that the SQL statement identifier is associated with.
- An SQL statement without a SQL statement identifier must not use AT clause.

## 6.4.5 Creating Applications during Cluster Operations

This section explains points to consider when creating applications during cluster operations.

### See

Refer to the Cluster Operation Guide for information on cluster operations.

### 6.4.5.1 Errors when an Application Connection Switch Occurs and Corresponding Actions

If an application connection switch occurs during cluster operations, explicitly close the connection and then reestablish the connection or reexecute the application.

The table below shows errors that may occur during a switch, and the corresponding action to take.

| State  |                                     | Error information (*2)                    | Action  |
|--|-------------------------------------|---|---|
| Node failure (server failure) or FUJITSU Enterprise Postgres system failure (*1) | Failure occurs during access        | 57P01<br>57P02<br>YE000<br>26000<br>40001 | After the switch is complete, reestablish the connection, or reexecute the application. |
|  | Accessed during node/system failure | 08001                                     |   |
| Switch to the standby node (standby server) (*1)                                 | Switched during access              | 57P01<br>57P02<br>YE000<br>26000<br>40001 |   |
|  | Accessed during switch              | 08001                                     |   |

\*1: Terms enclosed in () are terms used in database multiplexing mode.

\*2: Return value of SQLSTATE.

### 6.4.5.2 Notes when Creating Applications during Failover Operations in Shared Disk Mode

In the application, specify the same IP address as the one that was used when creating GIs or takeover network resources. This will enable the application to be executed if a state transition occurs, simply by reexecuting the application without modification.



See

.....  
Refer to "Creating GIs or Takeover Network Resources" in the Cluster Operation Guide for details.  
.....

### 6.4.6 Notes

---

#### Notes on creating multithreaded applications

In embedded SQL in C, DISCONNECT ALL disconnects all connections within a process, and therefore it is not thread-safe in all operations that use connections. Do not use it in multithreaded applications.

# Chapter 7 Embedded SQL in COBOL

This chapter describes application development using embedded SQL in COBOL.

## 7.1 Development Environment

Install the FUJITSU Enterprise Postgres Client package for the architecture to be developed and executed.



Refer to the Installation and Setup Guide for Client for information on the COBOL compiler required for COBOL application development.

## 7.2 Setup

### 7.2.1 Environment Settings

When using embedded SQL in COBOL, the same environment settings as when using the C library (libpq) are required. Refer to "[5.2.1 Environment Settings](#)" in "C Library (libpq)" for information on the environment settings for the library for C.

Additionally, set the following path for the precompiler ecobpg:

**L**

Linux

```
fujitsuEnterprisePostgresClientInstallDir/bin
```

**W**

Windows(R)

```
fujitsuEnterprisePostgresClientInstallDir\bin
```

### 7.2.2 Message Language and Encoding System Used by Applications

The settings for the message language and the encoding system used by applications should be the same as those required when using the library for C.

However, in embedded SQL, the PQsetClientEncoding function cannot be used in the encoding system settings. In embedded SQL, use the SET command to specify the encoding system in client\_encoding.

Refer to "[5.2.2 Message Language and Encoding System Used by Applications Settings](#)" in "C Library (libpq)" for information on the settings for the library for C.

### 7.2.3 Settings for Encrypting Communication Data

When encrypting the communication data, the same environment settings as when using the C library (libpq) are required.

Refer to "[5.2.3 Settings for Encrypting Communication Data](#)" in "C Library (libpq)" for information on the environment settings for the C library.

## 7.3 Connecting with the Database

Use the CONNECT statement shown below to create a connection to the database server.

## Format

```
EXEC SQL CONNECT TO target [AS connection-name] [USER user-name]END-EXEC.
```

### target

Write in one of the following formats:

- dbname@host:port
- tcp:postgresql://host:port/dbname[?options]
- unix:postgresql://host[:port][/dbname][?options]  
(Definition method when using the UNIX domain socket)
- SQL string literal containing one of the above formats
- Reference to a character variable containing one of the above formats
- DEFAULT

### user-name

Write in one of the following formats:

- username
- username/password
- username IDENTIFIED BY password
- username USING password

## Description of the arguments

| Argument        | Description   |
|-----------------|---|
| dbname          | Specify the database name.  |
| host            | Specify the host name for the connection destination.   |
| port            | Specify the port number for the database server.<br>The default is "27500".   |
| connection-name | Specify connection names to identify connections when multiple connections are to be processed within a single program.   |
| username        | Specify the user that will connect with the database.<br>If this is omitted, the name used will be that of the user on the operating system that is executing the application.  |
| password        | Specify a password when authentication is required.   |
| options         | Specify the following parameter when specifying a time for timeout. Connect parameters with & when specifying more than one. The following shows the values specified for each parameter. <ul style="list-style-type: none"><li>- connect_timeout<br/>Specify the timeout for connections.<br/>Specify a value between 0 and 2147483647 (in seconds). There is no limit set if you set 0 or an invalid value. If "1" is specified, the behavior will be the same as when "2" was specified. An error occurs when a connection cannot be established within the specified time.</li><li>- keepalives<br/>This enables keepalive.</li></ul> |

| Argument | Description  |
|----------|--|
|          | <p>Keepalive is disabled if 0 is specified. Keepalive is enabled when any other value is specified. The default is keepalive enabled. Keepalive causes an error to occur when it is determined that the connection with the database is disabled.</p> <ul style="list-style-type: none"> <li>- keepalives_idle <p>Specify the time until the system starts sending keepalive messages when communication with the database is not being performed.</p> <ul style="list-style-type: none"> <li>- Linux <p>Specify a value between 1 and 32767 (in seconds). The default value of the system is used if this is not specified.</p> </li> <li>- Windows(R) <p>Specify a value between 1 and 2147483647 (in seconds). 7200 will be set as default if a value outside this range is specified or if nothing is specified.</p> </li> </ul> </li> <li>- keepalives_interval <p>Specify the interval between resends when there is no response to keepalive messages.</p> <ul style="list-style-type: none"> <li>- Linux <p>Specify a value between 1 and 32767 (in seconds). The default value of the system is used if this is not specified.</p> </li> <li>- Windows(R) <p>Specify a value between 1 and 2147483647 (in seconds). 1 will be set as default if a value outside this range is specified or if nothing is specified.</p> </li> </ul> </li> <li>- keepalives_count <p>Specify the number of resends for keepalive messages.</p> <ul style="list-style-type: none"> <li>- Linux <p>Specify a value between 1 and 127. The default value of the system is used if this is not specified.</p> </li> <li>- Windows(R) <p>The system default value is used irrespective of what is specified for this parameter.</p> </li> </ul> </li> </ul> |

### Code examples for applications

```
EXEC SQL CONNECT TO tcp:postgresql://sv1:27500/mydb?
connect_timeout=20&keepalives_idle=20&keepalives_interval=5&keepalives_count=2&keepalives=
1 USER myuser/myuser01 END-EXEC.
```

## 7.4 Application Development

Refer to "[Appendix D ECOBPG - Embedded SQL in COBOL](#)" for information on developing applications.

### 7.4.1 Support for National Character Data Types

This section describes how to use the national character data types using the SQL embedded COBOL preprocessor.

The table below lists the COBOL variable types supporting the national character data types. Specify the number of characters specified for the CHAR type for the length of the host variable.

| National character data type  | COBOL variable type                      |
|-------------------------------|--|
| CHARACTER( <i>n</i> )         | <i>varName</i> PIC N( <i>n</i> )         |
| CHARACTER VARYING( <i>n</i> ) | <i>varName</i> PIC N( <i>n</i> ) VARYING |

## Information

FUJITSU Enterprise Postgres "NATIONAL CHARACTER" data type can be used as a national character data type.

If encoding is specified for the translation option when compiling with NetCOBOL, the encoding specified for the national character data types should be used for the environment variable ECOBPG\_NCHAR.

The list below shows NetCOBOL translation options and their corresponding environment variable ECOBPG\_NCHAR values.

| NetCOBOL translation options                | Environment variable ECOBPG_NCHAR |
|---|-----------------------------------|
| ENCODE (UTF-8,UTF16,LE)<br>RCS (UTF-16,LE)  | UTF-16LE                          |
| ENCODE (UTF-8,UTF-16,BE)<br>RCS (UTF-16,BE) | UTF-16BE                          |
| ENCODE (UTF-8,UTF-32,LE)                    | UTF-32LE                          |
| ENCODE (UTF-8,UTF-32,BE)                    | UTF-32BE                          |
| ENCODE (SJIS,SJIS)                          | SJIS                              |
| Not specified                               | No need to specify                |

If the post-compiling encoding for an application and the default encoding for the operating system differ, the client encoding system must be used for the application.

The list below shows the values supported for the combinations of application encoding, operating system default encoding, and client encoding systems.

| Application encoding | OS default encoding | Client encoding    |
|----------------------|---------------------|--------------------|
| UTF-8                | UTF-8               | No need to specify |
|                      | SJIS                | UTF-8              |
| SJIS                 | UTF-8               | SJIS               |
|                      | SJIS                | No need to specify |

Refer to "[7.2.2 Message Language and Encoding System Used by Applications](#)" for information on how to set client encoding systems.

The following example shows host variable declaration of a national character data type.

```
01 DATA1 PIC N(10).
01 DATA2 PIC N(10) VARYING.
```

## Note

- Halfwidth characters should not be used for the national character data type COBOL variable.
- The national character data type column attribute obtained by applications should be the CHAR type.
- Encoding cannot be specified using the ENCODING clause, which is a feature of NetCOBOL.

## 7.4.2 Compiling Applications

Append the extension "pco" to the name of the source file for the embedded SQL in COBOL.

When the pco file is precompiled using the ecobpg command, COBOL source files will be created, so use the COBOL compiler for the compile.

### Precompiling example

```
ecobpg testproc.pco
```

If an optimizer hint block comment is specified for the SQL statement, specify the following option in the ecobpg command:

--enable-hint

Enables the optimizer hint block comment (hereafter, referred to as the "hint clause"). If this option is not specified, the hint clause will be removed as a result of the ecobpg precompile and be disabled.

The SQL statements that can be specified in the hint clause are SELECT, INSERT, UPDATE, and DELETE.

The locations in which the hint clause can be specified are immediately after one of the SELECT, INSERT, UPDATE, DELETE, or WITH keywords. A syntax error will occur if it is specified in any other location.

Example of specifying the hint clause

```
EXEC SQL SELECT /*+ IndexScan(prod ix01) */ name_id
INTO :name_id FROM prod WHERE id = 1 END-EXEC.
```

Refer to "12.1.1 Optimizer Hints" for information on optimizer hints.

Specify the following options when compiling a COBOL application output with precompiling.

L

Linux

L

Table 7.1 Include file and library path

| Option                   | How to specify the option                                   |
|--------------------------|---|
| Path of the include file | <i>-I/fujitsuEnterprisePostgresClientInstallDir/include</i> |
| Path of the library      | <i>-L/fujitsuEnterprisePostgresClientInstallDir/lib</i>     |

L

Table 7.2 COBOL Library

| Type of library | Library name |
|-----------------|--------------|
| Dynamic library | libecpg.so   |
| Static library  | libecpg.a    |

W

Windows(R)

If the include file and the library path have been set in the environment variable, there is no need to specify the options shown below for the compile.

W

Table 7.3 Include file and library path

| Option                   | How to specify the option                                |
|--------------------------|--|
| Path of the include file | <i>fujitsuEnterprisePostgresClientInstallDir\include</i> |
| Path of the library      | <i>fujitsuEnterprisePostgresClientInstallDir\lib</i>     |

W

Table 7.4 COBOL Library

| Type of library   | Library name |
|-------------------|--------------|
| Library for links | libecpg.lib  |

| Type of library | Library name |
|-----------------|--------------|
| Dynamic library | libecpg.dll  |

## 7.4.3 Bulk INSERT

Bulk INSERT is a feature that inserts multiple rows of data in embedded SQL (ECOBPG) in bulk.

By specifying the array host variable that stored the data in the VALUES clause of the INSERT statement, the data for each element in the array can be inserted in bulk. This feature is used by specifying the insertion count in the FOR clause immediately before the INSERT statement.

### Synopsis

```
EXEC SQL [ AT connection ] [ FOR {number_of_rows|ARRAY_SIZE}]

    INSERT INTO table_name [ ( column_name [, ...] ) ]

    { VALUES ( { expression | DEFAULT } [, ...] ) [, ...] | query }

    [ RETURNING * | output_expression [ [ AS ] output_name ] [, ...]

    INTO output_host_var [ [ INDICATOR ] indicator_var ] [, ...]] END-EXEC
```

### FOR Clause

Specify the insertion count using *number\_of\_rows* or *ARRAY\_SIZE* in the FOR clause. The FOR clause can be specified only in the INSERT statement, not in other update statements.

#### *number\_of\_rows* and *ARRAY\_SIZE*

Insertion processing will be executed only for the specified count. However, if the count is 1, it will be assumed that the FOR clause was omitted when the application is executed. In this case, proceed according to the INSERT specification in the PostgreSQL Documentation.

Specify the FOR clause as an integer host variable or as a literal.

Specify *ARRAY\_SIZE* to insert all elements of the array in the table. When specifying *ARRAY\_SIZE*, specify at least one array in 'expression'.

If two or more arrays were specified in 'expression', it will be assumed that *ARRAY\_SIZE* is the minimum number of elements in the array.

*number\_of\_rows* or *ARRAY\_SIZE* must exceed the minimum number of elements in all arrays specified in expression, *output\_host\_var*, and *indicator\_val*.

The following example shows how to specify the FOR clause.

```
01 NUMBER-OF-ROWS PIC S9(9) COMP VALUE 10.
01 GROUP-ITEM.
05 ID1 PIC S9(9) OCCURS 25.
05 NAME PIC X(10) OCCURS 25.
* will process 10 rows
EXEC SQL FOR :NUMBER-OF-ROWS
INSERT INTO prod (name, id) VALUES (:NAME, :ID1) END-EXEC
* will process 25 rows
EXEC SQL FOR ARRAY_SIZE
INSERT INTO prod (name, id) VALUES (:NAME, :ID1) END-EXEC
```

### expression

Specify the value to be inserted in the table. Array host variables, host variable literals, strings, and pointer variables can be specified. Structure type arrays and pointer variable arrays cannot be specified.

Do not use pointer variables and `ARRAY_SIZE` at the same time. The reason for this is that the number of elements in the area represented by the pointer variable cannot be determined.

#### query

The number of rows returned by query must be 1. If two or more rows are returned, an error will occur. This cannot be used at the same time as `ARRAY_SIZE`.

#### output\_host\_var and indicator\_val

These must be array host variables or pointer variables.



In bulk `INSERT`, subqueries cannot be specified using the `WITH` clause.

If an error occurs, all bulk `INSERT` actions will be rolled back, therefore, no rows are inserted. However, if the `RETURNING` clause was used, and the error occurred while obtaining the rows after the insertion was successful, the insertion processing will not be rolled back.

## Error Messages

The messages below are output if an error occurs when the bulk `INSERT` is used.

### Invalid value for number\_of\_rows

#### Error Messages

The value for the `FOR` clause must be a positive integer.

#### Cause

The value given for `number_of_rows` is less than or equal to 0.

#### Solution

Specify a value that is more than or equal to 1 for `number_of_rows`.

### Invalid input for ARRAY\_SIZE

#### Error Messages

Array host variable is needed when using `FOR ARRAY_SIZE`.

#### Cause

An array host variable is not specified in the `VALUES` clause.

#### Solution

Specify more than one array host variable in the `VALUES` clause.

### Too many rows from SELECT... INTO

#### Error Messages

The `SELECT..INTO` query returned too many rows in row number %d.

#### Cause

The "`SELECT ... INTO`" query in the `INSERT` statement returned more than one row.

#### Solution

If `number_of_rows` is two or more, the maximum number of rows that can be returned in the "`SELECT ... INTO`" query in the `INSERT` statement is one.

## Limitations

The limitations when using bulk `INSERT` are given below.

- Array of structures should not be used as an input in the '`VALUES`' clause.

- Array of pointers should not be used as an input in the 'VALUES' clause.
- ECOBPG supports the use of 'WITH' clause in single INSERT statements. 'WITH' clause cannot be used in bulk INSERT statements.

## Samples

Given below are some sample usages of the bulk INSERT functionality.

### Basic Bulk INSERT

```
01 GROUP-ITEM.
05 IN-F1 PIC S9(9) OCCURS 4.
MOVE 1 TO IN-F1(1)
MOVE 2 TO IN-F1(2)
MOVE 3 TO IN-F1(3)
MOVE 4 TO IN-F1(4)
...
EXEC SQL FOR 3 INSERT INTO target (f1) VALUES (:IN-F1) END-EXEC
```

The number of rows to insert indicated by the FOR clause is 3, so the data in the first 3 elements of the host array variable are inserted into the table. The contents of the target table will be:

```
f1
----
1
2
3
(3 rows)
```

Also a host integer variable can be used to indicate the number of rows that will be inserted in FOR clause, which will produce the same result as above:

```
01 NUM PIC S9(9) COMP VALUE 3.
01 GROUP-ITEM.
05 IN-F1 PIC S9(9) OCCURS 4.
MOVE 1 TO IN-F1(1)
MOVE 2 TO IN-F1(2)
MOVE 3 TO IN-F1(3)
MOVE 4 TO IN-F1(4)
...
EXEC SQL FOR :NUM INSERT INTO target (f1) VALUES (:IN-F1) END-EXEC
```

### Inserting constant values

Constant values can also be bulk INSERTed into the table as follows:

```
EXEC SQL FOR 3 INSERT INTO target (f1,f2) VALUES (DEFAULT,'hello') END-EXEC
```

Assuming the 'DEFAULT' value for the 'f1' column is '0', the contents of the target table will be:

```
f1 | f2
---+-----
0 | hello
0 | hello
0 | hello
(3 rows)
```

### Using ARRAY\_SIZE

'FOR ARRAY\_SIZE' can be used to insert the entire contents of a host array variable, without explicitly specifying the size, into the table.

```

01 GROUP-ITEM.
05 IN-F1 PIC S9(9) OCCURS 4.
MOVE 1 TO IN-F1(1)
MOVE 2 TO IN-F1(2)
MOVE 3 TO IN-F1(3)
MOVE 4 TO IN-F1(4)
...
EXEC SQL FOR ARRAY_SIZE INSERT INTO target (f1) VALUES (:IN-F1) END-EXEC

```

### Note

If there are multiple host array variables specified as input values, then the number of rows inserted is same as the smallest array size. The example given below demonstrates this usage.

```

01 GROUP-ITEM.
05 IN-F1 PIC S9(9) OCCURS 4.
05 IN-F3 PIC X(10) OCCURS 3.
MOVE 1 TO IN-F1(1)
MOVE 2 TO IN-F1(2)
MOVE 3 TO IN-F1(3)
MOVE 4 TO IN-F1(4)
MOVE "one" TO IN-F3(1)
MOVE "two" TO IN-F3(2)
MOVE "three" TO IN-F3(3)
...
EXEC SQL FOR ARRAY_SIZE INSERT INTO target (f1,f3) VALUES (:IN-F1,:IN-F3) END-EXEC

```

In the above example, the array sizes are 3 and 4. Given that the smallest array size is 3, only three rows are inserted into the table. The table contents are given below.

```

f1 | f3
---+-----
1 | one
2 | two
3 | three
(3 rows)

```

### Using SELECT query

The result of a SELECT query can be used to insert values.

```

EXEC SQL FOR 4 INSERT INTO target(f1) SELECT age FROM source WHERE name LIKE 'foo' END-EXEC

```

In the example above, assuming that the SELECT query returns one row, the same row will be inserted into the table four times.

### Note

If "2" or more is specified for the FOR clause, the INSERT statement returns an error when two or more rows of query results are returned.

If "1" is specified for the FOR clause, all rows returned by the SELECT query will be inserted into the table.

```

EXEC SQL FOR 1 INSERT INTO target(f1) SELECT age FROM source END-EXEC

```

In the example above, "1" specified for the FOR clause indicates all returned rows.

## Using RETURNING clause

Bulk INSERT supports the same RETURNING clause syntax as normal INSERT. An example is given below.

```
01 GROUP-ITEM.  
05 IN-F1 PIC S9(9) OCCURS 4.  
05 OUT-F1 PIC S9(9) OCCURS 4.  
MOVE 1 TO IN-F1(1)  
MOVE 2 TO IN-F1(2)  
MOVE 3 TO IN-F1(3)  
MOVE 4 TO IN-F1(4)  
...  
EXEC SQL FOR 3 INSERT INTO target (f1) VALUES (:IN-F1) RETURNING f1 INTO :OUT-F1 END-EXEC
```

After the execution of the above INSERT statement, the 'out\_f1' array will have 3 elements with the values of '1', '2' and '3'.

## 7.4.4 DECLARE STATEMENT

---

Refer to "[6.4.4 DECLARE STATEMENT](#)" in "Embedded SQL in C".

# Chapter 8 SQL References

This chapter explains the SQL statement features expanded by FUJITSU Enterprise Postgres.

## 8.1 Expanded Trigger Definition Feature

This section explains the expanded trigger definition feature.

### 8.1.1 CREATE TRIGGER

In addition to features of PostgreSQL, triggers can be created with OR REPLACE option and DO option.

#### Synopsis

```
CREATE [ OR REPLACE ] [ CONSTRAINT ] TRIGGER name { BEFORE | AFTER | INSTEAD OF } { event
[ OR ... ] }
    ON table_name
    [ FROM referenced_table_name ]
    { NOT DEFERRABLE | [ DEFERRABLE ] { INITIALLY IMMEDIATE | INITIALLY DEFERRED } }
    [ FOR [ EACH ] { ROW | STATEMENT } ]
    [ WHEN ( condition ) ]
    { EXECUTE PROCEDURE function_name ( arguments ) | DO [ LANGUAGE lang_name ] code }
```

#### Description

Refer to the PostgreSQL Documentation for information about CREATE TRIGGER. This section describes OR REPLACE option and DO option.

A trigger which is created with OR REPLACE option and DO option will be associated with the specified table or view and will execute the specified code by the specified procedural language of DO (unnamed code block) when certain events occur.

#### Parameters

##### OR REPLACE

If the specified trigger is not defined in the table, it defines a new trigger.

If the specified trigger is already defined in the table, the named trigger replaces existing trigger.

##### code

When the certain events occur, it executes the code in a specified procedural language. The unnamed code block does not require a prior definition like a function. Syntax is same as procedural language.

##### lang\_name

The name of the language that the function is implemented in. Can be SQL, C, internal, or the name of a user-defined procedural language. The default is 'plpgsql'.

plpgsql is supported in CREATE TRIGGER.



#### Note

- A normal trigger cannot be replaced by a constraint trigger.
- A constraint trigger cannot be replaced by a normal trigger.
- A trigger defined with DO option cannot be replaced by a trigger defined with EXECUTE PROCEDURE option.
- A trigger defined with EXECUTE PROCEDURE option cannot be replaced by a trigger defined with DO option.

## Examples

It executes the code block that is specified by DO before the table is updated.  
(Example that LANGUAGE is plpgsql)

```
CREATE TRIGGER check_update
  BEFORE UPDATE ON accounts
  FOR EACH ROW
  DO $$BEGIN RETURN NEW; END;$$ ;
```



### Information

When a trigger created with DO option, a new function is created internally. The name of function is "schema name"."on table name"\_"trigger name"\_TRIGPROC(serial number).

## 8.1.2 How to Define Triggers in pgAdmin

---

The expanded features of the trigger definition can also be used in pgAdmin.



### See

Refer to "pgAdmin Help" for information on how to define triggers using pgAdmin.

# Chapter 9 Compatibility with Oracle Databases

This chapter describes the environment settings and functionality offered for features that are compatible with Oracle databases.

## 9.1 Overview

Features compatible with Oracle databases are provided. These features enable you to easily migrate to FUJITSU Enterprise Postgres and reduce the costs of reconfiguring applications.

The following compatible features are provided:

Table 9.1 Features compatible with Oracle databases

| Category |             | Features compatible with Oracle databases |                                       |
|----------|-------------|---|---------------------------------------|
|          |             | Item                                      | Overview                              |
| SQL      | Queries     | Outer join operator (+)                   | Operator for outer joining            |
|          |             | DUAL table                                | Tables provided by the system         |
|          | Functions   | DECODE                                    | Compares and converts values          |
|          |             | SUBSTR                                    | Extracting part of a character string |
|          |             | NVL                                       | NULL value conversion                 |
| Package  | DBMS_OUTPUT | Message sending                           |                                       |
|          | UTL_FILE    | File operation                            |                                       |
|          | DBMS_SQL    | Dynamic SQL execution                     |                                       |



See

In addition to the above, refer to the file below for information on the Oracle function.

L

- Linux:  
`fujitsuEnterprisePostgresInstallDir/share/doc/extension/README.asciidoc`

W

- Windows(R):  
`fujitsuEnterprisePostgresInstallDir\share\doc\extension\README.asciidoc`

## 9.2 Precautions when Using the Features Compatible with Oracle Databases

Features compatible with Oracle databases are defined as user-defined functions in the "public" schema created by default when database clusters are created, so they can be available for all users without the need for special settings.

For this reason, ensure that "public" (without the double quotation marks) is included in the list of schema search paths specified in the search\_path parameter.

### 9.2.1 Notes on SUBSTR

SUBSTR is implemented on FUJITSU Enterprise Postgres and Oracle databases using different external specifications.

For this reason, when using SUBSTR, define which specification is to be prioritized. The default setting executes with the FUJITSU Enterprise Postgres specifications prioritized.

When using the SUBSTR function compatible with Oracle databases, set "oracle" and "pg\_catalog" in the "search\_path" parameter of postgresql.conf. You must specify "oracle" in front of "pg\_catalog" when doing this.

```
search_path = '$user', public, oracle, pg_catalog'
```

## Information

- The search\_path feature specifies the priority of the schema search path. The SUBSTR function in Oracle database is defined in the oracle schema.
- Refer to "Statement Behavior" in "Server Administration" in the PostgreSQL Documentation for information on search\_path.

## 9.2.2 Notes when Integrating with the Interface for Application Development

The SQL noted in "Table 9.1 Features compatible with Oracle databases" can be used in the interface for application development. However, outer join operators cannot be used when integrated with Visual Studio.

When integrated with Visual Studio or using the features compatible with Oracle databases from Fujitsu Npgsql .NET Data Provider, select one of the actions below for the SearchPath parameter, which is one of the pieces of information needed to connect to databases specified for individual connections.

- Do not specify the SearchPath parameter itself, or
- Specify both "public" and the schema name in the SQL statement.

Note that both "public" and the schema name in the SQL statement must be specified as the SearchPath parameter before "oracle" and "pg\_catalog" when using the Oracle database-compatible feature SUBSTR.

## 9.3 Queries

The following queries are supported:

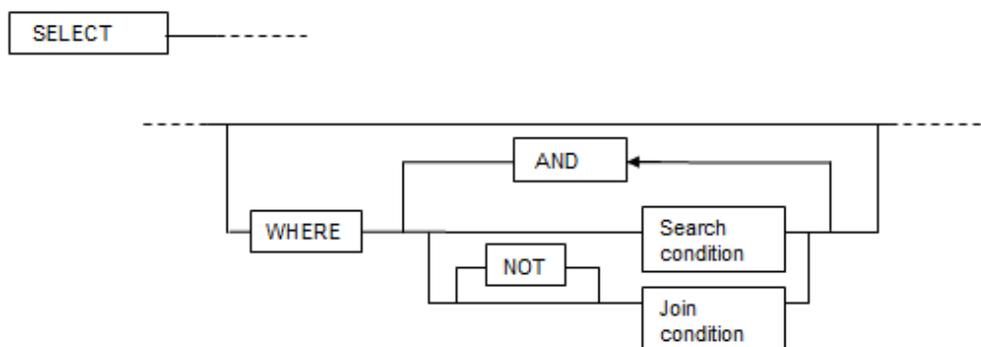
- Outer Join Operator (+)
- DUAL Table

### 9.3.1 Outer Join Operator (+)

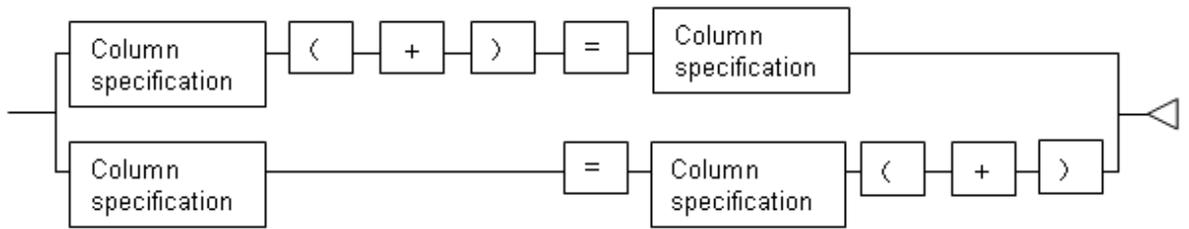
In the WHERE clause conditional expression, by adding the plus sign (+), which is the outer join operator, to the column of the table you want to add as a table join, it is possible to achieve an outer join that is the same as a joined table (OUTER JOIN).

Specification format

SELECT statement



## Join condition



## Note

Here we are dealing only with the WHERE clause of the SELECT statement. Refer to "SQL Commands" in "Reference" in the PostgreSQL Documentation for information on the overall specification format of the SELECT statement.

## General rules

### WHERE clause

- The WHERE clause specifies search condition or join conditions for the tables that are derived.
- Search conditions are any expressions that return BOOLEAN types as the results of evaluation. Any lines that do not meet these conditions are excluded from the output. When the values of the actual lines are assigned to variables and if the expression returns "true", those lines are considered to have met the conditions.
- Join conditions are comparison conditions that specify outer join operators. Join conditions in a WHERE clause return a table that includes all the lines that meet the join conditions, including lines that do not meet all the join conditions.
- Join conditions are prioritized over search conditions. For this reason, all lines returned by the join conditions are subject to the search conditions.
- The following rules and restrictions apply to queries that use outer join operators. We therefore recommend the use of FROM clause joined tables (OUTER JOIN) rather than outer join operators:
  - Outer join operators can only be specified in the WHERE clause.
  - Outer join operators can only be specified for base tables or views.
  - To perform outer joins using multiple join conditions, it is necessary to specify outer join operators for all join conditions.
  - When combining join conditions with constants, specify outer join operators in the corresponding column specification. When not specified, they will be treated as search conditions.
  - The results column of the outer join of table t1 is not returned if table t1 is joined with table t2 by specifying an outer join operator in the column of t1, then table t1 is joined with table t3 by using search conditions.
  - It is not possible to specify columns in the same table as the left/right column specification of a join condition.
  - It is not possible to specify an expression other than a column specification for outer join operators, but they may be specified for the columns that compose the expression.

There are the following limitations on the functionality of outer join operators when compared with joined tables (OUTER JOIN). To use functionality that is not available with outer join operators, use joined tables (OUTER JOIN).

Table 9.2 Range of functionality with outer join operators

| Functionality available with joined tables (OUTER JOIN) | Outer join operator |
|---|---------------------|
| Outer joins of two tables                               | Y                   |

| Functionality available with joined tables (OUTER JOIN) | Outer join operator |
|---|---------------------|
| Outer joins of three or more tables                     | Y (*1)              |
| Used together with joined tables within the same query  | N                   |
| Use of the OR logical operator to a join condition      | N                   |
| Use of an IN predicate to a join condition              | N                   |
| Use of subqueries to a join condition                   | N                   |

Y: Available

N: Not available

\*1: The outer joins by outer join operators can return outer join results only for one other table. For this reason, to combine outer joins of table t1 and table t2 or table t2 and table t3, it is not possible to specify outer join operators simultaneously for table t2.



## Example

Table configuration

t1

| col1 | col2  | col3 |
|------|-------|------|
| 1001 | AAAAA | 1000 |
| 1002 | BBBBB | 2000 |
| 1003 | CCCCC | 3000 |

t2

| col1 | col2   |
|------|--------|
| 1001 | aaaaa  |
| 1002 | bbbbbb |
| 1004 | dddddd |

Example 1:

In the following example, all records in table t2 that include ones that do not exist in table t1 are returned:

```
SELECT *
  FROM t1, t2
 WHERE t1.col1(+) = t2.col1;
col1 |   col2   | col3 | col1 |   col2
-----+-----+-----+-----+-----
1001 | AAAAA   | 1000 | 1001 | aaaaa
1002 | BBBBB   | 2000 | 1002 | bbbbbb
      |         |      | 1004 | ddddd
(3 rows)
```

This is the same syntax as the joined table (OUTER JOIN) of the FROM clause shown next.

```
SELECT *
  FROM t1 RIGHT OUTER JOIN t2
        ON t1.col1 = t2.col1;
```

Example 2:

In the following example, the results are filtered to records above 2000 in t1.col3 by search conditions, and the records are those in table t2 that include ones that do not exist in table t1. After filtering with the join conditions, there is further filtering with the search conditions, so there will only be one record returned.

```
SELECT *
  FROM t1, t2
 WHERE t1.col1(+) = t2.col1
       AND t1.col3 >= 2000;
col1 | col2 | col3 | col1 | col2
-----+-----+-----+-----+-----
1002 | BBBB | 2000 | 1002 | bbbbb
(1 row)
```

This is the same syntax as the joined table (OUTER JOIN) of the FROM clause shown next.

```
SELECT *
  FROM t1 RIGHT OUTER JOIN t2
       ON t1.col1 = t2.col1
 WHERE t1.col3 >= 2000;
```

### 9.3.2 DUAL Table

DUAL table is a virtual table provided by the system. Use when executing SQL where access to a base table is not required, such as when performing tests to get result expressions such as functions and operators.



#### Example

The following example shows acquiring the current date from the system:

```
SELECT CURRENT_DATE "date" FROM DUAL;
date
-----
2013-05-14
(1 row)
```

## 9.4 SQL Function Reference

The following SQL functions are supported:

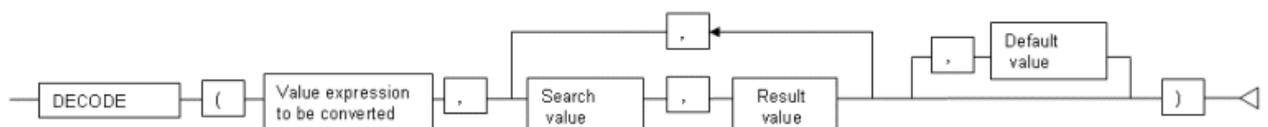
- [DECODE](#)
- [SUBSTR](#)
- [NVL](#)

### 9.4.1 DECODE

Features

Compares values and converts to other values.

Specification format



## General rules

- DECODE compares values of the value expression to be converted and the search values one by one, and if the values of the value expression to be converted and the search values match, a corresponding result value is returned. If none of the value expressions to be converted and search values match, the default value is returned if a default value has been specified. A NULL value is returned if a default value has not been specified.
- If the same search value is specified more than once, then the result value returned is the one listed for the first occurrence of the search value.
- The following data types can be used in result values and in the default value:
  - CHAR
  - VARCHAR
  - NCHAR
  - NCHAR VARYING
  - TEXT
  - INTEGER
  - BIGINT
  - NUMERIC
  - DATE
  - TIME WITHOUT TIME ZONE
  - TIMESTAMP WITHOUT TIME ZONE
  - TIMESTAMP WITH TIME ZONE
- The same data type must be specified for all value expressions to be converted and the search values. However, note that different data types may also be specified if a literal is specified in the search value, and the value expressions that will be converted contain data types that can be converted. Refer to "[Table A.1 Data type combinations that contain literals and can be converted implicitly](#)" in "[A.3 Implicit Data Type Conversions](#)" for information on data types that can be specified when a literal is specified in the search value.
- If the result values and default value are all literals, the data types for these values will be as shown below:
  - If all values are character string literals, all will become character string types.
  - If there is one or more numeric literal, all will become numeric types.
  - If there is one or more literal cast to the datetime/time types, all will become datetime/time types.
- If the result values and default value contain a mixture of literals and non-literals, the literals will be converted to the data types of the non-literals. Refer to "[Table A.1 Data type combinations that contain literals and can be converted implicitly](#)" in "[A.3 Implicit Data Type Conversions](#)" for information on data types that can be converted.
- The same data type must be specified for all result values and for the default value. However, different data types can be specified if the data type of any of the result values or default value can be converted - these data types are listed below:

Table 9.3 Data type combinations that can be converted by DECODE (summary)

|                    |                       | Other result values or default value |                       |                |
|--------------------|-----------------------|--------------------------------------|-----------------------|----------------|
|                    |                       | Numeric type                         | Character string type | Date/time type |
| Result value (any) | Numeric type          | Y                                    | N                     | N              |
|                    | Character string type | N                                    | Y                     | N              |

|  |                | Other result values or default value |                       |                |
|--|----------------|--------------------------------------|-----------------------|----------------|
|  |                | Numeric type                         | Character string type | Date/time type |
|  | Date/time type | N                                    | N                     | S (*1)         |

Y: Can be converted

S: Some data types can be converted

N: Cannot be converted

\*1: The data types that can be converted for date/time types are listed below:

Table 9.4 Result value and default value date/time data types that can be converted by DECODE

|                    |                             | Other result values or default value |                        |                             |                          |
|--------------------|-----------------------------|--------------------------------------|------------------------|-----------------------------|--------------------------|
|                    |                             | DATE                                 | TIME WITHOUT TIME ZONE | TIMESTAMP WITHOUT TIME ZONE | TIMESTAMP WITH TIME ZONE |
| Result value (any) | DATE                        | Y                                    | N                      | Y                           | Y                        |
|                    | TIME WITHOUT TIME ZONE      | N                                    | Y                      | N                           | N                        |
|                    | TIMESTAMP WITHOUT TIME ZONE | Y                                    | N                      | Y                           | Y                        |
|                    | TIMESTAMP WITH TIME ZONE    | Y                                    | N                      | Y                           | Y                        |

Y: Can be converted

N: Cannot be converted

- The data type of the return value will be the data type within the result or default value that is longest and has the highest precision.

### Example

In the following example, the value of col3 in table t1 is compared and converted to a different value. If the col3 value matches search value 1, the result value returned is "one". If the col3 value does not match any of search values 1, 2, or 3, the default value "other number" is returned.

```

SELECT col1,
       DECODE(col3, 1, 'one',
              2, 'two',
              3, 'three',
              'other number') "num-word"
FROM t1;
col1 | num-word
-----+-----
1001 | one
1002 | two
1003 | three
(3 rows)

```

## 9.4.2 SUBSTR

### Features

Extracts part of a character string.

## Specification format



## General rules

- SUBSTR returns the number of characters specified in the third argument (starting from the position specified in the second argument) from the string specified in the first argument.
- When the starting position is positive, the starting position will be from the beginning of the character value expression.
- When the starting position is 0, it will be that same as if 1 is specified in the starting position.
- When the starting position is negative, the starting position will be from the end of the character value expression.
- When string length is not specified, all characters until the end of the character value expression are returned. NULL is returned when the string length is less than 1.
- Specify SMALLINT or INTEGER as the data type for the start position and string length. Refer to "[Table A.1 Data type combinations that contain literals and can be converted implicitly](#)" in "[A.3 Implicit Data Type Conversions](#)" for information on data types that can be specified when a literal is specified.
- The data type of the return value is TEXT.

## Note

- There are two types of SUBSTR. One that behaves as described above, and one that behaves the same as SUBSTRING. The search\_path needs to be modified for it to behave the same as the specification described above.
- It is recommended to set search\_path in postgresql.conf. In this case, it will be effective for each instance. Refer to "[9.2.1 Notes on SUBSTR](#)" for information on how to configure postgresql.conf.
- The configuration of search\_path can be done at the user level or at the database level. Setting examples are shown below.

- Example of setting at the user level

This can be set by executing an SQL command. "user1" will be used as the username in this example.

```
ALTER USER user1 SET search_path = "$user",public,oracle,pg_catalog;
```

- Example of setting at the database level

This can be set by executing an SQL command. "db1" will be used as the database name in this example.

```
ALTER DATABASE db1 SET search_path = "$user",public,oracle,pg_catalog;
```

You must specify "oracle" in front of "pg\_catalog".

- If the change has not been implemented, SUBSTR is the same as SUBSTRING.

## See

Refer to "SQL Commands" under "Reference" in the PostgreSQL Documentation for information on ALTER USER and ALTER DATABASE.

## Information

The general rules for SUBSTRING are as follows:

- The starting position will be from the beginning of the character value expression, whether the starting position is positive, 0, or negative.
- When string length is not specified, all characters until the end of the character value expression are returned.
- An empty string is returned if the returned string is 0 or less or if the specified string length is less than 1.

## See

Refer to "String Functions and Operators" under "The SQL Language" in the PostgreSQL Documentation for information on SUBSTRING.

## Example

In the following example, part of the string "ABCDEFGH" is extracted:

```
SELECT SUBSTR('ABCDEFGH',3,4) "Substring" FROM DUAL;

 Substring
-----
 CDEF
(1 row)

SELECT SUBSTR('ABCDEFGH',-5,4) "Substring" FROM DUAL;

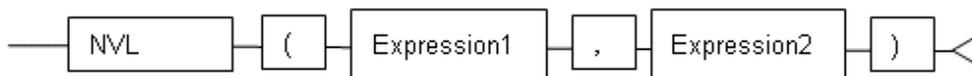
 Substring
-----
 CDEF
(1 row)
```

## 9.4.3 NVL

### Features

Converts NULL values.

### Specification format



### General rules

- NVL converts NULL values. When expression 1 is NULL, expression 2 is returned. When expression 1 is not NULL, expression 1 is returned.
- Specify the same data types for expression 1 and expression 2. However, if a constant is specified in expression 2, and the data type can also be converted by expression 1, different data types can be specified. When this happens, the conversion by expression 2 is done to suit the data type in expression 1, so the value of expression 2 returned when expression 1 is a NULL value will be the value converted in the data type of expression 1.
- Refer to "[Table A.1 Data type combinations that contain literals and can be converted implicitly](#)" in "[A.3 Implicit Data Type Conversions](#)" for information on data types that can be converted for literals.

## Example

In the following example, "IS NULL" is displayed if the value of col1 in table t1 is a NULL value.

```
SELECT col2, NVL(col1, 'IS NULL') "nvl" FROM t1;
col2 | nvl
-----+-----
aaa | IS NULL
(1 row)
```

## 9.5 Package Reference

A "package" is a group of features, brought together by schemas, that have a single functionality, and are used by calling from PL/pgSQL.

The following packages are supported:

- [DBMS\\_OUTPUT](#)
- [UTL\\_FILE](#)
- [DBMS\\_SQL](#)

To call the different functionalities from PL/pgSQL, use the PERFORM statement or SELECT statement, using the package name to qualify the name of the functionality. Refer to the explanations for each of the package functionalities for information on the format for calling.

### 9.5.1 DBMS\_OUTPUT

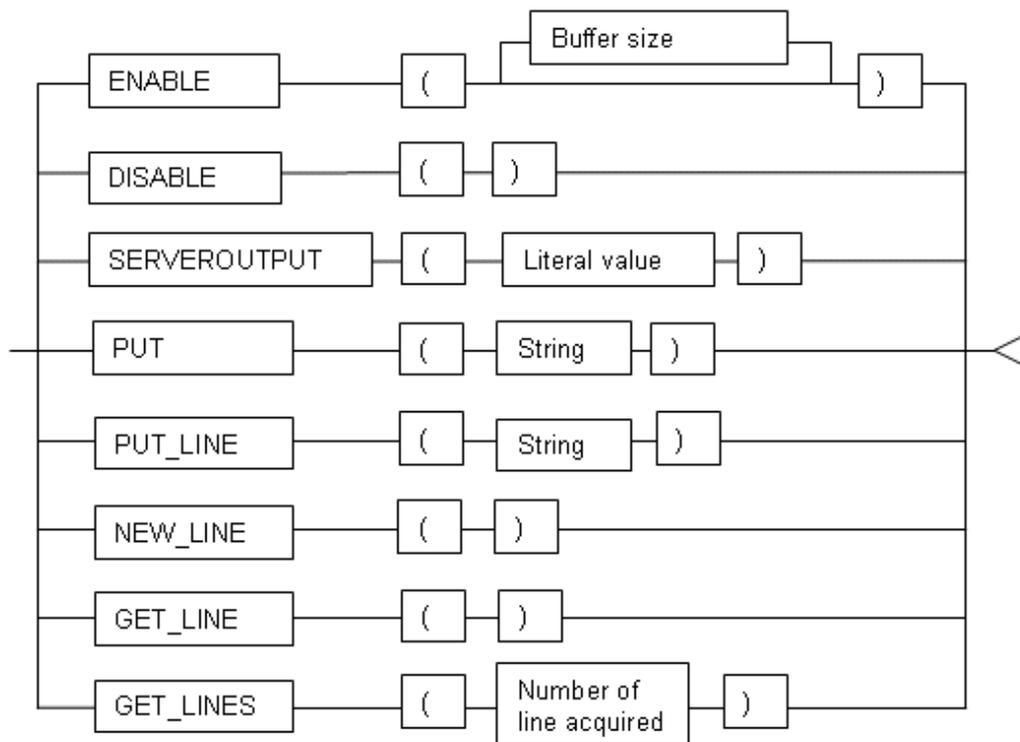
#### Overview

Sends messages to clients such as psql from PL/pgSQL.

#### Features

| Features     | Description                                |
|--------------|--|
| ENABLE       | Features of this package are enabled.      |
| DISABLE      | Features of this package are disabled.     |
| SERVEROUTPUT | Controls whether messages are sent.        |
| PUT          | Messages are sent.                         |
| PUT_LINE     | Messages are sent with a newline appended. |
| NEW_LINE     | Newlines are sent as messages.             |
| GET_LINE     | 1 line is read from the buffer.            |
| GET_LINES    | Multiple lines are read from the buffer.   |

## Specification format



### 9.5.1.1 Description

This section explains the procedures available in the DBMS\_OUTPUT package.

#### ENABLE

- ENABLE enables the use of PUT, PUT\_LINE, NEW\_LINE, GET\_LINE, and GET\_LINES.
- With multiple executions of ENABLE, the value specified last is the buffer size (in bytes). Specify in the range between 2000 and 1000000 if a buffer size is to be specified.
- The default value of the buffer size is 20000. If NULL is specified as the buffer size, 1000000 will be used.
- If ENABLE has not been executed, PUT, PUT\_LINE, NEW\_LINE, GET\_LINE, and GET\_LINES are ignored even if they are executed.

#### Example

```
PERFORM DBMS_OUTPUT.ENABLE(20000);
```

#### DISABLE

- DISABLE disables the use of PUT, PUT\_LINE, NEW\_LINE, GET\_LINE, and GET\_LINES.
- Remaining buffer information is discarded.

#### Example

```
PERFORM DBMS_OUTPUT.DISABLE();
```

## SERVEROUTPUT

- SERVEROUTPUT controls whether messages are sent.
- The logical value specifies whether to send messages.
- If the "true" logical value is specified, then when PUT, PUT\_LINE, or NEW\_LINE is executed, the message is sent to a client such as psql and not stored in the buffer.
- If the "false" logical value is specified, then when PUT, PUT\_LINE, or NEW\_LINE is executed, the message is stored in the buffer and not sent to a client such as psql.



Refer to "Boolean Type" in "The SQL Language" in the PostgreSQL Documentation for information on logical values.



```
PERFORM DBMS_OUTPUT.SERVEROUTPUT( TRUE );
```

## PUT

- PUT configures the message that is sent.
- The string is the message that is sent.
- When "True" is specified in the logical value at SERVEROUTPUT, the messages are sent to clients such as psql.
- When "False" is specified in the logical value at SERVEROUTPUT, the messages are retained in the buffer.
- PUT does not append a newline, so to append a newline, execute NEW\_LINE.
- If a string longer than the buffer size specified in ENABLE is sent, an error occurs.



```
PERFORM DBMS_OUTPUT.PUT( 'abc' );
```

## PUT\_LINE

- PUT\_LINE appends a newline to messages for sending.
- The string is the message that is sent.
- When "True" is specified in the logical value at SERVEROUTPUT, the messages are sent to clients such as psql.
- When "False" is specified in the logical value at SERVEROUTPUT, the messages are retained in the buffer.
- PUT\_LINE appends a newline to the end of messages.
- If a string longer than the buffer size specified in ENABLE is sent, an error occurs.



```
PERFORM DBMS_OUTPUT.PUT_LINE( 'abc' );
```

## NEW\_LINE

- NEW\_LINE sets a newline in the message that is sent.
- When "True" is specified in the logical value at SERVEROUTPUT, the messages are sent to clients such as psql.
- When "False" is specified in the logical value at SERVEROUTPUT, the messages are retained in the buffer.

### Example

```
PERFORM DBMS_OUTPUT.NEW_LINE ( ) ;
```

## GET\_LINE

- GET\_LINE extracts one line messages stored in the buffer.
- The information extracted is acquired as the values of the line and status columns with the SELECT statement.
- line is a TEXT type. A one line message extracted from the buffer is stored.
- status is an INTEGER type. The extracted result will be stored. 0 is stored when successful. 1 is stored when it fails.
- If GET\_LINE or GET\_LINES is executed, then PUT, PUT\_LINE, or NEW\_LINE is executed with message still not extracted from the buffer, the messages not extracted from the buffer will be discarded.

### Example

```
DECLARE
    buff1   VARCHAR(20);
    stts1   INTEGER;
BEGIN
    SELECT line,status INTO buff1,stts1 FROM DBMS_OUTPUT.GET_LINE();
```

## GET\_LINES

- GET\_LINES extracts multiple line messages stored in the buffer.
- The information extracted is acquired as the values of the lines and numlines columns with the SELECT statement.
- lines is a TEXT type. It stores the lines acquired from the buffer.
- numlines is an INTEGER type. It stores the number of lines acquired from the buffer.
- The number of lines acquired is an INTEGER type. It is the maximum number of lines extracted from the buffer.
- If GET\_LINE or GET\_LINES is executed, then PUT, PUT\_LINE, or NEW\_LINE is executed with message still not extracted from the buffer, the messages not extracted from the buffer will be discarded.

### Example

```
DECLARE
    buff   VARCHAR(20)[10];
    stts   INTEGER := 10;
BEGIN
    SELECT lines, numlines INTO buff,stts FROM DBMS_OUTPUT.GET_LINES(stts);
```

## 9.5.1.2 Example

A usage example of DBMS\_OUTPUT is shown below.

```
CREATE FUNCTION dbms_output_exe() RETURNS VOID AS $$
DECLARE
    buff1    VARCHAR(20);
    buff2    VARCHAR(20);
    stts1    INTEGER;
    stts2    INTEGER;
BEGIN
    PERFORM DBMS_OUTPUT.DISABLE();
    PERFORM DBMS_OUTPUT.ENABLE();
    PERFORM DBMS_OUTPUT.SERVEROUTPUT(FALSE);
    PERFORM DBMS_OUTPUT.PUT('DBMS_OUTPUT TEST 1');
    PERFORM DBMS_OUTPUT.NEW_LINE();
    PERFORM DBMS_OUTPUT.PUT_LINE('DBMS_OUTPUT TEST 2');
    SELECT line,status INTO buff1,stts1 FROM DBMS_OUTPUT.GET_LINE();
    SELECT line,status INTO buff2,stts2 FROM DBMS_OUTPUT.GET_LINE();
    PERFORM DBMS_OUTPUT.SERVEROUTPUT(TRUE);
    PERFORM DBMS_OUTPUT.PUT_LINE(buff1);
    PERFORM DBMS_OUTPUT.PUT_LINE(buff2);
END;
$$ LANGUAGE plpgsql;
SELECT dbms_output_exe();
DROP FUNCTION dbms_output_exe();
```

## 9.5.2 UTL\_FILE

### Overview

Text files can be written and read using PL/pgSQL.

To perform these file operations, the directory for the operation target must be registered in the UTL\_FILE.UTL\_FILE\_DIR table beforehand. Use the INSERT statement as the database administrator or a user who has INSERT privileges to register the directory. Also, if the directory is no longer necessary, delete it from the same table. Refer to "9.5.2.1 Registering and Deleting Directories" for information on the how to register and delete the directory.

Refer to "C.1 UTL\_FILE.UTL\_FILE\_DIR" for information on the UTL\_FILE.UTL\_FILE\_DIR table.

Declare the file handler explained hereafter as follows in PL/pgSQL:

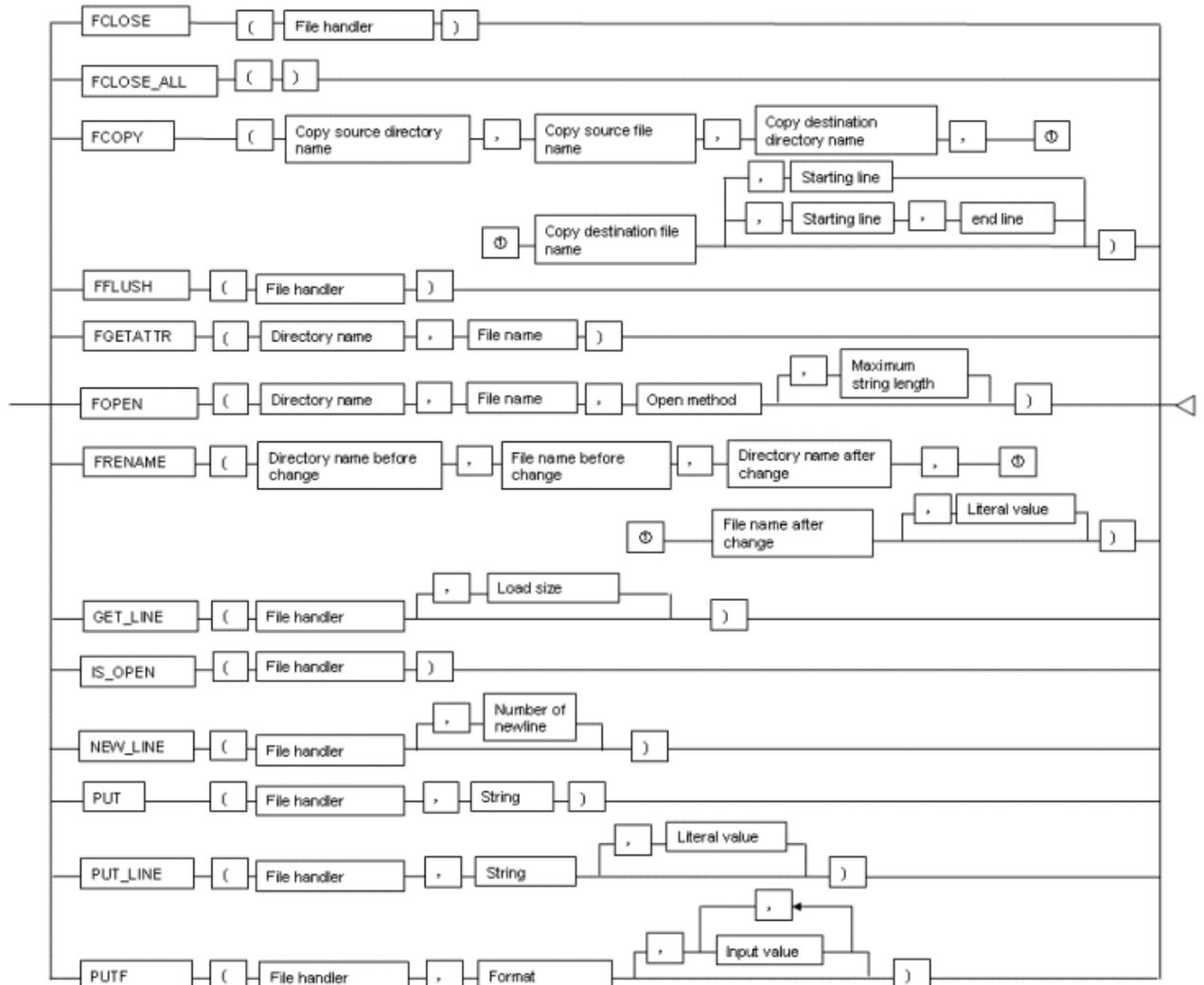
```
DECLARE
f UTL_FILE.FILE_TYPE;
```

### Features

| Feature    | Description   |
|------------|---|
| FCLOSE     | Closes the specified file.                            |
| FCLOSE_ALL | Closes all files open in a session.                   |
| FCOPY      | Copies a file.  |
| FFLUSH     | Flushes the buffer.                                   |
| FGETATTR   | Acquires the file existence and the size information. |
| FOPEN      | Opens a file.   |
| FRENAME    | Changes the name of the file.                         |
| GET_LINE   | Reads one line from a text file.                      |
| IS_OPEN    | Checks if there are open files.                       |

| Feature  | Description                                  |
|----------|--|
| NEW_LINE | Writes a newline.                            |
| PUT      | Writes a character string.                   |
| PUT_LINE | Adds a string and a newline and writes them. |
| PUTF     | Writes a formatted character string.         |

### Specification format



### 9.5.2.1 Registering and Deleting Directories

The examples in this sections are for Linux. In Windows(R), use a forward slash (/) as the separator for the directory.

**Windows(R) example:** 'c:/ fsep'

#### Registering the directory

1. Check if the directory is already registered (if it is, then step 2 is not necessary).

```
SELECT * FROM UTL_FILE.UTL_FILE_DIR WHERE dir='/home/fsep';
```

2. Register the directory.

```
INSERT INTO UTL_FILE.UTL_FILE_DIR VALUES('/home/fsep');
```

## Deleting the directory

```
DELETE FROM UTL_FILE.UTL_FILE_DIR WHERE dir='/home/fsep';
```

### 9.5.2.2 Description

This section explains the procedures available in the UTL\_FILE package.

#### FCLOSE

- FCLOSE closes a file that is open.
- Specify an open file handler as the file handler.
- The value returned is a NULL value.

#### Example

```
f := UTL_FILE.FCLOSE(f);
```

#### FCLOSE\_ALL

- FCLOSE\_ALL closes all files open in a session.
- Files closed with FCLOSE\_ALL can no longer be read or written.

#### Example

```
PERFORM UTL_FILE.FCLOSE_ALL();
```

#### FCOPY

- FCOPY copies from a copy source file to a copy destination file.
- Specify the directory where the copy source file exists as the copy source directory name.
- Specify the copy source file name as the file name of the copy source.
- Specify the directory where the copy destination file is stored as the copy destination directory name.
- Specify the copy destination file name as the file name of the copy destination.
- Specify a slash (/) or a backslash (\) as a separator in the copy source directory name and the copy destination directory name.
- Specify the starting line number of the file to be copied as the beginning line. If specifying, specify a value greater than 0. The starting line number is 1 if this is not specified.
- Specify the end line number of the file to be copied as the end line. The last line number of the file is used if this is not specified.

#### Example

**Linux**

**W**

**L**

```
PERFORM UTL_FILE.FCOPY('/home/fsep', 'regress_fsep.txt', '/home/fsep',
'regress_fsep2.txt');
```

W

#### Windows(R)

```
PERFORM UTL_FILE.FCOPY('c:/fsep', 'regress_fsep.txt', 'c:/fsep', 'regress_fsep2.txt');
```

### FFLUSH

- FFLUSH forcibly writes the buffer data to a file.
- Specify an open file handler as the file handler.

#### Example

```
PERFORM UTL_FILE.FFLUSH(f);
```

### FGETATTR

- FGETATTR extracts the file existence, file size, and information about the block size of the file.
- Specify the directory where the relevant file exists as the directory name.
- Specify a slash (/) or a backslash (\) as a separator in the directory name.
- Specify the relevant file name as the file name.
- The information extracted is acquired as the values of the fexists, file\_length, and blocksize columns with the SELECT statement.
- fexists is a BOOLEAN type. If the file exists, the logical value is "true". If the file does not exist, the logical value is "false".
- file\_length is an INTEGER type. The length of the file is set in bytes. If the file does not exist, the value is NULL.
- blocksize is an INTEGER type. The block size of the file is set in bytes. If the file does not exist, the value is NULL.

W

#### Example

L

#### Linux

```
SELECT fexists, file_length, blocksize INTO file_flag, file_chack_length, size FROM
UTL_FILE.FGETATTR('/home/fsep', 'regress_fsep.txt');
```

W

#### Windows(R)

```
SELECT fexists, file_length, blocksize INTO file_flag, file_chack_length, size FROM
UTL_FILE.FGETATTR('c:/fsep', 'regress_fsep.txt');
```

### FOPEN

- FOPEN opens a file.
- Specify the directory where the relevant file exists as the directory name.

W

- Specify a slash (/) or a backslash (\) as a separator in the directory name.
- Specify the relevant file name as the file name.
- Specify the mode for opening the file at open method. Specify the following:
  - r: Read
  - w: Write
  - a: Add
- Specify the maximum string length (in bytes) that can be processed with one operation. If omitted, the default is "1024". Specify in the range from 1 to 32767.
- Up to 50 files per session can be open at the same time.

 **Example**

L

**Linux**

```
f := UTL_FILE.FOPEN('/home/fsep', 'regress_fsep.txt', 'r', 1024);
```

W

**Windows(R)**

```
f := UTL_FILE.FOPEN('c:/fsep', 'regress_fsep.txt', 'r', 1024);
```

**FRENAME**

- FRENAME changes the name of an existing file.
- The directory name before change is the directory where the file was before change.
- The file name before change is the file name before change.
- The directory name after change is the directory where the file was created after change.
- The file name after change is the file name after change.

W

- Specify a slash (/) or a backslash (\) as a separator in the directory name.
- Specify whether to overwrite a file with changes, if one exists in the directory with the logical value. If the "true" logical value is specified, files with changes are overwritten even if they exist. If the "false" logical value is specified, an error occurs if files with changes exist. If this is omitted, the logical value for "False" will be set.

 **See**

Refer to "Boolean Type" in "The SQL Language" in the PostgreSQL Documentation for information on logical values.

 **Example**

L

**Linux**

```
PERFORM UTL_FILE.FRENAME('/home/fsep', 'regress_fsep.txt', '/home/fsep', 'regress_fsep2.txt', TRUE);
```

W

**Windows(R)**

```
PERFORM UTL_FILE.FRENAME('c:/fsep', 'regress_fsep.txt', 'c:/fsep', 'regress_fsep2.txt', TRUE);
```

## GET\_LINE

- GET\_LINE reads one line from a file.
- Specify an open file handler as the file handler. Specify the file handler returned by FOPEN using the r (read) mode.
- The load size is the number of bytes to be loaded from the file. If not specified, it will be the maximum string length of FOPEN.
- The return value is the buffer that receives the line loaded from the file.
- Newline characters are not loaded to the buffer.
- An empty string is returned if a blank line is loaded.
- Specify the maximum size(in bytes) of the data to be loaded at load size. Specify in the range from 1 to 32767. If a load size is not specified, then the maximum string length specified at FOPEN is set when a maximum string length is specified at FOPEN. 1024 is set if a maximum string length is not set at FOPEN.
- If the line length is greater than the load size, the load size is loaded and the remaining is loaded upon the next call.
- The NO\_DATA\_FOUND will be raised when trying to read past the last line.

### Example

```
buff := UTL_FILE.GET_LINE(f);
```

## IS\_OPEN

- IS\_OPEN checks if there are open files.
- Specify the file handler to be verified as the file handler.
- The return value is a BOOLEAN type. A "true" logical value represents the open state and the "false" logical value represents the closed state.

### See

Refer to "Boolean Type" under "The SQL Language" in the PostgreSQL Documentation for information on logical values.

### Example

```
IF UTL_FILE.IS_OPEN(f) THEN  
    PERFORM UTL_FILE.FCLOSE(f);  
END IF;
```

## NEW\_LINE

- NEW\_LINE writes one or more newlines.
- Specify an open file handler as the file handler.
- The number of newlines is the number of newlines to be written to the file. If omitted, "1" is set.

## Example

```
PERFORM UTL_FILE.NEW_LINE(f, 2);
```

### PUT

- PUT writes a string to a file.
- Specify an open file handler as the file handler. Specify the file handler that was opened with w (write) or a (append) with the FOPEN opening method.
- Specify the character string to be written to the file for the character string.
- The maximum size(in bytes) of the string is the maximum string length specified at FOPEN.
- The return value is a TEXT type and is the buffer that receives the line loaded from the file.

## Example

```
PERFORM UTL_FILE.PUT(f, 'ABC');
```

### PUT\_LINE

- PUT\_LINE adds a newline to a string and writes it.
- Specify an open file handler as the file handler. Specify the file handler that was opened with w (write) or a (append) with the FOPEN opening method.
- The logical value specifies whether to forcibly write to the file. If the "true" logical value is specified, file writing is forced. If the "false" logical value is specified, file writing is asynchronous. If this is omitted, the logical value for "False" will be set.
- The maximum size of the string (in bytes) is the maximum string length value specified at FOPEN.

## Example

```
PERFORM UTL_FILE.PUT_LINE(f, 'ABC', TRUE);
```

### PUTF

- PUTF writes a string that uses formatting.
- Specify an open file handler as the file handler. Specify the file handler that was opened with w (write) or a (append) with the FOPEN opening method.
- Format is a string that includes the formatting characters \n and %s.
- The \n in the format is code for a newline.
- Specify the same number of input values as there are %s in the format. Up to a maximum of five input values can be specified. The %s in the format are replaced with the corresponding input characters. If an input value corresponding to %s is not specified, it is replaced with an empty string.

## Example

```
PERFORM UTL_FILE.PUTF(f, '[1=%s, 2=%s, 3=%s, 4=%s, 5=%s]\n', '1', '2', '3', '4', '5');
```

### 9.5.2.3 Example

The procedure when using UTL\_FILE, and a usage example, are shown below.

#### 1. Preparation

Before starting a new job that uses UTL\_FILE, register the directory in the UTL\_FILE.UTL\_FILE\_DIR table.

Refer to "[9.5.2.1 Registering and Deleting Directories](#)" for information on how to register the directory.

#### 2. Performing a job

Perform a job that uses UTL\_FILE. The example is shown below.

```
CREATE OR REPLACE FUNCTION gen_file(mydir TEXT, infile TEXT, outfile TEXT, copyfile
TEXT) RETURNS void AS $$
DECLARE
    v1 VARCHAR(32767);
    inf UTL_FILE.FILE_TYPE;
    otf UTL_FILE.FILE_TYPE;
BEGIN
    inf := UTL_FILE.FOPEN(mydir, infile, 'r', 256);
    otf := UTL_FILE.FOPEN(mydir, outfile, 'w');
    v1 := UTL_FILE.GET_LINE(inf, 256);
    PERFORM UTL_FILE.PUT_LINE(otf, v1, TRUE);
    v1 := UTL_FILE.GET_LINE(inf, 256);
    PERFORM UTL_FILE.PUTF(otf, '%s\n', v1);
    v1 := UTL_FILE.GET_LINE(inf, 256);
    PERFORM UTL_FILE.PUT(otf, v1);
    PERFORM UTL_FILE.NEW_LINE(otf);
    PERFORM UTL_FILE.FFLUSH(otf);

    inf := UTL_FILE.FCLOSE(inf);
    otf := UTL_FILE.FCLOSE(otf);

    PERFORM UTL_FILE.FCOPY(mydir, outfile, mydir, copyfile, 2, 3);
    PERFORM UTL_FILE.FRENAME(mydir, outfile, mydir, 'rename.txt');

END;
$$ LANGUAGE plpgsql;

/* Linux */
SELECT gen_file('/home/fsep', 'input.txt', 'output.txt', 'copyfile.txt');

/* Windows(R) */
SELECT gen_file('c:/fsep', 'input.txt', 'output.txt', 'copyfile.txt');
```

#### 3. Post-processing

If you remove a job that uses UTL\_FILE, delete the directory information from the UTL\_FILE.UTL\_FILE\_DIR table. Ensure that the directory information is not being used by another job before deleting it.

Refer to "[9.5.2.1 Registering and Deleting Directories](#)" for information on how to delete the directory.

## 9.5.3 DBMS\_SQL

---

### Overview

Dynamic SQL can be executed from PL/pgSQL.

### Features

| Feature       | Description  |
|---------------|--|
| BIND_VARIABLE | Sets values in the host variable within the SQL statement.                         |
| CLOSE_CURSOR  | Closes the cursor.   |
| COLUMN_VALUE  | Acquires the value of the column in the select list extracted with FETCH_ROWS.     |
| DEFINE_COLUMN | Defines the column from which values are extracted and the storage destination.    |
| EXECUTE       | Executes SQL statements.   |
| FETCH_ROWS    | Positions the specified cursor at the next line and extracts values from the line. |
| OPEN_CURSOR   | Opens a new cursor.  |
| PARSE         | Parses SQL statements.   |

### Note

- In DBMS\_SQL, the data types supported in dynamic SQL are limited, and therefore the user must be careful - they are:

- INTEGER
- DECIMAL
- NUMERIC
- REAL
- DOUBLE PRECISION
- CHAR(\*1)
- VARCHAR(\*1)
- NCHAR(\*1)
- NCHAR VARYING(\*1)
- TEXT
- DATE
- TIMESTAMP WITHOUT TIME ZONE
- TIMESTAMP WITH TIME ZONE
- INTERVAL(\*2)
- SMALLINT
- BIGINT

**\*1:**

The host variables with CHAR, VARCHAR, NCHAR, and NCHAR VARYING data types are treated as TEXT, to match the string function arguments and return values. Refer to "String Functions and Operators" under "The SQL Language" in the PostgreSQL Documentation for information on string functions.

When specifying the arguments of the features compatible with Oracle databases NVL and/or DECODE, use CAST to convert the data types of the host variables to ensure that data types between arguments are the same.

\*2:

When using COLUMN\_VALUE to obtain an INTERVAL type value specified in the select list, use an INTERVAL type variable with no interval qualifier or with a range that matches that of the variable in the select list. If an interval qualifier variable with a narrow range is specified, then the value within the interval qualifier range will be obtained, but an error that the values outside the range have been truncated will not occur.

### Example

This example illustrates where a value expression that returns an INTERVAL value is set in the select list and the result is received with COLUMN\_VALUE. Note that the SQL statement operation result returns a value within the INTERVAL DAY TO SECOND range.

#### [Bad example]

Values of MINUTE, and those after MINUTE, are truncated, because the variable(v\_interval) is INTERVAL DAY TO HOUR.

```

v_interval    INTERVAL DAY TO HOUR;
...
PERFORM DBMS_SQL.PARSE(cursor, 'SELECT CURRENT_TIMESTAMP - '2010-01-01' FROM
DUAL', 1);
...
SELECT value INTO v_interval FROM DBMS_SQL.COLUMN_VALUE(cursor, 1, v_interval);
result:1324 days 09:00:00

```

#### [Good example]

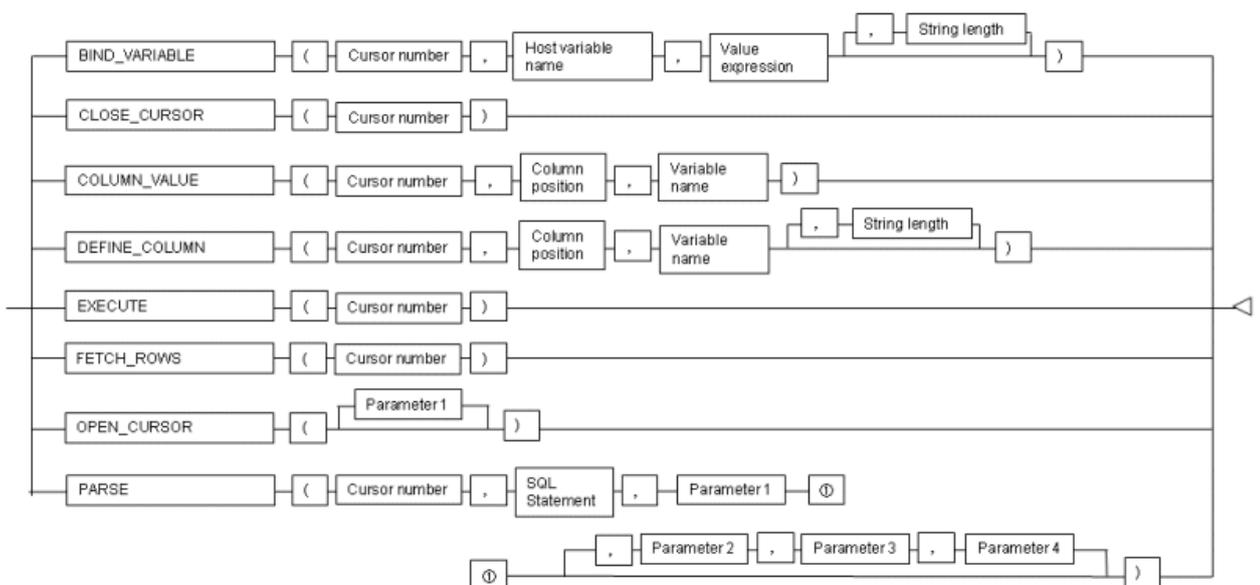
By ensuring that the variable(v\_interval) is INTERVAL, the values are received correctly.

```

v_interval    INTERVAL;
...
PERFORM DBMS_SQL.PARSE(cursor, 'SELECT CURRENT_TIMESTAMP - '2010-01-01' FROM
DUAL', 1);
...
SELECT value INTO v_interval FROM DBMS_SQL.COLUMN_VALUE(cursor, 1, v_interval);
result:1324 days 09:04:37.530623

```

### Specification format



### 9.5.3.1 Description

This section explains the procedures available in the DBMS\_SQL package.

#### BIND\_VARIABLE

- BIND\_VARIABLE sets values in the host variable within the SQL statement.
- The cursor number is the cursor number to be processed.
- Specify the name of the host variable within the SQL statement using a string for the host variable name.
- The value expression is the value set in the host variable. The data type of the host variable is the same as that of the value expression - it is implicitly converted in accordance with its position within the SQL statement. Refer to "A.3 Implicit Data Type Conversions" for information on implicit conversions.
- If the value expression is a character string type, the string length is the number of characters. If the string length is not specified, the size is the total length of the string.
- It is necessary to place a colon at the beginning of the host variable in SQL statements to identify the host variable. The colon does not have to be added to the host variable names specified at BIND\_VARIABLE. The following shows examples of host variable names specified with SQL statements and host variable names specified with BIND\_VARIABLE:

```
PERFORM DBMS_SQL.PARSE(cursor, 'SELECT emp_name FROM emp WHERE sal > :x', 1);
```

In this example, BIND\_VARIABLE will be as follows:

```
PERFORM DBMS_SQL.BIND_VARIABLE(cursor, ':x', 3500);
```

Or,

```
PERFORM DBMS_SQL.BIND_VARIABLE(cursor, 'x', 3500);
```

- The length of the host variable name can be up to 30 bytes (excluding colons).
- If the data type of the set value is string, specify the effective size of the column value as the fourth argument.

#### Example

If the data type of the value to be set is not a string:

```
PERFORM DBMS_SQL.BIND_VARIABLE(cursor, ':NO', 1);
```

If the data type of the value to be set is a string:

```
PERFORM DBMS_SQL.BIND_VARIABLE(cursor, ':NAME', h_memid, 5);
```

#### CLOSE\_CURSOR

- CLOSE\_CURSOR closes the cursor.
- The cursor number is the cursor number to be processed.
- The value returned is a NULL value.

#### Example

```
cursor := DBMS_SQL.CLOSE_CURSOR(cursor);
```

## COLUMN\_VALUE

- COLUMN\_VALUE acquires the value of the column in the select list extracted with FETCH\_ROWS.
- The cursor number is the cursor number to be processed.
- The column position is the position of the column of the select list in the SELECT statement. The position of the first column is 1.
- Specify the variable name for the storage location as the variable name.
- The information extracted is acquired as the values of the value, column\_error, and actual\_length columns with the SELECT statement.
- value returns the value of the column specified at column position. The data type of the variable name must match the data type of the column. If the data type of the column in the SELECT statement specified in PARSE is not compatible with DBMS\_SQL, use CAST to convert to a compatible data type.
- column\_error is a NUMERIC type. If the column value could not be set correctly in "value", a value other than 0 will be returned:  
22001: The extracted string has been truncated  
22002: The extracted value contains a NULL value
- actual\_length is an INTEGER type. If the extracted value is a character string type, the number of characters will be returned (if the value was truncated, the number of characters prior to the truncation will be returned), otherwise, the number of bytes will be returned.

### Example

When getting the value of the column, the error code, and the actual length of the column value:

```
SELECT value, column_error, actual_length INTO v_memid, v_col_err, v_act_len FROM  
DBMS_SQL.COLUMN_VALUE(cursor, 1, v_memid);
```

When just getting the value of the column:

```
SELECT value INTO v_memid FROM DBMS_SQL.COLUMN_VALUE(cursor, 1, v_memid);
```

## DEFINE\_COLUMN

- DEFINE\_COLUMN defines the column from which values are extracted and the storage destination.
- The cursor number is the cursor number to be processed.
- Specify the relative position of the select list for the column position. The position of the first column is 1.
- The variable name defines the storage location. The data type in the storage destination should be match with the data type of the column from which the value is to be extracted. If the data type of the column in the SELECT statement specified in PARSE is not compatible with DBMS\_SQL, use CAST to convert to a compatible data type.
- String length is the maximum string numbers of character string type column values.
- If the data type of the column value is string, specify the effective size of the column value as the fourth argument.

### Example

When the data type of the column value is not a string:

```
PERFORM DBMS_SQL.DEFINE_COLUMN(cursor, 1, v_memid);
```

When the data type of the column value is a string:

```
PERFORM DBMS_SQL.DEFINE_COLUMN(cursor, 1, v_memid, 10);
```

## EXECUTE

- EXECUTE executes SQL statements.
- The cursor number is the cursor number to be processed.
- The return value is an INTEGER type, is valid only with INSERT statement, UPDATE statement, and DELETE statement, and is the number of lines processed. Anything else is invalid.

### Example

```
ret := DBMS_SQL.EXECUTE(cursor);
```

## FETCH\_ROWS

- FETCH\_ROWS positions at the next line and extracts values from the line.
- The cursor number is the cursor number to be processed.
- The return value is an INTEGER type and is the number of lines extracted. 0 is returned if all are extracted.
- The extracted information is acquired with COLUMN\_VALUE.

### Example

```
LOOP
  IF DBMS_SQL.FETCH_ROWS(cursor) = 0 THEN
    EXIT;
  END IF;
  ...
END LOOP;
```

## OPEN\_CURSOR

- OPEN\_CURSOR opens a new cursor.
- Parameter 1 is a parameter used for compatibility with Oracle databases only, and are ignored by FUJITSU Enterprise Postgres. An INTEGER type can be specified, but it will be ignored. Although specifying a value here has no meanings, if you are specifying a value anyway, specify 1. If migrating from an Oracle database, the specified value does not need to be changed.
- Close unnecessary cursors by executing CLOSE\_CURSOR.
- The return value is an INTEGER type and is the cursor number.

### Example

```
cursor := DBMS_SQL.OPEN_CURSOR();
```

## PARSE

- PARSE analyzes dynamic SQL statements.
- The cursor number is the cursor number to be processed.
- The SQL statement is the SQL statement to be parsed.
- Parameters 1, 2, 3, and 4 are parameters used for compatibility with Oracle databases only, and are ignored by FUJITSU Enterprise Postgres. Although specifying a value here has no meanings, if you are specifying a value anyway, specify the following:
  - Parameter 1 is an INTEGER type. Specify 1.
  - Parameters 2 and 3 are TEXT types. If specifying, specify NULL.
  - Parameter 4 is a BOOLEAN type. If specifying, specify TRUE.If migrating from an Oracle database, the specified values for parameters 2, 3, and 4 do not need to be changed.
- Add a colon to the beginning of host variables in SQL statements.
- The DDL statement is executed when PARSE is issued. EXECUTE is not required for the DDL statement.
- If PARSE is called again for opened cursors, the content in the data regions within the cursors are reset, the SQL statement is parsed anew.

### Example

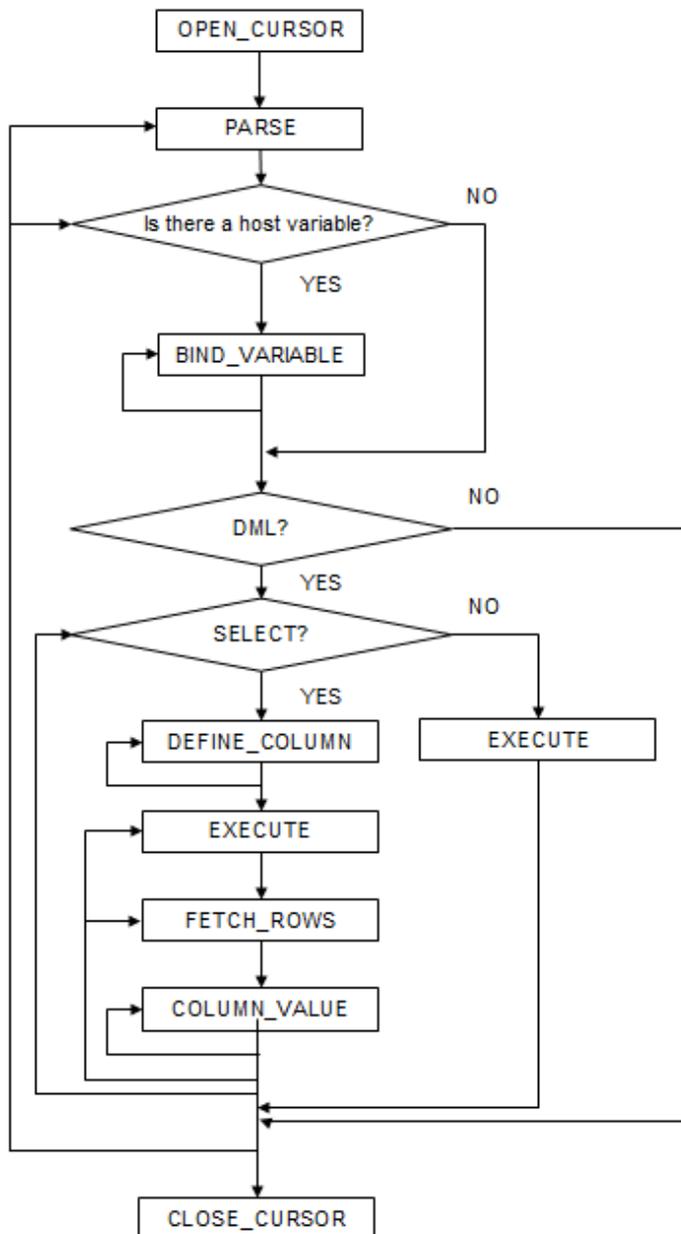
```
PERFORM DBMS_SQL.PARSE(cursor, 'SELECT memid, memnm FROM member WHERE memid = :NO', 1);
```

### 9.5.3.2 Example

This section explains the flow of DBMS\_SQL and the example.

## Flow of DBMS\_SQL

Flow of DBMS\_SQL



## Example

```
CREATE FUNCTION smp_00()  
RETURNS INTEGER  
AS $$  
DECLARE  
    str_sql    VARCHAR(255);  
    cursor     INTEGER;  
    h_smpid    INTEGER;  
    v_smpid    INTEGER;  
    v_smpnm    VARCHAR(20);  
    v_smpage   INTEGER;  
    errcd     INTEGER;
```

```

length      INTEGER;
ret         INTEGER;
BEGIN
  str_sql   := 'SELECT smpid, smpnm, smpage FROM smp_tbl WHERE smpid < :H_SMPID ORDER
BY smpid';
  h_smpid   := 3;
  v_smpid   := 0;
  v_smpnm   := '';
  v_smpage  := 0;

  cursor := DBMS_SQL.OPEN_CURSOR();

  PERFORM DBMS_SQL.PARSE(cursor, str_sql, 1);

  PERFORM DBMS_SQL.BIND_VARIABLE(cursor, ':H_SMPID', h_smpid);

  PERFORM DBMS_SQL.DEFINE_COLUMN(cursor, 1, v_smpid);
  PERFORM DBMS_SQL.DEFINE_COLUMN(cursor, 2, v_smpnm, 10);
  PERFORM DBMS_SQL.DEFINE_COLUMN(cursor, 3, v_smpage);

  ret := DBMS_SQL.EXECUTE(cursor);
  loop
    if DBMS_SQL.FETCH_ROWS(cursor) = 0 then
      EXIT;
    end if;

    SELECT value,column_error,actual_length INTO v_smpid,errcd,length FROM
DBMS_SQL.COLUMN_VALUE(cursor, 1, v_smpid);
    RAISE NOTICE '-----';
    RAISE NOTICE '-----';
    RAISE NOTICE 'smpid      = %', v_smpid;
    RAISE NOTICE 'errcd      = %', errcd;
    RAISE NOTICE 'length     = %', length;

    SELECT value,column_error,actual_length INTO v_smpnm,errcd,length FROM
DBMS_SQL.COLUMN_VALUE(cursor, 2, v_smpnm);
    RAISE NOTICE '-----';
    RAISE NOTICE 'smpnm      = %', v_smpnm;
    RAISE NOTICE 'errcd      = %', errcd;
    RAISE NOTICE 'length     = %', length;

    select value,column_error,actual_length INTO v_smpage,errcd,length FROM
DBMS_SQL.COLUMN_VALUE(cursor, 3, v_smpage);
    RAISE NOTICE '-----';
    RAISE NOTICE 'smpage     = %', v_smpage;
    RAISE NOTICE 'errcd      = %', errcd;
    RAISE NOTICE 'length     = %', length;
    RAISE NOTICE '';
  end loop;

  cursor := DBMS_SQL.CLOSE_CURSOR(cursor);
  RETURN 0;
END;
$$ LANGUAGE plpgsql;

```

# Chapter 10 Java Applications using PL/extJava

This chapter explains how to develop Java applications using PL/extJava.



Refer to "Setting up and Operating PL/extJava" in the Operation Guide for details.



In this chapter, PL/extJava stored functions that are registered in the database are referred to as "Java functions". Applications that operate on the Java VM are referred to as "Java applications".

## 10.1 Development Procedure

Perform the following procedure to develop the Java application that runs in the PL/extJava environment:

1. Develop the Java application

Use the same approach as the one generally used to develop Java applications.

There is no need to implement a special interface in order to use the application in PL/extJava.

The connection from the Java application to the database uses the JDBC connection pool. Refer to "[10.3 Connecting to the Database](#)" for details.

2. Compile the Java application

Compile the Java application that was created, and package (jar) the class files.

3. Deploy the jar file to the PL/extJava environment

Refer to "Registering Java Functions" in the Operation Guide for details.

## 10.2 Points to Consider when Developing Java Applications

This section contains points that should be considered regarding Java applications. These are as follows:

- Use JDK7 to develop the Java function.
- Implement methods that are to be called as Java functions as static.
- Do not use variable arguments as method arguments.
- Only a single row can be returned as the return value.
- In Java applications, the auto commit mode for transactions is 'off' by default. You can change it using the `setAutoCommit` method, as necessary.
- Standard output and standard error output  
If a Java application outputs to the standard output or to the standard error output, then it will be redirected to the server log of the container.
- File output  
In Java applications, the directories below are used as the current directory.  
If files are output using an absolute path, ensure that the output directory is secure.

- **Linux**

```
domainRoot(*1)/nodes/localhost-domain1/[serverInstanceName]/current
```



Java application are started by an instance administrator user, which must have file access privileges.

#### - Windows(R)

```
domainRoot(*1)\nodes\localhost-domain1\serverInstanceName\current
```

\*1: *domainRoot* is the directory that stores the domain resources (refer to "PL/extJava Configuration" in the Operation Guide for details).

- The following system administrator functions will wait until the execution of the Java application completes:
  - pg\_terminate\_backend
  - pg\_cancel\_backend
- Java applications run as transactions that are not dependent on the caller. For this reason, if the caller transaction is rolled back, the Java application transaction will not be rolled back. Additionally, if an error occurs in the Java application, it will be output to the server log of the container (refer to "PL/extJava Log Information" in the Operation Guide for details).

## 10.3 Connecting to the Database

The Java application uses the JDBC connection pool to connect to the database.

However, when using an integrated development environment such as Interstage Studio for testing during the Java application development stage, the JDBC driver is called directly in order to connect to the database.

Select the connection methods shown below according to the phase.

### Development/testing phase

Call the JDBC directly to connect to the database.

- Set CLASSPATH.

The CLASSPATH setting will be required to check the behavior by calling the JDBC driver directly.

The name of the JDBC driver file that can be used in the Java function is as follows:

```
postgresql-jdbc41.jar
```

Refer to "2.2.1 Environment Settings" for information on how to set CLASSPATH.

- The database server URL is called directly.

Refer to "2.3 Connecting to the Database" for information on how to use the JDBC driver.

### Operation phase

The JDBC connection pool of PL/extJava is used to connect to the database.

Use `DriverManager.getConnection()` to obtain the connection.

"jdbc:default:connection" must be specified as the `DriverManager.getConnection()` argument.

```
java.sql.Connection conn = DriverManager.getConnection("jdbc:default:connection");
```

## 10.4 Data type

This section explains the data type.

## 10.4.1 Relationship between the Java Function Data Types and Java Application Data Types

This section explains the relationship between the Java function data type and the Java application data type.

Use the mapping shown in the table below to implement the relationship between the Java function to be registered using CREATE FUNCTION and the arguments and return values of the Java application. If the method names match but the Java application data types do not match, the Java function cannot be executed and returns an error.

Table 10.1 Java function and Java application data type conversion rules

| Java function data type<br>(CREATE FUNCTION argument, return value type) | Java application data type<br>(method argument, return value type) |
|--|--|
| void   | void   |
| character  | java.lang.String   |
| national character   | java.lang.String   |
| character varying  | java.lang.String   |
| national character varying   | java.lang.String   |
| text   | java.lang.String   |
| bytea  | byte[]   |
| smallint   | short  |
| integer  | int  |
| bigint   | long   |
| smallserial  | short  |
| serial   | int  |
| bigserial  | long   |
| real   | float  |
| double precision   | double   |
| date   | java.sql.Date  |
| time with time zone  | java.sql.Time  |
| time without time zone   | java.sql.Time  |
| timestamp without time zone  | java.sql.Timestamp   |
| timestamp with time zone   | java.sql.Timestamp   |
| boolean  | boolean  |

### Note

In the Java function, the following data types cannot be used:

- numeric
- decimal
- money
- interval
- bit
- bit varying

- xml
  - array
  - uuid
  - point
  - box
  - lseg
  - path
  - polygon
  - circle
  - json
  - Network address type (inet, cidr, macaddr)
  - Types related to text searches (tsvector, tsquery)
  - Enumerated type
  - Composite type
  - Range type
  - Object identifier data type
  - Pseudo-data types (except void)
- 

## 10.4.2 Relationship between the Java Application Data Types and Database Data Types

---

When developing a Java application that uses JDBC driver, refer to "[2.4.1 Relationship between the Application Data Types and Database Data Types](#)" for information on this relationship.

# Chapter 11 Application Connection Switch Feature

The application connection switch feature enables automatic connection to the target server when there are multiple servers with redundant configurations.

When using this feature, specify the primary server and secondary server as the connected servers in the application connection information.

If an application connection switch occurs, explicitly close the connection and then reestablish the connection or reexecute the application. Refer to "Errors when an Application Connection Switch Occurs and Corresponding Actions" of the relevant client interface for information on how to confirm the switch.

## 11.1 Connection Information for the Application Connection Switch Feature

To use the application connection switch feature, set the information shown below when connecting the database.

### IP address or host name

Specify the IP address or host name that will be used to configure the database multiplexing system.

### Port number

A port number used by each database server to listen for connections from applications.

In each client interface, multiple port numbers can be specified, however in the format shown below, for example, if only one port number is specified, it will be assumed that host1: 27500 (the default value) and host2:port2 were specified.

host1,host2:port2

Omit all port numbers, or specify only one per server.

### Target server

From the specified connection destination server information, specify the selection sequence of the servers to which the application will connect. The values specified for the target server have the meanings shown below. If a value is omitted, "any" will be assumed if the JDBC driver is used, or "primary server" otherwise.

#### Primary server

The primary server is selected as the connection target from the specified "IP addresses or host names". Specify this to perform tasks that can be performed only on the primary server, such as applications in line with updates, or management tasks such as REINDEX and VACUUM.

#### Standby server (this value can be used only when the JDBC driver is used)

The standby server is selected as the connection target from the specified "IP addresses or host names". On standby server, the update will always fail. If the target server is not standby, the JDBC driver will throw an error stating that it is unable to find a server with the specified targetServerType.

#### Priority given to a standby server

The standby server is selected preferentially as the connection target from the specified "IP addresses or host names". If there is no standby server, the application will connect to the primary server.

This value can be specified when the Mirroring Controller option is used.

#### Any (this value can be used only when the JDBC driver is used)

This method is not recommended in database multiplexing systems. This is because, although the connection destination server is selected in the specified sequence from the specified "IP addresses or host names", if the server that was successfully connected to first is the standby server, the update will always fail.

The table below shows the server selection order values to set for each driver:

| Server selection order | JDBC driver | Drivers other than JDBC |
|------------------------|-------------|-------------------------|
| Primary server         | "master"    | "primary"               |

| Server selection order             | JDBC driver   | Drivers other than JDBC |
|------------------------------------|---------------|-------------------------|
| Standby server                     | "slave"       | -                       |
| Priority given to a standby server | "preferSlave" | "prefer_standby"        |
| Any                                | "any"         | -                       |

### SSL server certificate Common Name (CN)

To perform SSL authentication by creating the same server certificate for each server in a multiplexing system, specify the SSL server certificate Common Name (CN) in this parameter. Accordingly, SSL authentication using the CN can be performed without having to consider the names of the multiple servers contained in the multiplexing system.

## 11.2 Using the Application Connection Switch Feature

This section explains how to set the connection destination server using the application connection switch feature.

Of the parameters used as connection information for each client interface, only the parameters specific to the application connection switch feature are explained here. Refer to "Setup" and "Connecting to the Database" for information on the other parameters of each client interface.

### 11.2.1 Using the JDBC Driver

Set the following information in the connection string of the DriverManager class, or in the data source.

Table 11.1 Information to be set

| Argument         | Explanation  |
|------------------|--|
| host1<br>host2   | Specify the IP address or host name.   |
| port1<br>port2   | Specify the port number for the connection.<br>The port number can be omitted. If omitted, the default is 27500.   |
| database_name    | Specify the database name.   |
| targetServerType | Specify the selection sequence of the servers to which the application will connect.<br>Refer to " <a href="#">Target server</a> " for details.  |
| sslmode          | Specify this to encrypt communications. By default, this is disabled. The setting values for sslmode are as follows:<br><br>disable: Connect without SSL<br><br>require: Connect always with SSL<br><br>verify-ca: Connect with SSL, using a certificate issued by a trusted CA (*1)<br><br>verify-full: Connect with SSL, using a certificate issued by a trusted CA to verify if the server host name matches the certificate (*1) |
| sslservercertcn  | This parameter is enabled only to perform SSL authentication (sslmode=verify-full).<br><br>Specify the server certificate CN. If this is omitted, the value will be null, and the server certificate CN will be authenticated using the host name specified in host.   |

\*1: If specifying either "verify-ca" or "verify-full", the CA certificate file can be specified using connection string sslrootcert.

#### When using Driver Manager

Specify the following URL in the API of the DriverManager class:

```
jdbc:postgresql://host1[:port1],host2[:port2]/dbName[?targetServerType={master | slave
| preferSlave | any}][&sslmode=verify-
full&sslrootcert=cACertificateFile&sslservercertcn=targetServerCertificateCN]
```

- If the target server is omitted, the default value "any" is used.
- When using IPV6, specify the host in the "[host]" (with square brackets) format.

**[Example]**

```
jdbc:postgresql://[2001:Db8::1234]:27500,192.168.1.1:27500/dbName
```

**When using the data source**

Specify the properties of the data source in the following format:

```
source.setServerName("host1[:port1],host2[:port2]");
source.setTargetServerType("master");
source.setSslmode("verify-full");
source.setSslrootcert("cACertificateFile");
source.setSslservercertcn("targetServerCertificateCN");
```

- If the port number is omitted, the value specified in the portNumber property will be used. Also, if the portNumber property is omitted, the default is 27500.
- If the target server is omitted, the value will be "any".
- When using IPV6, specify the host in the "[host]" (with square brackets) format.

**[Example]**

```
source.setServerName("[2001:Db8::1234]:27500,192.168.1.1:27500");
```



If using the connection parameter loginTimeout, the value will be applied for the time taken attempting to connect to all of the specified hosts.

## 11.2.2 Using the ODBC Driver

Set the following information in the connection string or data source.

Table 11.2 Information to be set

| Parameter  | Explanation   |
|------------|---|
| Servername | Specify IP address 1 and IP address 2, or the host name, using a comma as the delimiter. Based on ODBC rules, it is recommended to enclose the whole string containing comma delimiters with {}.<br>Format: {host1,host2}   |
| Port       | Specify the connection destination port numbers, using a comma as the delimiter. Based on ODBC rules, it is recommended to enclose the whole string containing comma delimiters with {}.<br>Format: {port1,port2}<br>Specify the port number corresponding to the IP address or host specified for the nth Servername as the nth Port.<br>The port number can be omitted. If omitted, the default is 27500. |

| Parameter       | Explanation   |
|-----------------|---|
|                 | If <i>n</i> server names are specified, the ( <i>n</i> +1)th and later ports will be ignored.   |
| TargetServer    | Specify the selection sequence of the servers to which the application will connect. Refer to "Target server" for details.  |
| SSLMode         | Specify this to encrypt communications. By default, this is disabled. The setting values for SSLMode are as follows:<br><br>disable: Connect without SSL<br>allow: Connect without SSL, and if it fails, connect with SSL<br>prefer: Connect with SSL, and if it fails, connect without SSL<br>require: Connect always with SSL<br>verify-ca: Connect with SSL, using a certificate issued by a trusted CA (*1)<br>verify-full: Connect with SSL, using a certificate issued by a trusted CA to verify if the server host name matches the certificate (*1) |
| SSLServerCertCN | This parameter is enabled only to perform SSL authentication (SSLMode=verify-full). Specify the server certificate CN. If this is omitted, the value will be null, and the server certificate CN will be authenticated using the host name specified in Servername.   |

\*1: If specifying either "verify-ca" or "verify-full", use the system environment variable PGSSLROOTCERT of your operating system to specify the CA certificate file as shown below.

Example)

Variable name: PGSSLROOTCERT

Variable value: *cACertificateFile*

#### When specifying a connection string

Specify the following connection string:

```
...;Servername={host1,host2};Port={port1,port2};[TargetServer={primary | prefer_standby }];[ SSLMode=verify-full;SSLServerCertCN=targetServerCertificateCN]...
```

- When using IPV6, specify the host in the "host" format.

#### [Example]

```
Servername={2001:Db8::1234,192.168.1.1};Port={27500,27500};
```

#### When using the data source

Specify the properties of the data source in the following format:

```
Servername={host1,host2}
Port={port1,port2}
TargetServer={primary | prefer_standby }
SSLMode=verify-full
SSLServerCertCN=targetServerCertificateCN
```

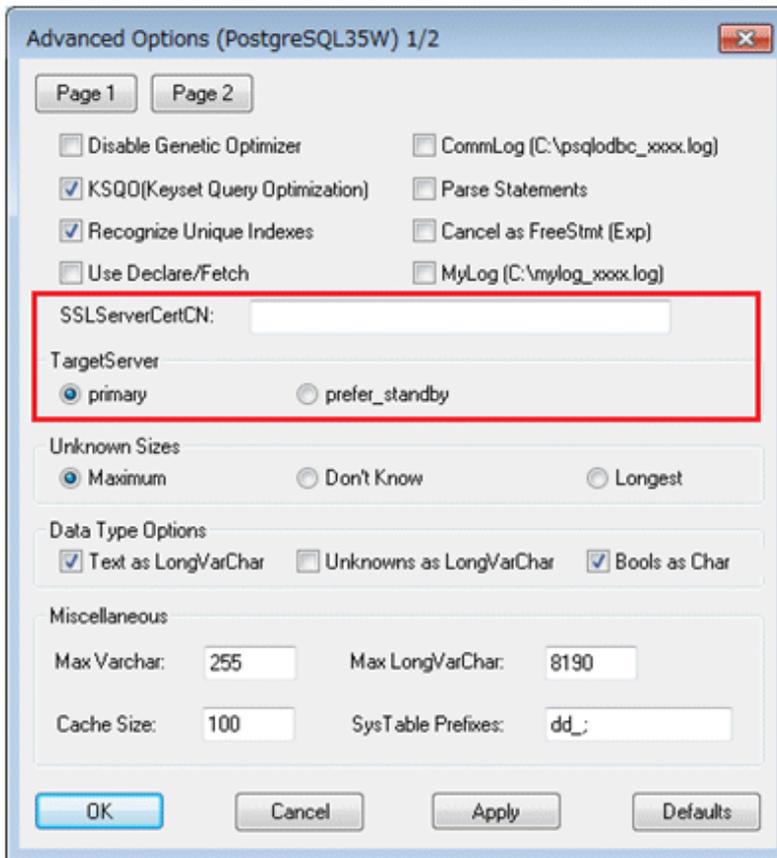
- When using IPV6, specify the host in the "host" format.

#### [Example]

```
Servername={2001:Db8::1234,192.168.1.1}
```

Registering the data source using the ODBC Data Source Administrator

Using the ODBC Data Source Administrator, specify the items within the red border below:



 Note

If using the connection parameter `login_timeout`, this value is applied for connections to each of the specified hosts. If both multiplexed database servers have failed, the connection will time out when a time equal to double the `login_timeout` value elapses.

### 11.2.3 Using a .NET Data Provider

Set the following information in the connection string of `NpgsqlConnection`, or in the data source.

Table 11.3 Information to be set

| Argument       | Explanation  |
|----------------|--|
| host1<br>host2 | Specify the IP address or host name.   |
| port1<br>port2 | Specify the port number for the connection.  |
| targetServer   | Specify the selection sequence of the servers to which the application will connect. Refer to " <a href="#">Target server</a> " for details. |

When specifying a connection string

Specify the following connection string:

```
host1[:port1],host2[:port2];[targetServer={primary | prefer_standby }];
```

- If the port number is omitted from the host string, the value specified for the Port keyword of the connection string will be used. Refer to "4.3.4 Connection String" for information on the Port keyword.
- If the target server is omitted, the value will be primary.
- When using IPV6, specify the host in the "[host]" (with square brackets) format.

**[Example]**

```
host=[ 2001:Db8::1234]:27500,192.168.1.1:27500;
```

When specifying the NpgsqlConnectionStringBuilder property, or adding a connection in TableAdapter

Specify the Host property of the data source in the following format:

```
host1[:port1],host2[:port2]
```

- If the port number is omitted from the host string, the value specified in the Port property will be used. Also, if the Port property is omitted, the default is 27500.

Specify the TargetServer property of the data source in the following format:

```
TargetServer.primary | TargetServer.prefer_standby
```

- If the target server is omitted, the value will be primary.



If using the connection parameter Timeout, this value is applied for connections to each of the specified hosts. If both multiplexed database servers have failed, the connection will time out when a time equal to double the Timeout value elapses.

## 11.2.4 Using a Connection Service File

Set the connection parameters as follows.

Table 11.4 Information to be set

| Parameter     | Explanation  |
|---------------|--|
| host          | Specify the host names, using a comma as the delimiter.  |
| hostaddr      | Specify IP address 1 and IP address 2, using a comma as the delimiter.   |
| port          | Specify the connection destination port numbers, using a comma as the delimiter.<br>Specify the port number for the server specified for the nth host or hostaddr as the nth port.<br>The port number can be omitted. If omitted, the default is 27500.<br>If n server names are specified, the (n+1)th and later ports will be ignored. |
| target_server | Specify the selection sequence of the servers to which the application will connect.<br>Refer to "Target server" for details.  |
| sslmode       | Specify this to encrypt communications. By default, this is disabled.<br>The setting values for sslmode are as follows:<br>disable: Connect without SSL<br>allow: Connect without SSL, and if it fails, connect with SSL   |

| Parameter       | Explanation   |
|-----------------|---|
|                 | <p>prefer: Connect with SSL, and if it fails, connect without SSL</p> <p>require: Connect always with SSL</p> <p>verify-ca: Connect with SSL, using a certificate issued by a trusted CA (*1)</p> <p>verify-full: Connect with SSL, using a certificate issued by a trusted CA to verify if the server host name matches the certificate (*1)</p> |
| sslservercertcn | <p>This parameter is enabled only to perform SSL authentication (sslmode=verify-full).</p> <p>Specify the server certificate CN. If this is omitted, the value will be null, and the server certificate CN will be authenticated using the host name specified in host.</p>   |

\*1: If specifying either "verify-ca" or "verify-full", use the system environment variable PGSSLROOTCERT (connection parameter sslrootcert) of your operating system to specify the CA certificate file as shown below.

Example)

Variable name: PGSSLROOTCERT

Variable value: *cACertificateFile*

### Note

If using the connection parameter connect\_timeout, this value is applied for connections to each of the specified hosts. If both multiplexed database servers have failed, the connection will time out when a time equal to double the connect\_timeout value elapses.

### Point

If using the C Library, embedded SQL or psql commands (including other client commands that specify connection destinations), it is recommended to use a connection service file to specify connection destinations.

In the connection service file, a name (service name) is defined as a set, comprising information such as connection destination information and various types of tuning information set for connections. By using the service name defined in the connection service file when connecting to databases, it is no longer necessary to modify applications when the connection information changes.

## 11.2.5 Using the C Library (libpq)

It is recommended that you use a connection service file. Refer to "[11.2.4 Using a Connection Service File](#)" for details.

If a connection service file will not be used, set the following information for the database connection control functions (PQconnectdbParams, PQconnectdb, and so on) or environment variables.

Table 11.5 Information to be set

| Parameter (environment variable name) | Explanation   |
|---------------------------------------|---|
| host(PGHOST)                          | Specify the host names, using a comma as the delimiter.   |
| hostaddr(PGHOSTADDR)                  | Specify IP address 1 and IP address 2, using a comma as the delimiter.  |
| port(PGPORT)                          | <p>Specify the connection destination port numbers, using a comma as the delimiter. Specify the port number for the server specified for the nth host or hostaddr as the nth port.</p> <p>The port number can be omitted. If omitted, the default is 27500.</p> |

| Parameter (environment variable name) | Explanation  |
|---------------------------------------|--|
|                                       | If $n$ server names are specified, the $(n+1)$ th and later ports will be ignored.   |
| target_server(PGXTARGETSERVER)        | Specify the selection sequence of the servers to which the application will connect.<br>Refer to " <a href="#">Target server</a> " for details.  |
| sslmode(PGSSLMODE)                    | Specify this to encrypt communications. By default, this is disabled.<br>The setting values for sslmode are as follows:<br><br>disable: Connect without SSL<br><br>allow: Connect without SSL, and if it fails, connect with SSL<br><br>prefer: Connect with SSL, and if it fails, connect without SSL<br><br>require: Connect always with SSL<br><br>verify-ca: Connect with SSL, using a certificate issued by a trusted CA (*1)<br><br>verify-full: Connect with SSL, using a certificate issued by a trusted CA to verify if the server host name matches the certificate (*1) |
| sslservercertcn(PGXSSLSERVERCERTCN)   | This parameter is enabled only to perform SSL authentication (sslmode=verify-full).<br><br>Specify the server certificate CN. If this is omitted, the value will be null, and the server certificate CN will be authenticated using the host name specified in host.   |

\*1: If specifying either "verify-ca" or "verify-full", use the system environment variable PGSSLROOTCERT (connection parameter sslrootcert) of your operating system to specify the CA certificate file as shown below.

Example)

Variable name: PGSSLROOTCERT

Variable value: *cACertificateFile*

#### When using URI

```
postgresql://host1[:port1],host2[:port2][, ...]/database_name
[?target_server={primary | prefer_standby}]
```

- When using IPV6, specify the host in the "[host]" (with square brackets) format.

#### [Example]

```
postgresql://postgres@[2001:Db8::1234]:27500,192.168.1.1:27500/database_name
```

#### When using key-value

```
host=host1[,host2] port=port1[,port2] user=user1 password=pwd1 dbname=mydb
[?target_server={primary | prefer_standby}]
```

- When using IPV6, specify the host in the "host" format.

#### [Example]

```
host=2001:Db8::1234,192.168.1.1 port=27500,27500
```

## Note

If using the connection parameter `connect_timeout`, this value is applied for connections to each of the specified hosts. If both multiplexed database servers have failed, the connection will time out when a time equal to double the `connect_timeout` value elapses.

## Information

If using a password file (`.pgpass`), describe the entries matching each server.

- Example 1:

```
host1:port1:dbname:user:password
host2:port2:dbname:user:password
```

- Example 2:

```
*:port:dbname:user:password
```

## 11.2.6 Using Embedded SQL

It is recommended that you use a connection service file. Refer to "[11.2.4 Using a Connection Service File](#)" for details.

## Point

If using a connection service file, either of the following methods is available:

- Set the service name as a string literal or host variable, as follows:

```
tcp:postgresql://?service=my_service
```

- Set the service name in the environment variable `PGSERVICE`, and use `CONNECT TO DEFAULT`

If a connection service file will not be used, use a literal or variable to specify the connection destination server information for target in the SQL statement below:

```
EXEC SQL CONNECT TO target [AS connection-name] [USER user-name];
```

Method used

```
dbname@host1,host2[:[port1][,port2]]
tcp:postgresql://host1,host2[:[port1][,port2]] [/dbname] [?target_server={primary |
prefer_standby}][&sslmode=verify-full&sslservercertcn=targetServerCertificateCN]
```

- The above format cannot be specified directly without using a literal or variable.

Table 11.6 Information to be set

| Argument       | Explanation  |
|----------------|--|
| host1<br>host2 | Specify the IP address or host name. IPv6 format addresses cannot be specified.  |
| port1<br>port2 | Specify the connection destination port numbers, using a comma as the delimiter. The port number can be omitted. If omitted, the default is 27500. |
| dbname         | Specify the database name.   |

| Argument        | Explanation   |
|-----------------|---|
| target_server   | Specify the selection sequence of the servers to which the application will connect. Refer to " <a href="#">Target server</a> " for details.  |
| sslmode         | Specify this to encrypt communications. By default, this is disabled. The setting values for sslmode are as follows:<br><br>disable: Connect without SSL<br>allow: Connect without SSL, and if it fails, connect with SSL<br>prefer: Connect with SSL, and if it fails, connect without SSL<br>require: Connect always with SSL<br>verify-ca: Connect with SSL, using a certificate issued by a trusted CA (*1)<br>verify-full: Connect with SSL, using a certificate issued by a trusted CA to verify if the server host name matches the certificate (*1) |
| sslservercertcn | This parameter is enabled only to perform SSL authentication (sslmode=verify-full).<br><br>Specify the server certificate CN. If this is omitted, the value will be null, and the server certificate CN will be authenticated using the host name specified in host.  |

\*1: If specifying either "verify-ca" or "verify-full", use the system environment variable PGSSLROOTCERT (connection parameter sslrootcert) of your operating system to specify the CA certificate file as shown below.

Example)

Variable name: PGSSLROOTCERT

Variable value: *cACertificateFile*

### Point

Environment variables can also be used. Refer to "[11.2.5 Using the C Library \(libpq\)](#)" for information on environment variables.

### Note

If using the connection parameter connect\_timeout, this value is applied for connections to each of the specified hosts. If both multiplexed database servers have failed, the connection will time out when a time equal to double the connect\_timeout value elapses.

## 11.2.7 Using the psql Command

It is recommended that you use a connection service file. Refer to "[11.2.4 Using a Connection Service File](#)" for details.

If a connection service file will not be used, specify the following information in the psql command option/environment variable.

Table 11.7 Information to be set

| Option (environment variable)    | Explanation   |
|----------------------------------|---|
| -h/--host(PGHOST/<br>PGHOSTADDR) | Specify IP address 1 and IP address 2, or the host name, using a comma as the delimiter.<br><br>This can also be specified for the environment variable PGHOST or PGHOSTADDR. |

| Option (environment variable) | Explanation  |
|-------------------------------|--|
| -p/--port(PGPORT)             | <p>Specify the connection destination port numbers, using a comma as the delimiter. This can also be specified for the environment variable PGPORT.</p> <p>Specify the port number corresponding to the IP address specified for the nth -h option as the nth -p option.</p> <p>The port number can be omitted. If omitted, the default is 27500.</p> <p>If <i>n</i>-h options are specified, the (<i>n</i>+1)th and later -p options will be ignored.</p>   |
| (PGXTARGETSERVER)             | <p>Specify the selection sequence of the servers to which the application will connect.</p> <p>Refer to "<a href="#">Target server</a>" for details.</p>   |
| (PGSSLMODE)                   | <p>Specify this to encrypt communications. By default, this is disabled. The setting values for PGSSLMODE are as follows:</p> <p>disable: Connect without SSL</p> <p>allow: Connect without SSL, and if it fails, connect with SSL</p> <p>prefer: Connect with SSL, and if it fails, connect without SSL</p> <p>require: Connect always with SSL</p> <p>verify-ca: Connect with SSL, using a certificate issued by a trusted CA (*1)</p> <p>verify-full: Connect with SSL, using a certificate issued by a trusted CA to verify if the server host name matches the certificate (*1)</p> |
| (PGXSSLSERVERCERT CN)         | <p>This environment variable is enabled only to perform SSL authentication (PGSSLMODE=verify-full).</p> <p>Specify the server certificate CN. If this is omitted, the value will be null, and the server certificate CN will be authenticated using the host name specified in host.</p>   |

\*1: If specifying either "verify-ca" or "verify-full", use the system environment variable PGSSLROOTCERT (connection parameter sslrootcert) of your operating system to specify the CA certificate file as shown below.

Example)

Variable name: PGSSLROOTCERT

Variable value: *cACertificateFile*

### Note

If using the connection parameter connect\_timeout, this value is applied for connections to each of the specified hosts. If both multiplexed database servers have failed, the connection will time out when a time equal to double the connect\_timeout value elapses.

### Information

Use the same method as for psql commands to specify connection destination server information for other client commands used to specify connection destinations.

# Chapter 12 Performance Tuning

This chapter explains how to tune application performance.

## 12.1 Enhanced Query Plan Stability

By stabilizing the SQL statement query plan so that it does not change, deterioration of the application performance is suppressed.

### 12.1.1 Optimizer Hints

This section explains the basic feature content of the optimizer hint (`pg_hint_plan`).

Refer to the open-source software webpage for information on `pg_hint_plan`.

In FUJITSU Enterprise Postgres, the optimizer hints can be specified in all application interfaces.

#### Description

You can specify a query plan in each SQL statement.

#### List of Features

The main query plans that can be specified using this feature are as follows:

- Query methods
- Join methods
- Join sequences

#### Query methods

Specify which method to use to query the specified table.

The main features are as follows:

- SeqScan (*tableName*)
- ParallelSeqScan (*tableName*)
- BitmapScan (*tableName* [*indexName* ... ])
- IndexScan (*tableName* [*indexName* ... ])
- IndexOnlyScan (*tableName* [*indexName* ... ])



#### Note

- If the specified index does not exist, or is not related to the search condition column specified in the WHERE clause, for example, SeqScan will be used.
- Even if IndexOnlyScan is specified, IndexScan may be used if it is necessary to access the table because a row was updated, for example.
- If multiple query methods were specified for the same table, the method specified last will be used.
- ParallelSeqScan is enabled when using parallel scan.

#### Join methods

Specify the join method.

The main features are as follows:

- NestLoop (*tableName tableName [tableName ... ]*)
- MergeJoin (*tableName tableName [tableName ... ]*)
- HashJoin (*tableName tableName [tableName ... ]*)

### Note

- These cannot be specified for view tables and subqueries.
- If multiple methods were specified for the same table combination, the method specified last will be used.

### Join sequences

The tables will be joined in the specified table sequence.

Specify the information using the following method:

- Leading (*((table table))*)

The method used to specify [*table*] is as follows:

*table* = *tableName* or (*table table*)

### Note

If multiple sequences were specified for the same table combination, the sequence specified last will be used.

## Usage method

The use of this feature is explained below.

### Preparation

The following preparation is required to use this feature.

1. Run CREATE EXTENSION for the database that uses this feature.  
The target database is described as "postgres" here.  
Use the psql command to connect to the "postgres" database.

### Example

```
Postgres=# CREATE EXTENSION pg_hint_plan;  
CREATE EXTENSION
```

### Information

Hereafter, also perform this preparatory task for the "template1" database when creating a new database, so that this feature can be used by default.

2. Set the postgresql.conf file parameters.  
Add "pg\_hint\_plan" to the "shared\_preload\_libraries" parameter.
3. Restart FUJITSU Enterprise Postgres.

## Method used to define this feature

Define this feature by specifying the format (block comment) `"/**+ ... */"`.

- To specify hint clauses in each SELECT statement, for example when there are multiple SELECT statements in the SQL statement, define all hint clauses in the first block comment.

### Example

#### Specifying hint clauses for the emp table and the dept table

```
WITH /**+ IndexScan(emp emp_age_index) IndexScan(dept dept_deptno_index) */ age30
AS (SELECT * FROM emp WHERE age BETWEEN 30 AND 39)
SELECT * FROM age30, dept WHERE age30.deptno = dept.deptno;
```

- To specify separate hint clauses for the same object in the SQL statement, define aliases in each object, and then specify hint clauses for those aliases.

### Example

#### Specifying separate hint clauses for the emp table

```
WITH /**+ SeqScan(ta) IndexScan(tb) */ over100
AS (SELECT empno FROM emp ta WHERE salary > 1000000)
SELECT * FROM emp tb, over100 WHERE tb.empno = over100.empno AND tb.age < 30
```

- When using embedded SQL in C, the locations in which the hint clause block comment is specified are restricted. Refer to "[6.4.2 Compiling Applications](#)" for details.

## Usage notes

- If a hint clause was specified in multiple block comments in the SQL statement, the hint clause specified in the second block comment and thereafter will be ignored.
- If characters other than those listed below appear before the hint clause in the SQL statement, they will be invalid even for hint clause block comments.
  - Space, tab, line feed
  - Letter (uppercase and lowercase), number
  - Underscore, comma
  - Brackets ()

## 12.1.2 Locked Statistics

---

This section explains the basic feature content for locked statistics (`pg_dbms_stats`).

Refer to the open-source software webpage for information on `pg_dbms_stats`.

### Description

Locks the statistics.

By using this feature to lock the statistics for performance obtained in job load testing in an environment that simulates a production environment, performance degradation caused by changes to the query plan after go-live can be suppressed.

Additionally, by using the export and import features, statistics that were checked in the test environment can also be reproduced in the production environment.

## List of Features

The main features that can be specified using this feature are as follows.

### [Features]

| Feature                             | Details | Description   |
|-------------------------------------|---------|---|
| Lock/unlock of the statistics       | Lock    | Locks the statistics.   |
|                                     | Unlock  | Unlocks the statistics.   |
| Backup/restore of the statistics    | Backup  | Backs up the current statistics.  |
|                                     | Restore | Restores the statistics to the point when they were backed up, and then locks them. |
|                                     | Purge   | Deletes backups that are no longer necessary.                                       |
| Backup/restore using external files | Export  | Exports the statistics (binary format).   |
|                                     | Import  | Imports the statistics, and then locks them.  |

### [Target object]

| Target resource | Range of feature |
|-----------------|------------------|
| Database        | In the database  |
| Schema          | In the schema    |
| Table           | In the table     |
| Column          | ID column        |

## Usage method

The use of this feature is explained below.

### Preparation

The following preparation is required to use this feature.

1. Run CREATE EXTENSION for the database that will use this feature.  
The target database is described as "postgres" here.  
Use the psql command to connect to the "postgres" database.



### Example

```
Postgres=# CREATE EXTENSION pg_dbms_stats;
CREATE EXTENSION
```



### Information

Hereafter, also perform this preparatory task for the "template1" database, so that this feature can be used by default when creating a new database.

2. Set the postgresql.conf file parameter.  
Add "pg\_dbms\_stats" to the "shared\_preload\_libraries" parameter.
3. Restart FUJITSU Enterprise Postgres.

Method used to specify this feature

Specify this feature as an SQL function.

The methods used to specify the main features are shown in the table below.

| Feature | Object   | Function specified  |
|---------|----------|---|
| Lock    | Database | dbms_stats.lock_database_stats()  |
|         | Schema   | dbms_stats.lock_schema_stats('schemaName')  |
|         | Table    | dbms_stats.lock_schema_stats('schemaName.tableName')  |
| Unlock  | Database | dbms_stats.unlock_database_stats()  |
|         | Schema   | dbms_stats.unlock_schema_stats('schemaName')  |
|         | Table    | dbms_stats.unlock_schema_stats('schemaName.tableName')  |
| Import  | Database | dbms_stats.import_database_stats('fullPathOfExportedFile')  |
| Backup  | Database | dbms_stats.backup_database_stats('commentUsedForIdentification')  |
| Restore | Database | [Format 1]<br>dbms_stats.restore_database_stats('timestamp')  |
|         |          | [Timestamp]<br>Specify in the same format as the time column of the backup_history table. Backups earlier than the specified time will be restored.                       |
| Purge   | Backup   | [Format 2]<br>dbms_stats.restore_stats(backupId)  |
|         |          | [Backup ID]<br>Specify a value in the id column of the backup_history table. The specified backup will be restored.   |
| Purge   | Backup   | dbms_stats.purge_stats(backupId,flagUsedForDeletion)  |
|         |          | [Backup ID]<br>Specify a value in the id column of the backup_history table.  |
|         |          | [Flag used for deletion]<br>true: The target backup is forcibly deleted.<br>false: The target backup is deleted only when there are also backups for the entire database. |

Remark 1: The export feature is executed using the COPY statement, not the SQL function.

 Example

**Example 1: Locking the statistics of the entire database**

```

userdb=# SELECT dbms_stats.lock_database_stats();
lock_database_stats
-----
tbl1
tbl1_pkey
    
```

Note that the locked information can be referenced as follows:

```

userdb=# select relname from dbms_stats._relation_stats_locked;
relname
-----
    
```

```
tbl1
tbl1_pkey
```

**Example 2: Unlocking the statistics of the entire database**

```
userdb=# SELECT dbms_stats.unlock_database_stats();
unlock_database_stats
-----
tbl1
tbl1_pkey
```

**Example 3: Backing up the statistics of the entire database**

```
userdb=# SELECT dbms_stats.backup_database_stats('backup1');
backup_database_stats
-----
1
```

Note that the backed up statistics can be referenced as follows:

```
userdb=# select id,comment,time,unit from dbms_stats.backup_history;
 id | comment | time | unit
-----+-----+-----+-----
  1 | backup1 | 2014-03-04 11:08:40.315948+09 | d
```

The ID:1 backup "backup1" is obtained for each database at "2014-03-04 11:08:40.315948+09".  
[Meaning of unit] d: database s: schema t: table c: column

**Example 4: Exporting the statistics of the entire database**

```
$ psql -d userdb -f export.sql
BEGIN
COMMIT
```

export.sql is the file in which the COPY statement is defined.  
Refer to "export\_effective\_stats-9.2.sql\_sample" for information on the content of the COPY statement.  
"export\_effective\_stats-9.2.sql\_sample" is stored as follows:  
*fujitsuEnterprisePostgresInstallDir/share/extension/pg\_dbms\_stats*

**Example 5: Importing the statistics of the entire database**

```
$ psql -d userdb -c "SELECT dbms_stats.import_database_stats ('$PWD/
export_stats.dmp')";
import_database_stats
-----
(1 row)
```



**Usage notes**

- You must run the ANALYZE command once for the target tables of this feature. If the ANALYZE command is not run, the statistics cannot be locked.  
Refer to "SQL Commands" in "Reference" in the PostgreSQL Documentation for information on the ANALYZE command.
- To use this feature to delete an object that has locked the statistics, use the unlock feature to delete the object lock information first.

- This feature does not specify the statistics value directly. It reproduces the status that has actually occurred. For this reason, if the text format is specified in the COPY statement when the export occurs, restore will not be possible. Always use the binary format when performing the export.

# Chapter 13 Parallel Scan

This chapter describes the parallel scan feature.

## 13.1 Operating Conditions

Parallel scan is one of the execution plans that the query planner can automatically use.

This section describes the conditions under which parallel scan can be used.

### SQL statements for which parallel scan can be used

In addition to general SELECT statements, parallel scan can be used in the execution plan for the SQL statements below (as long as they do not specify any of the elements listed in "SQL statements for which parallel scan cannot be used" below):

- SELECT INTO
- INSERT INTO ... SELECT
- CREATE TABLE AS SELECT
- COPY SELECT ... TO

### SQL statements for which parallel scan cannot be used

Parallel scan cannot be used in the execution plan for SQL statements that specify any of the following:

- Foreign table
- Temporary table
- Subquery
- Lock clause (such as FOR UPDATE)
- Cursor
- SERIALIZABLE transaction isolation level
- Function other than the ones supported by parallel processing (refer to "[13.3 Checking Functions that can be Used](#)" for details).
- Table for which a VCI was created (but vci.enable is set to "on" (enabled) in a session that performs scanning).

### Selection conditions during execution

Parallel scan will not be used in the execution plan for SQL statements if any of the criteria below is met, because it would not increase system performance. You can check if parallel scan was used and the user action to take if it was not run in "[13.2.3 Checking](#)".

- Statement performs a table scan other than with no index (sequential scan)
- Statement contains a table smaller than the value of parallel\_scan\_pages\_threshold (1,000 pages is approximately equal to 8,000 KB).
- There is no CPU available in system (system is busy servicing other queries).
- The parameters impose restrictions on operation.

The statements can be tuned so that they no longer meet the criteria above. Refer to "Parameters" in the Operation Guide for details.

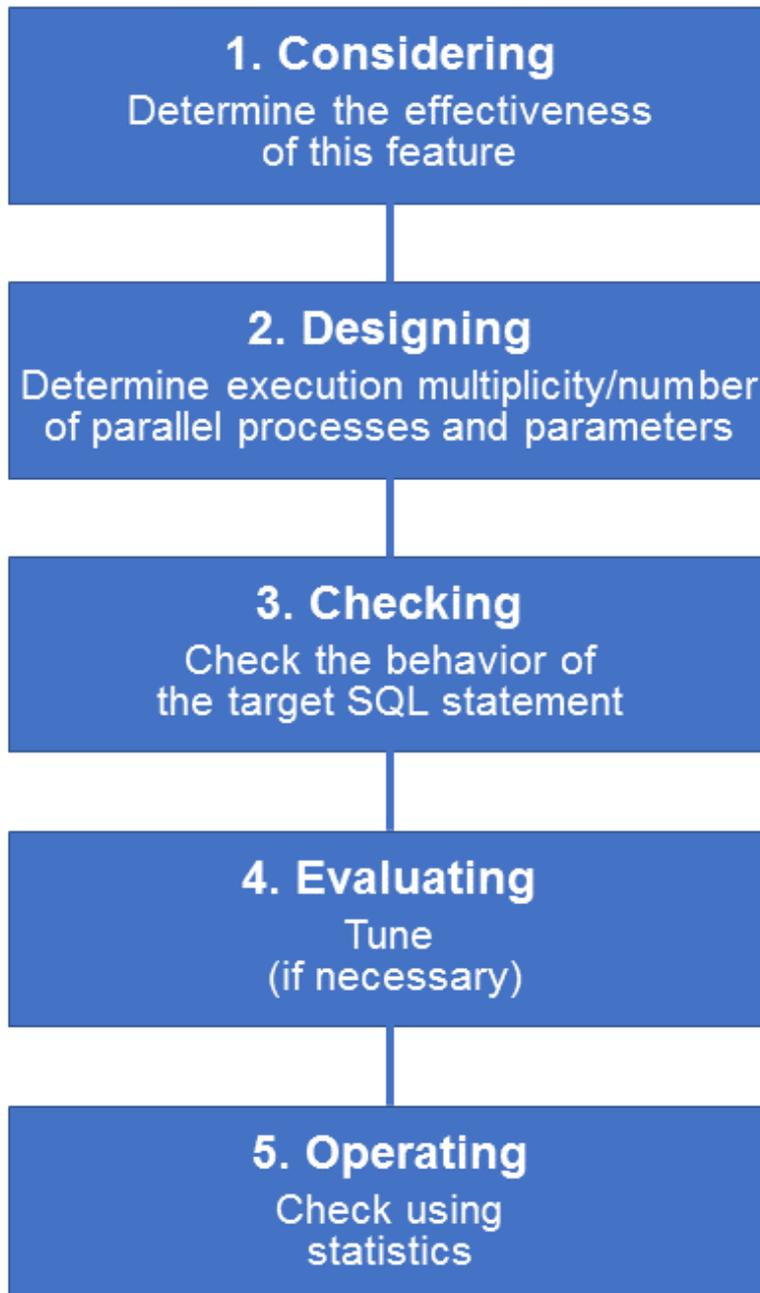
 **Point**

.....  
The SQL statement query plan for a parallel scan can be stabilized using the optimizer hint. Refer to "[12.1 Enhanced Query Plan Stability](#)" for details.  
.....

## 13.2 Usage

---

This section describes how to use parallel scan in line with the following steps:



## 13.2.1 Considering

---

Parallel scan uses available resources within the server to speed up scanning.

Parallel scan is not expected to have an effect in any of the situations below. You must therefore determine beforehand whether it will be effective.

- System in which server resources (CPU, IO) are constantly under high load
- System in which the jobs to be run mostly consist of update processing
- System in which the jobs to be run are not sufficiently filtered by the SELECT statement

## 13.2.2 Designing

---

Design as follows before using parallel scan.

- [Execution multiplicity and number of parallel processes of SQL statements](#)
- [Parameters](#)

### Execution multiplicity and number of parallel processes of SQL statements

Determine the maximum number of SQL statements that can be executed simultaneously and the number of parallel processes based on the number of CPU cores that can be allocated for parallel scan.

For example, if the number of CPUs that can be allocated for parallel scan is 32 cores, then the maximum number of SQL statements that can be executed simultaneously is 4 and the number of parallel processes is 8.

### Parameters

Parallel scan cannot be used for setting parameters immediately after creating an instance.

Therefore, set the parameters below based on the values determined in "Execution multiplicity and number of parallel processes of SQL statements" above.

| Parameter name       | Description   | Default | Value index  |
|----------------------|---|---------|--|
| max_parallel_degree  | Maximum number of parallel processes (background processes) to be used per SQL statement. | 0       | Specify the number of parallel processes subtracted by 1 (since the number of parallel processes includes the backend process).                |
| max_worker_processes | Maximum number of backend processes that the system supports.                             | 8       | Add the value of the maximum number of SQL statements that can be executed simultaneously for parallel scan multiplied by max_parallel_degree. |



See

.....  
Refer to "Parameters" in the Operation Guide for information on the details of and how to set the parameters.  
.....

## 13.2.3 Checking

---

Execute the SQL statement with EXPLAIN ANALYZE to check if parallel scan was run.

Check if the "Parallel Seq Scan" execution note was output to the output result of the EXPLAIN statement.

The following shows an example of the output result of EXPLAIN ANALYZE:

```

postgres=# EXPLAIN ANALYZE select * from test_time where f1 = 0;
                                         QUERY PLAN
-----
Gather  (cost=1000.00..23566.58 rows=1 width=8) (actual time=1079.126..1190.999 rows=100
loops=1)
  Number of Workers:  7
  Allocated Workers:  7
  ->  Parallel Seq Scan on test_time  (cost=0.00..22566.48 rows=1 width=8) (actual
time=10.102..128.702 rows=12 loops=8)
    Filter:  (f1 = 0)
    Rows Removed by Filter:  1249988
Planning time:  0.329 ms
Execution time: 1192.455 ms
(8 rows)

```

"Parallel Seq Scan" is displayed and you can also check the degree of parallelism during execution.

When evaluating only SQL statement, you can also use EXPLAIN to check if parallel scan is selected.

```

postgres=# EXPLAIN select * from test_time where f1 = 0;
                                         QUERY PLAN
-----
Gather  (cost=1000.00..23566.58 rows=1 width=8)
  Number of Workers:  7
  Allocated Workers:  0
  ->  Parallel Seq Scan on test_time  (cost=0.00..22566.48 rows=1 width=8)
    Filter:  (f1 = 0)
(5 rows)

```

## 13.2.4 Evaluating

If the result obtained in "[13.2.3 Checking](#)" is any of the following, tune accordingly:

Not parallelized

- Check if the "[13.1 Operating Conditions](#)" are met.
- Check if sufficient system resources are available when the SQL statement is executed. (CPU usage)  
Two or more cores of the CPU in the server must be available when the SQL statement is executed. For example, if the CPU has four cores and the total of 200% or more is available from cores 1 to 4, parallel scan is planned, otherwise it is not.
- Check the following parameters:
  - The parameter `max_worker_processes` is set to "0"
  - The parameter `max_parallel_degree` is not set or is set to "0".
  - The parameter `enable_parallelscan` is set to "off".
  - The parameter `enable_parallelagg` is set to "off".
  - The parameter `parallel_scan_pages_threshold` is set to a value lower than the size (number of pages) of the table.

If none of the above applies, lower the value of the `parallel_set_cost` or `parallel_tuple_cost` and check again.

Response does not improve

Tuning may improve response. Check the following:

- If there is a margin in the CPU usage, increase the value of `max_parallel_degree` and check again.  
In addition, if the value of `max_worker_processes` is lower than that of the maximum number of SQL statements

that can be executed simultaneously multiplied by `max_parallel_degree`, then increase the value of `max_workers_processes` and check again.

- If the number of parallel processes is already large, you may see improvements by decreasing it. Additional overhead due to multiplicity may affect the response, so decrease the value of `max_parallel_degree` and check again.

### Point

.....  
The number of parallel processes may not be the value specified in `max_parallel_degree`, as the system selects an appropriate value based on the CPU load during SQL statement execution or table sizes.  
.....

## 13.2.5 Operating

---

After operation starts, you can check the action state by using the existing statistics collector. Monitoring the statistics enables you to check the action state of parallel processing through, for example, changes in the system load.

The following table describes the column added to the statistics views:

`pg_stat_all_tables`

| Column                     | Data type           | Description  |
|----------------------------|---------------------|--|
| <code>parallel_scan</code> | <code>bigint</code> | Number of parallel scans initialized in the table. |

The `parallel_scan` column has also been added to the following views:

- `pg_stat_sys_tables`
- `pg_stat_user_tables`
- `pg_stat_xact_all_tables`
- `pg_stat_xact_sys_tables`
- `pg_stat_xact_user_tables`

### See

.....  
Refer to "The Statistics Collector" in "Server Administration" in the PostgreSQL Documentation for information on the statistics collector and views.  
.....

Values will be set for the following views if parallel scan is run.

`pgx_stat_sql`

| Column                                | Data type           | Description  |
|---------------------------------------|---------------------|--|
| <code>selects_with_parallelism</code> | <code>bigint</code> | Number of times parallel scan was used in SELECT statements. |
| <code>inserts_with_parallelism</code> | <code>bigint</code> | Not used.  |
| <code>deletes_with_parallelism</code> | <code>bigint</code> | Not used.  |
| <code>updates_with_parallelism</code> | <code>bigint</code> | Not used.  |
| <code>copies_with_parallelism</code>  | <code>bigint</code> | Not used.  |



Refer to "pgx\_stat\_sql" in the Operation Guide.

## 13.3 Checking Functions that can be Used

You can use the following SQL statement to check the functions available for parallel scan.

```
select * from pg_proc where proparallel='s';
```

The following table describes the column added to pg\_proc:

| Column      | Data type | Description  |
|-------------|-----------|--|
| proparallel | char      | Indicates whether parallel scan can be performed.<br><br>'s' indicates that the function is safe, 'u' indicates that the function is not safe, and 'r' indicates that its usage is restricted. Parallel scan can only be used for functions that return 's'. |

You can also use the following SQL statement to check the aggregate function available for parallel scan.

```
select * from pg_aggregate where aggcombinefn <> 0;
```

The following table describes the column added to pg\_aggregate:

| Column       | Data type | Description   |
|--------------|-----------|---------------|
| aggcombinefn | regproc   | Join function |

## 13.4 Usage Notes

This section provides notes on using parallel scan.

- Even if a normal scan changes to parallel scan, the content of the result does not change. However, records may be returned in a different order if the ORDER BY clause is not specified.
- Parallel scan uses available CPU resources on the server, so running it increases CPU usage. Therefore, edit postgresql.conf or use the SET statement to enable/disable enable\_parallelscan and enable\_parallelagg when you use this feature only for specific times or jobs (SQL applications).
- Memory usage increases during parallel scan. This is because memory is used to communicate with the generated parallel processes.



Refer to "Parallel Scan Memory Requirements" in the Installation and Setup Guide for Server for information on the amount of memory used for parallel scans.

# Chapter 14 Scan Using a Vertical Columnar Index (VCI)

This chapter describes scanning using a VCI.

## 14.1 Operating Conditions

Faster aggregation can be achieved by using a VCI defined for all columns to be referenced.

This section describes the conditions under which a scan can use a VCI.

Whether to use VCI is determined based on cost estimation in the same way as normal indexes. Therefore, another execution plan will be selected if it is cheaper than a VCI even if a VCI is available.

### SQL statements that can use VCIs

In addition to general SELECT statements, VCIs can be used for the SQL statements below (as long as they do not specify any of the elements listed in "SQL statements that cannot use VCIs" below):

- SELECT INTO
- CREATE TABLE AS SELECT
- CREATE MATERIALIZED VIEW ... AS SELECT
- CREATE VIEW ... AS SELECT
- COPY (SELECT ...) TO

### SQL statements that cannot use VCIs

VCIs cannot be used for SQL statements that specify any of the following:

- Subquery to reference the column in which the parent query is referencing is specified
- Lock clause (such as FOR UPDATE)
- Cursor declared with WITH HOLD or scrollable
- SERIALIZABLE transaction isolation level
- Function or operator listed in "Functions and operators that do not use a VCI"
- User-defined function

Table 14.1 Functions and operators that cannot use VCIs

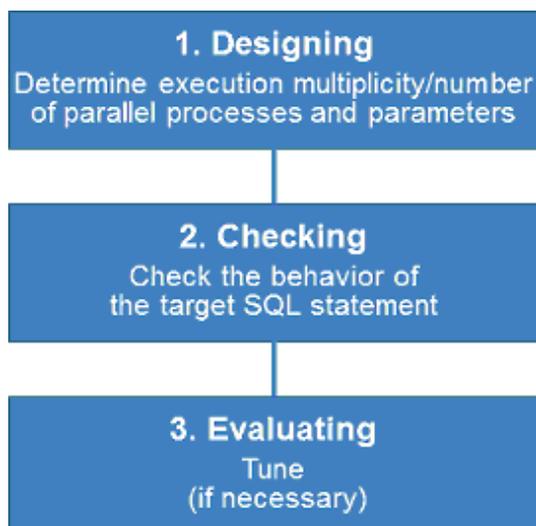
| Classification                          |                              | Function/operator  |
|---|------------------------------|--|
| Mathematical functions and operators    | Random functions             | random and setseed   |
| String functions and operators          | String functions             | format (if the <i>format</i> argument is specified), regexp_matches, regexp_split_to_array and regexp_split_to_table |
| Date/time functions and operators       | Date/time functions          | statement_timestamp, transaction_timestamp   |
|   | Delaying execution functions | pg_sleep, pg_sleep_for, and pg_sleep_until   |
| Enum support functions                  |                              | All functions and operators  |
| Geometric functions and operators       |                              | All functions and operators  |
| Network address functions and operators |                              | All functions and operators  |
| Text search functions and operators     |                              | All functions and operators  |
| XML functions                           |                              | All functions  |

| Classification                  |                                      | Function/operator   |
|---------------------------------|--------------------------------------|---|
| JSON functions and operators    |                                      | All functions and operators   |
| Sequence manipulation functions |                                      | All functions   |
| Array functions and operators   |                                      | All functions and operators   |
| Range functions and operators   |                                      | All functions and operators   |
| Aggregate functions             | General-purpose aggregate functions  | array_agg, json_agg, json_object_agg, string_agg and xmlagg   |
|                                 | Aggregate functions for statistics   | corr, covar_pop, covar_samp, regr_avgx, regr_avgy, regr_count, regr_intercept, regr_r2, regr_slope, regr_sxx, regr_sxy and regr_syy |
|                                 | Ordered-set aggregate functions      | All functions   |
|                                 | Hypothetical-set aggregate functions | All functions   |
| Window functions                |                                      | All functions   |
| Subquery expressions            |                                      | Subquery expressions with its row constructor specified on the left side  |
| Row and array comparisons       |                                      | Row constructor and composite type comparisons  |
| Set returning functions         |                                      | All functions   |
| System information functions    |                                      | All functions   |
| System administration functions |                                      | All functions   |
| Trigger functions               |                                      | All functions   |

## 14.2 Usage

---

This section describes how to use a VCI in line with the following steps:



### 14.2.1 Designing

---

Design as follows before using a VCI.

- Execution multiplicity and number of parallel processes
- Parameters

## Execution multiplicity and number of parallel processes

Determine the maximum number of SQL statements that can be executed simultaneously and the number of parallel processes based on the number of CPU cores that can be allocated for scans that use VCI to perform aggregate processing. Design in advance the multiplicity of SQL statements for executing scans that use VCI and the number of parallel processes for scans that use VCI.

For example, if the number of CPUs that can be allocated is 32 cores, then the maximum number of SQL statements that can be executed simultaneously is 8 and the number of parallel processes is 4.

### Note

A temporary file is created in /dev/shm as the dynamic shared memory for each SQL statement during a scan using a VCI.

A temporary file is created in a directory under the data storage directory as the dynamic shared memory for each SQL statement during a scan using a VCI.

Ensure that this directory has sufficient space to meet the memory requirements estimated for the execution multiplicity and number of parallel processes of SQL statements (refer to "Memory used per scanning" in "VCI Memory Requirements" in the Installation and Setup Guide for Server for details). If it does not have sufficient space when a scan is performed, SQL statements will return errors due to the insufficient memory.

## Parameters

The VCI parallel scan feature cannot be used for setting parameters immediately after creating an instance.

Therefore, set the parameters below based on the values determined in "Execution multiplicity and number of parallel processes of SQL statements" above.

| Parameter name          | Description   | Default | Value index   |
|-------------------------|---|---------|---|
| vci.max_parallel_degree | Maximum number of VCI parallel processes (background processes) to be used per SQL statement. | 0       | Specify the number of parallel processes.   |
| max_worker_processes    | Maximum number of background processes that the system supports.                              | 8       | Add the value of the maximum number of SQL statements that can be executed simultaneously for scans that use VCI multiplied by vci.max_parallel_degree. |

### See

Refer to "Parameters" in the Operation Guide for information on the details of and how to set the parameters.

## 14.2.2 Checking

Execute the SQL statement with "EXPLAIN ANALYZE" to check the following:

- If a VCI was used  
"Custom Scan (VCI...)" is displayed in the plan if a VCI was used.
- Number of parallel processes  
The number of parallel processes when the SQL statement is executed is displayed in "Allocated Workers". Check that it is running the designed number of parallel processes.
- Response  
Check if the execution time displayed in "Execution time" is as estimated.

The following shows an example of the output result of EXPLAIN ANALYZE:

```
EXPLAIN ANALYZE SELECT COUNT(*) FROM test WHERE x > 10000;
                                                    QUERY
PLAN
-----
Custom Scan (VCI Aggregate) (cost=19403.15..19403.16 rows=1 width=0) (actual
time=58.505..58.506 rows=1 loops=1)
  Allocated Workers: 4
    -> Custom Scan (VCI Scan) using test_x_idx on test (cost=0.00..16925.00 rows=991261
width=0) (never executed)
      Filter: (x > 10000)
Planning time: 0.151 ms
Execution time: 86.910 ms
(6 rows)
```

## 14.2.3 Evaluating

If the results in "14.2.2 Checking" is any of the following, tune accordingly:

If a VCI is not used

- Check if the "14.1 Operating Conditions" are met.
- Check if vci.enable is set to "off".
- A VCI may not be appropriately used when statistics are outdated, such as immediately after inserting a large amount of data. In such cases, execute the VACUUM ANALYZE statement or the ANALYZE statement.
- A VCI is not used if there is insufficient memory for VCI scan. This may occur during time-consuming transactions involving tables for which VCIs were defined. Set vci.log\_query to "on", and check if either "could not use VCI: local ROS size (%zu) exceeds limit (%zu)" or "out of memory during local ROS generation" is output. If it is, then increase the value of the vci.max\_local\_ros.

Response is not as expected

Tuning may improve response. Check the following:

- If vci.max\_parallel\_degree is not set or is set to 0, set an appropriate value according to "14.2.1 Designing".
- If there is a margin in the CPU usage, increase the value of vci.max\_parallel\_degree and check again. In addition, if the value that of max\_worker\_processes is lower than the maximum number of SQL statements that can be executed simultaneously for parallel scan multiplied by vci.max\_parallel\_degree, increase it and check again.

## 14.3 Usage Notes

This section provides notes on using VCI.

- Regardless of whether VCI is used, the content of the result does not change. However, records may be returned in a different order if the ORDER BY clause is not specified.
- To reduce resource consumption, edit postgresql.conf or use the SET statement to enable/disable vci.enable when you use this feature only for specific times or jobs (SQL applications).
- The optimizer hint (pg\_hint\_plan) cannot be specified for a VCI. The hint clause is ignored if it is specified.
- If a plan other than VCI is specified for the optimizer hint (pg\_hint\_plan), a VCI may be used. Therefore, if you specify a query plan with the hint clause, use the SET statement to set vci.enable to "off".
- The message below may be output when a scan that uses VCI is performed on the streaming replication standby server:

```
"LOG: recovery has paused"
"HINT: Execute pg_xlog_replay_resume() to continue."
```

This message is output because application of the WAL to the VCI temporarily pauses due to the scan being performed.

# Appendix A Precautions when Developing Applications

This appendix describes precautions when developing applications with FUJITSU Enterprise Postgres.

## A.1 Precautions when Using Functions and Operators

This section describes notes for using functions and operators.

### A.1.1 General rules of Functions and Operators

This section describes general rules for using functions and operators. Ensure the general rules are followed when using functions and operators to develop applications.

General rules

- Specify the stated numbers for arguments when specifying numbers for arguments in functions.
- Specify the stated data types when specifying data types for functions. If you use a data type other than the stated data types, use CAST to explicitly convert the data type.
- Specify data types that can be compared when specifying data types for operators. If you use a data type that cannot be compared, use CAST to explicitly convert the data type.



See

Refer to "Functions and Operators" under "The SQL Language" in the PostgreSQL Documentation for information on the functions and operators available with FUJITSU Enterprise Postgres.

### A.1.2 Errors when Developing Applications that Use Functions and/or Operators

This section provides examples of problems that may occur when developing applications that use functions and/or operators, and describes how to deal with them.

The error "Function \*\*\*\*\* does not exist" occurs when executing SQL

The following error will occur when executing an SQL statement that does not abide by the general rules for functions:

```
ERROR: Function ***** does not exist
```

Note: "\*\*\*\*\*" denotes the function for which the error occurred, and the data type of its arguments.

The cause of the error will be one of the following:

- The specified function does not exist.
- The wrong number of arguments or wrong argument data type was specified

Corrective action

Check the following points and correct any errors:

- Check if there are any errors in the specified function name, number of arguments, or argument data type, and revise accordingly.
- Check the argument data type of the function displayed in the message. If an unintended data type is displayed, use a function such as CAST to convert it.

The error "Operator does not exist" occurs when executing SQL

The following error will occur when executing an SQL statement that specifies a data type in the operator that cannot be compared:

```
ERROR: Operator does not exist: *****
```

Note: "\*\*\*\*\*" denotes the operator for which the error occurred, and the data type of the specified value.

#### Corrective action

Ensure the data type of the expressions specified on the left and right sides of the operator can be compared. If required, revise to ensure these data types can be compared by using a function such as CAST to explicitly convert them.

## A.2 Notes when Using Temporary Tables

---

In standard SQL, a temporary table can be defined in advance to enable an empty temporary table to be created automatically when the application connects to the database. However, in FUJITSU Enterprise Postgres, a temporary table must be created when the application connects to the database by explicitly using the CREATE TABLE statement.

If the same temporary table is repeatedly created and deleted during the same session, the system table might expand, and memory usage might increase. To prevent this, specify the CREATE TABLE statement to ensure the temporary table is reused.

For example, in cases where a temporary table would be created and deleted for repeatedly executed transactions, specify the CREATE TABLE statement as shown below:

- Specify "IF NOT EXISTS" to create a temporary table only if none exists when the transaction starts.
- Specify "ON COMMIT DELETE ROWS" to ensure all rows are deleted when the transaction ends.



See

.....  
Refer to "SQL Commands" under "Reference" in the PostgreSQL Documentation for information on the CREATE TABLE statement.  
.....

Examples of SQL using a temporary table are shown below:

Example of bad use (creating and deleting a temporary table)

```
BEGIN;  
CREATE TEMPORARY TABLE mytable(col1 CHAR(4), col2 INTEGER) ON COMMIT DROP;  
    (mytable processes)  
COMMIT;
```

Example of good use (reusing a temporary table)

```
BEGIN;  
CREATE TEMPORARY TABLE IF NOT EXISTS mytable(col1 CHAR(4), col2 INTEGER) ON COMMIT  
DELETE ROWS;  
    (mytable processes)  
COMMIT;
```

## A.3 Implicit Data Type Conversions

---

An implicit data type conversion refers to a data type conversion performed automatically by FUJITSU Enterprise Postgres, without the need to explicitly specify the data type to convert to.

The combination of possible data type conversions differs, depending on whether the expression in the conversion source is a literal.

For non-literals, data types can only be converted to other types within the same range.

For literals, character string literal types can be converted to the target data type. Numeric literals are implicitly converted to specific numeric types. These implicitly converted numeric literals can then have their types converted to match the conversion target data type within the numeric type range. For bit character string literals, only the bit column data type can be specified. The following shows the range of type conversions for literals.

Table A.1 Data type combinations that contain literals and can be converted implicitly

| Conversion target |                             | Conversion source      |                     |                              |
|-------------------|-----------------------------|------------------------|---------------------|------------------------------|
|                   |                             | Character literal (*1) | Numeric literal(*2) | Bit character string literal |
| Numeric type      | SMALLINT                    | Y                      | N                   | N                            |
|                   | INTEGER                     | Y                      | Y (*3)              | N                            |
|                   | BIGINT                      | Y                      | Y (*4)              | N                            |
|                   | DECIMAL                     | Y                      | Y (*5)              | N                            |
|                   | NUMERIC                     | Y                      | Y (*5)              | N                            |
|                   | REAL                        | Y                      | N                   | N                            |
|                   | DOUBLE PRECISION            | Y                      | N                   | N                            |
|                   | SMALLSERIAL                 | Y                      | N                   | N                            |
|                   | SERIAL                      | Y                      | Y (*3)              | N                            |
|                   | BIGSERIAL                   | Y                      | Y (*4)              | N                            |
| Currency type     | MONEY                       | Y                      | N                   | N                            |
| Character type    | CHAR                        | Y                      | N                   | N                            |
|                   | VARCHAR                     | Y                      | N                   | N                            |
|                   | NCHAR                       | Y                      | N                   | N                            |
|                   | NCHAR VARYING               | Y                      | N                   | N                            |
|                   | TEXT                        | Y                      | N                   | N                            |
| Binary data type  | BYTEA                       | Y                      | N                   | N                            |
| Date/time type    | TIMESTAMP WITHOUT TIME ZONE | Y                      | N                   | N                            |
|                   | TIMESTAMP WITH TIME ZONE    | Y                      | N                   | N                            |
|                   | DATE                        | Y                      | N                   | N                            |
|                   | TIME WITHOUT TIME ZONE      | Y                      | N                   | N                            |
|                   | TIME WITH TIME ZONE         | Y                      | N                   | N                            |
|                   | INTERVAL                    | Y                      | N                   | N                            |
| Boolean type      | BOOLEAN                     | Y                      | N                   | N                            |
| Geometric type    | POINT                       | Y                      | N                   | N                            |
|                   | LSEG                        | Y                      | N                   | N                            |
|                   | BOX                         | Y                      | N                   | N                            |

| Conversion target    |             | Conversion source     |                     |                              |
|----------------------|-------------|-----------------------|---------------------|------------------------------|
|                      |             | Character literal(*1) | Numeric literal(*2) | Bit character string literal |
|                      | PATH        | Y                     | N                   | N                            |
|                      | POLYGON     | Y                     | N                   | N                            |
|                      | CIRCLE      | Y                     | N                   | N                            |
| Network address type | CIDR        | Y                     | N                   | N                            |
|                      | INET        | Y                     | N                   | N                            |
|                      | MACADDR     | Y                     | N                   | N                            |
| Bit string type      | BIT         | Y                     | N                   | Y                            |
|                      | BIT VARYING | Y                     | N                   | Y                            |
| Text search type     | TSVECTOR    | Y                     | N                   | N                            |
|                      | TSQUERY     | Y                     | N                   | N                            |
| UUID type            | UUID        | Y                     | N                   | N                            |
| XML type             | XML         | Y                     | N                   | N                            |
| JSON type            | JSON        | Y                     | N                   | N                            |

Y: Can be converted

N: Cannot be converted

\*1: Only strings that can be converted to the data type of the conversion target can be specified (such as "1" if the conversion target is a numeric type)

\*2: "Y" indicates specific numeric types that are converted first.

\*3: Integers that can be expressed as INTEGER types can be specified

\*4: Integers that cannot be expressed as INTEGER types, but can be expressed as BIGINT types, can be specified

\*5: Integers that cannot be expressed as INTEGER or BIGINT types, but that can be expressed as NUMERIC types, or numeric literals that contain a decimal point or the exponent symbol (e), can be specified

Implicit data type conversions can be used when comparing or storing data.

The conversion rules differ, depending on the reason for converting. Purpose-specific explanations are provided below.

### A.3.1 Function Argument

---

Value expressions specified in a function argument will be converted to the data type of that function argument.



See

.....  
Refer to "Functions and Operators" under "The SQL Language" in the PostgreSQL Documentation for information on data types that can be specified in function arguments.  
.....

### A.3.2 Operators

---

Comparison operators, BETWEEN, IN

Combinations of data types that can be compared using comparison operators, BETWEEN, or IN are shown below.

Table A.2 Combinations of comparable data type

| Left side      | Right side   |                       |                |
|----------------|--------------|-----------------------|----------------|
|                | Numeric type | Character string type | Date/time type |
| Numeric type   | Y            | N                     | N              |
| Character type | N            | Y                     | N              |
| Date/time type | N            | N                     | Y              |

Y: Can be compared

N: Cannot be compared

When strings with different lengths are compared, the shorter one is padded with spaces to make the lengths match.

When numeric values with different precisions are compared, data will be converted to the type with the higher precision.

Set operation and CASE also follow the same rules.

#### Other operators

Value expressions specified in operators will be converted to data types that are valid for that operator.



Refer to "Functions and Operators" under "The SQL Language" in the PostgreSQL Documentation for information on data types that can be specified in operators.

### A.3.3 Storing Values

---

Value expressions specified in the VALUES clause of the INSERT statement or the SET clause of the UPDATE statement will be converted to the data type of the column in which they will be stored.

## A.4 Notes on Using Index

---

This section explains the notes on using the following indexes:

- Hush index
- SP-GiST index

### A.4.1 Hush Index

---

Update operations for the hush index are not recorded in the WAL.

Therefore, if the database server fails, the hush index needs to be rebuilt with REINDEX to recover the database server.

Also, after obtaining the first backup, queries that use the hush index would return incorrect results, since index updates are not reflected in streaming replication and file-based replication. For these reasons, use of the hush index is not recommended.

### A.4.2 SP-GiST Index

---

If more than 2 concurrent updates are performed on a table in which the SP-GiST index is defined, applications may stop responding. When this occur, all system processes including the Check Pointer process will also be in the state of no response. For these reasons, use of the SP-GiST index is not recommended.

## A.5 Notes on Using the psql Commands

---

This section explains the notes on using the psql commands.

### A.5.1 Entering Multibyte Characters

---

Multibyte characters cannot be entered from the psql command prompt.

Multibyte characters can be entered from a file by specifying the -f option.

If using this option, the target file encoding system must be explicitly specified as the client encoding system.



.....  
Refer to "Character Set Support" in "Server Administration" in the PostgreSQL Documentation for information on how to configure the client encoding system.  
.....

## A.6 Notes on Using Multibyte Characters in Definition Names

---

Do not use multibyte characters in database names or user names if using a Windows database server.

Multibyte characters must not be used in database space names or user names on non-Windows database servers, because certain conditions may apply or it may not be possible to connect to some clients.

Related notes and constraints are described below.

### 1) Configuring the client encoding system

The client encoding system must be configured when the names are created.



.....  
Refer to "Character Set Support" in "Server Administration" in the PostgreSQL Documentation for information on how to configure the client encoding system.  
.....

### 2) Encoding system of names used for connection

Ensure that the encoding system of names used for connection is the same as that of the database that was connected when these names were created.

The reasons for this are as follows:

- Storage system for names in FUJITSU Enterprise Postgres

The system catalog saves encoded names by using the encoding system of the database at the time the names were created.

- Encoding conversion policy when connected

When connected, names sent from the client are matched with names in the system catalog without performing encoding conversion.

Accordingly, if the database that was connected when the names were defined uses the EUC\_JP encoding system, but the database name is specified using UTF-8 encoding, then the database will be considered to be non-existent.

### 3) Connection constraints

The table below shows the connection constraints for each client type, based on the following assumptions:

- The conditions described in 1) and 2) above are satisfied.

- The database name and user names use the same encoding system.

| Client type          | Client operating system   |                           |
|----------------------|---|---------------------------|
|                      | Windows(R)  | Linux                     |
| JDBC driver          | Cannot be connected   | Cannot be connected       |
| ODBC driver          | Cannot be connected   | No connection constraints |
| .NET Data Provider   | Can only connect when the encoding system used for definitions is UTF-8     | -                         |
| SQLEmbedded SQL in C | Can only connect when the connection service file (pg_service.conf) is used | No connection constraints |
| psql command         | Can only connect when the connection service file (pg_service.conf) is used | No connection constraints |

# Appendix B Conversion Procedures Required due to Differences from Oracle Database

This appendix explains how to convert from an Oracle database to FUJITSU Enterprise Postgres, within the scope noted in "[Chapter 9 Compatibility with Oracle Databases](#)" from the following perspectives:

- Feature differences
- Specification differences

This document assumes that the version of the Oracle database to be converted is 7-10.2g.

## B.1 Outer Join Operator (Perform Outer Join)

### Features

In the WHERE clause conditional expression, by adding the plus sign (+), which is the outer join operator, to the column of the table you want to add as a table join, it is possible to achieve an outer join that is the same as a joined table (OUTER JOIN).

### B.1.1 Comparing with the ^= Comparison Operator

#### Oracle database

```
SELECT *
FROM t1, t2
WHERE t1.col1(+) ^= t2.col1;
```

\* col1 is assumed to be CHAR(4) type

#### FUJITSU Enterprise Postgres

```
SELECT *
FROM t1, t2
WHERE t1.col1(+) != t2.col1;
```

\* col1 is assumed to be CHAR(4) type

#### Feature differences

##### Oracle database

The ^= comparison operator can be specified.

##### FUJITSU Enterprise Postgres

The ^= comparison operator cannot be specified.

#### Conversion procedure

Convert using the following procedure:

1. Locate the places where the keyword "^=" is used.
2. Ensure that the keyword, "(+)", is either on the right or left-hand side.
3. Change "^=" to "!=".

## B.2 DECODE (Compare Values and Return Corresponding Results)

---

### Features

DECODE compares values of the conversion target value expression and the search values one by one, and if the values of the conversion target value expression and the search values match, a corresponding result value is returned.

### B.2.1 Comparing Numeric Data of Character String Types and Numeric Characters

---

#### Oracle database

```
SELECT DECODE( col1,
              1000, 'ITEM-A',
              2000, 'ITEM-B',
              'ITEM-C' )
FROM t1;
```

\* col1 is assumed to be CHAR(4) type

#### FUJITSU Enterprise Postgres

```
SELECT DECODE( CAST(col1 AS INTEGER),
              1000, 'ITEM-A',
              2000, 'ITEM-B',
              'ITEM-C' )
FROM t1;
```

\* col1 is assumed to be CHAR(4) type

### Feature differences

#### Oracle database

When the value expression is a string and the search value is a numeric, the string value will be converted to the data type of the comparison target numeric, so that they can be compared.

#### FUJITSU Enterprise Postgres

If the conversion target value expression is a string value, then no search value can be specified with numbers.

### Conversion procedure

Since the data type that can be specified for the conversion target value expression is unknown, use CAST to explicitly convert the conversion target value expression (col1 in the example) to a numeric (INTEGER type in the example).

## B.2.2 Obtaining Comparison Result from more than 50 Conditional Expressions

---

#### Oracle database

```
SELECT DECODE(col1,
              1, 'A',
              2, 'B',
              ...
              78, 'BZ',
              NULL, 'UNKNOWN',
              'OTHER' )
FROM t1;
```

\* col1 is assumed to be INTEGER type

## FUJITSU Enterprise Postgres

```
SELECT CASE
    WHEN col1 = 1 THEN 'A'
    WHEN col1 = 2 THEN 'B'
    ...
    WHEN col1 = 78 THEN 'BZ'
    WHEN col1 IS NULL THEN 'UNKNOWN'
    ELSE 'OTHER'
END
FROM t1;
```

\* col1 is assumed to be INTEGER type

### Feature differences

#### Oracle database

Search value with a maximum of 127 items (up to 255 arguments in total) can be specified.

#### FUJITSU Enterprise Postgres

Search value with a maximum of 49 items (up to 100 arguments in total) only can be specified.

### Conversion procedure

Convert to the CASE expression using the following procedure:

1. Specify the DECODE conversion target value expression (col1 in the first argument, in the example) and the search value (1 in the second argument, in the example) for the CASE expression search condition. Specify the DECODE result value ('A' in the third argument, in the example) for the CASE expression THEN (WHEN col1 = 1 THEN 'A', in the example). Note that if the search value is NULL, specify "IS NULL" for the search condition for the CASE expression.
2. If the DECODE default value ('OTHER' in the last argument, in the example) is specified, specify the default value for the CASE expression ELSE (ELSE 'OTHER', in the example).

## B.2.3 Obtaining Comparison Result from Values with Different Data Types

---

### Oracle database

```
SELECT DECODE( col1,
    '1000', 'A',
    '2000', '1',
    'OTHER' )
FROM t1;
```

\* col1 is assumed to be CHAR(4) type

### FUJITSU Enterprise Postgres

```
SELECT DECODE( col1,
    '1000', 'A',
    '2000', '1',
    'OTHER' )
FROM t1;
```

\* col1 is assumed to be CHAR(4) type

## Feature differences

### Oracle database

The data types of all result values are converted to the data type of the first result value.

### FUJITSU Enterprise Postgres

Results in an error.

## Conversion procedure

Convert using the following procedure:

1. Check the literal data type for the first result value specified.
2. Change the literals specified for each result value to the literal data type checked in the step 1.

## B.3 SUBSTR (Extract a String of the Specified Length from Another String)

---

### Features

SUBSTR returns the number of characters specified in the third argument (starting from the position specified in the second argument) from the string specified in the first argument.

Refer to "[9.2.1 Notes on SUBSTR](#)" for details on precautions when using SUBSTR.

### B.3.1 Specifying a Value Expression with a Data Type Different from the One that can be Specified for Function Arguments

---

#### Oracle database

```
SELECT SUBSTR( col1,  
              1,  
              col2)  
FROM DUAL;
```

\* col1 and col2 are assumed to be CHAR type

#### FUJITSU Enterprise Postgres

```
CREATE CAST (CHAR AS INTEGER) WITH INOUT AS IMPLICIT;  
  
SELECT SUBSTR( col1,  
              1,  
              col2)  
FROM DUAL;  
# No changes to SELECT statement;
```

\* col1 and col2 are assumed to be CHAR type

## Feature differences

### Oracle database

If the type can be converted to a data type that can be specified for function arguments, conversion is performed implicitly.

### FUJITSU Enterprise Postgres

If the data types are different from each other, or if loss of significance occurs, implicit conversion is not performed.

## Conversion procedure

Since the data type of the string length is clear, first execute the following CREATE CAST only once so that the CHAR type value (col2 in the example) specified for the string length is implicitly converted to INTEGER type.

```
CREATE CAST (CHAR AS INTEGER) WITH INOUT AS IMPLICIT;
```

## B.3.2 Extracting a String with the Specified Format from a Datetime Type Value

---

### Oracle database

```
SELECT SUBSTR( CURRENT_TIMESTAMP ,
              1,
              8)
FROM DUAL;
```

### FUJITSU Enterprise Postgres

```
SELECT SUBSTR( TO_CHAR(CURRENT_TIMESTAMP,
                      'DD-MON-YY HH.MI.SS.US PM')
              1,
              8)
FROM DUAL;
```

### Feature differences

#### Oracle database

A datetime value such as CURRENT\_TIMESTAMP can be specified for character value expressions.

#### FUJITSU Enterprise Postgres

A datetime value such as CURRENT\_TIMESTAMP cannot be specified for character value expressions.

### Conversion procedure

First, specify TO\_CHAR for the SUBSTR character value expression.

Specify datetime type (CURRENT\_TIMESTAMP, in the example) in firstArg of TO\_CHAR, and specify the format template pattern ('DD-MON-YY HH.MI.SS.US PM', in the example) for secondArg to match with the result of SUBSTR before conversion.

TO\_CHAR specification format: TO\_CHAR(*firstArg*, *secondArg*)



### Information

Refer to "Data Type Formatting Functions" in the PostgreSQL Documentation for information on format template patterns that can be specified for TO\_CHAR in FUJITSU Enterprise Postgres.

## B.3.3 Concatenating a String Value with a NULL value

---

### Oracle database

```
SELECT SUBSTR( col1 || col2,
              2,
              5)
FROM t1;
```

\* col1 and col2 are assumed to be character string type, and col2 may contain NULL

## FUJITSU Enterprise Postgres

```
SELECT SUBSTR( col1 || NVL(col2, '')
              2,
              5)
FROM t1;
```

\* col1 and col2 are assumed to be character string type, and col2 may contain NULL

### Feature differences

#### Oracle database

NULL is handled as an empty string, and strings are joined.

#### FUJITSU Enterprise Postgres

NULL is not handled as an empty string, and the result of joining the strings becomes NULL.

### Conversion procedure

Convert using the following procedure:

1. Locate the places where the keyword "||" is used.
2. Check if any of the value expressions can contain NULL - if they can, then execute step 3.
3. Modify to NVL(*valExpr*, "").

## B.4 NVL (Replace NULL)

---

### Features

NVL converts NULL values.

### B.4.1 Obtaining Result from Arguments with Different Data Types

---

#### Oracle database

```
SELECT NVL( col1,
           col2)
FROM t1;
```

\* col1 is assumed to be VARCHAR(100) type, and col2 is assumed to be CHAR(100) type

#### FUJITSU Enterprise Postgres

```
SELECT NVL( col1,
           CAST(col2 AS VARCHAR(100)))
FROM t1;
```

\* col1 is assumed to be VARCHAR(100) type, and col2 is assumed to be CHAR(100) type

### Feature differences

#### Oracle database

Value expressions with different data types can be specified. If the first argument is a string value, then VARCHAR2 is returned, and if it is a numeric, then a numeric type with greater range is returned.

#### FUJITSU Enterprise Postgres

Value expressions with different data types cannot be specified.

## Conversion procedure

Since the data types that can be specified for expressions 1 and 2 are unknown, use the following steps to convert:

1. Check the data types specified for the expressions 1 and 2.
2. Using the data type that is to be received as a result, explicitly convert the other argument with CAST.

## B.4.2 Operating on Datetime/Numeric, Including Adding Number of Days to a Particular Day

---

### Oracle database

```
SELECT NVL( col1 + 10, CURRENT_DATE)
FROM t1;
```

\* col1 is assumed to be TIMESTAMP WITHOUT TIME ZONE type or TIMESTAMP WITH TIME ZONE type

### FUJITSU Enterprise Postgres

```
SELECT NVL( CAST(col1 AS DATE) + 10, CURRENT_DATE)
FROM t1;
```

\* col1 is assumed to be TIMESTAMP WITHOUT TIME ZONE type or TIMESTAMP WITH TIME ZONE type

## Feature differences

### Oracle database

Numbers can be operated (added to or subtracted from) with either TIMESTAMP WITHOUT TIME ZONE type or TIMESTAMP WITH TIME ZONE type. Operation result will be DATE type.

### FUJITSU Enterprise Postgres

Numbers cannot be operated (added to or subtracted from) with neither TIMESTAMP WITHOUT TIME ZONE type nor TIMESTAMP WITH TIME ZONE type. However, numbers can be operated (added to or subtracted from) with DATE type.

## Conversion procedure

Convert using the following procedure:

1. Search locations where the keyword "+" or "-" is used in addition or subtraction, and check if these operations are between numbers and TIMESTAMP WITHOUT TIME ZONE type or TIMESTAMP WITH TIME ZONE type.
2. If they are, use CAST to explicitly convert TIMESTAMP WITHOUT TIME ZONE type or TIMESTAMP WITH TIME ZONE type to DATE type.

## B.4.3 Calculating INTERVAL Values, Including Adding Periods to a Date

---

### Oracle database

```
SELECT NVL( CURRENT_DATE + (col1 * 1.5), col2)
FROM t1;
```

\* col1 and col2 are assumed to be INTERVAL YEAR TO MONTH types

### FUJITSU Enterprise Postgres

```
SELECT NVL( CURRENT_DATE +
          CAST(col1 * 1.5 AS
```

```
INTERVAL YEAR TO MONTH), col2)
FROM t1;
```

\* col1 and col2 are assumed to be INTERVAL YEAR TO MONTH types

### Feature differences

#### Oracle database

INTERVAL YEAR TO MONTH type multiplication and division result in INTERVAL YEAR TO MONTH type and any fraction (number of days) will be truncated.

#### FUJITSU Enterprise Postgres

INTERVAL YEAR TO MONTH type multiplication and division result in INTERVAL type and fractions (number of days) will not be truncated.

### Conversion procedure

Convert using the following procedure:

1. Search locations where the keywords "\*" or "/" are used in multiplication or division, and check if the specified value is INTERVAL YEAR TO MONTH type.
2. If the value is INTERVAL YEAR TO MONTH type, use CAST to explicitly convert the operation result to INTERVAL YEAR TO MONTH type.

## B.5 DBMS\_OUTPUT (Output Messages)

### Features

DBMS\_OUTPUT sends messages to clients such as psql from PL/pgSQL.

### B.5.1 Outputting Messages Such As Process Progress Status

#### Oracle database

```
set serveroutput on;...(1)

DECLARE
v_col1      CHAR(20);
v_col2      INTEGER;
CURSOR c1 IS
  SELECT col1, col2 FROM t1;
BEGIN
  DBMS_OUTPUT.PUT_LINE('-- BATCH_001 Start --');
  OPEN c1;
  DBMS_OUTPUT.PUT_LINE('-- LOOP Start --');
  LOOP
    FETCH c1 INTO v_col1, v_col2;
    EXIT WHEN c1%NOTFOUND;
    DBMS_OUTPUT.PUT(' ');
  END LOOP;
  DBMS_OUTPUT.NEW_LINE; ...(2)
  DBMS_OUTPUT.PUT_LINE('-- LOOP End --');
  CLOSE c1;

  DBMS_OUTPUT.PUT_LINE('-- BATCH_001 End --');

EXCEPTION
  WHEN OTHERS THEN
    DBMS_OUTPUT.PUT_LINE('-- SQL Error --');
    DBMS_OUTPUT.PUT_LINE('ERROR : ' || SQLERRM );
```

```
END;  
/
```

## FUJITSU Enterprise Postgres

```
DO $$  
DECLARE  
    v_col1      CHAR(20);  
    v_col2      INTEGER;  
    c1 CURSOR FOR  
        SELECT col1, col2 FROM t1;  
BEGIN  
    PERFORM DBMS_OUTPUT.SERVEROUTPUT(TRUE); ...(1)  
    PERFORM DBMS_OUTPUT.ENABLE(NULL); ...(1)  
  
    PERFORM DBMS_OUTPUT.PUT_LINE('-- BATCH_001 Start --');  
  
    OPEN c1;  
    PERFORM DBMS_OUTPUT.PUT_LINE('-- LOOP Start --');  
    LOOP  
        FETCH c1 INTO v_col1, v_col2;  
        EXIT WHEN FOUND = false;  
        PERFORM DBMS_OUTPUT.PUT('.');  
    END LOOP;  
    PERFORM DBMS_OUTPUT.NEW_LINE(); ...(2)  
  
    PERFORM DBMS_OUTPUT.PUT_LINE('-- LOOP End --');  
    CLOSE c1;  
  
    PERFORM DBMS_OUTPUT.PUT_LINE('-- BATCH_001 End --');  
  
EXCEPTION  
    WHEN OTHERS THEN  
        PERFORM DBMS_OUTPUT.PUT_LINE('-- SQL Error --');  
        PERFORM DBMS_OUTPUT.PUT_LINE('ERROR : ' || SQLERRM );  
END;  
$$  
;
```

### (1) SERVEROUTPUT/ENABLE

#### Specification differences

##### Oracle database

Use SET statement and specify SERVEROUTPUT ON.

##### FUJITSU Enterprise Postgres

Specify DBMS\_SQL.SERVEROUTPUT(TRUE).

#### Conversion procedure

Convert using the following procedure:

1. Check if a SET SERVEROUTPUT statement is specified before the PL/SQL block of a stored procedure.
2. If a SET SERVEROUTPUT statement is specified, specify DBMS\_SQL.SERVEROUTPUT straight after BEGIN of PL/pgSQL. If ON is specified to have messages output to a window, then specify TRUE. If OFF is specified, then specify FALSE.
3. Specify DBMS\_SQL.ENABLE only if SET SERVEROUTPUT is ON. The values to be specified for the argument are as follows:
  - If SIZE is specified for the SET SERVEROUTPUT statement, specify this size for the argument.

- If SIZE is not specified for the SET SERVEROUTPUT statement, then specify 2000 for Oracle10.1g or earlier, NULL for Oracle10.2g or later.

If DBMS\_SQL.ENABLE is specified for the PL/SQL block of the stored procedure, specify the same value as that argument.

## (2) NEW\_LINE

### Specification differences

#### Oracle database

If there is no argument for *packageName.featureName*, parenthesis can be omitted.

#### FUJITSU Enterprise Postgres

Even if there is no argument for *packageName.featureName*, parenthesis cannot be omitted.

### Conversion procedure

Convert using the following procedure:

1. Locate the places where the keyword "DBMS\_OUTPUT.NEW\_LINE" is used in the stored procedure.
2. If there is no parenthesis after *packageName.featureName*, add the parenthesis.

## B.5.2 Receiving a Return Value from a Procedure (PL/SQL) Block (For GET\_LINES)

---

### Oracle database

```

set serveroutput off;

DECLARE
    v_num          INTEGER;
BEGIN

    DBMS_OUTPUT.DISABLE; ... (3)
    DBMS_OUTPUT.ENABLE(20000); ... (4)
    DBMS_OUTPUT.PUT_LINE('-- ITEM CHECK --');

    SELECT count(*) INTO v_num FROM t1;

    IF v_num = 0 THEN
        DBMS_OUTPUT.PUT_LINE('-- NO ITEM --');

    ELSE
        DBMS_OUTPUT.PUT_LINE('-- IN ITEM(' || v_num || ') --');
    END IF;
END;
/

set serveroutput on;

DECLARE
    v_buffs        DBMSOUTPUT_LINESARRAY; ... (5)
    v_num          INTEGER := 10;
BEGIN

    DBMS_OUTPUT.GET_LINES(v_buffs, v_num); ... (5)

    FOR i IN 1..v_num LOOP
        DBMS_OUTPUT.PUT_LINE('LOG : ' || v_buffs(i)); ... (5)
    
```

```

    END LOOP;
END;
/

```

## FUJITSU Enterprise Postgres

```

DO $$
DECLARE
    v_num          INTEGER;
BEGIN
    PERFORM DBMS_OUTPUT.SERVEROUTPUT(FALSE);
    PERFORM DBMS_OUTPUT.DISABLE(); ... (3)
    PERFORM DBMS_OUTPUT.ENABLE(20000); ... (4)
    PERFORM DBMS_OUTPUT.PUT_LINE('-- ITEM CHECK --');

    SELECT count(*) INTO v_num FROM t1;

    IF v_num = 0 THEN
        PERFORM DBMS_OUTPUT.PUT_LINE('-- NO ITEM --');
    ELSE
        PERFORM DBMS_OUTPUT.PUT_LINE('-- IN ITEM(' || v_num || ') --');
    END IF;
END;
$$
;

DO $$
DECLARE
    v_buffs        VARCHAR[]; ... (5)
    v_num          INTEGER := 10;
BEGIN
    PERFORM DBMS_OUTPUT.SERVEROUTPUT(TRUE);
    SELECT lines, numlines INTO v_buffs, v_num FROM DBMS_OUTPUT.GET_LINES(v_num); ... (5)

    FOR i IN 1..v_num LOOP
        PERFORM DBMS_OUTPUT.PUT_LINE('LOG : ' || v_buffs[i]); ... (5)
    END LOOP;
END;
$$
;

```

### (3) DISABLE

Same as the NEW\_LINE in the DBMS\_OUTPUT package. Refer to NEW\_LINE for information on specification differences and conversion procedures associated with specification differences.

### (4) ENABLE

Same as NEW\_LINE in the DBMS\_OUTPUT package. Refer to NEW\_LINE for information on specification differences and conversion procedures associated with specification differences.

### (5) GET\_LINES

Specification format for Oracle database

```
DBMS_OUTPUT.GET_LINES(firstArg, secondArg)
```

Specification differences

Oracle database

Obtained values are received with variables specified for arguments.

## FUJITSU Enterprise Postgres

Since obtained values are the search results for DBMS\_OUTPUT.GET\_LINES, they are received with variables specified for the INTO clause of the SELECT statement.

### Conversion procedure

Convert using the following procedure:

1. Locate the places where the keyword "DBMS\_OUTPUT.GET\_LINES" is used in the stored procedure.
2. Change the data type (DBMSOUTPUT\_LINESARRAY in the example) of the variable (v\_buffs in the example) specified as *firstArg* of DBMS\_OUTPUT.GET\_LINES into a VARCHAR type array (VARCHAR[] in the example).
3. Replace the DBMS\_OUTPUT.GET\_LINES location called with a SELECT INTO statement.
  - Use the literal "lines, numlines" in the select list.
  - Specify *firstArg* (v\_buffs in the example) and *secondArg* (v\_num in the example) configured in DBMS\_OUTPUT.GET\_LINES, in the INTO clause.
  - Use DBMS\_OUTPUT.GET\_LINES in the FROM clause. Specify only *secondArg* (v\_num in the example) before modification.
4. Identify the location that references *firstArg* (v\_buffs in the example), and change it to the PL/pgSQL array reference format (v\_buffs[i] in the example).

## B.5.3 Receiving a Return Value from a Procedure (PL/SQL) Block (For GET\_LINE)

---

### Oracle database

```
set serveroutput on;

DECLARE
    v_buff1      VARCHAR2(100);
    v_buff2      VARCHAR2(1000);
    v_num        INTEGER;
BEGIN

    v_buff2 := '';
    LOOP
        DBMS_OUTPUT.GET_LINE(v_buff1, v_num); ... (6)
        EXIT WHEN v_num = 1;
        v_buff2 := v_buff2 || v_buff1;
    END LOOP;

    DBMS_OUTPUT.PUT_LINE(v_buff2);
END;
/
```

\* Only the process to obtain a value is stated

### FUJITSU Enterprise Postgres

```
DO $$
DECLARE
    v_buff1      VARCHAR(100);
    v_buff2      VARCHAR(1000);
    v_num        INTEGER;
BEGIN
    PERFORM DBMS_OUTPUT.SERVEROUTPUT(TRUE);
    v_buff2 := '';
    LOOP
```

```

        SELECT line, status INTO v_buff1, v_num FROM DBMS_OUTPUT.GET_LINE(); ...(6)
        EXIT WHEN v_num = 1;
        v_buff2 := v_buff2 || v_buff1;
    END LOOP;

    PERFORM DBMS_OUTPUT.PUT_LINE(v_buff2);
END;
$$
;

```

\* Only the process to obtain a value is stated

## (6) GET\_LINE

Specification format for Oracle database

```
DBMS_OUTPUT.GET_LINE(firstArg, secondArg)
```

Specification differences

Oracle database

Obtained values are received with variables specified for arguments.

FUJITSU Enterprise Postgres

Since obtained values are the search results for DBMS\_OUTPUT.GET\_LINES, they are received with variables specified for the INTO clause of the SELECT statement.

Conversion procedure

Convert using the following procedure:

1. Locate the places where the keyword "DBMS\_OUTPUT.GET\_LINE" is used in the stored procedure.
2. Replace the DBMS\_OUTPUT.GET\_LINE location called with a SELECT INTO statement.
  - Use the literal "line, status" in the select list.
  - Specify *firstArg* (v\_buff1 in the example) and *secondArg* (v\_num in the example) configured in DBMS\_OUTPUT.GET\_LINE, in the INTO clause.
  - Use DBMS\_OUTPUT.GET\_LINE in the FROM clause. Although arguments are not specified, parenthesis must be specified.

## B.6 UTL\_FILE (Perform File Operation)

---

Features

UTL\_FILE reads and writes text files from PL/pgSQL.

### B.6.1 Registering a Directory to Load and Write Text Files

---

Oracle database

```

[Oracle9i or earlier]
Configure the following with initialization parameter
    UTL_FILE_DIR= '/home/fsep' ...(1)

[Oracle9.2i or later]
Configure the following with CREATE DIRECTORY statement
    CREATE DIRECTORY DIR AS '/home/fsep'; ...(1)

```

## FUJITSU Enterprise Postgres

```
INSERT INTO UTL_FILE.UTL_FILE_DIR(dir)
VALUES ('/home/fsep'); ... (1)
```

### (1) UTL\_FILE\_DIR/CREATE DIRECTORY

#### Feature differences

##### Oracle database

Configure the directory to be operated, using the CREATE DIRECTORY statement or the initialization parameter UTL\_FILE\_DIR.

##### FUJITSU Enterprise Postgres

The directory to be operated cannot be configured using the CREATE DIRECTORY statement or the initialization parameter UTL\_FILE\_DIR.

#### Conversion procedure

Configure the target directory information in the UTL\_FILE.UTL\_FILE\_DIR table using the INSERT statement. Note that this conversion procedure should be performed only once before executing the PL/pgSQL function.

- When using the initialization parameter UTL\_FILE\_DIR:
  1. Check the initialization parameter UTL\_FILE\_DIR value ('/home/fsep' in the example).
  2. Using the INSERT statement, specify and execute the directory name checked in step 1.
    - Specify UTL\_FILE.UTL\_FILE\_DIR(dir) for the INTO clause.
    - Using the character string literal ('/home/fsep' in the example), specify the target directory name for the VALUES clause.
    - If multiple directories are specified, execute the INSERT statement for each directory.
- When using the CREATE DIRECTORY statement:
  1. Check the directory name ('/home/fsep' in the example) registered with the CREATE DIRECTORY statement. To check, log in SQL\*Plus as a user with DBA privileges, and execute "show ALL\_DIRECTORIES;".
  2. Using the INSERT statement, specify and execute the directory name checked in step 1. Same steps are used to specify the INSERT statement as when using the initialization parameter UTL\_FILE\_DIR.

## B.6.2 Checking File Information

### Oracle database

```
CREATE PROCEDURE read_file(fname VARCHAR2) AS

    v_file      UTL_FILE.FILE_TYPE;
    v_exists    BOOLEAN;
    v_length    NUMBER;
    v_bsize     INTEGER;
    v_rbuff     VARCHAR2(1024);
BEGIN

    UTL_FILE.FGETATTR('DIR', fname, v_exists, v_length, v_bsize); ... (2)

    IF v_exists <> true THEN
        DBMS_OUTPUT.PUT_LINE('-- FILE NOT FOUND --');
        RETURN;
    END IF;
```

```

DBMS_OUTPUT.PUT_LINE('-- FILE DATA --');

v_file := UTL_FILE.FOPEN('DIR', fname, 'r', 1024); ...(3)
FOR i IN 1..3 LOOP
    UTL_FILE.GET_LINE(v_file, v_rbuff, 1024); ...(4)
    DBMS_OUTPUT.PUT_LINE(v_rbuff);
END LOOP;
DBMS_OUTPUT.PUT_LINE('... more');
DBMS_OUTPUT.PUT_LINE('-- READ END --');

UTL_FILE.FCLOSE(v_file); ...(5)
RETURN;

EXCEPTION
WHEN NO_DATA_FOUND THEN
    DBMS_OUTPUT.PUT_LINE('-- FILE END --');

    UTL_FILE.FCLOSE(v_file);
    RETURN;
WHEN OTHERS THEN
    DBMS_OUTPUT.PUT_LINE('-- SQL Error --');

    DBMS_OUTPUT.PUT_LINE('ERROR : ' || SQLERRM );
    UTL_FILE.FCLOSE_ALL; ...(6)
    RETURN;
END;
/

set serveroutput on

call read_file('file01.txt');

```

## FUJITSU Enterprise Postgres

```

CREATE FUNCTION read_file(fname VARCHAR) RETURNS void AS $$
DECLARE
    v_file      UTL_FILE.FILE_TYPE;
    v_exists    BOOLEAN;
    v_length    NUMERIC;
    v_bsize     INTEGER;
    v_rbuff     VARCHAR(1024);
BEGIN
    PERFORM DBMS_OUTPUT.SERVEROUTPUT(TRUE);

    SELECT fexists, file_length, blocksize
        INTO v_exists, v_length, v_bsize
        FROM UTL_FILE.FGETATTR('/home/fsep', fname); ...(2)
    IF v_exists <> true THEN
        PERFORM DBMS_OUTPUT.PUT_LINE('-- FILE NOT FOUND --');
        RETURN;
    END IF;

    PERFORM DBMS_OUTPUT.PUT_LINE('-- FILE DATA --');
    v_file := UTL_FILE.FOPEN('/home/fsep', fname, 'w', 1024); ...(3)
    FOR i IN 1..3 LOOP
        v_rbuff := UTL_FILE.GET_LINE(v_file, 1024); ...(4)
        PERFORM DBMS_OUTPUT.PUT_LINE(v_rbuff);
    END LOOP;
    PERFORM DBMS_OUTPUT.PUT_LINE('... more');
    PERFORM DBMS_OUTPUT.PUT_LINE('-- READ END --');

    v_file := UTL_FILE.FCLOSE(v_file); ...(5)

```

```

RETURN;

EXCEPTION
  WHEN NO_DATA_FOUND THEN
    PERFORM DBMS_OUTPUT.PUT_LINE('-- FILE END --');
    v_file := UTL_FILE.FCLOSE(v_file);
    RETURN;
  WHEN OTHERS THEN
    PERFORM DBMS_OUTPUT.PUT_LINE('-- SQL Error --');
    PERFORM DBMS_OUTPUT.PUT_LINE('ERROR : ' || SQLERRM);
    PERFORM UTL_FILE.FCLOSE_ALL(); ... (6)
    RETURN;
END;
$$
LANGUAGE plpgsql;

SELECT read_file('file01.txt');

```

## (2) FGETATTR

Specification format for Oracle database

UTL\_FILE.FGETATTR(*firstArg*, *secondArg*, *thirdArg*, *fourthArg*, *fifthArg*)

Feature differences

Oracle database

If using a CREATE DIRECTORY statement (Oracle9.2i or later), specify a directory object name for the directory name.

FUJITSU Enterprise Postgres

A directory object name cannot be specified for the directory name.

Specification differences

Oracle database

Obtained values are received with variables specified for arguments.

FUJITSU Enterprise Postgres

Since obtained values are the search results for UTL\_FILE.FGETATTR, they are received with variables specified for the INTO clause of the SELECT statement.

Conversion procedure

Convert using the following procedure. Refer to UTL\_FILE\_DIR/CREATE DIRECTORY for information on how to check if the directory object name corresponds to the actual directory name.

1. Locate the places where the keyword "UTL\_FILE.FOPEN" is used in the stored procedure.
2. Check the actual directory name ('/home/fsep' in the example) that corresponds to the directory object name ('DIR' in the example).
3. Replace the directory object name ('DIR' in the example) in *firstArg* with the actual directory name ('/home/fsep' in the example) verified in step 2.
4. Replace the UTL\_FILE.FGETATTR location called with a SELECT INTO statement.
  - Use the literal "fexists, file\_length, blocksize" in the select list.
  - Specify *thirdArg*, *fourthArg*, and *fifthArg* (v\_exists, v\_length, v\_bsize, in the example) specified for UTL\_FILE.FGETATTR to the INTO clause in the same order as that of the arguments.
  - Use UTL\_FILE.FGETATTR in the FROM clause. Specify only the actual directory name for *firstArg* ('/home/fsep' in the example) and *secondArg* (fname in the example) before modification for the arguments.

### (3) FOPEN

Specification format for Oracle

UTL\_FILE.FOPEN(*firstArg*, *secondArg*, *thirdArg*, *fourthArg*, *fifthArg*)

Feature differences

Oracle database

If using a CREATE DIRECTORY statement (Oracle9.2i or later), specify a directory object name for the directory name.

FUJITSU Enterprise Postgres

A directory object name cannot be specified for the directory name.

Conversion procedure

Convert using the following procedure. Refer to UTL\_FILE\_DIR/CREATE DIRECTORY for information on how to check if the directory object name corresponds to the actual directory name.

1. Locate the places where the keyword "UTL\_FILE.FOPEN" is used in the stored procedure.
2. Check the actual directory name ('/home/fsep' in the example) that corresponds to the directory object name ('DIR' in the example).
3. Replace the directory object name ('DIR' in the example) in *firstArg* with the actual directory name ('/home/fsep' in the example) checked in step 1.

### (4) GET\_LINE

Specification format for Oracle database

UTL\_FILE.GET\_LINE(*firstArg*, *secondArg*, *thirdArg*, *fourthArg*)

Specification differences

Oracle database

Obtained values are received with variables specified for arguments.

FUJITSU Enterprise Postgres

Since obtained values are the returned value of UTL\_FILE.GET\_LINE, they are received with variables specified for substitution statement.

Conversion procedure

Convert using the following procedure:

1. Locate the places where the keyword "UTL\_FILE.GET\_LINE" is used in the stored procedure.
2. Replace the UTL\_FILE.GET\_LINE location called with a value assignment (:=).
  - On the left-hand side, specify *secondArg* (*v\_rbuff* in the example) specified for UTL\_FILE.GET\_LINE.
  - Use UTL\_FILE.GET\_LINE in the right-hand side. Specify only *firstArg* (*v\_file* in the example) and *thirdArg* (1024 in the example) before modification.

### (5) FCLOSE

Specification format for Oracle database

UTL\_FILE.FCLOSE(*firstArg*)

Specification differences

Oracle database

After closing, the file handler specified for the argument becomes NULL.

## FUJITSU Enterprise Postgres

After closing, set the file handler to NULL by assigning the return value of UTL\_FILE.FCLOSE to it.

### Conversion procedure

Convert using the following procedure:

1. Locate the places where the keyword "UTL\_FILE.FCLOSE" is used in the stored procedure.
2. Replace the UTL\_FILE.FCLOSE location called with a value assignment (:=) so that the file handler (v\_file in the example) becomes NULL.
  - On the left-hand side, specify the argument (v\_file in the example) specified for UTL\_FILE.FCLOSE.
  - Use UTL\_FILE.FCLOSE in the right-hand side. For the argument, specify the same value (v\_file in the example) as before modification.

### (6) FCLOSE\_ALL

Same as NEW\_LINE in the DBMS\_OUTPUT package. Refer to NEW\_LINE in the DBMS\_OUTPUT for information on specification differences and conversion procedures associated with specification differences.

## B.6.3 Copying Files

---

### Oracle database

```
CREATE PROCEDURE copy_file(fromname VARCHAR2, toname VARCHAR2) AS
BEGIN

    UTL_FILE.FCOPY('DIR1', fromname, 'DIR2', toname, 1, NULL); ... (7)

RETURN;

EXCEPTION
    WHEN OTHERS THEN
        DBMS_OUTPUT.PUT_LINE('-- SQL Error --');

        DBMS_OUTPUT.PUT_LINE('ERROR : ' || SQLERRM );
        RETURN;
END;
/

set serveroutput on

call copy_file('file01.txt','file01_bk.txt');
```

### FUJITSU Enterprise Postgres

```
CREATE FUNCTION copy_file(fromname VARCHAR, toname VARCHAR) RETURNS void AS $$
BEGIN
    PERFORM DBMS_OUTPUT.SERVEROUTPUT(TRUE);

    PERFORM UTL_FILE.FCOPY('/home/fsep', fromname, '/home/backup', toname, 1, NULL); ... (7)
RETURN;

EXCEPTION
    WHEN OTHERS THEN
        PERFORM DBMS_OUTPUT.PUT_LINE('-- SQL Error --');
        PERFORM DBMS_OUTPUT.PUT_LINE('ERROR : ' || SQLERRM );
        RETURN;
END;
```

```

$$
LANGUAGE plpgsql;

SELECT copy_file('file01.txt', 'file01_bk.txt');

```

## (7) FCOPY

Specification format for Oracle database

UTL\_FILE.FCOPY(*firstArg*, *secondArg*, *thirdArg*, *fourthArg*, *fifthArg*, *sixthArg*)

Feature differences

Oracle database

If using a CREATE DIRECTORY statement (Oracle9.2i or later), specify a directory object name for the directory name.

FUJITSU Enterprise Postgres

A directory object name cannot be specified for the directory name.

Conversion procedure

Convert using the following procedure. Refer to UTL\_FILE\_DIR/CREATE DIRECTORY for information on how to check if the directory object name corresponds to the actual directory name.

1. Locate the places where the keyword "UTL\_FILE.FCOPY" is used in the stored procedure.
2. Check the actual directory names ('/home/fsep' and '/home/backup', in the example) that correspond to the directory object names ('DIR1' and 'DIR2', in the example) of *firstArg* and *thirdArg* argument.
3. Replace the directory object name ('DIR1' and 'DIR2', in the example) with the actual directory names ('/home/fsep' in the example) checked in step 1.

## B.6.4 Moving/Renaming Files

Oracle database

```

CREATE PROCEDURE move_file(fromname VARCHAR2, toname VARCHAR2) AS
BEGIN

    UTL_FILE.FRENAME('DIR1', fromname, 'DIR2', toname, FALSE); ... (8)
    RETURN;

EXCEPTION
    WHEN OTHERS THEN
        DBMS_OUTPUT.PUT_LINE('-- SQL Error --');

        DBMS_OUTPUT.PUT_LINE('ERROR : ' || SQLERRM );
        RETURN;
END;
/

set serveroutput on

call move_file('file01.txt', 'file02.txt');

```

FUJITSU Enterprise Postgres

```

CREATE FUNCTION move_file(fromname VARCHAR, toname VARCHAR) RETURNS void AS $$
BEGIN
    PERFORM DBMS_OUTPUT.SERVEROUTPUT(TRUE);

```

```

        PERFORM UTL_FILE.FRENAME('/home/fsep', fromname, '/home/backup', toname, FALSE); ... (8)
    RETURN;

EXCEPTION
    WHEN OTHERS THEN
        PERFORM DBMS_OUTPUT.PUT_LINE('-- SQL Error --');
        PERFORM DBMS_OUTPUT.PUT_LINE('ERROR : ' || SQLERRM );
        RETURN;
END;
$$
LANGUAGE plpgsql;

SELECT move_file('file01.txt','file02.txt');

```

## (8) FRENAME

Same as FCOPY for the UTL\_FILE package. Refer to FCOPY in the UTL\_FILE package for information on specification differences and conversion procedures associated with specification differences.

## B.7 DBMS\_SQL (Execute Dynamic SQL)

### Features

For DBMS\_SQL, dynamic SQL can be executed from PL/pgSQL.

### B.7.1 Searching Using a Cursor

#### Oracle database

```

CREATE PROCEDURE search_test(h_where CLOB) AS

    str_sql      CLOB;
    v_cnt        INTEGER;
    v_array      DBMS_SQL.VARCHAR2A;
    v_cur        INTEGER;
    v_smpid      INTEGER;
    v_smpnm      VARCHAR2(20);
    v_addbuff    VARCHAR2(20);
    v_smpage     INTEGER;
    errcd       INTEGER;
    length       INTEGER;
    ret          INTEGER;
BEGIN

    str_sql      := 'SELECT smpid, smpnm FROM smp_tbl WHERE ' || h_where || ' ORDER BY smpid';
    v_smpid      := 0;
    v_smpnm      := '';
    v_smpage     := 0;

    v_cur := DBMS_SQL.OPEN_CURSOR; ... (1)

    v_cnt :=
        CEIL(DBMS_LOB.GETLENGTH(str_sql)/1000);
    FOR idx IN 1 .. v_cnt LOOP
        v_array(idx) :=
            DBMS_LOB.SUBSTR(str_sql,
                            1000,
                            (idx-1)*1000+1);
    
```

```

END LOOP;
DBMS_SQL.PARSE(v_cur, v_array, 1, v_cnt, FALSE, DBMS_SQL.NATIVE); ...(2)

DBMS_SQL.DEFINE_COLUMN(v_cur, 1, v_smpid);

DBMS_SQL.DEFINE_COLUMN(v_cur, 2, v_smpnm, 10);

ret := DBMS_SQL.EXECUTE(v_cur);
LOOP
  v_addbuff := '';

  IF DBMS_SQL.FETCH_ROWS(v_cur) = 0 THEN
    EXIT;
  END IF;

  DBMS_OUTPUT.PUT_LINE('-----');
  DBMS_SQL.COLUMN_VALUE(v_cur, 1, v_smpid, errcd, length); ...(3)

  IF errcd = 1405 THEN ...(3)

    DBMS_OUTPUT.PUT_LINE('smpid      = (NULL)');
  ELSE
    DBMS_OUTPUT.PUT_LINE('smpid      = ' || v_smpid);
  END IF;

  DBMS_SQL.COLUMN_VALUE(v_cur, 2, v_smpnm, errcd, length);

  IF errcd = 1406 THEN
    v_addbuff := '... [len=' || length || ']';
  END IF;
  IF errcd = 1405 THEN
    DBMS_OUTPUT.PUT_LINE('v_smpnm     = (NULL)');
  ELSE
    DBMS_OUTPUT.PUT_LINE('v_smpnm     = ' || v_smpnm || v_addbuff );
  END IF;

DBMS_OUTPUT.PUT_LINE('-----');

  DBMS_OUTPUT.NEW_LINE;
END LOOP;

DBMS_SQL.CLOSE_CURSOR(v_cur); ...(4)

RETURN;
END;
/

Set serveroutput on

call search_test('smpid < 100');

```

## FUJITSU Enterprise Postgres

```

CREATE FUNCTION search_test(h_where text) RETURNS void AS $$
DECLARE
  str_sql      text;

  v_cur        INTEGER;

```

```

v_smpid      INTEGER;
v_smpnm     VARCHAR(20);
v_addbuff   VARCHAR(20);
v_smpage    INTEGER;
errcd       INTEGER;
length      INTEGER;
ret         INTEGER;
BEGIN
PERFORM DBMS_OUTPUT.SERVEROUTPUT(TRUE);
str_sql     := 'SELECT smpid, smpnm FROM smp_tbl WHERE ' || h_where || ' ORDER BY smpid';
v_smpid     := 0;
v_smpnm     := '';
v_smpage    := 0;

v_cur := DBMS_SQL.OPEN_CURSOR(); ... (1)

PERFORM DBMS_SQL.PARSE(v_cur, str_sql, 1); ... (2)
PERFORM DBMS_SQL.DEFINE_COLUMN(v_cur, 1, v_smpid);
PERFORM DBMS_SQL.DEFINE_COLUMN(v_cur, 2, v_smpnm, 10);

ret := DBMS_SQL.EXECUTE(v_cur);
LOOP
    v_addbuff := '';

    IF DBMS_SQL.FETCH_ROWS(v_cur) = 0 THEN
        EXIT;
    END IF;

    PERFORM
DBMS_OUTPUT.PUT_LINE('-----');
SELECT value,column_error,actual_length
INTO v_smpid, errcd, length
FROM DBMS_SQL.COLUMN_VALUE(v_cur,
1,
v_smpid); ... (3)
IF errcd = 22002 THEN ... (3)
    PERFORM DBMS_OUTPUT.PUT_LINE('smpid      = (NULL)');
ELSE
    PERFORM DBMS_OUTPUT.PUT_LINE('smpid      = ' || v_smpid);
END IF;

    SELECT value,column_error,actual_length INTO v_smpnm, errcd, length FROM
DBMS_SQL.COLUMN_VALUE(v_cur, 2, v_smpnm);
    IF errcd = 22001 THEN
        v_addbuff := '... [len=' || length || ']';
    END IF;
    IF errcd = 22002 THEN
        PERFORM DBMS_OUTPUT.PUT_LINE('v_smpnm     = (NULL)');
    ELSE
        PERFORM DBMS_OUTPUT.PUT_LINE('v_smpnm     = ' || v_smpnm || v_addbuff );
    END IF;

    PERFORM
DBMS_OUTPUT.PUT_LINE('-----');
    PERFORM DBMS_OUTPUT.NEW_LINE();
END LOOP;

v_cur := DBMS_SQL.CLOSE_CURSOR(v_cur); ... (4)
RETURN;
END;
$$
LANGUAGE plpgsql;

```

```
SELECT search_test('smpid < 100');
```

### (1) OPEN\_CURSOR

Same as NEW\_LINE in the DBMS\_OUTPUT package. Refer to NEW\_LINE in the DBMS\_OUTPUT package for information on specification differences and conversion procedures associated with specification differences.

### (2) PARSE

Specification format for Oracle database

DBMS\_SQL.PARSE(*firstArg*, *secondArg*, *thirdArg*, *fourthArg*, *fifthArg*)

Feature differences

Oracle database

SQL statements can be specified with string table types (VARCHAR2A type, VARCHAR2S type). Specify this for *secondArg*.

DBMS\_SQL.NATIVE, DBMS\_SQL.V6, DBMS\_SQL.V7 can be specified for processing SQL statements.

FUJITSU Enterprise Postgres

SQL statements cannot be specified with string table types.

DBMS\_SQL.NATIVE, DBMS\_SQL.V6, DBMS\_SQL.V7 cannot be specified for processing SQL statements.

Conversion procedure

Convert using the following procedure:

1. Locate the places where the keyword "DBMS\_SQL.PARSE" is used in the stored procedure.
2. Check the data type of the SQL statement specified for *secondArg* (*v\_array* in the example).
  - If the data type is either DBMS\_SQL.VARCHAR2A type or DBMS\_SQL.VARCHAR2S type, then it is a table type specification. Execute step 3 and continue the conversion process.
  - If the data type is neither DBMS\_SQL.VARCHAR2A type nor DBMS\_SQL.VARCHAR2S type, then it is a string specification. Execute step 7 and continue the conversion process.
3. Check the SQL statement (*str\_sql* in the example) before it was divided into DBMS\_SQL.VARCHAR2A type and DBMS\_SQL.VARCHAR2S type.
4. Delete the sequence of the processes (processes near FOR *idx* in the example) where SQL is divided into DBMS\_SQL.VARCHAR2A type and DBMS\_SQL.VARCHAR2S type.
5. Replace *secondArg* with the SQL statement (*str\_sql* in the example) before it is divided, that was checked in step 2.
6. Delete *thirdArg*, *fourthArg*, and *fifthArg* (*v\_cnt*, FALSE, DBMS\_SQL.NATIVE, in the example).
7. If DBMS\_SQL.NATIVE, DBMS\_SQL.V6, and DBMS\_SQL.V7 are specified, then replace *thirdArg* with a numeric literal 1.
  - If either DBMS\_SQL.VARCHAR2A type or DBMS\_SQL.VARCHAR2S type is used, then *sixthArg* becomes relevant.
  - If neither DBMS\_SQL.VARCHAR2A type nor DBMS\_SQL.VARCHAR2S type is used, then *thirdArg* becomes relevant.

### (3) COLUMN\_VALUE

Specification format for Oracle database

DBMS\_SQL.COLUMN\_VALUE(*firstArg*, *secondArg*, *thirdArg*, *fourthArg*, *fifthArg*)

## Feature differences

### Oracle database

The following error codes are returned for `column_error`.

- 1406: fetched column value was truncated
- 1405: fetched column value is NULL

### FUJITSU Enterprise Postgres

The following error codes are returned for `column_error`.

- 22001: `string_data_right_truncation`
- 22002: `null_value_no_indicator_parameter`

## Specification differences

### Oracle database

Obtained values are received with variables specified for arguments.

### FUJITSU Enterprise Postgres

Since obtained values are the search results for `DBMS_SQL.COLUMN_VALUE`, they are received with variables specified for the `INTO` clause of the `SELECT` statement.

## Conversion procedure

Convert using the following procedure:

1. Locate the places where the keyword "`DBMS_SQL.COLUMN_VALUE`" is used in the stored procedure.
2. Replace the `DBMS_SQL.COLUMN_VALUE` location called with a `SELECT INTO` statement.
  - Check the number of arguments (`v_smpid`, `errcd`, and `length` in the example) specified after *secondArg* (1 in the example) of `DBMS_SQL.COLUMN_VALUE`.
  - Specify "value", "column\_error", and "actual\_length" in the select list, according to the number of arguments checked in the previous step (for example, if only *thirdArg* is specified, then specify "value" only.)
  - Specify *thirdArg*, *fourthArg*, and *fifthArg* (`v_smpid`, `errcd`, `length` in the example) configured for `DBMS_SQL.COLUMN_VALUE`, for the `INTO` clause.
  - Use `DBMS_SQL.COLUMN_VALUE` in the `FROM` clause. Specify *firstArg*, *secondArg*, and *thirdArg* (`v_cur`, 1, `v_smpid`, in the example) before modification.
3. If the *fourthArg* (`column_error` value in the example) is used, then check the location of the target variable (`errcd` in the example).
4. If a decision process is performed in the location checked, then modify the values used in the decision process as below:
  - 1406 to 22001
  - 1405 to 22002

## (4) CLOSE\_CURSOR

### Specification format for Oracle database

`DBMS_SQL.CLOSE_CURSOR(firstArg)`

### Specification differences

#### Oracle database

After closing, the cursor specified in *firstArg* becomes NULL.

## FUJITSU Enterprise Postgres

After closing, set the cursor to NULL by assigning the return value of DBMS\_SQL.CLOSE\_CURSOR to it.

### Conversion procedure

Convert using the following procedure:

1. Locate the places where the keyword "DBMS\_SQL.CLOSE\_CURSOR" is used in the stored procedure.
2. Set the cursor to NULL by assigning (:=) the return value of DBMS\_SQL.CLOSE\_CURSOR to it.
  - On the left-hand side, specify the argument (v\_cur in the example) specified for DBMS\_SQL.CLOSE\_CURSOR.
  - Use DBMS\_SQL.CLOSE\_CURSOR in the right-hand side. For the argument, specify the same value (v\_cur in the example) as before modification.

## Appendix C Tables Used by the Features Compatible with Oracle Databases

This chapter describes the tables used by the features compatible with Oracle databases.

### C.1 UTL\_FILE.UTL\_FILE\_DIR

Register the directory handled by the UTL\_FILE package in the UTL\_FILE.UTL\_FILE\_DIR table.

| Name       | Type | Description   |
|------------|------|---|
| <i>dir</i> | text | Name of the directory handled by the UTL_FILE package |

# Appendix D ECOBPG - Embedded SQL in COBOL

This appendix describes application development using embedded SQL in COBOL.

## D.1 Precautions when Using Functions and Operators

An embedded SQL program consists of code written in an ordinary programming language, in this case COBOL, mixed with SQL commands in specially marked sections. To build the program, the source code (\*.pco) is first passed through the embedded SQL preprocessor, which converts it to an ordinary COBOL program (\*.cob), and afterwards it can be processed by a COBOL compiler. (For details about the compiling and linking see " [D.9 Processing Embedded SQL Programs](#) "). Converted ECOBPG applications call functions in the libpq library through the embedded SQL library (ecpglib), and communicate with the PostgreSQL server using the normal frontend-backend protocol.

Embedded SQL has advantages over other methods for handling SQL commands from COOBL code. First, it takes care of the tedious passing of information to and from variables in your C program. Second, the SQL code in the program is checked at build time for syntactical correctness. Third, embedded SQL in COBOL is specified in the SQL standard and supported by many other SQL database systems. The PostgreSQL implementation is designed to match this standard as much as possible, and it is usually possible to port embedded SQL programs written for other SQL databases to PostgreSQL with relative ease.

As already stated, programs written for the embedded SQL interface are normal COBOL programs with special code inserted to perform database-related actions. This special code always has the form:

```
EXEC SQL ... END-EXEC
```

These statements syntactically take the place of a COBOL statement. Depending on the particular statement, they can appear at the data division or at the procedure division. Actual executable SQLs need to be placed at the procedure division, and host variable declarations need to be placed at data division. However, the precompiler does not validate their placements. Embedded SQL statements follow the case-sensitivity rules of normal SQL code, and not those of COBOL.

The precompiler introduces fixed syntax for embedded SQL in COBOL. In each line, 1st column to 6th column constitute line number area, and 7th column do indicator area. Embedded SQL programs also should be placed on the area B(12-72 column).

Note that sample codes in this document ommitt indents for each area.

ECOBPG processes and outputs programs compliance for fixed syntax. However, there are a few restrictions for using ecobps as follows.

- Ecobpg does not validate the limitation of number of characters other than embedded SQLs. 73 and later columns are deleted in the precompiled source.

ECOBPG accepts generally possible COBOL statement. However, there are a few restrictions for using ecobps as follows.

- In declaring host variable section, you can't use debug line.
- Outside of declaring host variable section, you can use debug line, but you can't contain any SQL in debug lines.
- In declaring host variable section, you can't use commas or semicolons as separator. Use space instead.
- EXEC SQL VAR command, it can be used in ECPG, is not available in ECOBPG. Use REDEFINE clause of COBOL instead.

The following sections explain all the embedded SQL statements.

## D.2 Managing Database Connections

This section describes how to open, close, and switch database connections.

## D.2.1 Connecting to the Database Server

---

One connects to a database using the following statement:

```
EXEC SQL CONNECT TO target [AS connection-name] [USER user-name] END-EXEC.
```

The target can be specified in the following ways:

- dbname[@hostname][:port]
- tcp:postgresql://hostname[:port][/dbname][?options]
- unix:postgresql://hostname[:port][/dbname][?options]
- an SQL string literal containing one of the above forms
- a reference to a character variable containing one of the above forms (see examples)
- DEFAULT

If you specify the connection target literally (that is, not through a variable reference) and you don't quote the value, then the case-insensitivity rules of normal SQL are applied. In that case you can also double-quote the individual parameters separately as needed. In practice, it is probably less error-prone to use a (single-quoted) string literal or a variable reference. The connection target `DEFAULT` initiates a connection to the default database under the default user name. No separate user name or connection name can be specified in that case.

There are also different ways to specify the user name:

- username
- username/password
- username IDENTIFIED BY password
- username USING password

As above, the parameters `username` and `password` can be an SQL identifier, an SQL string literal, or a reference to a character variable.

The `connection-name` is used to handle multiple connections in one program. It can be omitted if a program uses only one connection. The most recently opened connection becomes the current connection, which is used by default when an SQL statement is to be executed (see later in this chapter).

Here are some examples of `CONNECT` statements:

```
EXEC SQL CONNECT TO mydb@sql.mydomain.com END-EXEC.
```

```
EXEC SQL CONNECT TO tcp:postgresql://sql.mydomain.com/mydb AS myconnection USER john END-EXEC.
```

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.  
01 TARGET PIC X(25).  
01 USER PIC X(5).  
EXEC SQL END DECLARE SECTION END-EXEC.  
...  
MOVE "mydb@sql.mydomain.com" TO TARGET.  
MOVE "john" TO USER.  
EXEC SQL CONNECT TO :TARGET USER :USER END-EXEC.
```

The last form makes use of the variant referred to above as character variable reference. For this purpose, only fixed-length string (no `VARYING`) variable can be used. Trailing spaces are ignored. You will see in later sections how COBOL variables can be used in SQL statements when you prefix them with a colon.

Be advised that the format of the connection target is not specified in the SQL standard. So if you want to develop portable applications, you might want to use something based on the last example above to encapsulate the connection target string somewhere.

## D.2.2 Choosing a Connection

SQL statements in embedded SQL programs are by default executed on the current connection, that is, the most recently opened one. If an application needs to manage multiple connections, then there are two ways to handle this.

The first option is to explicitly choose a connection for each SQL statement, for example:

```
EXEC SQL AT connection-name SELECT ... END-EXEC.
```

This option is particularly suitable if the application needs to use several connections in mixed order.

If your application uses multiple threads of execution, they cannot share a connection concurrently. You must either explicitly control access to the connection (using mutexes) or use a connection for each thread. If each thread uses its own connection, you will need to use the AT clause to specify which connection the thread will use.

The second option is to execute a statement to switch the current connection. That statement is:

```
EXEC SQL SET CONNECTION connection-name END-EXEC.
```

This option is particularly convenient if many statements are to be executed on the same connection. It is not thread-aware.

Here is an example program managing multiple database connections:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.
  01 DBNAME PIC X(7).
EXEC SQL END DECLARE SECTION END-EXEC.

EXEC SQL CONNECT TO testdb1 AS con1 USER testuser END-EXEC.
EXEC SQL CONNECT TO testdb2 AS con2 USER testuser END-EXEC.
EXEC SQL CONNECT TO testdb3 AS con3 USER testuser END-EXEC.

* This query would be executed in the last opened database "testdb3".
EXEC SQL SELECT current_database() INTO :DBNAME END-EXEC.
DISPLAY "current=" DBNAME " (should be testdb3)".

* Using "AT" to run a query in "testdb2"
EXEC SQL AT con2 SELECT current_database() INTO :DBNAME END-EXEC.
DISPLAY "current=" DBNAME " (should be testdb2)".

* Switch the current connection to "testdb1".
EXEC SQL SET CONNECTION con1 END-EXEC.

EXEC SQL SELECT current_database() INTO :DBNAME END-EXEC.
DISPLAY "current=" DBNAME " (should be testdb1)".

EXEC SQL DISCONNECT ALL END-EXEC.
```

This example would produce this output:

```
current=testdb3 (should be testdb3)
current=testdb2 (should be testdb2)
current=testdb1 (should be testdb1)
```

## D.2.3 Closing a Connection

---

To close a connection, use the following statement:

```
EXEC SQL DISCONNECT [connection] END-EXEC.
```

The connection can be specified in the following ways:

- connection-name
- DEFAULT
- CURRENT
- ALL

If no connection name is specified, the current connection is closed.

It is good style that an application always explicitly disconnect from every connection it opened.

## D.3 Running SQL Commands

---

Any SQL command can be run from within an embedded SQL application. Below are some examples of how to do that.

### D.3.1 Executing SQL Statements

---

Creating a table:

```
EXEC SQL CREATE TABLE foo (number integer, ascii char(16)) END-EXEC.  
EXEC SQL CREATE UNIQUE INDEX num1 ON foo(number) END-EXEC.  
EXEC SQL COMMIT END-EXEC.
```

Inserting rows:

```
EXEC SQL INSERT INTO foo (number, ascii) VALUES (9999, 'doodad') END-EXEC.  
EXEC SQL COMMIT END-EXEC.
```

Deleting rows:

```
EXEC SQL DELETE FROM foo WHERE number = 9999 END-EXEC.  
EXEC SQL COMMIT END-EXEC.
```

Updates:

```
EXEC SQL UPDATE foo  
  SET ascii = 'foobar'  
  WHERE number = 9999 END-EXEC.  
EXEC SQL COMMIT END-EXEC.
```

SELECT statements that return a single result row can also be executed using EXEC SQL directly. To handle result sets with multiple rows, an application has to use a cursor; see "[D.3.2 Using Cursors](#)" below. (As a special case, an application can fetch multiple rows at once into an array host variable; see "[Arrays](#)".)

Single-row select:

```
EXEC SQL SELECT foo INTO :FooBar FROM table1 WHERE ascii = 'doodad' END-EXEC.
```

Also, a configuration parameter can be retrieved with the SHOW command:

```
EXEC SQL SHOW search_path INTO :var END-EXEC.
```

The tokens of the form :something are *host variables*, that is, they refer to variables in the COBOL program. They are explained in "[D.4 Using Host Variables](#)".

## D.3.2 Using Cursors

---

To retrieve a result set holding multiple rows, an application has to declare a cursor and fetch each row from the cursor. The steps to use a cursor are the following: declare a cursor, open it, fetch a row from the cursor, repeat, and finally close it.

Select using cursors:

```
EXEC SQL DECLARE foo_bar CURSOR FOR
    SELECT number, ascii FROM foo
    ORDER BY ascii END-EXEC.
EXEC SQL OPEN foo_bar END-EXEC.
EXEC SQL FETCH foo_bar INTO :FooBar, :DooDad END-EXEC.
...
EXEC SQL CLOSE foo_bar END-EXEC.
EXEC SQL COMMIT END-EXEC.
```

For more details about declaration of the cursor, see "[D.11.4 DECLARE](#)", and refer to "SQL Commands" in "Reference" in the PostgreSQL Documentation for information on FETCH command.

Note: The ECOBPG DECLARE command does not actually cause a statement to be sent to the PostgreSQL backend. The cursor is opened in the backend (using the backend's DECLARE command) at the point when the OPEN command is executed.

## D.3.3 Managing Transactions

---

In the default mode, statements are committed only when EXEC SQL COMMIT is issued. The embedded SQL interface also supports autocommit of transactions (similar to libpq behavior) via the -t command-line option to ecobpg or via the EXEC SQL SET AUTOCOMMIT TO ON statement. In autocommit mode, each command is automatically committed unless it is inside an explicit transaction block. This mode can be explicitly turned off using EXEC SQL SET AUTOCOMMIT TO OFF.



Refer to "ecpg" in "PostgreSQL Client Applications" in the PostgreSQL Documentation for information on -t command-line option to ecobpg.

The following transaction management commands are available:

EXEC SQL COMMIT END-EXEC

Commit an in-progress transaction.

EXEC SQL ROLLBACK END-EXEC

Roll back an in-progress transaction.

EXEC SQL SET AUTOCOMMIT TO ON END-EXEC

Enable autocommit mode.

EXEC SQL SET AUTOCOMMIT TO OFF END-EXEC

Disable autocommit mode. This is the default.

## D.3.4 Prepared Statements

---

When the values to be passed to an SQL statement are not known at compile time, or the same statement is going to be used many times, then prepared statements can be useful.

The statement is prepared using the command PREPARE. For the values that are not known yet, use the placeholder "?":

```
EXEC SQL PREPARE stmt1 FROM "SELECT oid, datname FROM pg_database WHERE oid = ?" END-EXEC.
```

If a statement returns a single row, the application can call EXECUTE after PREPARE to execute the statement, supplying the actual values for the placeholders with a USING clause:

```
EXEC SQL EXECUTE stmt1 INTO :dboid, :dbname USING 1 END-EXEC.
```

If a statement returns multiple rows, the application can use a cursor declared based on the prepared statement. To bind input parameters, the cursor must be opened with a USING clause:

```
EXEC SQL PREPARE stmt1 FROM "SELECT oid,datname FROM pg_database WHERE oid > ?" END-EXEC.  
EXEC SQL DECLARE foo_bar CURSOR FOR stmt1 END-EXEC.  
  
* when end of result set reached, break out of while loop  
EXEC SQL WHENEVER NOT FOUND GOTO FETCH-END END-EXEC.  
  
EXEC SQL OPEN foo_bar USING 100 END-EXEC.  
...  
PERFORM NO LIMIT  
    EXEC SQL FETCH NEXT FROM foo_bar INTO :dboid, :dbname END-EXEC  
END-PERFORM.  
  
FETCH-END.  
EXEC SQL CLOSE foo_bar END-EXEC.
```

When you don't need the prepared statement anymore, you should deallocate it:

```
EXEC SQL DEALLOCATE PREPARE name END-EXEC.
```

For more details about PREPARE, see "[D.11.10 PREPARE](#)". Also see "[D.5 Dynamic SQL](#)" for more details about using placeholders and input parameters.

## D.4 Using Host Variables

---

In "[D.3 Running SQL Commands](#)" you saw how you can execute SQL statements from an embedded SQL program. Some of those statements only used fixed values and did not provide a way to insert user-supplied values into statements or have the program process the values returned by the query. Those kinds of statements are not really useful in real applications. This section explains in detail how you can pass data between your COBOL program and the embedded SQL statements using a simple mechanism called host variables. In an embedded SQL program we consider the SQL statements to be guests in the COBOL program code which is the host language. Therefore the variables of the COBOL program are called host variables.

Another way to exchange values between PostgreSQL backends and ECOBPG applications is the use of SQL descriptors, described in "[D.6 Using Descriptor Areas](#)".

### D.4.1 Overview

---

Passing data between the COBOL program and the SQL statements is particularly simple in embedded SQL. Instead of having the program paste the data into the statement, which entails various complications, such as properly quoting the value, you can simply write the name of a COBOL variable into the SQL statement, prefixed by a colon. For example:

```
EXEC SQL INSERT INTO sometable VALUES (:v1, 'foo', :v2) END-EXEC.
```

This statement refers to two COBOL variables named v1 and v2 and also uses a regular SQL string literal, to illustrate that you are not restricted to use one kind of data or the other.

This style of inserting COBOL variables in SQL statements works anywhere a value expression is expected in an SQL statement.

### D.4.2 Declare Sections

---

To pass data from the program to the database, for example as parameters in a query, or to pass data from the database back to the program, the COBOL variables that are intended to contain this data need to be declared in specially marked sections, so the embedded SQL preprocessor is made aware of them.

This section starts with:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.
```

and ends with:

```
EXEC SQL END DECLARE SECTION END-EXEC.
```

Between those lines, there must be normal COBOL variable declarations, such as:

```
01 INTX PIC S9(9) COMP VALUE 4.  
01 FOO PIC X(15).  
01 BAR PIC X(15).
```

As you can see, you can optionally assign an initial value to the variable. The variable's scope is determined by the location of its declaring section within the program.

You can have as many declare sections in a program as you like.

The declarations are also echoed to the output file as normal COBOL variables, so there's no need to declare them again. Variables that are not intended to be used in SQL commands can be declared normally outside these special sections.

The definition of a group item also must be listed inside a DECLARE section. Otherwise the preprocessor cannot handle these types since it does not know the definition.

### D.4.3 Retrieving Query Results

Now you should be able to pass data generated by your program into an SQL command. But how do you retrieve the results of a query? For that purpose, embedded SQL provides special variants of the usual commands SELECT and FETCH. These commands have a special INTO clause that specifies which host variables the retrieved values are to be stored in. SELECT is used for a query that returns only single row, and FETCH is used for a query that returns multiple rows, using a cursor.

Here is an example:

```
*  
* assume this table:  
* CREATE TABLE test (a int, b varchar(50));  
*  
  
EXEC SQL BEGIN DECLARE SECTION END-EXEC.  
01 V1 PIC S9(9).  
01 V2 PIC X(50) VARYING.  
EXEC SQL END DECLARE SECTION END-EXEC.  
  
...  
  
EXEC SQL SELECT a, b INTO :V1, :V2 FROM test END-EXEC.
```

So the INTO clause appears between the select list and the FROM clause. The number of elements in the select list and the list after INTO (also called the target list) must be equal.

Here is an example using the command FETCH:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.  
01 V1 PIC S9(9).  
01 V2 PIC X(50) VARYING.  
EXEC SQL END DECLARE SECTION END-EXEC.  
  
...  
  
EXEC SQL DECLARE foo CURSOR FOR SELECT a, b FROM test END-EXEC.  
  
...  
  
PERFORM WITH
```

```

...
EXEC SQL FETCH NEXT FROM foo INTO :V1, :V2 END-EXEC
...
END-PERFORM.

```

Here the INTO clause appears after all the normal clauses.

## D.4.4 Type Mapping

When ECOBPG applications exchange values between the PostgreSQL server and the COBOL application, such as when retrieving query results from the server or executing SQL statements with input parameters, the values need to be converted between PostgreSQL data types and host language variable types (COBOL language data types, concretely). One of the main points of ECOBPG is that it takes care of this automatically in most cases.

In this respect, there are two kinds of data types: Some simple PostgreSQL data types, such as integer and text, can be read and written by the application directly. Other PostgreSQL data types, such as timestamp and date can only be accessed through character strings. special library functions does not exist in ecobpg. (pgtypes, exists in ECPG, for COBOL is not implemented yet)

"[Table D.1 Mapping Between PostgreSQL Data Types and COBOL Variable Types](#)" shows which PostgreSQL data types correspond to which COBOL data types. When you wish to send or receive a value of a given PostgreSQL data type, you should declare a COBOL variable of the corresponding COBOL data type in the declare section.

Table D.1 Mapping Between PostgreSQL Data Types and COBOL Variable Types

| PostgreSQL data type           | COBOL Host variable type   |
|--------------------------------|--|
| smallint                       | PIC S9([1-4]) {BINARY COMP COMP-5}   |
| integer                        | PIC S9([5-9]) {BINARY COMP COMP-5}   |
| bigint                         | PIC S9([10-18]) {BINARY COMP COMP-5}   |
| decimal                        | PIC S9(m)V9(n) PACKED-DECIMAL<br>PIC 9(m)V9(n) DISPLAY (*1)<br>PIC S9(m)V9(n) DISPLAY<br>PIC S9(m)V9(n) DISPLAY SIGN TRAILING [SEPARATE]<br>PIC S9(m)V9(n) DISPLAY SIGN LEADING [SEPARATE] |
| numeric                        | (same with decimal)  |
| real                           | COMP-1   |
| double precision               | COMP-2   |
| small serial                   | PIC S9([1-4]) {BINARY COMP COMP-5}   |
| serial                         | PIC S9([1-9]) {BINARY COMP COMP-5}   |
| bigserial                      | PIC S9([10-18]) {BINARY COMP COMP-5}   |
| oid                            | PIC 9(9) {BINARY COMP COMP-5}  |
| character(n), varchar(n), text | PIC X(n), PIC X(n) VARYING   |
| name                           | PIC X(NAMEDATALEN)   |
| boolean                        | BOOL(*2)   |
| other types(e.g. timestamp)    | PIC X(n), PIC X(n) VARYING   |

\*1: If no USAGE is specified, host variable is regarded as DISPLAY.

\*2: Type definition is added automatically on pre-compiling.

Body of BOOL is PIC X(1). '1' for true and '0' for false.

You can use some pattern of digits for integer(see table), but if database sends big number with more digits than specified, behavior is undefined .

| PostgreSQL data type   | COBOL Host variable type |
|--|--------------------------|
| VALUE clause can't be used with VARYING. (Can be used with other types)                                |                          |
| REDEFINE clause can be used, but it won't be validated on pre-compilation (Your COBOL compiler will do |                          |

## Handling Character Strings

To handle SQL character string data types, such as varchar and text, there is a possible way to declare the host variables.

The way is using the PIC X(*n*) VARYING type (we call it VARCHAR type from now on), which is a special type provided by ECOBPG. The definition on type VARCHAR is converted into a group item consists of named variables. A declaration like:

```
01 VAR PIC X(180) VARYING.
```

is converted into:

```
01 VAR.
49 LEN PIC S9(4) COMP-5.
49 ARR PIC X(180).
```

if --varchar-with-named-member option is used, it is converted into:

```
01 VAR.
49 VAR-LEN PIC S9(4) COMP-5.
49 VAR-ARR PIC X(180).
```

You can use level 1 to 48 for VARCHAR. Don't use level 49 variable right after VARCHAR variable. To use a VARCHAR host variable as an input for SQL statement, LEN must be set the length of the string included in ARR.

To use a VARCHAR host variable as an output of SQL statement, the variable must be declared in a sufficient length. if the length is insufficient, it can cause a buffer overrun.

PIC X(*n*) and VARCHAR host variables can also hold values of other SQL types, which will be stored in their string forms.

## Accessing Special Data Types

ECOBPG doesn't have special support for date, timestamp, and interval types.

(ECPG has pgtypes, but ECOBPG doesn't.)

You can use PIC X(*n*) or VARCHAR for DB I/O with these types. See "Data Types" section in PostgreSQL's document.

## Host Variables with Nonprimitive Types

As a host variable you can also use arrays, typedefs, and group items.

### Arrays

To create and use array variables, OCCURENCE syntax is provided by COBOL.

The typical use case is to retrieve multiple rows from a query result without using a cursor. Without an array, to process a query result consisting of multiple rows, it is required to use a cursor and the FETCH command. But with array host variables, multiple rows can be received at once. The length of the array has to be defined to be able to accommodate all rows, otherwise a buffer overrun will likely occur.

Following example scans the pg\_database system table and shows all OIDs and names of the available databases:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.
01 GROUP-ITEM.
   05 DBID PIC S9(9) COMP OCCURS 8.
   05 DBNAME PIC X(16) OCCURS 8.
01 I PIC S9(9) COMP.
EXEC SQL END DECLARE SECTION END-EXEC.

EXEC SQL CONNECT TO testdb END-EXEC.
```

```

* Retrieve multiple rows into arrays at once.
EXEC SQL SELECT oid,datname INTO :DBID, :DBNAME FROM pg_database END-EXEC.

PERFORM VARYING I FROM 1 BY 1 UNTIL I > 8
    DISPLAY "oid=" DBID(I) ", dbname=" DBNAME(I)
END-PERFORM.

EXEC SQL COMMIT END-EXEC.
EXEC SQL DISCONNECT ALL END-EXEC.

```

You can use member of array as simple host variable by specifying subscript of array. For specifying subscript, use C-style "[1]", not COBOL-style "(1)". But subscript starts with 1, according to COBOL syntax.

```

EXEC SQL BEGIN DECLARE SECTION END-EXEC.
01 GROUP-ITEM.
    05 DBID PIC S9(9) COMP OCCURS 8.
EXEC SQL END DECLARE SECTION END-EXEC.

EXEC SQL CONNECT TO testdb END-EXEC.

EXEC SQL SELECT oid INTO :DBID[1] FROM pg_database WHERE oid=1 END-EXEC.

    DISPLAY "oid=" DBID(1)

EXEC SQL COMMIT END-EXEC.
EXEC SQL DISCONNECT ALL END-EXEC.

```

## Group Item

A group item whose subordinate item names match the column names of a query result, can be used to retrieve multiple columns at once. The group item enables handling multiple column values in a single host variable.

The following example retrieves OIDs, names, and sizes of the available databases from the pg\_database system table and using the pg\_database\_size() function. In this example, a group item variable dbinfo\_t with members whose names match each column in the SELECT result is used to retrieve one result row without putting multiple host variables in the FETCH statement.

```

EXEC SQL BEGIN DECLARE SECTION END-EXEC.
    01 DBINFO-T TYPEDEF.
        02 OID PIC S9(9) COMP.
        02 DATNAME PIC X(65).
        02 DBSIZE PIC S9(18) COMP.

    01 DBVAL TYPE DBINFO-T.
EXEC SQL END DECLARE SECTION END-EXEC.

EXEC SQL DECLARE curl CURSOR FOR SELECT oid, datname, pg_database_size(oid) AS size
FROM pg_database END-EXEC.
EXEC SQL OPEN curl END-EXEC.

* when end of result set reached, break out of loop
EXEC SQL WHENEVER NOT FOUND GOTO END-FETCH END-EXEC.

PERFORM NO LIMIT

* Fetch multiple columns into one structure.
EXEC SQL FETCH FROM curl INTO :DBVAL END-EXEC

* Print members of the structure.
    DISPLAY "oid=" OID ", datname=" DATNAME ", size=" DBSIZE
END-PERFORM.

```

```

END-FETCH.
EXEC SQL CLOSE curl END-EXEC.

```

group item host variables "absorb" as many columns as the group item as subordinate items. Additional columns can be assigned to other host variables. For example, the above program could also be restructured like this, with the size variable outside the group item:

```

EXEC SQL BEGIN DECLARE SECTION END-EXEC.
  01 DBINFO-T TYPEDEF.
    02 OID PIC S9(9) COMP.
    02 DATNAME PIC X(65).

  01 DBVAL TYPE DBINFO-T.
  01 DBSIZE PIC S9(18) COMP.
EXEC SQL END DECLARE SECTION END-EXEC.

EXEC SQL DECLARE curl CURSOR FOR SELECT oid, datname, pg_database_size(oid) AS size
FROM pg_database END-EXEC.
EXEC SQL OPEN curl END-EXEC.

*   when end of result set reached, break out of loop
EXEC SQL WHENEVER NOT FOUND GOTO END-FETCH END-EXEC.

PERFORM NO LIMIT
*   Fetch multiple columns into one structure.
EXEC SQL FETCH FROM curl INTO :DBVAL, :DBSIZE END-EXEC

*   Print members of the structure.
DISPLAY "oid=" OID " , datname=" DATNAME " , size=" DBSIZE
END-PERFORM

FETCH-END.
EXEC SQL CLOSE curl END-EXEC.

```

You can use only non-nested group items for host variable of SQL statement. Declaration of nested group items are OK, but you must specify non-nested part of group items for SQL. (VARCHAR, is translated to group item on pre-compilation, is not considered as offense of this rule.) When using inner item of group item in SQL, use C-struct like period separated syntax(not COBOL's A OF B). Here is example.

```

EXEC SQL BEGIN DECLARE SECTION END-EXEC.
01 NESTED-GROUP.
  02 CHIL1.
    03 A PIC X(10).
    03 B PIC S9(9) COMP.
  02 CHIL2.
    03 A PIC X(10).
    03 B PIC S9(9) COMP.
EXEC SQL END DECLARE SECTION END-EXEC.

* This SQL is valid. CHIL1 has no nested group items.
EXEC SQL SELECT * INTO :NESTED-GROUP.CHIL1 FROM TABLE1 END-EXEC.

```

For specifying basic item of group items, full specification is not needed if the specification is enough for identifying the item. This is from COBOL syntax. For more detail, see resources of COBOL syntax.

## TYPEDEF

Use the typedef keyword to map new types to already existing types.

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.
    01 MYCHARTYPE TYPEDEF PIC X(40).
    01 SERIAL-T TYPEDEF PIC S9(9) COMP.
EXEC SQL END DECLARE SECTION END-EXEC.
```

Note that you could also use:

```
EXEC SQL TYPE SERIAL-T IS PIC S9(9) COMP-5. END-EXEC.
```

This declaration does not need to be part of a declare section.

## D.4.5 Handling Nonprimitive SQL Data Types

This section contains information on how to handle nonscalar and user-defined SQL-level data types in ECOBPG applications. Note that this is distinct from the handling of host variables of nonprimitive types, described in the previous section.

### Arrays

SQL-level arrays are not directly supported in ECOBPG. It is not possible to simply map an SQL array into a COBOL array host variable. This will result in undefined behavior. Some workarounds exist, however.

If a query accesses elements of an array separately, then this avoids the use of arrays in ECOBPG. Then, a host variable with a type that can be mapped to the element type should be used. For example, if a column type is array of integer, a host variable of type PIC S9(9) COMP can be used. Also if the element type is varchar or text, a host variable of type VARCHAR can be used.

Here is an example. Assume the following table:

```
CREATE TABLE t3 (
    ii integer[]
);

testdb=> SELECT * FROM t3;
    ii
-----
{1,2,3,4,5}
(1 row)
```

The following example program retrieves the 4th element of the array and stores it into a host variable of type PIC S9(9) COMP-5:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.
01 II PIC S9(9) COMP.
EXEC SQL END DECLARE SECTION END-EXEC.

EXEC SQL DECLARE cur1 CURSOR FOR SELECT ii[4] FROM t3 END-EXEC.
EXEC SQL OPEN cur1 END-EXEC.

EXEC SQL WHENEVER NOT FOUND GOTO END-FETCH END-EXEC.

PERFORM NO LIMIT
    EXEC SQL FETCH FROM cur1 INTO :II END-EXEC
    DISPLAY "ii=" II
END-PERFORM.
```

```
END-FETCH.  
EXEC SQL CLOSE cur1 END-EXEC.
```

To map multiple array elements to the multiple elements in an array type host variables each element of array column and each element of the host variable array have to be managed separately, for example:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.  
01 GROUP-ITEM.  
    05 II_A PIC S9(9) COMP OCCURS 8.  
EXEC SQL END DECLARE SECTION END-EXEC.  
  
EXEC SQL DECLARE cur1 CURSOR FOR SELECT ii[1], ii[2], ii[3], ii[4] FROM t3 END-EXEC.  
EXEC SQL OPEN cur1 END-EXEC.  
  
EXEC SQL WHENEVER NOT FOUND GOTO END-FETCH END-EXEC.  
  
PERFORM NO LIMIT  
    EXEC SQL FETCH FROM cur1 INTO :II_A[1], :II_A[2], :II_A[3], :II_A[4] END-EXEC  
    ...  
END-PERFORM.
```

Note again that.

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.  
01 GROUP-ITEM.  
    05 II_A PIC S9(9) COMP OCCURS 8.  
EXEC SQL END DECLARE SECTION END-EXEC.  
  
EXEC SQL DECLARE cur1 CURSOR FOR SELECT ii FROM t3 END-EXEC.  
EXEC SQL OPEN cur1 END-EXEC.  
  
EXEC SQL WHENEVER NOT FOUND GOTO END-FETCH END-EXEC.  
  
PERFORM NO LIMIT  
*   WRONG  
    EXEC SQL FETCH FROM cur1 INTO :II_A END-EXEC  
    ...  
END-PERFORM.
```

would not work correctly in this case, because you cannot map an array type column to an array host variable directly.

Another workaround is to store arrays in their external string representation in host variables of type VARCHAR. For more details about this representation.

 See

.....  
Refer to "Arrays" in "Tutorial" in the PostgreSQL Documentation for information more details about this representation.  
.....

Note that this means that the array cannot be accessed naturally as an array in the host program (without further processing that parses the text representation).

## Composite Types

Composite types are not directly supported in ECOBPG, but an easy workaround is possible. The available workarounds are similar to the ones described for arrays above: Either access each attribute separately or use the external string representation.

For the following examples, assume the following type and table:

```
CREATE TYPE comp_t AS (intval integer, textval varchar(32));
CREATE TABLE t4 (compval comp_t);
INSERT INTO t4 VALUES ( (256, 'PostgreSQL') );
```

The most obvious solution is to access each attribute separately. The following program retrieves data from the example table by selecting each attribute of the type comp\_t separately:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.
01 INTVAL PIC S9(9) COMP.
01 TEXTVAL PIC X(33) VARYING.
EXEC SQL END DECLARE SECTION END-EXEC.

* Put each element of the composite type column in the SELECT list.
EXEC SQL DECLARE cur1 CURSOR FOR SELECT (compval).intval, (compval).textval FROM t4 END-
EXEC.
EXEC SQL OPEN cur1 END-EXEC.

EXEC SQL WHENEVER NOT FOUND GOTO END-FETCH END-EXEC.

PERFORM NO LIMIT
* Fetch each element of the composite type column into host variables.
EXEC SQL FETCH FROM cur1 INTO :INTVAL, :TEXTVAL END-EXEC

DISPLAY "intval=" INTVAL ", textval=" ARR OF TEXTVAL
END-PERFORM.

END-FETCH.
EXEC SQL CLOSE cur1 END-EXEC.
```

To enhance this example, the host variables to store values in the FETCH command can be gathered into one group item. For more details about the host variable in the group item form, see ["Group Item"](#). To switch to the group item, the example can be modified as below. The two host variables, intval and textval, become subordinate items of the comp\_t group item, and the group item is specified on the FETCH command.

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.
01 COMP-T TYPEDEF.
02 INTVAL PIC S9(9) COMP.
02 TEXTVAL PIC X(33) VARYING.

01 COMPVAL TYPE COMP-T.
EXEC SQL END DECLARE SECTION END-EXEC.

* Put each element of the composite type column in the SELECT list.
EXEC SQL DECLARE cur1 CURSOR FOR SELECT (compval).intval, (compval).textval FROM t4 END-
EXEC.
EXEC SQL OPEN cur1 END-EXEC.
EXEC SQL WHENEVER NOT FOUND GOTO END-FETCH END-EXEC.

PERFORM NO LIMIT
* Put all values in the SELECT list into one structure.
EXEC SQL FETCH FROM cur1 INTO :COMPVAL END-EXEC

DISPLAY "intval=" INTVAL ", textval=" ARR OF TEXTVAL
END-PERFORM.

END-FETCH.
EXEC SQL CLOSE cur1 END-EXEC.
```

Although a group item is used in the FETCH command, the attribute names in the SELECT clause are specified one by one. This can be enhanced by using a \* to ask for all attributes of the composite type value.

```
...
EXEC SQL DECLARE cur1 CURSOR FOR SELECT (compval).* FROM t4 END-EXEC.
```

```

EXEC SQL OPEN cur1 END-EXEC.
EXEC SQL WHENEVER NOT FOUND GOTO END-FETCH END-EXEC.

PERFORM NO LIMIT
*   Put all values in the SELECT list into one structure.
    EXEC SQL FETCH FROM cur1 INTO :COMPVAL END-EXEC

        DISPLAY "intval=" INTVAL " , textval=" ARR OF TEXTVAL
END-PERFORM.

```

This way, composite types can be mapped into structures almost seamlessly, even though ECOBPG does not understand the composite type itself.

Finally, it is also possible to store composite type values in their external string representation in host variables of type VARCHAR. But that way, it is not easily possible to access the fields of the value from the host program.

## User-defined Base Types

New user-defined base types are not directly supported by ECOBPG. You can use the external string representation and host variables of type VARCHAR, and this solution is indeed appropriate and sufficient for many types.

Here is an example using the data type complex.



See

Refer to "User-defined Types" in "Server Programming" in the PostgreSQL Documentation for information on the data type complex..

The external string representation of that type is (%lf,%lf), which is defined in the functions `complex_in()` and `complex_out()` functions. The following example inserts the complex type values (1,1) and (3,3) into the columns a and b, and select them from the table after that.

```

EXEC SQL BEGIN DECLARE SECTION END-EXEC.
    01 A PIC X(64) VARYING.
    01 B PIC X(64) VARYING.
EXEC SQL END DECLARE SECTION END-EXEC.

EXEC SQL INSERT INTO test_complex VALUES ('(1,1)', '(3,3)') END-EXEC.

EXEC SQL DECLARE cur1 CURSOR FOR SELECT a, b FROM test_complex END-EXEC.
EXEC SQL OPEN cur1 END-EXEC.

EXEC SQL WHENEVER NOT FOUND GOTO END-FETCH END-EXEC.

PERFORM NO LIMIT
    EXEC SQL FETCH FROM cur1 INTO :A, :B END-EXEC
        DISPLAY "a=" ARR OF A " , b=" ARR OF B
END-PERFORM.

END-FETCH.
EXEC SQL CLOSE cur1 END-EXEC.

```

Another workaround is avoiding the direct use of the user-defined types in ECOBPG and instead create a function or cast that converts between the user-defined type and a primitive type that ECOBPG can handle. Note, however, that type casts, especially implicit ones, should be introduced into the type system very carefully.

For example:

```

CREATE FUNCTION create_complex(r double precision, i double precision) RETURNS complex
LANGUAGE SQL
IMMUTABLE
AS $$ SELECT $1 * complex '(1,0)' + $2 * complex '(0,1)' $$;

```

After this definition, the following:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.  
01 A COMP-2.  
01 B COMP-2.  
01 C COMP-2.  
01 D COMP-2.  
EXEC SQL END DECLARE SECTION END-EXEC.  
  
MOVE 1 TO A.  
MOVE 2 TO B.  
MOVE 3 TO C.  
MOVE 4 TO D.  
  
EXEC SQL INSERT INTO test_complex VALUES (create_complex(:A, :B), create_complex(:C, :D))  
END-EXEC.
```

has the same effect as

```
EXEC SQL INSERT INTO test_complex VALUES ('(1,2)', '(3,4)') END-EXEC.
```

## D.4.6 Indicators

The examples above do not handle null values. In fact, the retrieval examples will raise an error if they fetch a null value from the database. To be able to pass null values to the database or retrieve null values from the database, you need to append a second host variable specification to each host variable that contains data. This second host variable is called the *indicator* and contains a flag that tells whether the datum is null, in which case the value of the real host variable is ignored. Here is an example that handles the retrieval of null values correctly:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.  
01 VAL PIC X(50) VARYING.  
01 VAL_IND PIC S9(9) COMP-5.  
EXEC SQL END DECLARE SECTION END-EXEC.  
  
...  
  
EXEC SQL SELECT b INTO :VAL :VAL_IND FROM test1 END-EXEC.
```

The indicator variable `val_ind` will be zero if the value was not null, and it will be negative if the value was null.

The indicator has another function: if the indicator value is positive, it means that the value is not null, but it was truncated when it was stored in the host variable.

## D.5 Dynamic SQL

In many cases, the particular SQL statements that an application has to execute are known at the time the application is written. In some cases, however, the SQL statements are composed at run time or provided by an external source. In these cases you cannot embed the SQL statements directly into the COBOL source code, but there is a facility that allows you to call arbitrary SQL statements that you provide in a string variable.

### D.5.1 Executing Statements without a Result Set

The simplest way to execute an arbitrary SQL statement is to use the command EXECUTE IMMEDIATE. For example:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.  
01 STMT PIC X(30) VARYING.  
EXEC SQL END DECLARE SECTION END-EXEC.  
  
MOVE "CREATE TABLE test1 (...);" TO ARR OF STMT.  
COMPUTE LEN OF STMT = FUNCTION STORED-CHAR-LENGTH (ARR OF STMT).  
EXEC SQL EXECUTE IMMEDIATE :STMT END-EXEC.
```

EXECUTE IMMEDIATE can be used for SQL statements that do not return a result set (e.g., DDL, INSERT, UPDATE, DELETE). You cannot execute statements that retrieve data (e.g., SELECT) this way. The next section describes how to do that.

## D.5.2 Executing a Statement with Input Parameters

---

A more powerful way to execute arbitrary SQL statements is to prepare them once and execute the prepared statement as often as you like. It is also possible to prepare a generalized version of a statement and then execute specific versions of it by substituting parameters. When preparing the statement, write question marks where you want to substitute parameters later. For example:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.
01 STMT PIC X(40) VARYING.
EXEC SQL END DECLARE SECTION END-EXEC.

MOVE "INSERT INTO test1 VALUES(?, ?);" TO ARR OF STMT.
COMPUTE LEN OF STMT = FUNCTION STORED-CHAR-LENGTH (ARR OF STMT).
EXEC SQL PREPARE MYSTMT FROM :STMT END-EXEC.
...
EXEC SQL EXECUTE MYSTMT USING 42, 'foobar' END-EXEC.
```

When you don't need the prepared statement anymore, you should deallocate it:

```
EXEC SQL DEALLOCATE PREPARE name END-EXEC.
```

## D.5.3 Executing a Statement with a Result Set

---

To execute an SQL statement with a single result row, EXECUTE can be used. To save the result, add an INTO clause.

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.
01 STMT PIC X(50) VARYING.
01 V1 PIC S9(9) COMP.
01 V2 PIC S9(9) COMP.
01 V3 PIC X(50) VARYING.
EXEC SQL END DECLARE SECTION END-EXEC.

MOVE "SELECT a, b, c FROM test1 WHERE a > ?" TO ARR OF STMT.
COMPUTE LEN OF STMT = FUNCTION STORED-CHAR-LENGTH (ARR OF STMT).
EXEC SQL PREPARE MYSTMT FROM :STMT END-EXEC.
...
EXEC SQL EXECUTE MYSTMT INTO :V1, :V2, :V3 USING 37 END-EXEC.
```

An EXECUTE command can have an INTO clause, a USING clause, both, or neither.

If a query is expected to return more than one result row, a cursor should be used, as in the following example. (See "[D.3.2 Using Cursors](#)" for more details about the cursor.)

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.
01 DBANAME PIC X(128) VARYING.
01 DATNAME PIC X(128) VARYING.
01 STMT PIC X(200) VARYING.
EXEC SQL END DECLARE SECTION END-EXEC.

MOVE "SELECT u.username as dbaname, d.datname
-           " FROM pg_database d, pg_user u
-           " WHERE d.datdba = u.usesysid"
TO ARR OF STMT.
COMPUTE LEN OF STMT = FUNCTION STORED-CHAR-LENGTH (ARR OF STMT).

EXEC SQL CONNECT TO testdb AS con1 USER testuser END-EXEC.

EXEC SQL PREPARE STMT1 FROM :STMT END-EXEC.
```

```

EXEC SQL DECLARE cursor1 CURSOR FOR STMT1 END-EXEC.
EXEC SQL OPEN cursor1 END-EXEC.

EXEC SQL WHENEVER NOT FOUND GOTO FETCH-END END-EXEC.

PERFORM NO LIMIT
    EXEC SQL FETCH cursor1 INTO :DBANAME, :DATNAME END-EXEC
    DISPLAY "dbaname=" ARR OF DBANAME ", datname=" ARR OF DATNAME
END-PERFORM.

FETCH-END.

EXEC SQL CLOSE cursor1 END-EXEC.

EXEC SQL COMMIT END-EXEC.
EXEC SQL DISCONNECT ALL END-EXEC.

```

## D.6 Using Descriptor Areas

An SQL descriptor area is a more sophisticated method for processing the result of a SELECT, FETCH or a DESCRIBE statement. An SQL descriptor area groups the data of one row of data together with metadata items into one data group item. The metadata is particularly useful when executing dynamic SQL statements, where the nature of the result columns might not be known ahead of time. PostgreSQL provides a way to use Descriptor Areas: the named SQL Descriptor Areas.

### D.6.1 Named SQL Descriptor Areas

A named SQL descriptor area consists of a header, which contains information concerning the entire descriptor, and one or more item descriptor areas, which basically each describe one column in the result row.

Before you can use an SQL descriptor area, you need to allocate one:

```
EXEC SQL ALLOCATE DESCRIPTOR identifier END-EXEC.
```

The identifier serves as the "variable name" of the descriptor area. When you don't need the descriptor anymore, you should deallocate it:

```
EXEC SQL DEALLOCATE DESCRIPTOR identifier END-EXEC.
```

To use a descriptor area, specify it as the storage target in an INTO clause, instead of listing host variables:

```
EXEC SQL FETCH NEXT FROM mycursor INTO SQL DESCRIPTOR mydesc END-EXEC.
```

If the result set is empty, the Descriptor Area will still contain the metadata from the query, i.e. the field names.

For not yet executed prepared queries, the DESCRIBE statement can be used to get the metadata of the result set:

```

EXEC SQL BEGIN DECLARE SECTION END-EXEC.
01 SQL-STMT PIC X(30) VARYING.
EXEC SQL END DECLARE SECTION END-EXEC.

MOVE "SELECT * FROM table1" TO ARR OF SQL-STMT.
COMPUTE LEN OF SQL-STMT = FUNCTION STORED-CHAR-LENGTH ( ARR OF SQL-STMT ) .
EXEC SQL PREPARE STMT1 FROM :SQL-STMT END-EXEC.
EXEC SQL DESCRIBE STMT1 INTO SQL DESCRIPTOR MYDESC END-EXEC.

```

Before PostgreSQL 9.0, the SQL keyword was optional, so using DESCRIPTOR and SQL DESCRIPTOR produced named SQL Descriptor Areas. Now it is mandatory, omitting the SQL keyword is regarded as the syntax that produces SQLDA Descriptor Areas. However, ecobpg does not support SQLDA and it causes an error.

In DESCRIBE and FETCH statements, the INTO and USING keywords can be used to similarly: they produce the result set and the metadata in a Descriptor Area.

Now how do you get the data out of the descriptor area? You can think of the descriptor area as a group item with named fields. To retrieve the value of a field from the header and store it into a host variable, use the following command:

```
EXEC SQL GET DESCRIPTOR name :hostvar = field END-EXEC.
```

Currently, there is only one header field defined: COUNT, which tells how many item descriptor areas exist (that is, how many columns are contained in the result). The host variable needs to be of an integer type as PIC S9(9) COMP-5. To get a field from the item descriptor area, use the following command:

```
EXEC SQL GET DESCRIPTOR name VALUE num :hostvar = field END-EXEC.
```

num can be a host variable containing an integer as PIC S9(9) COMP-5.

hostvar must be PIC S9(9) COMP-5 if type of the field is integer. Possible fields are:

**CARDINALITY (integer)**

number of rows in the result set

**DATA**

actual data item (therefore, the data type of this field depends on the query)

**DATETIME\_INTERVAL\_CODE (integer)**

When TYPE is 9, DATETIME\_INTERVAL\_CODE will have a value of 1 for DATE, 2 for TIME, 3 for TIMESTAMP, 4 for TIME WITH TIME ZONE, or 5 for TIMESTAMP WITH TIME ZONE.

**DATETIME\_INTERVAL\_PRECISION (integer)**

not implemented

**INDICATOR (integer)**

the indicator (indicating a null value or a value truncation)

**KEY\_MEMBER (integer)**

not implemented

**LENGTH (integer)**

length of the datum in characters

**NAME (string)**

name of the column

**NULLABLE (integer)**

not implemented

**OCTET\_LENGTH (integer)**

length of the character representation of the datum in bytes

**PRECISION (integer)**

precision (for type numeric)

**RETURNED\_LENGTH (integer)**

length of the datum in characters

**RETURNED\_OCTET\_LENGTH (integer)**

length of the character representation of the datum in bytes

**SCALE (integer)**

scale (for type numeric)

**TYPE (integer)**

numeric code of the data type of the column

In EXECUTE, DECLARE and OPEN statements, the effect of the INTO and USING keywords are different. A Descriptor Area can also be manually built to provide the input parameters for a query or a cursor and USING SQL DESCRIPTOR name is the way to pass the input parameters into a parametrized query. The statement to build a named SQL Descriptor Area is below:

```
EXEC SQL SET DESCRIPTOR name VALUE num field = :hostvar END-EXEC.
```

PostgreSQL supports retrieving more than one record in one FETCH statement and storing the data in host variables in this case assumes that the variable is an array. E.g.:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.  
01 GROUP-ITEM.  
    05 IDNUM PIC S9(9) COMP OCCURS 5.  
EXEC SQL END DECLARE SECTION END-EXEC.  
  
EXEC SQL FETCH 5 FROM mycursor INTO SQL DESCRIPTOR mydesc END-EXEC.  
  
EXEC SQL GET DESCRIPTOR mydesc VALUE 1 :IDNUM = DATA END-EXEC.
```

## D.7 Error Handling

---

This section describes how you can handle exceptional conditions and warnings in an embedded SQL program. There are two nonexclusive facilities for this.

- Callbacks can be configured to handle warning and error conditions using the WHENEVER command.
- Detailed information about the error or warning can be obtained from the sqlca variable.

### D.7.1 Setting Callbacks

---

One simple method to catch errors and warnings is to set a specific action to be executed whenever a particular condition occurs. In general:

```
EXEC SQL WHENEVER condition action END-EXEC.
```

condition can be one of the following:

#### SQLERROR

The specified action is called whenever an error occurs during the execution of an SQL statement.

#### SQLWARNING

The specified action is called whenever a warning occurs during the execution of an SQL statement.

#### NOT FOUND

The specified action is called whenever an SQL statement retrieves or affects zero rows. (This condition is not an error, but you might be interested in handling it specially.)

action can be one of the following:

#### CONTINUE

This effectively means that the condition is ignored. This is the default.

#### GOTO label

#### GO TO label

Jump to the specified label (using a COBOL goto statement).

#### SQLPRINT

Print a message to standard error. This is useful for simple programs or during prototyping. The details of the message cannot be configured.

## STOP

Call STOP, which will terminate the program.

## CALL name usingargs

## DO name usingargs

Call the specified functions with the following characters including arguments. Thus, syntaxes (including compiler depending) are able to be placed as well as the arguments. Though, there are some limitation as following:

- You can't use RETURNING, ON EXCEPTION or OVER FLOW clauses.
- In the called subprogram, You must specify CONTINUE for every action with WHENEVER statement.

The SQL standard only provides for the actions CONTINUE and GOTO (and GO TO).

Here is an example that you might want to use in a simple program. It prints a simple message when a warning occurs and aborts the program when an error happens:

```
EXEC SQL WHENEVER SQLWARNING SQLPRINT END-EXEC.  
EXEC SQL WHENEVER SQLERROR STOP END-EXEC.
```

The statement EXEC SQL WHENEVER is a directive of the SQL preprocessor, not a COBOL statement. The error or warning actions that it sets apply to all embedded SQL statements that appear below the point where the handler is set, unless a different action was set for the same condition between the first EXEC SQL WHENEVER and the SQL statement causing the condition, regardless of the flow of control in the COBOL program. So neither of the two following COBOL program excerpts will have the desired effect:

```
*  
*   WRONG  
*  
*   ...  
*   IF VERBOSE = 1 THEN  
*       EXEC SQL WHENEVER SQLWARNING SQLPRINT END-EXEC  
*   END-IF.  
*   ...  
*   EXEC SQL SELECT ... END-EXEC.  
*   ...  
*  
*   WRONG  
*  
*   ...  
*   CALL SET-ERROR-HANDLER.  
*       (and execute "EXEC SQL WHENEVER SQLERROR STOP" in SET-ERROR-HANDLER)  
*   ...  
*   EXEC SQL SELECT ... END-EXEC.  
*   ...
```

## D.7.2 sqlca

For more powerful error handling, the embedded SQL interface provides a global variable with the name sqlca (SQL communication area) that has the following group item:

```
01 SQLCA.  
   02 SQLCAID PIC X(8).  
   02 SQLABC PIC S9(9).  
   02 SQLCODE PIC S9(9).  
   02 SQLERRM.  
       03 SQLERRML PIC S9(9).  
       03 SQLERRMC PIC X(150).  
   02 SQLERRP PIC X(8).  
   02 SQLERRD PIC S9(9) OCCURS 6.
```

```
02 SQLWARN PIC X(8).
02 SQLSTATE PIC X(5).
```

(In a multithreaded program, every thread automatically gets its own copy of sqlca. This works similarly to the handling of the standard C global variable errno.)

sqlca covers both warnings and errors. If multiple warnings or errors occur during the execution of a statement, then sqlca will only contain information about the last one.

If no error occurred in the last SQL statement, SQLCODE will be 0 and SQLSTATE will be "00000". If a warning or error occurred, then SQLCODE will be negative and SQLSTATE will be different from "00000". A positive SQLCODE indicates a harmless condition, such as that the last query returned zero rows. SQLCODE and SQLSTATE are two different error code schemes; details appear below.

If the last SQL statement was successful, then SQLERRD(2) contains the OID of the processed row, if applicable, and SQLERRD(3) contains the number of processed or returned rows, if applicable to the command.

In case of an error or warning, SQLERRMC will contain a string that describes the error. The field SQLERRML contains the length of the error message that is stored in SQLERRMC (the result of FUNCTION STORED-CHAR-LENGTH. Note that some messages are too long to fit in the fixed-size sqlerrmc array; they will be truncated.

In case of a warning, the 3rd character of SQLWARN is set to W. (In all other cases, it is set to something different from W.) If the 2nd character of SQLWARN is set to W, then a value was truncated when it was stored in a host variable. The 1st character of SQLWARN is set to W if any of the other elements are set to indicate a warning.

The fields sqlcaid, sqlcabc, sqlerrp, and the remaining elements of sqlerrd and sqlwarn currently contain no useful information.

The structure sqlca is not defined in the SQL standard, but is implemented in several other SQL database systems. The definitions are similar at the core, but if you want to write portable applications, then you should investigate the different implementations carefully.

Here is one example that combines the use of WHENEVER and sqlca, printing out the contents of sqlca when an error occurs. This is perhaps useful for debugging or prototyping applications, before installing a more "user-friendly" error handler.

```
EXEC SQL WHENEVER SQLERROR GOTO PRINT_SQLCA END-EXEC.

PRINT_SQLCA.
  DISPLAY "==== sqlca ====".
  DISPLAY "SQLCODE: " SQLCODE.
  DISPLAY "SQLERRML: " SQLERRML.
  DISPLAY "SQLERRMC: " SQLERRMC.
  DISPLAY "SQLERRD: " SQLERRD(1) " " SQLERRD(2) " " SQLERRD(3) " " SQLERRD(4) " "
SQLERRD(5) " " SQLERRD(6).
  DISPLAY "SQLSTATE: " SQLSTATE.
  DISPLAY "=====".
```

The result could look as follows (here an error due to a misspelled table name):

```
==== sqlca ====
sqlcode: -000000400
SQLERRML: +000000064
SQLERRMC: relation "pg_databasep" does not exist (10292) on line 93
sqlerrd: +000000000 +000000000 +000000000 +000000000 +000000000 +000000000
sqlstate: 42P01
=====
```

## D.7.3 SQLSTATE vs. SQLCODE

The fields SQLSTATE and SQLCODE are two different schemes that provide error codes. Both are derived from the SQL standard, but SQLCODE has been marked deprecated in the SQL-92 edition of the standard and has been dropped in later editions. Therefore, new applications are strongly encouraged to use SQLSTATE.

SQLSTATE is a five-character array. The five characters contain digits or upper-case letters that represent codes of various error and warning conditions. SQLSTATE has a hierarchical scheme: the first two characters indicate the general class of the condition, the last three characters indicate a subclass of the general condition. A successful state is indicated by the code 00000. The SQLSTATE codes are for the most part defined in the SQL standard. The PostgreSQL server natively supports SQLSTATE error codes; therefore a high degree of consistency can be achieved by using this error code scheme throughout all applications.



Refer to "PostgreSQL Error Codes" in "Appendixes" in the PostgreSQL Documentation for further information.

SQLCODE, the deprecated error code scheme, is a simple integer. A value of 0 indicates success, a positive value indicates success with additional information, a negative value indicates an error. The SQL standard only defines the positive value +100, which indicates that the last command returned or affected zero rows, and no specific negative values. Therefore, this scheme can only achieve poor portability and does not have a hierarchical code assignment. Historically, the embedded SQL processor for PostgreSQL has assigned some specific SQLCODE values for its use, which are listed below with their numeric value and their symbolic name. Remember that these are not portable to other SQL implementations. To simplify the porting of applications to the SQLSTATE scheme, the corresponding SQLSTATE is also listed. There is, however, no one-to-one or one-to-many mapping between the two schemes (indeed it is many-to-many), so you should consult the global SQLSTATE in each case.



Refer to "PostgreSQL Error Codes" in "Appendixes" in the PostgreSQL Documentation.

These are the assigned SQLCODE values:

0

Indicates no error. (SQLSTATE 00000)

100

This is a harmless condition indicating that the last command retrieved or processed zero rows, or that you are at the end of the cursor. (SQLSTATE 02000)

When processing a cursor in a loop, you could use this code as a way to detect when to abort the loop, like this:

```
PERFORM NO LIMIT
EXEC SQL FETCH ... END-EXEC
IF SQLCODE = 100 THEN
    GO TO FETCH-END
END-IF
END-PERFORM.
```

But `WHENEVER NOT FOUND GOTO ...` effectively does this internally, so there is usually no advantage in writing this out explicitly.

-12

Indicates that your virtual memory is exhausted. The numeric value is defined as `-ENOMEM`. (SQLSTATE YE001)

-200

Indicates the preprocessor has generated something that the library does not know about. Perhaps you are running incompatible versions of the preprocessor and the library. (SQLSTATE YE002)

-201

This means that the command specified more host variables than the command expected. (SQLSTATE 07001 or 07002)

-202

This means that the command specified fewer host variables than the command expected. (SQLSTATE 07001 or 07002)

-203

This means a query has returned multiple rows but the statement was only prepared to store one result row (for example, because the specified variables are not arrays). (SQLSTATE 21000)

-204

The host variable is of type signed int and the datum in the database is of a different type and contains a value that cannot be interpreted as an signed int. The library uses strtol() for this conversion. (SQLSTATE 42804)

-205

The host variable is of type unsigned int and the datum in the database is of a different type and contains a value that cannot be interpreted as an unsigned int. The library uses strtoul() for this conversion. (SQLSTATE 42804)

-206

The host variable is of type float and the datum in the database is of another type and contains a value that cannot be interpreted as a float. The library uses strtod() for this conversion. (SQLSTATE 42804)

-207

The host variable is of type DECIMAL and the datum in the database is of another type and contains a value that cannot be interpreted as a DECIMAL or DISPLAY value. For the case of DISPLAY, this error happens if values in the database is too large for converting to DISPLAY value. (SQLSTATE 42804)

-208

The host variable is of type interval and the datum in the database is of another type and contains a value that cannot be interpreted as an interval value. (SQLSTATE 42804)

-209

The host variable is of type date and the datum in the database is of another type and contains a value that cannot be interpreted as a date value. (SQLSTATE 42804)

-210

The host variable is of type timestamp and the datum in the database is of another type and contains a value that cannot be interpreted as a timestamp value. (SQLSTATE 42804)

-211

This means the host variable is of type bool and the datum in the database is neither 't' nor 'f'. (SQLSTATE 42804)

-212

The statement sent to the PostgreSQL server was empty. (This cannot normally happen in an embedded SQL program, so it might point to an internal error.) (SQLSTATE YE002)

-213

A null value was returned and no null indicator variable was supplied. (SQLSTATE 22002)

-214

An ordinary variable was used in a place that requires an array. (SQLSTATE 42804)

-215

The database returned an ordinary variable in a place that requires array value. (SQLSTATE 42804)

-220

The program tried to access a connection that does not exist. (SQLSTATE 08003)

-221

The program tried to access a connection that does exist but is not open. (This is an internal error.) (SQLSTATE YE002)

-230

The statement you are trying to use has not been prepared. (SQLSTATE 26000)

-240

The descriptor specified was not found. The statement you are trying to use has not been prepared. (SQLSTATE 33000)

-241

The descriptor index specified was out of range. (SQLSTATE 07009)

-242

An invalid descriptor item was requested. (This is an internal error.) (SQLSTATE YE002)

-243

During the execution of a dynamic statement, the database returned a numeric value and the host variable was not numeric. (SQLSTATE 07006)

-244

During the execution of a dynamic statement, the database returned a non-numeric value and the host variable was numeric. (SQLSTATE 07006)

-400

Some error caused by the PostgreSQL server. The message contains the error message from the PostgreSQL server.

-401

The PostgreSQL server signaled that we cannot start, commit, or rollback the transaction. (SQLSTATE 08007)

-402

The connection attempt to the database did not succeed. (SQLSTATE 08001)

-403

Duplicate key error, violation of unique constraint. (SQLSTATE 23505)

-404

A result for the subquery is not single row. (SQLSTATE 21000)

-602

An invalid cursor name was specified. (SQLSTATE 34000)

-603

Transaction is in progress. (SQLSTATE 25001)

-604

There is no active (in-progress) transaction. (SQLSTATE 25P01)

-605

An existing cursor name was specified. (SQLSTATE 42P03)

## D.8 Preprocessor Directives

---

Several preprocessor directives are available that modify how the ecobpg preprocessor parses and processes a file.

### D.8.1 Including Files

---

To include an external file into your embedded SQL program, use:

```
EXEC SQL INCLUDE filename END-EXEC.  
EXEC SQL INCLUDE <filename> END-EXEC.  
EXEC SQL INCLUDE "filename" END-EXEC.
```

The embedded SQL preprocessor will look for a file named filename.pco, preprocess it, and include it in the resulting COBOL output. Thus, embedded SQL statements in the included file are handled correctly.

By default, the ecobpg preprocessor will search a file at the current directory. This behavior can be changed by the ecobpg commandline option.

First, the preprocessor tries to locate a file by specified file name at the current directory. If it fails and the file name does not end with .pco, the preprocessor also tries to locate a file with the suffix at the same directory.

The difference between EXEC SQL INCLUDE and COPY statement is whether precompiler processes embedded SQLs in the file, or not. If the file contains embedded SQLs, use EXEC SQL INCLUDE.



The include file name is case-sensitive, even though the rest of the EXEC SQL INCLUDE command follows the normal SQL case-sensitivity rules.

## D.8.2 The define and undef Directives

Similar to the directive #define that is known from C, embedded SQL has a similar concept:

```
EXEC SQL DEFINE name END-EXEC.  
EXEC SQL DEFINE name value END-EXEC.
```

So you can define a name:

```
EXEC SQL DEFINE HAVE_FEATURE END-EXEC.
```

And you can also define constants:

```
EXEC SQL DEFINE MYNUMBER 12 END-EXEC.  
EXEC SQL DEFINE MYSTRING 'abc' END-EXEC.
```

Use undef to remove a previous definition:

```
EXEC SQL UNDEF MYNUMBER END-EXEC.
```

Note that a constant in the SQL statement is only replaced by EXEC SQL DEFINE. The replacement may change the number of characters in a line, but ecobpg does not validate it after the replacement. Pay attention to the limitation of the number of characters in a line.

## D.8.3 ifdef, ifndef, else, elif, and endif Directives

You can use the following directives to compile code sections conditionally:

```
EXEC SQL ifdef name END-EXEC.
```

Checks a name and processes subsequent lines if name has been created with EXEC SQL define name.

```
EXEC SQL ifndef name END-EXEC.
```

Checks a name and processes subsequent lines if name has not been created with EXEC SQL define name.

```
EXEC SQL else END-EXEC.
```

Starts processing an alternative section to a section introduced by either EXEC SQL ifdef name or EXEC SQL ifndef name.

```
EXEC SQL elif name END-EXEC.
```

Checks name and starts an alternative section if name has been created with EXEC SQL define name.

```
EXEC SQL endif END-EXEC.
```

Ends an alternative section.

Example:

```
EXEC SQL ifndef TZVAR END-EXEC.  
EXEC SQL SET TIMEZONE TO 'GMT' END-EXEC.  
EXEC SQL elif TZNAME END-EXEC.  
EXEC SQL SET TIMEZONE TO TZNAME END-EXEC.  
EXEC SQL else END-EXEC.  
EXEC SQL SET TIMEZONE TO TZVAR END-EXEC.  
EXEC SQL endif END-EXEC.
```

## D.9 Processing Embedded SQL Programs

Now that you have an idea how to form embedded SQL COBOL programs, you probably want to know how to compile them. Before compiling you run the file through the embedded SQL COBOL preprocessor, which converts the SQL statements you used to special function calls. After compiling, you must link with a special library that contains the needed functions. These functions fetch information from the arguments, perform the SQL command using the libpq interface, and put the result in the arguments specified for output.

The preprocessor program is called `ecobpg` and is included in a normal PostgreSQL installation. Embedded SQL programs are typically named with an extension `.pco`. If you have a program file called `prog1.pco`, you can preprocess it by simply calling:

```
ecobpg prog1.pco
```

This will create a file called `prog1.cob`. If your input files do not follow the suggested naming pattern, you can specify the output file explicitly using the `-o` option.

The preprocessed file can be compiled normally, following the usage of the compiler.

The generated COBOL source files include library files from the PostgreSQL installation, so if you installed PostgreSQL in a location that is not searched by default, you have to add an option such as `-I/usr/local/pgsql/include` to the compilation command line.

To link an embedded SQL program, you need to include the `libecpg` library.

Again, you might have to add an option for library search like `-L/usr/local/pgsql/lib` to that command line.

If you manage the build process of a larger project using `make`, it might be convenient to include the following implicit rule to your makefiles:

```
ECOBPG = ecobpg  
  
%.cob: %.pco  
    $(ECOBPG) $<
```

The complete syntax of the `ecobpg` command is detailed in "[D.12.1 ecobpg](#)".

Currently, `ecobpg` does not support multi threading.

## D.10 Large Objects

Large objects are not supported by `ECOBPG`.

If you need to access large objects, use large objects interfaces of `libpq` instead.

## D.11 Embedded SQL Commands

This section describes all SQL commands that are specific to embedded SQL.

| Command             | Description                     |
|---------------------|---------------------------------|
| ALLOCATE DESCRIPTOR | Allocate an SQL descriptor area |

| Command               | Description   |
|-----------------------|---|
| CONNECT               | Eestablish a database connection  |
| DEALLOCATE DESCRIPTOR | Deallocate an SQL descriptor area   |
| DECLARE               | Define a cursor   |
| DESCRIBE              | Obtain information about a prepared statement or result set   |
| DISCONNECT            | Terminate a database connection   |
| EXECUTE IMMEDIATE     | Dynamically prepare and execute a statement   |
| GET DESCRIPTOR        | Get information from an SQL descriptor area   |
| OPEN                  | Open a dynamic cursor   |
| PREPARE               | Prepare a statement for execution   |
| SET AUTOCOMMIT        | Set the autocommit behavior of the current session  |
| SET CONNECTION        | Select a database connection  |
| SET DESCRIPTOR        | Set information in an SQL descriptor area   |
| TYPE                  | Define a new data type  |
| VAR                   | Define a variable   |
| WHENEVER              | Specify the action to be taken when an SQL statement causes a specific class condition to be raised |



See

Refer to the SQL commands listed in "SQL Commands" under "Reference" in the PostgreSQL Documentation, which can also be used in embedded SQL, unless stated otherwise.

## D.11.1 ALLOCATE DESCRIPTOR

### Name

ALLOCATE DESCRIPTOR -- allocate an SQL descriptor area

### Synopsis

```
ALLOCATE DESCRIPTOR name
```

### Description

ALLOCATE DESCRIPTOR allocates a new named SQL descriptor area, which can be used to exchange data between the PostgreSQL server and the host program.

Descriptor areas should be freed after use using the DEALLOCATE DESCRIPTOR command.

### Parameters

name

A name of SQL descriptor, case sensitive. This can be an SQL identifier or a host variable.

### Examples

```
EXEC SQL ALLOCATE DESCRIPTOR mydesc END-EXEC.
```

## Compatibility

ALLOCATE DESCRIPTOR is specified in the SQL standard.

## See Also

[DEALLOCATE DESCRIPTOR](#), [GET DESCRIPTOR](#), [SET DESCRIPTOR](#)

## D.11.2 CONNECT

---

### Name

CONNECT -- establish a database connection

### Synopsis

```
CONNECT TO connection_target [ AS connection_name ] [ USER connection_user_name ]
```

```
CONNECT TO DEFAULT
```

```
CONNECT connection_user_name
```

```
DATABASE connection_target
```

### Description

The CONNECT command establishes a connection between the client and the PostgreSQL server.

### Parameters

**connection\_target**

connection\_target specifies the target server of the connection on one of several forms.

```
[ database_name ] [ @host ] [ :port ]
```

Connect over TCP/IP

```
unix:postgresql://host [ :port ] / [ database_name ] [ ?connection_option ]
```

Connect over Unix-domain sockets

```
tcp:postgresql://host [ :port ] / [ database_name ] [ ?connection_option ]
```

Connect over TCP/IP

**SQL string constant**

containing a value in one of the above forms

**host variable**

host variable of fixed-length string (trailing spaces are ignored) containing a value in one of the above forms

**connection\_name**

An optional identifier for the connection, so that it can be referred to in other commands. This can be an SQL identifier or a host variable.

**connection\_user\_name**

The user name for the database connection.

This parameter can also specify user name and password, using one of the forms user\_name/password, user\_name IDENTIFIED BY password, or user\_name USING password.

User name and password can be SQL identifiers, string constants, or host variables (fixed-length string, trailing spaces are ignored).

## DEFAULT

Use all default connection parameters, as defined by libpq.

## Examples

Here are several variants for specifying connection parameters:

```
EXEC SQL CONNECT TO "connectdb" AS main END-EXEC.
EXEC SQL CONNECT TO "connectdb" AS second END-EXEC.
EXEC SQL CONNECT TO "unix:postgresql://localhost/connectdb" AS main USER connectuser END-
EXEC.
EXEC SQL CONNECT TO 'connectdb' AS main END-EXEC.
EXEC SQL CONNECT TO 'unix:postgresql://localhost/connectdb' AS main USER :user END-EXEC.
EXEC SQL CONNECT TO :dbn AS :idt END-EXEC.
EXEC SQL CONNECT TO :dbn USER connectuser USING :pw END-EXEC.
EXEC SQL CONNECT TO @localhost AS main USER connectdb END-EXEC.
EXEC SQL CONNECT TO REGRESSDB1 as main END-EXEC.
EXEC SQL CONNECT TO connectdb AS :idt END-EXEC.
EXEC SQL CONNECT TO connectdb AS main USER connectuser/connectdb END-EXEC.
EXEC SQL CONNECT TO connectdb AS main END-EXEC.
EXEC SQL CONNECT TO connectdb@localhost AS main END-EXEC.
EXEC SQL CONNECT TO tcp:postgresql://localhost/ USER connectdb END-EXEC.
EXEC SQL CONNECT TO tcp:postgresql://localhost/connectdb USER connectuser IDENTIFIED BY
connectpw END-EXEC.
EXEC SQL CONNECT TO tcp:postgresql://localhost:20/connectdb USER connectuser IDENTIFIED BY
connectpw END-EXEC.
EXEC SQL CONNECT TO unix:postgresql://localhost/ AS main USER connectdb END-EXEC.
EXEC SQL CONNECT TO unix:postgresql://localhost/connectdb AS main USER connectuser END-
EXEC.
EXEC SQL CONNECT TO unix:postgresql://localhost/connectdb USER connectuser IDENTIFIED BY
"connectpw" END-EXEC.
EXEC SQL CONNECT TO unix:postgresql://localhost/connectdb USER connectuser USING
"connectpw" END-EXEC.
EXEC SQL CONNECT TO unix:postgresql://localhost/connectdb?connect_timeout=14 USER
connectuser END-EXEC.
```

Here is an example program that illustrates the use of host variables to specify connection parameters:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.
*   database name
    01 DBNAME PIC X(6).
*   connection user name
    01 USER PIC X(8).
*   connection string
    01 CONNECTION PIC X(38).

    01 VER PIC X(256).
EXEC SQL END DECLARE SECTION END-EXEC.

MOVE "testdb" TO DBNAME.
MOVE "testuser" TO USER.
MOVE "tcp:postgresql://localhost:5432/testdb" TO CONNECTION.

EXEC SQL CONNECT TO :DBNAME USER :USER END-EXEC.
EXEC SQL SELECT version() INTO :VER END-EXEC.
EXEC SQL DISCONNECT END-EXEC.

DISPLAY "version: " VER.

EXEC SQL CONNECT TO :CONNECTION USER :USER END-EXEC.
```

```
EXEC SQL SELECT version() INTO :VER END-EXEC.  
EXEC SQL DISCONNECT END-EXEC.  
  
DISPLAY "version: " VER.
```

## Compatibility

CONNECT is specified in the SQL standard, but the format of the connection parameters is implementation-specific.

## See Also

[DISCONNECT](#), [SET CONNECTION](#)

## D.11.3 DEALLOCATE DESCRIPTOR

---

### Name

DEALLOCATE DESCRIPTOR -- deallocate an SQL descriptor area

### Synopsis

```
DEALLOCATE DESCRIPTOR name
```

### Description

DEALLOCATE DESCRIPTOR deallocates a named SQL descriptor area.

### Parameters

name

The name of the descriptor which is going to be deallocated. It is case sensitive. This can be an SQL identifier or a host variable.

### Examples

```
EXEC SQL DEALLOCATE DESCRIPTOR mydesc END-EXEC.
```

## Compatibility

DEALLOCATE DESCRIPTOR is specified in the SQL standard.

## See Also

[ALLOCATE DESCRIPTOR](#), [GET DESCRIPTOR](#), [SET DESCRIPTOR](#)

## D.11.4 DECLARE

---

### Name

DECLARE -- define a cursor

### Synopsis

```
DECLARE cursor_name [ BINARY ] [ INSENSITIVE ] [ [ NO ] SCROLL ] CURSOR [ { WITH | WITHOUT }  
HOLD ] FOR prepared_name
```

```
DECLARE cursor_name [ BINARY ] [ INSENSITIVE ] [ [ NO ] SCROLL ] CURSOR [ { WITH | WITHOUT }  
HOLD ] FOR query
```

## Description

DECLARE declares a cursor for iterating over the result set of a prepared statement. This command has slightly different semantics from the direct SQL command DECLARE: Whereas the latter executes a query and prepares the result set for retrieval, this embedded SQL command merely declares a name as a "loop variable" for iterating over the result set of a query; the actual execution happens when the cursor is opened with the OPEN command.

## Parameters

cursor\_name

A cursor name, case sensitive. This can be an SQL identifier or a host variable.

prepared\_name

The name of a prepared query, either as an SQL identifier or a host variable.

query

A SELECT or VALUES command which will provide the rows to be returned by the cursor.

For the meaning of the cursor options, see DECLARE.



See

.....  
Refer to "SQL Commands" in "Reference" in the PostgreSQL Documentation for information on the SELECT, VALUES and DECLARE command.  
.....

## Examples

Examples declaring a cursor for a query:

```
EXEC SQL DECLARE C CURSOR FOR SELECT * FROM My_Table END-EXEC.  
EXEC SQL DECLARE C CURSOR FOR SELECT Item1 FROM T END-EXEC.  
EXEC SQL DECLARE curl CURSOR FOR SELECT version() END-EXEC.
```

An example declaring a cursor for a prepared statement:

```
EXEC SQL PREPARE stmt1 AS SELECT version() END-EXEC.  
EXEC SQL DECLARE curl CURSOR FOR stmt1 END-EXEC.
```

## Compatibility

DECLARE is specified in the SQL standard.

## See Also

OPEN, CLOSE, DECLARE



See

.....  
Refer to "SQL Commands" in "Reference" in the PostgreSQL Documentation for information on the CLOSE and DECLARE command.  
.....

## D.11.5 DESCRIBE

---

### Name

DESCRIBE -- obtain information about a prepared statement or result set

## Synopsis

```
DESCRIBE [ OUTPUT ] prepared_name USING SQL DESCRIPTOR descriptor_name  
DESCRIBE [ OUTPUT ] prepared_name INTO SQL DESCRIPTOR descriptor_name
```

## Description

DESCRIBE retrieves metadata information about the result columns contained in a prepared statement, without actually fetching a row.

## Parameters

prepared\_name

The name of a prepared statement. This can be an SQL identifier or a host variable.

descriptor\_name

A descriptor name. It is case sensitive. It can be an SQL identifier or a host variable.

## Examples

```
EXEC SQL ALLOCATE DESCRIPTOR mydesc END-EXEC.  
EXEC SQL PREPARE stmt1 FROM :sql_stmt END-EXEC.  
EXEC SQL DESCRIBE stmt1 INTO SQL DESCRIPTOR mydesc END-EXEC.  
EXEC SQL GET DESCRIPTOR mydesc VALUE 1 :charvar = NAME END-EXEC.  
EXEC SQL DEALLOCATE DESCRIPTOR mydesc END-EXEC.
```

## Compatibility

DESCRIBE is specified in the SQL standard.

## See Also

[ALLOCATE DESCRIPTOR](#), [GET DESCRIPTOR](#)

## D.11.6 DISCONNECT

---

### Name

DISCONNECT -- terminate a database connection

### Synopsis

```
DISCONNECT connection_name  
DISCONNECT [ CURRENT ]  
DISCONNECT DEFAULT  
DISCONNECT ALL
```

### Description

DISCONNECT closes a connection (or all connections) to the database.

### Parameters

connection\_name

A database connection name established by the CONNECT command.

## CURRENT

Close the "current" connection, which is either the most recently opened connection, or the connection set by the SET CONNECTION command. This is also the default if no argument is given to the DISCONNECT command.

## DEFAULT

Close the default connection.

## ALL

Close all open connections.

## Examples

```
EXEC SQL CONNECT TO testdb AS DEFAULT USER testuser END-EXEC.
EXEC SQL CONNECT TO testdb AS con1 USER testuser END-EXEC.
EXEC SQL CONNECT TO testdb AS con2 USER testuser END-EXEC.
EXEC SQL CONNECT TO testdb AS con3 USER testuser END-EXEC.

*   close con3
EXEC SQL DISCONNECT CURRENT END-EXEC.
*   close DEFAULT
EXEC SQL DISCONNECT DEFAULT END-EXEC.
*   close con2 and con1
EXEC SQL DISCONNECT ALL END-EXEC.
```

## Compatibility

DISCONNECT is specified in the SQL standard.

## See Also

[CONNECT](#), [SET CONNECTION](#)

## D.11.7 EXECUTE IMMEDIATE

---

### Name

EXECUTE IMMEDIATE -- dynamically prepare and execute a statement

### Synopsis

```
EXECUTE IMMEDIATE string
```

### Description

EXECUTE IMMEDIATE immediately prepares and executes a dynamically specified SQL statement, without retrieving result rows.

### Parameters

string

A literal string or a host variable containing the SQL statement to be executed.

### Examples

Here is an example that executes an INSERT statement using EXECUTE IMMEDIATE and a host variable named command:

```
MOVE "INSERT INTO test (name, amount, letter) VALUES ('db: 'r1'', 1, 'f')" TO ARR OF cmd.
COMPUTE LEN OF cmd = FUNCTION STORED-CHAR-LENGTH(ARR OF cmd).
EXEC SQL EXECUTE IMMEDIATE :cmd END-EXEC.
```

## Compatibility

EXECUTE IMMEDIATE is specified in the SQL standard.

## D.11.8 GET DESCRIPTOR

---

### Name

GET DESCRIPTOR -- get information from an SQL descriptor area

### Synopsis

```
GET DESCRIPTOR descriptor_name :hostvariable = descriptor_header_item [, ... ]
```

```
GET DESCRIPTOR descriptor_name VALUE column_number :hostvariable = descriptor_item [, ... ]
```

### Description

GET DESCRIPTOR retrieves information about a query result set from an SQL descriptor area and stores it into host variables. A descriptor area is typically populated using FETCH or SELECT before using this command to transfer the information into host language variables.

This command has two forms: The first form retrieves descriptor "header" items, which apply to the result set in its entirety. One example is the row count. The second form, which requires the column number as additional parameter, retrieves information about a particular column. Examples are the column name and the actual column value.

### Parameters

descriptor\_name

A descriptor name.

descriptor\_header\_item

A token identifying which header information item to retrieve. Only COUNT, to get the number of columns in the result set, is currently supported.

column\_number

The number of the column about which information is to be retrieved. The count starts at 1.

descriptor\_item

A token identifying which item of information about a column to retrieve. See Section 33.7.1 for a list of supported items.

hostvariable

A host variable that will receive the data retrieved from the descriptor area.

### Examples

An example to retrieve the number of columns in a result set:

```
EXEC SQL GET DESCRIPTOR d :d_count = COUNT END-EXEC.
```

An example to retrieve a data length in the first column:

```
EXEC SQL GET DESCRIPTOR d VALUE 1 :d_returned_octet_length = RETURNED_OCTET_LENGTH END-EXEC.
```

An example to retrieve the data body of the second column as a string:

```
EXEC SQL GET DESCRIPTOR d VALUE 2 :d_data = DATA END-EXEC.
```

Here is an example for a whole procedure of executing `SELECT current_database()`; and showing the number of columns, the column data length, and the column data:

```
EXEC SQL BEGIN DECLARE SECTION END-EXEC.
  01 D-COUNT PIC S9(9) COMP-5.
  01 D-DATA PIC X(1024).
  01 D-RETURNED-OCTET-LENGTH PIC S9(9) COMP.
EXEC SQL END DECLARE SECTION END-EXEC.

EXEC SQL CONNECT TO testdb AS con1 USER testuser END-EXEC.
EXEC SQL ALLOCATE DESCRIPTOR d END-EXEC.

* Declare, open a cursor, and assign a descriptor to the cursor
EXEC SQL DECLARE cur CURSOR FOR SELECT current_database() END-EXEC.
EXEC SQL OPEN cur END-EXEC.
EXEC SQL FETCH NEXT FROM cur INTO SQL DESCRIPTOR d END-EXEC.

* Get a number of total columns
EXEC SQL GET DESCRIPTOR d :D-COUNT = COUNT END-EXEC.
DISPLAY "d_count                = " D-COUNT.

* Get length of a returned column
EXEC SQL GET DESCRIPTOR d VALUE 1 :D-RETURNED-OCTET-LENGTH = RETURNED_OCTET_LENGTH END-
EXEC.
DISPLAY "d_returned_octet_length = " D-RETURNED-OCTET-LENGTH.

* Fetch the returned column as a string
EXEC SQL GET DESCRIPTOR d VALUE 1 :D-DATA = DATA END-EXEC.
DISPLAY "d_data                  = " D-DATA.

* Closing
EXEC SQL CLOSE cur END-EXEC.
EXEC SQL COMMIT END-EXEC.

EXEC SQL DEALLOCATE DESCRIPTOR d END-EXEC.
EXEC SQL DISCONNECT ALL END-EXEC.
```

When the example is executed, the result will look like this:

```
d_count                = +000000001
d_returned_octet_length = +000000006
d_data                  = testdb
```

## Compatibility

GET DESCRIPTOR is specified in the SQL standard.

## See Also

[ALLOCATE DESCRIPTOR](#), [SET DESCRIPTOR](#)

## D.11.9 OPEN

---

### Name

OPEN -- open a dynamic cursor

### Synopsis

OPEN cursor\_name

```
OPEN cursor_name USING value [ , ... ]
```

```
OPEN cursor_name USING SQL DESCRIPTOR descriptor_name
```

## Description

OPEN opens a cursor and optionally binds actual values to the placeholders in the cursor's declaration. The cursor must previously have been declared with the DECLARE command. The execution of OPEN causes the query to start executing on the server.

## Parameters

cursor\_name

The name of the cursor to be opened. This can be an SQL identifier or a host variable.

value

A value to be bound to a placeholder in the cursor. This can be an SQL constant, a host variable, or a host variable with indicator.

descriptor\_name

The name of a descriptor containing values to be bound to the placeholders in the cursor. This can be an SQL identifier or a host variable.

## Examples

```
EXEC SQL OPEN a END-EXEC.  
EXEC SQL OPEN d USING 1, 'test' END-EXEC.  
EXEC SQL OPEN c1 USING SQL DESCRIPTOR mydesc END-EXEC.  
EXEC SQL OPEN :curname1 END-EXEC.
```

## Compatibility

OPEN is specified in the SQL standard.

## See Also

[DECLARE](#), [CLOSE](#)



See

.....  
Refer to "SQL Commands" in "Reference" in the PostgreSQL Documentation for information on the CLOSE command.  
.....

## D.11.10 PREPARE

---

### Name

PREPARE -- prepare a statement for execution

### Synopsis

```
PREPARE name FROM string
```

### Description

PREPARE prepares a statement dynamically specified as a string for execution. This is different from the direct SQL statement PREPARE, which can also be used in embedded programs. The EXECUTE command is used to execute either kind of prepared statement.

## Parameters

prepared\_name

An identifier for the prepared query.

string

A literal string or a host variable containing a preparable statement, one of the SELECT, INSERT, UPDATE, or DELETE.

## Examples

```
MOVE "SELECT * FROM test1 WHERE a = ? AND b = ?" TO ARR OF STMT.  
COMPUTE LEN OF STMT = FUNCTION STORED-CHAR-LENGTH (ARR OF STMT).  
EXEC SQL ALLOCATE DESCRIPTOR indesc END-EXEC.  
EXEC SQL ALLOCATE DESCRIPTOR outdesc END-EXEC.  
EXEC SQL PREPARE foo FROM :STMT END-EXEC.  
  
EXEC SQL EXECUTE foo USING SQL DESCRIPTOR indesc INTO SQL DESCRIPTOR outdesc END-EXEC.
```

## Compatibility

PREPARE is specified in the SQL standard.

## See Also

EXECUTE



See

.....  
Refer to "SQL Commands" in "Reference" in the PostgreSQL Documentation for information on the EXECUTE command.  
.....

## D.11.11 SET AUTOCOMMIT

---

### Name

SET AUTOCOMMIT -- set the autocommit behavior of the current session

### Synopsis

```
SET AUTOCOMMIT { = | TO } { ON | OFF }
```

### Description

SET AUTOCOMMIT sets the autocommit behavior of the current database session. By default, embedded SQL programs are not in autocommit mode, so COMMIT needs to be issued explicitly when desired. This command can change the session to autocommit mode, where each individual statement is committed implicitly.

### Compatibility

SET AUTOCOMMIT is an extension of PostgreSQL ECOBPG.

## D.11.12 SET CONNECTION

---

### Name

SET CONNECTION -- select a database connection

### Synopsis

```
SET CONNECTION [ TO | = ] connection_name
```

## Description

SET CONNECTION sets the "current" database connection, which is the one that all commands use unless overridden.

## Parameters

connection\_name

A database connection name established by the CONNECT command.

DEFAULT

Set the connection to the default connection.

## Examples

```
EXEC SQL SET CONNECTION TO con2 END-EXEC.  
EXEC SQL SET CONNECTION = con1 END-EXEC.
```

## Compatibility

SET CONNECTION is specified in the SQL standard.

## See Also

[CONNECT](#), [DISCONNECT](#)

## D.11.13 SET DESCRIPTOR

---

### Name

SET DESCRIPTOR -- set information in an SQL descriptor area

### Synopsis

```
SET DESCRIPTOR descriptor_name descriptor_header_item = value [, ... ]
```

```
SET DESCRIPTOR descriptor_name VALUE number descriptor_item = value [, ...]
```

### Description

SET DESCRIPTOR populates an SQL descriptor area with values. The descriptor area is then typically used to bind parameters in a prepared query execution.

This command has two forms: The first form applies to the descriptor "header", which is independent of a particular datum. The second form assigns values to particular datums, identified by number.

### Parameters

descriptor\_name

A descriptor name.

descriptor\_header\_item

A token identifying which header information item to set. Only COUNT, to set the number of descriptor items, is currently supported.

number

The number of the descriptor item to set. The count starts at 1.

descriptor\_item

A token identifying which item of information to set in the descriptor. See Section 33.7.1 for a list of supported items.

value

A value to store into the descriptor item. This can be an SQL constant or a host variable.

### Examples

```
EXEC SQL SET DESCRIPTOR indesc COUNT = 1 END-EXEC.  
EXEC SQL SET DESCRIPTOR indesc VALUE 1 DATA = 2 END-EXEC.  
EXEC SQL SET DESCRIPTOR indesc VALUE 1 DATA = :vall END-EXEC.  
EXEC SQL SET DESCRIPTOR indesc VALUE 2 DATA = 'some string', INDICATOR = :vall END-EXEC.  
EXEC SQL SET DESCRIPTOR indesc VALUE 2 INDICATOR = :val2null, DATA = :val2 END-EXEC.
```

### Compatibility

SET DESCRIPTOR is specified in the SQL standard.

### See Also

[ALLOCATE DESCRIPTOR](#), [GET DESCRIPTOR](#)

## D.11.14 TYPE

---

### Name

TYPE -- define a new data type

### Synopsis

```
TYPE type_name IS ctype
```

### Description

The TYPE command defines a new COBOL type. It is equivalent to putting a typedef into a declare section.

This command is only recognized when ecobpgpg is run with the -c option.

A level number of 01 is automatically added to type\_name item. Thus, the level number must not to be specified externally. To define a group item, a level number needs to be specified to the each subordinate items.

For reasons of internal implementation, "TYPE" must be placed just after "EXEC SQL", without containing newline. For other place, you can use newline.

### Parameters

type\_name

The name for the new type. It must be a valid COBOL type name.

ctype

A COBOL type specification (including expression format specification).

### Examples

```
EXEC SQL TYPE CUSTOMER IS  
    02 NAME PIC X(50) VARYING.  
    02 PHONE PIC S9(9) COMP. END-EXEC.  
  
EXEC SQL TYPE CUST-IND IS  
    02 NAME_IND PIC S9(4) COMP.  
    02 PHONE_IND PIC S9(4) COMP. END-EXEC.  
  
EXEC SQL TYPE INTARRAY IS  
    02 INT PIC S9(9) OCCURS 20. END-EXEC.
```

```
EXEC SQL TYPE STR IS PIC X(50) VARYING. END-EXEC.  
EXEC SQL TYPE STRING IS PIC X(10). END-EXEC.
```

Here is an example program that uses EXEC SQL TYPE:

```
EXEC SQL TYPE TT IS  
  02 V PIC X(256) VARYING.  
  02 I PIC S9(9) COMP. END-EXEC.  
  
EXEC SQL TYPE TT-IND IS  
  02 V-IND PIC S9(4) COMP.  
  02 I-IND PIC S9(4) COMP. END-EXEC.  
  
EXEC SQL BEGIN DECLARE SECTION END-EXEC.  
  01 T TYPE TT.  
  01 T-IND TYPE TT-IND.  
EXEC SQL END DECLARE SECTION END-EXEC.  
  
EXEC SQL CONNECT TO testdb AS con1 END-EXEC.  
  
EXEC SQL SELECT current_database(), 256 INTO :T :T-IND LIMIT 1 END-EXEC.  
  
DISPLAY "t.v = " ARR OF V OF T.  
DISPLAY "t.i = " I OF T.  
  
DISPLAY "t_ind.v_ind = " V-IND OF T-IND.  
DISPLAY "t_ind.i_ind = " I-IND OF T-IND.  
  
EXEC SQL DISCONNECT con1 END-EXEC.
```

## Compatibility

The TYPE command is a PostgreSQL extension.

## D.11.15 VAR

---

### Name

VAR— define a variable

### Synopsis

```
VAR varname IS ctype
```

### Description

The VAR command defines a host variable. It is equivalent to an ordinary COBOL variable definition inside a declare section.

When translating , a level number 01 is added. Thus, the level number must not to be specified externally.

To define a group item, a level number needs to be specified to the each subordinate items.

For reasons of internal implementation, "VAR" must be placed just after "EXEC SQL", without containing newline. For other place, you can use newline.

### Parameters

varname

A COBOL variable name.

ctype

A COBOL type specification.

## Examples

```
EXEC SQL VAR VC IS PIC X(10) VARYING. END-EXEC.  
EXEC SQL VAR BOOL-VAR IS BOOL. END-EXEC.
```

## Compatibility

The VAR command is a PostgreSQL extension.

## D.11.16 WHENEVER

---

### Name

WHENEVER -- specify the action to be taken when an SQL statement causes a specific class condition to be raised

### Synopsis

```
WHENEVER { NOT FOUND | SQLERROR | SQLWARNING } action
```

### Description

Define a behavior which is called on the special cases (Rows not found, SQL warnings or errors) in the result of SQL execution.

### Parameters

See Section "[D.7.1 Setting Callbacks](#)" or a description of the parameters.

### Examples

```
EXEC SQL WHENEVER NOT FOUND CONTINUE END-EXEC.  
EXEC SQL WHENEVER SQLWARNING SQLPRINT END-EXEC.  
EXEC SQL WHENEVER SQLWARNING DO "warn" END-EXEC.  
EXEC SQL WHENEVER SQLERROR sqlprint END-EXEC.  
EXEC SQL WHENEVER SQLERROR CALL "print2" END-EXEC.  
EXEC SQL WHENEVER SQLERROR DO handle_error USING "select" END-EXEC.  
EXEC SQL WHENEVER SQLERROR DO sqlnotice USING 0 1 END-EXEC.  
EXEC SQL WHENEVER SQLERROR DO "sqlprint" END-EXEC.  
EXEC SQL WHENEVER SQLERROR GOTO error_label END-EXEC.  
EXEC SQL WHENEVER SQLERROR STOP END-EXEC.
```

A typical application is the use of WHENEVER NOT FOUND GOTO to handle looping through result sets:

```
EXEC SQL CONNECT TO testdb AS con1 END-EXEC.  
EXEC SQL ALLOCATE DESCRIPTOR d END-EXEC.  
EXEC SQL DECLARE cur CURSOR FOR SELECT current_database(), 'hoge', 256 END-EXEC.  
EXEC SQL OPEN cur END-EXEC.  
  
* when end of result set reached, break out of while loop  
EXEC SQL WHENEVER NOT FOUND GOTO NOTFOUND END-EXEC.  
  
PERFORM NO LIMIT  
    EXEC SQL FETCH NEXT FROM cur INTO SQL DESCRIPTOR d END-EXEC  
    ...  
END-PERFORM.  
  
NOTFOUND.
```

```
EXEC SQL CLOSE cur END-EXEC.  
EXEC SQL COMMIT END-EXEC.  
  
EXEC SQL DEALLOCATE DESCRIPTOR d END-EXEC.  
EXEC SQL DISCONNECT ALL END-EXEC.
```

## Compatibility

WHENEVER is specified in the SQL standard, but most of the actions are PostgreSQL extensions.

## D.12 PostgreSQL Client Applications

---

This part contains reference information for PostgreSQL client applications and utilities. Not all of these commands are of general utility; some might require special privileges. The common feature of these applications is that they can be run on any host, independent of where the database server resides.

When specified on the command line, user and database names have their case preserved — the presence of spaces or special characters might require quoting. Table names and other identifiers do not have their case preserved, except where documented, and might require quoting.

### D.12.1 ecobpg

---

#### Name

ecobpg -- embedded SQL COBOL preprocessor

#### Synopsis

ecobpg [option...] file...

#### Description

ecobpg is the embedded SQL preprocessor for COBOL programs. It converts COBOL programs with embedded SQL statements to normal COBOL code by replacing the SQL invocations with special function calls. The output files can then be processed with any COBOL compiler tool chain.

ecobpg will convert each input file given on the command line to the corresponding COBOL output file. Input files preferably have the extension .pco, in which case the extension will be replaced by .cob to determine the output file name. If the extension of the input file is not .pco, then the output file name is computed by appending .cob to the full file name. The output file name can also be overridden using the -o option.

#### Options

ecobpg accepts the following command-line arguments:

-c

Automatically generate certain COBOL code from SQL code. Currently, this works for EXEC SQL TYPE.

-I directory

Specify an additional include path, used to find files included via EXEC SQL INCLUDE. Defaults are . (current directory), /usr/local/include, the PostgreSQL include directory which is defined at compile time (default: /usr/local/pgsql/include), and /usr/include, in that order.

-o filename

Specifies that ecobpg should write all its output to the given filename.

-r option

Selects run-time behavior. Option can be one of the following:

prepare

Prepare all statements before using them. Libecpg will keep a cache of prepared statements and reuse a statement if it gets executed again. If the cache runs full, libecpg will free the least used statement.

questionmarks

Allow question mark as placeholder for compatibility reasons. This used to be the default long ago.

-t

Turn on autocommit of transactions. In this mode, each SQL command is automatically committed unless it is inside an explicit transaction block. In the default mode, commands are committed only when EXEC SQL COMMIT is issued.

--varchar-with-named-member

When converting VARCHAR host variable, adding name of the variable to members as prefix. Instead of LEN and ARR, (varname)-ARR and (varname)-LEN will be used.

-v

Print additional information including the version and the "include" path.

--version

Print the ecobpg version and exit.

-?

--help

Show help about ecobpg command line arguments, and exit.

## Notes

When compiling the preprocessed COBOL code files, the compiler needs to be able to find the ECOBPG library text files in the PostgreSQL include directory. Therefore, you might have to use the -I option when invoking the compiler.

Programs using COBOL code with embedded SQL have to be linked against the libecpg library, for example using the linker options.

The value of either of these directories that is appropriate for the installation can be found out using pg\_config.



See

.....  
Refer to "pg\_config" in "Reference" in the PostgreSQL Documentation.  
.....

## Examples

If you have an embedded SQL COBOL source file named prog1.pco, you can create an executable program using the following command:

```
ecobpg prog1.pco
```

# Appendix E Quantitative Limits

This appendix lists the quantitative limits of FUJITSU Enterprise Postgres.

Table E.1 Length of identifier

| Item                            | Limit                       |
|---------------------------------|-----------------------------|
| Database name                   | Up to 63 bytes (*1)(*2)(*3) |
| Schema name                     | Up to 63 bytes (*1)(*2)     |
| Table name                      | Up to 63 bytes (*1)(*2)     |
| View name                       | Up to 63 bytes (*1)(*2)     |
| Index name                      | Up to 63 bytes (*1)(*2)     |
| Table space name                | Up to 63 bytes (*1)(*2)     |
| Cursor name                     | Up to 63 bytes (*1)(*2)     |
| Function name                   | Up to 63 bytes (*1)(*2)     |
| Aggregate function name         | Up to 63 bytes (*1)(*2)     |
| Trigger name                    | Up to 63 bytes (*1)(*2)     |
| Constraint name                 | Up to 63 bytes (*1)(*2)     |
| Conversion name                 | Up to 63 bytes (*1)(*2)     |
| Role name                       | Up to 63 bytes (*1)(*2)(*4) |
| Cast name                       | Up to 63 bytes (*1)(*2)     |
| Collation sequence name         | Up to 63 bytes (*1)(*2)     |
| Encoding method conversion name | Up to 63 bytes (*1)(*2)     |
| Domain name                     | Up to 63 bytes (*1)(*2)     |
| Extension name                  | Up to 63 bytes (*1)(*2)     |
| Operator name                   | Up to 63 bytes (*1)(*2)     |
| Operator class name             | Up to 63 bytes (*1)(*2)     |
| Operator family name            | Up to 63 bytes (*1)(*2)     |
| Rewrite rule name               | Up to 63 bytes (*1)(*2)     |
| Sequence name                   | Up to 63 bytes (*1)(*2)     |
| Text search settings name       | Up to 63 bytes (*1)(*2)     |
| Text search dictionary name     | Up to 63 bytes (*1)(*2)     |
| Text search parser name         | Up to 63 bytes (*1)(*2)     |
| Text search template name       | Up to 63 bytes (*1)(*2)     |
| Data type name                  | Up to 63 bytes (*1)(*2)     |
| Enumerator type label           | Up to 63 bytes (*1)(*2)     |

\*1: This is the character string byte length when converted by the server character set character code.

\*2: If an identifier that exceeds 63 bytes in length is specified, the excess characters are truncated and it is processed.

\*3: Names of databases that use PL/extJava must be 28 bytes or less.

\*4: Names of roles for connecting from the PL/extJava application server must be 8 bytes or less.

Table E.2 Database object

| Item  | Limit                        |
|---|------------------------------|
| Number of databases   | Less than 4,294,967,296 (*1) |
| Number of schemas   | Less than 4,294,967,296 (*1) |
| Number of tables  | Less than 4,294,967,296 (*1) |
| Number of views   | Less than 4,294,967,296 (*1) |
| Number of indexes   | Less than 4,294,967,296 (*1) |
| Number of table spaces  | Less than 4,294,967,296 (*1) |
| Number of functions   | Less than 4,294,967,296 (*1) |
| Number of aggregate functions   | Less than 4,294,967,296 (*1) |
| Number of triggers  | Less than 4,294,967,296 (*1) |
| Number of constraints   | Less than 4,294,967,296 (*1) |
| Number of conversion  | Less than 4,294,967,296 (*1) |
| Number of roles   | Less than 4,294,967,296 (*1) |
| Number of casts   | Less than 4,294,967,296 (*1) |
| Number of collation sequences   | Less than 4,294,967,296 (*1) |
| Number of encoding method conversions   | Less than 4,294,967,296 (*1) |
| Number of domains   | Less than 4,294,967,296 (*1) |
| Number of extensions  | Less than 4,294,967,296 (*1) |
| Number of operators   | Less than 4,294,967,296 (*1) |
| Number of operator classes  | Less than 4,294,967,296 (*1) |
| Number of operator families   | Less than 4,294,967,296 (*1) |
| Number of rewrite rules   | Less than 4,294,967,296 (*1) |
| Number of sequences   | Less than 4,294,967,296 (*1) |
| Number of text search settings  | Less than 4,294,967,296 (*1) |
| Number of text search dictionaries  | Less than 4,294,967,296 (*1) |
| Number of text search parsers   | Less than 4,294,967,296 (*1) |
| Number of text search templates   | Less than 4,294,967,296 (*1) |
| Number of data types  | Less than 4,294,967,296 (*1) |
| Number of enumerator type labels  | Less than 4,294,967,296 (*1) |
| Number of default access privileges defined in the ALTER DEFAULT PRIVILEGES statement | Less than 4,294,967,296 (*1) |
| Number of large objects   | Less than 4,294,967,296 (*1) |
| Number of rows in tables defined by WITH OIDS   | Less than 4,294,967,296 (*1) |
| Number of index access methods  | Less than 4,294,967,296 (*1) |

\*1: The total number of all database objects must be less than 4,294,967,296.

Table E.3 Schema element

| Item   | Limit   |
|--|---|
| Number of columns that can be defined in one table | From 250 to 1600 (according to the data type) |

| Item   | Limit                          |
|--|--------------------------------|
| Table row length   | Up to 400 gigabytes            |
| Number of columns comprising a unique constraint                           | Up to 32 columns               |
| Data length comprising a unique constraint                                 | Less than 2,000 bytes (*1)(*2) |
| Table size   | Up to one terabyte             |
| Search condition character string length in a trigger definition statement | Up to 800 megabytes (*1)(*2)   |
| Item size  | Up to 1 gigabyte               |

\*1: Operation might proceed correctly even if operations are performed with a quantity outside the limits.

\*2: This is the character string byte length when converted by the server character set character code.

Table E.4 Index

| Item   | Limit                      |
|--|----------------------------|
| Number of columns comprising a key (including VCI) | Up to 32 columns           |
| Key length (other than VCI)                        | Less than 2,000 bytes (*1) |

\*1: This is the character string byte length when converted by the server character set character code.

Table E.5 Data types and attributes that can be handled

| Item         |                                   | Limit  |  |
|--------------|-----------------------------------|--|--|
| Character    | Data length                       | Data types and attributes that can be handled (*1)   |  |
|              | Specification length ( <i>n</i> ) | Up to 10,485,760 characters (*1)   |  |
| Numeric      | External decimal expression       | Up to 131,072 digits before the decimal point, and up to 16,383 digits after the decimal point |  |
|              | Internal binary expression        | 2 bytes  | From -32,768 to 32,767   |
|              |                                   | 4 bytes  | From -2,147,483,648 to 2,147,483,647   |
|              |                                   | 8 bytes  | From -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807                                   |
|              | Internal decimal expression       |  | Up to 13,1072 digits before the decimal point, and up to 16,383 digits after the decimal point |
|              | Floating point expression         | 4 bytes  | From -3.4E+38 to -7.1E-46, 0, or from 7.1E-46 to 3.4E+38                                       |
|              |                                   | 8 bytes  | From -1.7E+308 to -2.5E-324, 0, or from 2.5E-324 to 1.7E+308                                   |
| bytea        |                                   | Up to one gigabyte minus 53 bytes  |  |
| Large object |                                   | Up to two gigabytes  |  |

\*1: This is the character string byte length when converted by the server character set character code.

Table E.6 Function definition

| Item   | Limit     |
|--|-----------|
| Number of arguments that can be specified  | Up to 100 |
| Number of variable names that can be specified in the declarations section                                   | No limit  |
| Number of SQL statements or control statements that can be specified in a function processing implementation | No limit  |

Table E.7 Data operation statement

| Item   | Limit                         |
|--|-------------------------------|
| Maximum number of connections for one process in an application (remote access)  | 4,000 connections             |
| Number of expressions that can be specified in a selection list  | Up to 1,664                   |
| Number of tables that can be specified in a FROM clause  | No limit                      |
| Number of unique expressions that can be specified in a selection list/DISTINCT clause/ORDER BY clause/GROUP BY clause within one SELECT statement | Up to 1,664                   |
| Number of expressions that can be specified in a GROUP BY clause   | No limit                      |
| Number of expressions that can be specified in an ORDER BY clause  | No limit                      |
| Number of SELECT statements that can be specified in a UNION clause/INTERSECT clause/EXCEPT clause   | Up to 4,000 (*1)              |
| Number of nestings in joined tables that can be specified in one view  | Up to 4,000 (*1)              |
| Number of functions or operator expressions that can be specified in one expression  | Up to 4,000 (*1)              |
| Number of expressions that can be specified in one row constructor   | Up to 1,664                   |
| Number of expressions that can be specified in an UPDATE statement SET clause  | Up to 1,664                   |
| Number of expressions that can be specified in one row of a VALUES list  | Up to 1,664                   |
| Number of expressions that can be specified in a RETURNING clause  | Up to 1,664                   |
| Total expression length that can be specified in the argument list of one function specification   | Up to 800 megabytes (*2)      |
| Number of cursors that can be processed simultaneously by one session  | No limit                      |
| Character string length of one SQL statement   | Up to 800 megabytes (*1) (*3) |
| Number of input parameter specifications that can be specified in one dynamic SQL statement  | No limit                      |
| Number of tokens that can be specified in one SQL statement  | Up to 10,000                  |
| Number of values that can be specified as a list in a WHERE clause IN syntax   | No limit                      |
| Number of expressions that can be specified in a USING clause  | No limit                      |

| Item  | Limit                             |
|---|-----------------------------------|
| Number of JOINS that can be specified in a joined table                                       | Up to 4,000 (*1)                  |
| Number of expressions that can be specified in COALESCE                                       | No limit                          |
| Number of WHEN clauses that can be specified for CASE in a simple format or a searched format | No limit                          |
| Data size per record that can be updated or inserted by one SQL statement                     | Up to one gigabyte minus 53 bytes |
| Number of objects that can share a lock simultaneously  | Up to 256,000 (*1)                |

\*1: Operation might proceed correctly even if operations are performed with a quantity outside the limits.

\*2: The total number of all database objects must be less than 4,294,967,296.

\*3: This is the character string byte length when converted by the server character set character code.

Table E.8 Data sizes

| Item   | Limit                    |
|--|--------------------------|
| Data size per record for input data files (COPY statement, psql command \copy meta command)  | Up to 800 megabytes (*1) |
| Data size per record for output data files (COPY statement, psql command \copy meta command) | Up to 800 megabytes (*1) |

\*1: Operation might proceed correctly even if operations are performed with a quantity outside the limits.

# Appendix F Reference

## F.1 JDBC Driver

### F.1.1 Java Programming Language API

java.sql

| Interface name                         | Method name   | jdbc4/jdbc41 |
|--|---|--------------|
| Array                                  | free()  | N            |
|  | getArray()  | Y            |
|  | getArray(long index, int count)                               | Y            |
|  | getArray(long index, int count, Map<String,Class<?>> map)     | Y            |
|  | getArray(Map<String,Class<?>> map)                            | Y            |
|  | getBaseType()   | Y            |
|  | getBaseTypeName()   | Y            |
|  | getResultSet()  | Y            |
|  | getResultSet(long index, int count)                           | Y            |
|  | getResultSet(long index, int count, Map<String,Class<?>> map) | Y            |
| getResultSet(Map<String,Class<?>> map) | Y   |              |
| Blob                                   | free()  | Y            |
|  | getBinaryStream()   | Y            |
|  | getBinaryStream(long pos, long length)                        | N            |
|  | getBytes(long pos, int length)                                | Y            |
|  | length()  | Y            |
|  | position(Blob pattern, long start)                            | Y            |
|  | position(byte[] pattern, long start)                          | Y            |
|  | setBinaryStream(long pos)                                     | Y            |
|  | setBytes(long pos, byte[] bytes)                              | Y            |
|  | setBytes(long pos, byte[] bytes, int offset, int len)         | Y            |
| truncate(long len)                     | Y   |              |
| CallableStatement                      | getArray(int parameterIndex)                                  | Y            |
|  | getArray(String parameterName)                                | N            |
|  | getBigDecimal(int parameterIndex)                             | Y            |
|  | getBigDecimal(int parameterIndex, int scale)                  | Y            |
|  | getBigDecimal(String parameterName)                           | N            |
|  | getBlob(int parameterIndex)                                   | N            |
|  | getBlob(String parameterName)                                 | N            |
|  | getBoolean(int parameterIndex)                                | Y            |
| getBoolean(String parameterName)       | N   |              |

| Interface name | Method name   | jdbc4/jdbc41 |
|----------------|---|--------------|
|                | getByte(int parameterIndex)                               | Y            |
|                | getByte(String parameterName)                             | N            |
|                | getBytes(int parameterIndex)                              | Y            |
|                | getBytes(String parameterName)                            | N            |
|                | getCharacterStream(int parameterIndex)                    | N            |
|                | getCharacterStream(String parameterName)                  | N            |
|                | getClob(int parameterIndex)                               | N            |
|                | getClob(String parameterName)                             | N            |
|                | getDate(int parameterIndex)                               | Y            |
|                | getDate(int parameterIndex, Calendar cal)                 | Y            |
|                | getDate(String parameterName)                             | N            |
|                | getDate(String parameterName, Calendar cal)               | N            |
|                | getDouble(int parameterIndex)                             | Y            |
|                | getDouble(String parameterName)                           | N            |
|                | getFloat(int parameterIndex)                              | Y            |
|                | getFloat(String parameterName)                            | N            |
|                | getInt(int parameterIndex)                                | Y            |
|                | getInt(String parameterName)                              | N            |
|                | getLong(int parameterIndex)                               | Y            |
|                | getLong(String parameterName)                             | N            |
|                | getNCharacterStream(int parameterIndex)                   | Y            |
|                | getNCharacterStream(String parameterName)                 | N            |
|                | getNClob(int parameterIndex)                              | N            |
|                | getNClob(String parameterName)                            | N            |
|                | getNString(int parameterIndex)                            | Y            |
|                | getNString(String parameterName)                          | N            |
|                | getObject(int parameterIndex)                             | Y            |
|                | getObject(int parameterIndex, Map<String,Class<?>> map)   | Y            |
|                | getObject(String parameterName)                           | N            |
|                | getObject(String parameterName, Map<String,Class<?>> map) | Y            |
|                | getRef(int parameterIndex)                                | N            |
|                | getRef(String parameterName)                              | N            |
|                | getRowId(int parameterIndex)                              | N            |
|                | getRowId(String parameterName)                            | N            |
|                | getShort(int parameterIndex)                              | Y            |
|                | getShort(String parameterName)                            | N            |
|                | getSQLXML(int parameterIndex)                             | Y            |
|                | getSQLXML(String parameterName)                           | N            |

| Interface name | Method name  | jdbc4/jdbc41 |
|----------------|--|--------------|
|                | getString(int parameterIndex)  | Y            |
|                | getString(String parameterName)  | N            |
|                | getTime(int parameterIndex)  | Y            |
|                | getTime(int parameterIndex, Calendar cal)                                | Y            |
|                | getTime(String parameterName)  | N            |
|                | getTime(String parameterName, Calendar cal)                              | N            |
|                | getTimestamp(int parameterIndex)   | Y            |
|                | getTimestamp(int parameterIndex, Calendar cal)                           | Y            |
|                | getTimestamp(String parameterName)                                       | N            |
|                | getTimestamp(String parameterName, Calendar cal)                         | N            |
|                | getURL(int parameterIndex)   | N            |
|                | getURL(String parameterName)   | N            |
|                | registerOutParameter(int parameterIndex, int sqlType)                    | Y            |
|                | registerOutParameter(int parameterIndex, int sqlType, int scale)         | Y            |
|                | registerOutParameter(int parameterIndex, int sqlType, String typeName)   | N            |
|                | registerOutParameter(String parameterName, int sqlType)                  | N            |
|                | registerOutParameter(String parameterName, int sqlType, int scale)       | N            |
|                | registerOutParameter(String parameterName, int sqlType, String typeName) | N            |
|                | setAsciiStream(String parameterName, InputStream x)                      | N            |
|                | setAsciiStream(String parameterName, InputStream x, int length)          | N            |
|                | setAsciiStream(String parameterName, InputStream x, long length)         | N            |
|                | setBigDecimal(String parameterName, BigDecimal x)                        | N            |
|                | setBinaryStream(String parameterName, InputStream x)                     | N            |
|                | setBinaryStream(String parameterName, InputStream x, int length)         | N            |
|                | setBinaryStream(String parameterName, InputStream x, long length)        | N            |
|                | setBlob(String parameterName, Blob x)                                    | N            |
|                | setBlob(String parameterName, InputStream inputStream)                   | N            |
|                | setBlob(String parameterName, InputStream inputStream, long length)      | N            |
|                | setBoolean(String parameterName, boolean x)                              | N            |

| Interface name | Method name   | jdbc4/jdbc41 |
|----------------|---|--------------|
|                | setByte(String parameterName, byte x)                                   | N            |
|                | setBytes(String parameterName, byte[] x)                                | N            |
|                | setCharacterStream(String parameterName, Reader reader)                 | N            |
|                | setCharacterStream(String parameterName, Reader reader, int length)     | N            |
|                | setCharacterStream(String parameterName, Reader reader, long length)    | N            |
|                | setClob(String parameterName, Clob x)                                   | N            |
|                | setClob(String parameterName, Reader reader)                            | N            |
|                | setClob(String parameterName, Reader reader, long length)               | N            |
|                | setDate(String parameterName, Date x)                                   | N            |
|                | setDate(String parameterName, Date x, Calendar cal)                     | N            |
|                | setDouble(String parameterName, double x)                               | N            |
|                | setFloat(String parameterName, float x)                                 | N            |
|                | setInt(String parameterName, int x)                                     | N            |
|                | setLong(String parameterName, long x)                                   | N            |
|                | setNCharacterStream(String parameterName, Reader value)                 | N            |
|                | setNCharacterStream(String parameterName, Reader value, long length)    | Y            |
|                | setNClob(String parameterName, NClob value)                             | N            |
|                | setNClob(String parameterName, Reader reader)                           | N            |
|                | setNClob(String parameterName, Reader reader, long length)              | N            |
|                | setNString(String parameterName, String value)                          | Y            |
|                | setNull(String parameterName, int sqlType)                              | N            |
|                | setNull(String parameterName, int sqlType, String typeName)             | N            |
|                | setObject(String parameterName, Object x)                               | N            |
|                | setObject(String parameterName, Object x, int targetSqlType)            | N            |
|                | setObject(String parameterName, Object x, int targetSqlType, int scale) | N            |
|                | setRowId(String parameterName, RowId x)                                 | N            |
|                | setShort(String parameterName, short x)                                 | N            |
|                | setSQLXML(String parameterName, SQLXML xmlObject)                       | N            |
|                | setString(String parameterName, String x)                               | N            |
|                | setTime(String parameterName, Time x)                                   | N            |
|                | setTime(String parameterName, Time x, Calendar cal)                     | N            |

| Interface name | Method name  | jdbc4/jdbc41 |
|----------------|--|--------------|
|                | setTimestamp(String parameterName, Timestamp x)  | N            |
|                | setTimestamp(String parameterName, Timestamp x, Calendar cal)                                  | N            |
|                | setURL(String parameterName, URL val)  | N            |
|                | wasNull()  | Y            |
| Clob           | free()   | Y            |
|                | getAsciiStream()   | Y            |
|                | getCharacterStream()   | Y            |
|                | getCharacterStream(long pos, long length)  | N            |
|                | getSubString(long pos, int length)   | Y            |
|                | length()   | Y            |
|                | position(Clob searchstr, long start)   | N            |
|                | position(String searchstr, long start)   | N            |
|                | setAsciiStream(long pos)   | N            |
|                | setCharacterStream(long pos)   | N            |
|                | setString(long pos, String str)  | N            |
|                | setString(long pos, String str, int offset, int len)   | N            |
|                | truncate(long len)   | Y            |
| Connection     | clearWarnings()  | Y            |
|                | close()  | Y            |
|                | commit()   | Y            |
|                | createArrayOf(String typeName, Object[] elements)  | Y            |
|                | createBlob()   | N            |
|                | createClob()   | N            |
|                | createNClob()  | N            |
|                | createQueryObject(Class ifc)   | N            |
|                | createQueryObject(Class ifc, Connection con)   | N            |
|                | createSQLXML()   | Y            |
|                | createStatement()  | Y            |
|                | createStatement(int resultSetType, int resultSetConcurrency)                                   | Y            |
|                | createStatement(int resultSetType, int resultSetConcurrency, int resultSetHoldability)         | Y            |
|                | createStruct(String typeName, Object[] attributes)   | N            |
|                | nativeSQL(String sql)  | Y            |
|                | prepareCall(String sql)  | Y            |
|                | prepareCall(String sql, int resultSetType, int resultSetConcurrency)                           | Y            |
|                | prepareCall(String sql, int resultSetType, int resultSetConcurrency, int resultSetHoldability) | Y            |
|                | prepareStatement(String sql)   | Y            |

| Interface name   | Method name   | jdbc4/jdbc41 |
|------------------|---|--------------|
|                  | prepareStatement(String sql, int resultSetType, int resultSetConcurrency)                           | Y            |
|                  | prepareStatement(String sql, int resultSetType, int resultSetConcurrency, int resultSetHoldability) | Y            |
|                  | prepareStatement(String sql, int autoGeneratedKeys)   | Y            |
|                  | prepareStatement(String sql, int[] columnIndexes)   | Y            |
|                  | prepareStatement(String sql, String[] columnNames)  | Y            |
|                  | releaseSavepoint(Savepoint savepoint)   | Y            |
|                  | rollback()  | Y            |
|                  | rollback(Savepoint savepoint)   | Y            |
|                  | setAutoCommit(boolean autoCommit)   | Y            |
|                  | getAutoCommit()   | N            |
|                  | setCatalog(String catalog)  | Y            |
|                  | getCatalog()  | N            |
|                  | setClientInfo(String name, String value)  | Y            |
|                  | setClientInfo(Properties properties)  | Y            |
|                  | getClientInfo(String name)  | N            |
|                  | getClientInfo()   | N            |
|                  | isClosed()  | Y            |
|                  | setHoldability(int holdability)   | Y            |
|                  | getHoldability()  | N            |
|                  | getMetaData()   | Y            |
|                  | setReadOnly(boolean readOnly)   | Y            |
|                  | isReadOnly()  | Y            |
|                  | setSavepoint()  | Y            |
|                  | setSavepoint(String name)   | Y            |
|                  | setTransactionIsolation(int level)  | Y            |
|                  | getTransactionIsolation()   | N            |
|                  | setTypeMap(Map map)   | Y            |
|                  | getTypeMap()  | Y            |
|                  | isValid(int timeout)  | Y            |
|                  | getWarnings()   | Y            |
| DatabaseMetaData | allProceduresAreCallable()  | Y            |
|                  | allTablesAreSelectable()  | Y            |
|                  | autoCommitFailureClosesAllResultSets()  | Y            |
|                  | dataDefinitionCausesTransactionCommit()   | Y            |
|                  | dataDefinitionIgnoredInTransactions()   | Y            |
|                  | deletesAreDetected(int type)  | Y            |
|                  | doesMaxRowSizeIncludeBlobs()  | Y            |

| Interface name | Method name  | jdbc4/jdbc41 |
|----------------|--|--------------|
|                | getAttributes(String catalog, String schemaPattern, String typeNamePattern, String attributeNamePattern)   | N            |
|                | getBestRowIdentifier(String catalog, String schema, String table, int scope, boolean nullable)   | Y            |
|                | getCatalogs()  | Y            |
|                | getCatalogSeparator()  | Y            |
|                | getCatalogTerm()   | Y            |
|                | getClientInfoProperties()  | Y            |
|                | getColumnPrivileges(String catalog, String schema, String table, String columnNamePattern)   | Y            |
|                | getColumns(String catalog, String schemaPattern, String tableNamePattern, String columnNamePattern)  | Y            |
|                | getConnection()  | Y            |
|                | getCrossReference(String parentCatalog, String parentSchema, String parentTable, String foreignCatalog, String foreignSchema, String foreignTable) | Y            |
|                | getDatabaseMajorVersion()  | Y            |
|                | getDatabaseMinorVersion()  | Y            |
|                | getDatabaseProductName()   | Y            |
|                | getDatabaseProductVersion()  | Y            |
|                | getDefaultTransactionIsolation()   | Y            |
|                | getDriverMajorVersion()  | Y            |
|                | getDriverMinorVersion()  | Y            |
|                | getDriverName()  | Y            |
|                | getDriverVersion()   | Y            |
|                | getExportedKeys(String catalog, String schema, String table)   | Y            |
|                | getExtraNameCharacters()   | Y            |
|                | getFunctionColumns(String catalog, String schemaPattern, String functionNamePattern, String columnNamePattern)                                     | N            |
|                | getFunctions(String catalog, String schemaPattern, String functionNamePattern)   | N            |
|                | getIdentifierQuoteString()   | Y            |
|                | getImportedKeys(String catalog, String schema, String table)   | Y            |
|                | getIndexInfo(String catalog, String schema, String table, boolean unique, boolean approximate)   | Y            |
|                | getJDBCMinorVersion()  | Y            |
|                | getJDBCMajorVersion()  | Y            |
|                | getJDBCMinorVersion()  | Y            |
|                | getMaxBinaryLiteralLength()  | Y            |

| Interface name | Method name  | jdbc4/jdbc41 |
|----------------|--|--------------|
|                | getMaxCatalogNameLength()  | Y            |
|                | getMaxCharLiteralLength()  | Y            |
|                | getMaxColumnNameLength()   | Y            |
|                | getMaxColumnsInGroupBy()   | Y            |
|                | getMaxColumnsInIndex()   | Y            |
|                | getMaxColumnsInOrderBy()   | Y            |
|                | getMaxColumnsInSelect()  | Y            |
|                | getMaxColumnsInTable()   | Y            |
|                | getMaxConnections()  | Y            |
|                | getMaxCursorNameLength()   | Y            |
|                | getMaxIndexLength()  | Y            |
|                | getMaxProcedureNameLength()  | Y            |
|                | getMaxRowSize()  | Y            |
|                | getMaxSchemaNameLength()   | Y            |
|                | getMaxStatementLength()  | Y            |
|                | getMaxStatements()   | Y            |
|                | getMaxTableNameLength()  | Y            |
|                | getMaxTablesInSelect()   | Y            |
|                | getMaxUserNameLength()   | Y            |
|                | getNumericFunctions()  | Y            |
|                | getPrimaryKeys(String catalog, String schema, String table)  | Y            |
|                | getProcedureColumns(String catalog, String schemaPattern, String procedureNamePattern, String columnNamePattern) | Y            |
|                | getProcedures(String catalog, String schemaPattern, String procedureNamePattern)                                 | Y            |
|                | getProcedureTerm()   | Y            |
|                | getResultSetHoldability()  | Y            |
|                | getRowIdLifetime()   | N            |
|                | getSchemas()   | Y            |
|                | getSchemas(String catalog, String schemaPattern)   | Y            |
|                | getSchemaTerm()  | Y            |
|                | getSearchStringEscape()  | Y            |
|                | getSQLKeywords()   | Y            |
|                | getSQLStateType()  | Y            |
|                | getStringFunctions()   | Y            |
|                | getSuperTables(String catalog, String schemaPattern, String tableNamePattern)                                    | N            |
|                | getSuperTypes(String catalog, String schemaPattern, String typeNamePattern)                                      | N            |

| Interface name | Method name  | jdbc4/jdbc41 |
|----------------|--|--------------|
|                | getSystemFunctions()   | Y            |
|                | getTablePrivileges(String catalog, String schemaPattern, String tableNamePattern)        | Y            |
|                | getTables(String catalog, String schemaPattern, String tableNamePattern, String[] types) | Y            |
|                | getTableTypes()  | Y            |
|                | getTimeDateFunctions()   | Y            |
|                | getTypeInfo()  | Y            |
|                | getUDTs(String catalog, String schemaPattern, String typeNamePattern, int[] types)       | Y            |
|                | getURL()   | Y            |
|                | getUserName()  | Y            |
|                | getVersionColumns(String catalog, String schema, String table)                           | Y            |
|                | insertsAreDetected(int type)   | Y            |
|                | isCatalogAtStart()   | Y            |
|                | isReadOnly()   | Y            |
|                | locatorsUpdateCopy()   | Y            |
|                | nullPlusNonNullIsNull()  | Y            |
|                | nullsAreSortedAtEnd()  | Y            |
|                | nullsAreSortedAtStart()  | Y            |
|                | nullsAreSortedHigh()   | Y            |
|                | nullsAreSortedLow()  | Y            |
|                | othersDeletesAreVisible(int type)  | Y            |
|                | othersInsertsAreVisible(int type)  | Y            |
|                | othersUpdatesAreVisible(int type)  | Y            |
|                | ownDeletesAreVisible(int type)   | Y            |
|                | ownInsertsAreVisible(int type)   | Y            |
|                | ownUpdatesAreVisible(int type)   | Y            |
|                | storesLowerCaseIdentifiers()   | Y            |
|                | storesLowerCaseQuotedIdentifiers()   | Y            |
|                | storesMixedCaseIdentifiers()   | Y            |
|                | storesMixedCaseQuotedIdentifiers()   | Y            |
|                | storesUpperCaseIdentifiers()   | Y            |
|                | storesUpperCaseQuotedIdentifiers()   | Y            |
|                | supportsAlterTableWithAddColumn()  | Y            |
|                | supportsAlterTableWithDropColumn()   | Y            |
|                | supportsANSI92EntryLevelSQL()  | Y            |
|                | supportsANSI92FullSQL()  | Y            |
|                | supportsANSI92IntermediateSQL()  | Y            |

| Interface name | Method name   | jdbc4/jdbc41 |
|----------------|---|--------------|
|                | supportsBatchUpdates()                                  | Y            |
|                | supportsCatalogsInDataManipulation()                    | Y            |
|                | supportsCatalogsInIndexDefinitions()                    | Y            |
|                | supportsCatalogsInPrivilegeDefinitions()                | Y            |
|                | supportsCatalogsInProcedureCalls()                      | Y            |
|                | supportsCatalogsInTableDefinitions()                    | Y            |
|                | supportsColumnAliasing()                                | Y            |
|                | supportsConvert()                                       | Y            |
|                | supportsConvert(int fromType, int toType)               | Y            |
|                | supportsCoreSQLGrammar()                                | Y            |
|                | supportsCorrelatedSubqueries()                          | Y            |
|                | supportsDataDefinitionAndDataManipulationTransactions() | Y            |
|                | supportsDataManipulationTransactionsOnly()              | Y            |
|                | supportsDifferentTableCorrelationNames()                | Y            |
|                | supportsExpressionsInOrderBy()                          | Y            |
|                | supportsExtendedSQLGrammar()                            | Y            |
|                | supportsFullOuterJoins()                                | Y            |
|                | supportsGetGeneratedKeys()                              | Y            |
|                | supportsGroupBy()                                       | Y            |
|                | supportsGroupByBeyondSelect()                           | Y            |
|                | supportsGroupByUnrelated()                              | Y            |
|                | supportsIntegrityEnhancementFacility()                  | Y            |
|                | supportsLikeEscapeClause()                              | Y            |
|                | supportsLimitedOuterJoins()                             | Y            |
|                | supportsMinimumSQLGrammar()                             | Y            |
|                | supportsMixedCaseIdentifiers()                          | Y            |
|                | supportsMixedCaseQuotedIdentifiers()                    | Y            |
|                | supportsMultipleOpenResults()                           | Y            |
|                | supportsMultipleResultSets()                            | Y            |
|                | supportsMultipleTransactions()                          | Y            |
|                | supportsNamedParameters()                               | Y            |
|                | supportsNonNullableColumns()                            | Y            |
|                | supportsOpenCursorsAcrossCommit()                       | Y            |
|                | supportsOpenCursorsAcrossRollback()                     | Y            |
|                | supportsOpenStatementsAcrossCommit()                    | Y            |
|                | supportsOpenStatementsAcrossRollback()                  | Y            |
|                | supportsOrderByUnrelated()                              | Y            |
|                | supportsOuterJoins()                                    | Y            |
|                | supportsPositionedDelete()                              | Y            |

| Interface name    | Method name   | jdbc4/jdbc41 |
|-------------------|---|--------------|
|                   | supportsPositionedUpdate()                              | Y            |
|                   | supportsResultSetConcurrency(int type, int concurrency) | Y            |
|                   | supportsResultSetHoldability(int holdability)           | Y            |
|                   | supportsResultSetType(int type)                         | Y            |
|                   | supportsSavepoints()                                    | Y            |
|                   | supportsSchemasInDataManipulation()                     | Y            |
|                   | supportsSchemasInIndexDefinitions()                     | Y            |
|                   | supportsSchemasInPrivilegeDefinitions()                 | Y            |
|                   | supportsSchemasInProcedureCalls()                       | Y            |
|                   | supportsSchemasInTableDefinitions()                     | Y            |
|                   | supportsSelectForUpdate()                               | Y            |
|                   | supportsStatementPooling()                              | Y            |
|                   | supportsStoredFunctionsUsingCallSyntax()                | Y            |
|                   | supportsStoredProcedures()                              | Y            |
|                   | supportsSubqueriesInComparisons()                       | Y            |
|                   | supportsSubqueriesInExists()                            | Y            |
|                   | supportsSubqueriesInIns()                               | Y            |
|                   | supportsSubqueriesInQuantifieds()                       | Y            |
|                   | supportsTableCorrelationNames()                         | Y            |
|                   | supportsTransactionIsolationLevel(int level)            | Y            |
|                   | supportsTransactions()                                  | Y            |
|                   | supportsUnion()   | Y            |
|                   | supportsUnionAll()                                      | Y            |
|                   | updatesAreDetected(int type)                            | Y            |
|                   | usesLocalFilePerTable()                                 | Y            |
|                   | usesLocalFiles()  | Y            |
| Driver            | acceptsURL(String url)                                  | Y            |
|                   | connect(String url, Properties info)                    | Y            |
|                   | getMajorVersion()                                       | Y            |
|                   | getMinorVersion()                                       | Y            |
|                   | getPropertyInfo(String url, Properties info)            | Y            |
|                   | jdbcCompliant()   | Y            |
| ParameterMetaData | getParameterClassName(int param)                        | Y            |
| a                 | getParameterCount()                                     | Y            |
|                   | getParameterMode(int param)                             | Y            |
|                   | getParameterType(int param)                             | Y            |
|                   | getParameterTypeName(int param)                         | Y            |
|                   | getPrecision(int param)                                 | Y            |
|                   | getScale(int param)                                     | Y            |

| Interface name    | Method name  | jdbc4/jdbc41 |
|-------------------|--|--------------|
|                   | isNullable(int param)  | Y            |
|                   | isSigned(int param)  | Y            |
| PreparedStatement | addBatch()   | Y            |
|                   | clearParameters()  | Y            |
|                   | execute()  | Y            |
|                   | executeQuery()   | Y            |
|                   | executeUpdate()  | Y            |
|                   | getMetaData()  | Y            |
|                   | getParameterMetaData()   | Y            |
|                   | setArray(int parameterIndex, Array x)                              | Y            |
|                   | setAsciiStream(int parameterIndex, InputStream x)                  | N            |
|                   | setAsciiStream(int parameterIndex, InputStream x, int length)      | Y            |
|                   | setAsciiStream(int parameterIndex, InputStream x, long length)     | N            |
|                   | setBigDecimal(int parameterIndex, BigDecimal x)                    | Y            |
|                   | setBinaryStream(int parameterIndex, InputStream x)                 | N            |
|                   | setBinaryStream(int parameterIndex, InputStream x, int length)     | Y            |
|                   | setBinaryStream(int parameterIndex, InputStream x, long length)    | Y            |
|                   | setBlob(int parameterIndex, Blob x)                                | Y            |
|                   | setBlob(int parameterIndex, InputStream inputStream)               | N            |
|                   | setBlob(int parameterIndex, InputStream inputStream, long length)  | N            |
|                   | setBoolean(int parameterIndex, boolean x)                          | Y            |
|                   | setByte(int parameterIndex, byte x)                                | Y            |
|                   | setBytes(int parameterIndex, byte[] x)                             | Y            |
|                   | setCharacterStream(int parameterIndex, Reader reader)              | N            |
|                   | setCharacterStream(int parameterIndex, Reader reader, int length)  | Y            |
|                   | setCharacterStream(int parameterIndex, Reader reader, long length) | N            |
|                   | setClob(int parameterIndex, Clob x)                                | Y            |
|                   | setClob(int parameterIndex, Reader reader)                         | N            |
|                   | setClob(int parameterIndex, Reader reader, long length)            | N            |
|                   | setDate(int parameterIndex, Date x)                                | Y            |
|                   | setDate(int parameterIndex, Date x, Calendar cal)                  | Y            |
|                   | setDouble(int parameterIndex, double x)                            | Y            |

| Interface name | Method name   | jdbc4/jdbc41 |
|----------------|---|--------------|
|                | setFloat(int parameterIndex, float x)   | Y            |
|                | setInt(int parameterIndex, int x)   | Y            |
|                | setLong(int parameterIndex, long x)   | Y            |
|                | setNCharacterStream(int parameterIndex, Reader value)                         | N            |
|                | setNCharacterStream(int parameterIndex, Reader value, long length)            | Y            |
|                | setNClob(int parameterIndex, NClob value)                                     | N            |
|                | setNClob(int parameterIndex, Reader reader)                                   | N            |
|                | setNClob(int parameterIndex, Reader reader, long length)                      | N            |
|                | setNString(int parameterIndex, String value)                                  | Y            |
|                | setNull(int parameterIndex, int sqlType)                                      | Y            |
|                | setNull(int parameterIndex, int sqlType, String typeName)                     | Y            |
|                | setObject(int parameterIndex, Object x)                                       | Y            |
|                | setObject(int parameterIndex, Object x, int targetSqlType)                    | Y            |
|                | setObject(int parameterIndex, Object x, int targetSqlType, int scaleOrLength) | Y            |
|                | setRef(int parameterIndex, Ref x)   | N            |
|                | setRowId(int parameterIndex, RowId x)   | N            |
|                | setShort(int parameterIndex, short x)   | Y            |
|                | setSQLXML(int parameterIndex, SQLXML xmlObject)                               | Y            |
|                | setString(int parameterIndex, String x)                                       | Y            |
|                | setTime(int parameterIndex, Time x)   | Y            |
|                | setTime(int parameterIndex, Time x, Calendar cal)                             | Y            |
|                | setTimestamp(int parameterIndex, Timestamp x)                                 | Y            |
|                | setTimestamp(int parameterIndex, Timestamp x, Calendar cal)                   | Y            |
|                | setUnicodeStream(int parameterIndex, InputStream x, int length)               | Y            |
|                | setURL(int parameterIndex, URL x)   | Y            |
| ResultSet      | absolute(int row)   | Y            |
|                | afterLast()   | Y            |
|                | beforeFirst()   | Y            |
|                | cancelRowUpdates()  | Y            |
|                | clearWarnings()   | Y            |
|                | close()   | Y            |
|                | deleteRow()   | Y            |
|                | findColumn(String columnLabel)  | Y            |

| Interface name | Method name                                  | jdbc4/jdbc41 |
|----------------|--|--------------|
|                | first()                                      | Y            |
|                | getArray(int columnIndex)                    | Y            |
|                | getArray(String columnLabel)                 | Y            |
|                | getAsciiStream(int columnIndex)              | Y            |
|                | getAsciiStream(String columnLabel)           | Y            |
|                | getBigDecimal(int columnIndex)               | Y            |
|                | getBigDecimal(int columnIndex, int scale)    | Y            |
|                | getBigDecimal(String columnLabel)            | Y            |
|                | getBigDecimal(String columnLabel, int scale) | Y            |
|                | getBinaryStream(int columnIndex)             | Y            |
|                | getBinaryStream(String columnLabel)          | Y            |
|                | getBlob(int columnIndex)                     | Y            |
|                | getBlob(String columnLabel)                  | Y            |
|                | getBoolean(int columnIndex)                  | Y            |
|                | getBoolean(String columnLabel)               | Y            |
|                | getByte(int columnIndex)                     | Y            |
|                | getByte(String columnLabel)                  | Y            |
|                | getBytes(int columnIndex)                    | Y            |
|                | getBytes(String columnLabel)                 | Y            |
|                | getCharacterStream(int columnIndex)          | Y            |
|                | getCharacterStream(String columnLabel)       | Y            |
|                | getClob(int columnIndex)                     | Y            |
|                | getClob(String columnLabel)                  | Y            |
|                | getConcurrency()                             | Y            |
|                | getCursorName()                              | Y            |
|                | getDate(int columnIndex)                     | Y            |
|                | getDate(int columnIndex, Calendar cal)       | Y            |
|                | getDate(String columnLabel)                  | Y            |
|                | getDate(String columnLabel, Calendar cal)    | Y            |
|                | getDouble(int columnIndex)                   | Y            |
|                | getDouble(String columnLabel)                | Y            |
|                | getFetchDirection()                          | Y            |
|                | getFetchSize()                               | Y            |
|                | getFloat(int columnIndex)                    | Y            |
|                | getFloat(String columnLabel)                 | Y            |
|                | getHoldability()                             | N            |
|                | getInt(int columnIndex)                      | Y            |
|                | getInt(String columnLabel)                   | Y            |
|                | getLong(int columnIndex)                     | Y            |

| Interface name | Method name   | jdbc4/jdbc41 |
|----------------|---|--------------|
|                | getLong(String columnLabel)                             | Y            |
|                | getMetaData()   | Y            |
|                | getNCharacterStream(int columnIndex)                    | Y            |
|                | getNCharacterStream(String columnLabel)                 | N            |
|                | getNClob(int columnIndex)                               | N            |
|                | getNClob(String columnLabel)                            | N            |
|                | getNString(int columnIndex)                             | Y            |
|                | getNString(String columnLabel)                          | N            |
|                | getObject(int columnIndex)                              | Y            |
|                | getObject(int columnIndex, Map<String,Class<?>> map)    | Y            |
|                | getObject(String columnLabel)                           | Y            |
|                | getObject(String columnLabel, Map<String,Class<?>> map) | Y            |
|                | getRef(int columnIndex)                                 | Y            |
|                | getRef(String columnLabel)                              | Y            |
|                | getRow()  | Y            |
|                | getRowId(int columnIndex)                               | N            |
|                | getRowId(String columnLabel)                            | N            |
|                | getShort(int columnIndex)                               | Y            |
|                | getShort(String columnLabel)                            | Y            |
|                | getSQLXML(int columnIndex)                              | Y            |
|                | getSQLXML(String columnLabel)                           | Y            |
|                | getStatement()  | Y            |
|                | getString(int columnIndex)                              | Y            |
|                | getString(String columnLabel)                           | Y            |
|                | getTime(int columnIndex)                                | Y            |
|                | getTime(int columnIndex, Calendar cal)                  | Y            |
|                | getTime(String columnLabel)                             | Y            |
|                | getTime(String columnLabel, Calendar cal)               | Y            |
|                | getTimestamp(int columnIndex)                           | Y            |
|                | getTimestamp(int columnIndex, Calendar cal)             | Y            |
|                | getTimestamp(String columnLabel)                        | Y            |
|                | getTimestamp(String columnLabel, Calendar cal)          | Y            |
|                | getType()   | Y            |
|                | getUnicodeStream(int columnIndex)                       | Y            |
|                | getUnicodeStream(String columnLabel)                    | Y            |
|                | getURL(int columnIndex)                                 | N            |
|                | getURL(String columnLabel)                              | N            |
|                | getWarnings()   | Y            |

| Interface name | Method name   | jdbc4/jdbc41 |
|----------------|---|--------------|
|                | insertRow()   | Y            |
|                | isAfterLast()   | Y            |
|                | isBeforeFirst()   | Y            |
|                | isClosed()  | Y            |
|                | isFirst()   | Y            |
|                | isLast()  | Y            |
|                | last()  | Y            |
|                | moveToCurrentRow()  | Y            |
|                | moveToInsertRow()   | Y            |
|                | next()  | Y            |
|                | previous()  | Y            |
|                | refreshRow()  | Y            |
|                | relative(int rows)  | Y            |
|                | rowDeleted()  | Y            |
|                | rowInserted()   | Y            |
|                | rowUpdated()  | Y            |
|                | setFetchDirection(int direction)                                  | Y            |
|                | setFetchSize(int rows)  | Y            |
|                | updateArray(int columnIndex, Array x)                             | Y            |
|                | updateArray(String columnLabel, Array x)                          | Y            |
|                | updateAsciiStream(int columnIndex, InputStream x)                 | Y            |
|                | updateAsciiStream(int columnIndex, InputStream x, int length)     | N            |
|                | updateAsciiStream(int columnIndex, InputStream x, long length)    | N            |
|                | updateAsciiStream(String columnLabel, InputStream x)              | Y            |
|                | updateAsciiStream(String columnLabel, InputStream x, int length)  | N            |
|                | updateAsciiStream(String columnLabel, InputStream x, long length) | Y            |
|                | updateBigDecimal(int columnIndex, BigDecimal x)                   | Y            |
|                | updateBigDecimal(String columnLabel, BigDecimal x)                | N            |
|                | updateBinaryStream(int columnIndex, InputStream x)                | N            |
|                | updateBinaryStream(int columnIndex, InputStream x, int length)    | Y            |
|                | updateBinaryStream(int columnIndex, InputStream x, long length)   | N            |
|                | updateBinaryStream(String columnLabel, InputStream x)             | N            |

| Interface name | Method name   | jdbc4/jdbc41 |
|----------------|---|--------------|
|                | updateBinaryStream(String columnLabel, InputStream x, int length)     | N            |
|                | updateBinaryStream(String columnLabel, InputStream x, long length)    | N            |
|                | updateBlob(int columnIndex, Blob x)                                   | N            |
|                | updateBlob(int columnIndex, InputStream inputStream)                  | N            |
|                | updateBlob(int columnIndex, InputStream inputStream, long length)     | N            |
|                | updateBlob(String columnLabel, Blob x)                                | N            |
|                | updateBlob(String columnLabel, InputStream inputStream)               | N            |
|                | updateBlob(String columnLabel, InputStream inputStream, long length)  | N            |
|                | updateBoolean(int columnIndex, boolean x)                             | Y            |
|                | updateBoolean(String columnLabel, boolean x)                          | Y            |
|                | updateByte(int columnIndex, byte x)                                   | Y            |
|                | updateByte(String columnLabel, byte x)                                | Y            |
|                | updateBytes(int columnIndex, byte[] x)                                | Y            |
|                | updateBytes(String columnLabel, byte[] x)                             | Y            |
|                | updateCharacterStream(int columnIndex, Reader x)                      | N            |
|                | updateCharacterStream(int columnIndex, Reader x, int length)          | Y            |
|                | updateCharacterStream(int columnIndex, Reader x, long length)         | N            |
|                | updateCharacterStream(String columnLabel, Reader reader)              | N            |
|                | updateCharacterStream(String columnLabel, Reader reader, int length)  | Y            |
|                | updateCharacterStream(String columnLabel, Reader reader, long length) | N            |
|                | updateClob(int columnIndex, Clob x)                                   | N            |
|                | updateClob(int columnIndex, Reader reader)                            | N            |
|                | updateClob(int columnIndex, Reader reader, long length)               | N            |
|                | updateClob(String columnLabel, Clob x)                                | N            |
|                | updateClob(String columnLabel, Reader reader)                         | N            |
|                | updateClob(String columnLabel, Reader reader, long length)            | N            |
|                | updateDate(int columnIndex, Date x)                                   | Y            |
|                | updateDate(String columnLabel, Date x)                                | Y            |
|                | updateDouble(int columnIndex, double x)                               | Y            |
|                | updateDouble(String columnLabel, double x)                            | Y            |

| Interface name | Method name  | jdbc4/jdbc41 |
|----------------|--|--------------|
|                | updateFloat(int columnIndex, float x)                                  | Y            |
|                | updateFloat(String columnLabel, float x)                               | Y            |
|                | updateInt(int columnIndex, int x)                                      | Y            |
|                | updateInt(String columnLabel, int x)                                   | Y            |
|                | updateLong(int columnIndex, long x)                                    | Y            |
|                | updateLong(String columnLabel, long x)                                 | Y            |
|                | updateNCharacterStream(int columnIndex, Reader x)                      | N            |
|                | updateNCharacterStream(int columnIndex, Reader x, long length)         | Y            |
|                | updateNCharacterStream(String columnLabel, Reader reader)              | N            |
|                | updateNCharacterStream(String columnLabel, Reader reader, long length) | N            |
|                | updateNClob(int columnIndex, NClob nClob)                              | N            |
|                | updateNClob(int columnIndex, Reader reader)                            | N            |
|                | updateNClob(int columnIndex, Reader reader, long length)               | N            |
|                | updateNClob(String columnLabel, NClob nClob)                           | N            |
|                | updateNClob(String columnLabel, Reader reader)                         | N            |
|                | updateNClob(String columnLabel, Reader reader, long length)            | N            |
|                | updateNString(int columnIndex, String nString)                         | Y            |
|                | updateNString(String columnLabel, String nString)                      | N            |
|                | updateNull(int columnIndex)  | Y            |
|                | updateNull(String columnLabel)   | Y            |
|                | updateObject(int columnIndex, Object x)                                | Y            |
|                | updateObject(int columnIndex, Object x, int scaleOrLength)             | Y            |
|                | updateObject(String columnLabel, Object x)                             | Y            |
|                | updateObject(String columnLabel, Object x, int scaleOrLength)          | Y            |
|                | updateRef(int columnIndex, Ref x)                                      | N            |
|                | updateRef(String columnLabel, Ref x)                                   | N            |
|                | updateRow()  | Y            |
|                | updateRowId(int columnIndex, RowId x)                                  | N            |
|                | updateRowId(String columnLabel, RowId x)                               | N            |
|                | updateShort(int columnIndex, short x)                                  | Y            |
|                | updateShort(String columnLabel, short x)                               | Y            |
|                | updateSQLXML(int columnIndex, SQLXML xmlObject)                        | Y            |
|                | updateSQLXML(String columnLabel, SQLXML xmlObject)                     | Y            |

| Interface name           | Method name                                      | jdbc4/jdbc41 |
|--------------------------|--|--------------|
|                          | updateString(int columnIndex, String x)          | Y            |
|                          | updateString(String columnLabel, String x)       | Y            |
|                          | updateTime(int columnIndex, Time x)              | Y            |
|                          | updateTime(String columnLabel, Time x)           | Y            |
|                          | updateTimestamp(int columnIndex, Timestamp x)    | Y            |
|                          | updateTimestamp(String columnLabel, Timestamp x) | Y            |
|                          | wasNull()  | Y            |
| ResultSetMetaData        | isAutoIncrement(int column)                      | Y            |
|                          | isCaseSensitive(int column)                      | Y            |
|                          | getCatalogName(int column)                       | Y            |
|                          | getColumnClassName(int column)                   | Y            |
|                          | getColumnCount()                                 | Y            |
|                          | getColumnDisplaySize(int column)                 | Y            |
|                          | getColumnLabel(int column)                       | Y            |
|                          | getColumnName(int column)                        | Y            |
|                          | getColumnType(int column)                        | Y            |
|                          | getColumnTypeName(int column)                    | Y            |
|                          | isCurrency(int column)                           | Y            |
|                          | isDefinitelyWritable(int column)                 | Y            |
|                          | isNullable(int column)                           | Y            |
|                          | getPrecision(int column)                         | Y            |
|                          | isReadOnly(int column)                           | Y            |
|                          | getScale(int column)                             | Y            |
|                          | getSchemaName(int column)                        | Y            |
|                          | isSearchable(int column)                         | Y            |
|                          | isSigned(int column)                             | Y            |
| getTableName(int column) | Y  |              |
| isWritable(int column)   | Y  |              |
| RowId                    | equals(Object obj)                               | N            |
|                          | hashCode()                                       | N            |
|                          | toString()                                       | N            |
|                          | getBytes()                                       | N            |
| Savepoint                | getSavepointId()                                 | Y            |
|                          | getSavepointName()                               | Y            |
| SQLXML                   | free()   | Y            |
|                          | setBinaryStream()                                | Y            |
|                          | getBinaryStream()                                | Y            |
|                          | setCharacterStream()                             | Y            |
|                          | getCharacterStream()                             | Y            |

| Interface name | Method name                                      | jdbc4/jdbc41 |
|----------------|--|--------------|
|                | setResult(Class resultClass)                     | Y            |
|                | getSource(Class sourceClass)                     | Y            |
|                | setString(String value)                          | Y            |
|                | getString()                                      | Y            |
| Statement      | addBatch(String sql)                             | Y            |
|                | cancel()   | Y            |
|                | clearBatch()                                     | Y            |
|                | clearWarnings()                                  | Y            |
|                | close()  | Y            |
|                | execute(String sql)                              | Y            |
|                | execute(String sql, int autoGeneratedKeys)       | Y            |
|                | execute(String sql, int[] columnIndexes)         | Y            |
|                | execute(String sql, String[] columnNames)        | Y            |
|                | executeBatch()                                   | Y            |
|                | executeQuery(String sql)                         | Y            |
|                | executeUpdate(String sql)                        | Y            |
|                | executeUpdate(String sql, int autoGeneratedKeys) | Y            |
|                | executeUpdate(String sql, int[] columnIndexes)   | Y            |
|                | executeUpdate(String sql, String[] columnNames)  | Y            |
|                | isClosed()                                       | Y            |
|                | getConnection()                                  | Y            |
|                | setCursorName(String name)                       | Y            |
|                | setEscapeProcessing(boolean enable)              | Y            |
|                | setFetchDirection(int direction)                 | Y            |
|                | getFetchDirection()                              | Y            |
|                | setFetchSize(int rows)                           | Y            |
|                | getFetchSize()                                   | Y            |
|                | getGeneratedKeys()                               | Y            |
|                | setMaxFieldSize(int max)                         | Y            |
|                | getMaxFieldSize()                                | Y            |
|                | setMaxRows(int max)                              | Y            |
|                | getMaxRows()                                     | Y            |
|                | getMoreResults()                                 | Y            |
|                | getMoreResults(int current)                      | Y            |
|                | setPoolable(boolean poolable)                    | Y            |
|                | isPoolable()                                     | Y            |
|                | setQueryTimeout(int seconds)                     | Y            |
|                | getQueryTimeout()                                | Y            |
|                | getResultSet()                                   | Y            |

| Interface name | Method name               | jdbc4/jdbc41 |
|----------------|---------------------------|--------------|
|                | getResultSetConcurrency() | Y            |
|                | getResultSetHoldability() | Y            |
|                | getResultSetType()        | Y            |
|                | getUpdateCount()          | Y            |
|                | getWarnings()             | Y            |

Y: Supported

N: Not supported

### javax.sql

| Interface name       | Method name   | jdbc4/jdbc41 |
|----------------------|---|--------------|
| ConnectionPool       | getPooledConnection()   | Y            |
| DataSource           | getPooledConnection(String user, String password)                   | Y            |
| DataSource           | createQueryObject(Class ifc)  | N            |
|                      | createQueryObject(Class ifc, DataSource ds)                         | N            |
|                      | getConnection()   | Y            |
|                      | getConnection(String username, String password)                     | Y            |
| PooledConnecti<br>on | addConnectionEventListener(ConnectionEventListen<br>er listener)    | Y            |
|                      | addStatementEventListener(StatementEventListene<br>r listener)      | Y            |
|                      | close()   | Y            |
|                      | removeConnectionEventListener(ConnectionEventLi<br>stener listener) | Y            |
|                      | removeStatementEventListener(StatementEventListe<br>ner listener)   | N            |
|                      | getConnection()   | Y            |

Y: Supported

N: Not supported

## F.1.2 PostgreSQL Fixed API

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### org.postgresql

| Interface name | Method name  | jdbc4/jdbc41 |
|----------------|--|--------------|
| PGConnection   | addDataType(java.lang.String type,<br>java.lang.Class klass) | Y            |
|                | addDataType(java.lang.String type,<br>java.lang.String name) | Y            |
|                | getBackendPID()  | Y            |
|                | getCopyAPI()   | Y            |
|                | getFastpathAPI()   | Y            |
|                | getLargeObjectAPI()  | Y            |
|                | getmaxStatements()   | Y            |

| Interface name       | Method name                        | jdbc4/jdbc41 |
|----------------------|------------------------------------|--------------|
|                      | getNotifications()                 | Y            |
|                      | getPrepareThreshold()              | Y            |
|                      | setPrepareThreshold(int threshold) | Y            |
| PGNotification       | getName()                          | Y            |
|                      | getParameter()                     | Y            |
|                      | getPID()                           | Y            |
| PGRefCursorResultSet | getRefCursor()                     | Y            |
| PGResultSetMetaData  | getBaseColumnName(int column)      | Y            |
|                      | getBaseSchemaName(int column)      | Y            |
|                      | getBaseTableName(int column)       | Y            |
|                      | getFormat(int column)              | Y            |
| PGStatement          | getLastOID()                       | Y            |
|                      | getPrepareThreshold()              | Y            |
|                      | isUseServerPrepare()               | Y            |
|                      | setPrepareThreshold(int threshold) | Y            |
|                      | setUseServerPrepare(boolean flag)  | Y            |

Y: Supported

### org.postgresql.copy

| Interface name | Method name  | jdbc4/jdbc41 |
|----------------|--|--------------|
| CopyIn         | endCopy()  | Y            |
|                | flushCopy()  | Y            |
|                | writeToCopy(byte[] buf, int off, int siz)                              | Y            |
| CopyOperation  | cancelCopy()   | Y            |
|                | getFieldCount()  | Y            |
|                | getFieldFormat(int field)  | Y            |
|                | getFormat()  | Y            |
|                | getHandledRowCount()   | Y            |
|                | isActive()   | Y            |
| CopyOut        | readFromCopy()   | Y            |
| CopyManager    | copyIn(java.lang.String sql)   | Y            |
|                | copyIn(java.lang.String sql, java.io.InputStream from)                 | Y            |
|                | copyIn(java.lang.String sql, java.io.InputStream from, int bufferSize) | Y            |
|                | copyIn(java.lang.String sql, java.io.Reader from)                      | Y            |
|                | copyIn(java.lang.String sql, java.io.Reader from, int bufferSize)      | Y            |
|                | copyOut(java.lang.String sql)  | Y            |

| Interface name                            | Method name  | jdbc4/jdbc41 |
|---|--|--------------|
|   | copyOut(java.lang.String sql, java.io.OutputStream to) | Y            |
|   | copyOut(java.lang.String sql, java.io.Writer to)       | Y            |
| PGCopyInputStream                         | available()  | Y            |
|   | cancelCopy()   | Y            |
|   | close()  | Y            |
|   | getFieldCount()  | Y            |
|   | getFieldFormat(int field)                              | Y            |
|   | getFormat()  | Y            |
|   | getHandledRowCount()                                   | Y            |
|   | isActive()   | Y            |
|   | read()   | Y            |
|   | read(byte[] buf)                                       | Y            |
|   | read(byte[] buf, int off, int siz)                     | Y            |
| readFromCopy()                            | Y  |              |
| PGCopyOutputStream                        | cancelCopy()   | Y            |
|   | close()  | Y            |
|   | endCopy()  | Y            |
|   | flush()  | Y            |
|   | flushCopy()  | Y            |
|   | getFieldCount()  | Y            |
|   | getFieldFormat(int field)                              | Y            |
|   | getFormat()  | Y            |
|   | getHandledRowCount()                                   | Y            |
|   | isActive()   | Y            |
|   | write(byte[] buf)                                      | Y            |
|   | write(byte[] buf, int off, int siz)                    | Y            |
|   | write(int b)   | Y            |
| writeToCopy(byte[] buf, int off, int siz) | Y  |              |

Y: Supported

### org.postgresql.ds

| Interface name             | Method name                                      | jdbc4/jdbc41 |
|----------------------------|--|--------------|
| PGConnectionPoolDataSource |  | Y            |
| PGPooledConnection         | createConnectionEvent(java.sql.SQLException sql) | Y            |
| PGPoolingDataSource        | addDataSource(java.lang.String dataSourceName)   | Y            |
| PGSimpleDataSource         |  | Y            |

Y: Supported

**org.postgresql.ds.common**

| Interface name                        | Method name  | jdbc4/jdbc41 |
|---------------------------------------|--|--------------|
| BaseDataSource                        | createReference()  | Y            |
|                                       | getApplicationName()   | Y            |
|                                       | getBinaryTransfer()  | Y            |
|                                       | getBinaryTransferDisable()   | Y            |
|                                       | getBinaryTransferEnable()  | Y            |
|                                       | getCompatible()  | Y            |
|                                       | getConnection()  | Y            |
|                                       | getConnection(java.lang.String user,<br>java.lang.String password) | Y            |
|                                       | getDatabaseName()  | Y            |
|                                       | getDescription()   | Y            |
|                                       | getLoginTimeout()  | Y            |
|                                       | getLogLevel()  | Y            |
|                                       | getLogWriter()   | Y            |
|                                       | getmaxStatements()   | Y            |
|                                       | getPassword()  | Y            |
|                                       | getPortNumber()  | Y            |
|                                       | getPrepareThreshold()  | Y            |
|                                       | getProtocolVersion()   | Y            |
|                                       | getReceiveBufferSize()   | Y            |
|                                       | getReference()   | Y            |
|                                       | getSendBufferSize()  | Y            |
|                                       | getServerName()  | Y            |
|                                       | getSocketTimeout()   | Y            |
|                                       | getSsl()   | Y            |
|                                       | getSslfactory()  | Y            |
|                                       | getSslmode()   | Y            |
|                                       | getSslrootcert()   | Y            |
|                                       | getSslservercertcn()   | Y            |
|                                       | getStringType()  | Y            |
|                                       | getTargetServer()  | Y            |
|                                       | getTcpKeepAlive()  | Y            |
|                                       | getUnknownLength()   | Y            |
|                                       | getUrl()   | Y            |
| getUser()                             | Y  |              |
| initializeFrom(BaseDataSource source) | Y  |              |
| isColumnSanitiserDisabled()           | Y  |              |

| Interface name | Method name   | jdbc4/jdbc41 |
|----------------|---|--------------|
|                | readBaseObject(java.io.ObjectInputStream in)              | Y            |
|                | setApplicationName(java.lang.String applicationName)      | Y            |
|                | setBinaryTransfer(boolean enabled)                        | Y            |
|                | setBinaryTransferDisable(java.lang.String oidList)        | Y            |
|                | setBinaryTransferEnable(java.lang.String oidList)         | Y            |
|                | setCompatible(java.lang.String compatible)                | Y            |
|                | setDatabaseName(java.lang.String databaseName)            | Y            |
|                | setDisableColumnSanitiser(boolean disableColumnSanitiser) | Y            |
|                | setLoginTimeout(int i)                                    | Y            |
|                | setLogLevel(int logLevel)                                 | Y            |
|                | setLogWriter(java.io.PrintWriter printWriter)             | Y            |
|                | setMaxStatements(int cacheSize)                           | Y            |
|                | setPassword(java.lang.String password)                    | Y            |
|                | setPortNumber(int portNumber)                             | Y            |
|                | setPrepareThreshold(int count)                            | Y            |
|                | setProtocolVersion(int protocolVersion)                   | Y            |
|                | setReceiveBufferSize(int nbytes)                          | Y            |
|                | setSendBufferSize(int nbytes)                             | Y            |
|                | setServerName(java.lang.String serverName)                | Y            |
|                | setSocketTimeout(int seconds)                             | Y            |
|                | setSsl(boolean enabled)                                   | Y            |
|                | setSslfactory(java.lang.String classname)                 | Y            |
|                | setSslmode(java.lang.String sslmode)                      | Y            |
|                | setSslrootcert(java.lang.String sslrootcert)              | Y            |
|                | setSslservercertcn(java.lang.String sslservercertcn)      | Y            |
|                | setStringType(java.lang.String stringType)                | Y            |
|                | setTargetServer(java.lang.String targetServer)            | Y            |
|                | setTcpKeepAlive(boolean enabled)                          | Y            |
|                | setUnknownLength(int unknownLength)                       | Y            |
|                | setUrl(String url)  | Y            |
|                | setUser(java.lang.String user)                            | Y            |
|                | writeBaseObject(java.io.ObjectOutputStream out)           | Y            |

Y: Supported

### org.postgresql.fastpath

| Interface name | Method name   | jdbc4/jdbc41 |
|----------------|---|--------------|
| Fastpath       | addFunction(java.lang.String name, int fnid)                            | Y            |
|                | addFunctions(java.sql.ResultSet rs)                                     | Y            |
|                | createOIDArg(long oid)  | Y            |
|                | fastpath(int fnId, boolean resultType, FastpathArg[] args)              | Y            |
|                | fastpath(java.lang.String name, boolean resulttype, FastpathArg[] args) | Y            |
|                | getData(java.lang.String name, FastpathArg[] args)                      | Y            |
|                | getID(java.lang.String name)  | Y            |
|                | getInteger(java.lang.String name, FastpathArg[] args)                   | Y            |
|                | getOID(java.lang.String name, FastpathArg[] args)                       | Y            |
| FastpathArg    |   | Y            |

Y: Supported

### org.postgresql.geometric

| Interface name | Method name                        | jdbc4/jdbc41 |
|----------------|------------------------------------|--------------|
| PGbox          | clone()                            | Y            |
|                | equals(java.lang.Object obj)       | Y            |
|                | getValue()                         | Y            |
|                | hashCode()                         | Y            |
|                | lengthInBytes()                    | Y            |
|                | setByteValue(byte[] b, int offset) | Y            |
|                | setValue(java.lang.String value)   | Y            |
|                | toBytes(byte[] bytes, int offset)  | Y            |
| PGcircle       | clone()                            | Y            |
|                | equals(java.lang.Object obj)       | Y            |
|                | getValue()                         | Y            |
|                | hashCode()                         | Y            |
|                | setValue(java.lang.String s)       | Y            |
| PGline         | clone()                            | Y            |
|                | equals(java.lang.Object obj)       | Y            |
|                | getValue()                         | Y            |
|                | hashCode()                         | Y            |
|                | setValue(java.lang.String s)       | Y            |
| PGlseg         | clone()                            | Y            |
|                | equals(java.lang.Object obj)       | Y            |
|                | getValue()                         | Y            |

| Interface name | Method name                        | jdbc4/jdbc41 |
|----------------|------------------------------------|--------------|
|                | hashCode()                         | Y            |
|                | setValue(java.lang.String s)       | Y            |
| PGpath         | clone()                            | Y            |
|                | closePath()                        | Y            |
|                | equals(java.lang.Object obj)       | Y            |
|                | getValue()                         | Y            |
|                | hashCode()                         | Y            |
|                | isClosed()                         | Y            |
|                | isOpen()                           | Y            |
|                | openPath()                         | Y            |
|                | setValue(java.lang.String s)       | Y            |
| PGpoint        | equals(java.lang.Object obj)       | Y            |
|                | getValue()                         | Y            |
|                | hashCode()                         | Y            |
|                | lengthInBytes()                    | Y            |
|                | move(double x, double y)           | Y            |
|                | move(int x, int y)                 | Y            |
|                | setByteValue(byte[] b, int offset) | Y            |
|                | setLocation(int x, int y)          | Y            |
|                | setLocation(java.awt.Point p)      | Y            |
|                | setValue(java.lang.String s)       | Y            |
|                | toBytes(byte[] b, int offset)      | Y            |
|                | translate(double x, double y)      | Y            |
|                | translate(int x, int y)            | Y            |
| PGpolygon      | clone()                            | Y            |
|                | equals(java.lang.Object obj)       | Y            |
|                | getValue()                         | Y            |
|                | hashCode()                         | Y            |
|                | setValue(java.lang.String s)       | Y            |

Y: Supported

### org.postgresql.largeobject

| Interface name   | Method name         | jdbc4/jdbc41 |
|------------------|---------------------|--------------|
| BlobInputStream  | close()             | Y            |
|                  | mark(int readlimit) | Y            |
|                  | markSupported()     | Y            |
|                  | read()              | Y            |
|                  | reset()             | Y            |
| BlobOutputStream | close()             | Y            |

| Interface name     | Method name                                     | jdbc4/jdbc41 |
|--------------------|---|--------------|
|                    | flush()   | Y            |
|                    | write(byte[] buf, int off, int len)             | Y            |
|                    | write(int b)                                    | Y            |
| LargeObject        | close()   | Y            |
|                    | copy()  | Y            |
|                    | getInputStream()                                | Y            |
|                    | getLongOID()                                    | Y            |
|                    | getOID()  | Y            |
|                    | getOutputStream()                               | Y            |
|                    | read(byte[] buf, int off, int len)              | Y            |
|                    | read(int len)                                   | Y            |
|                    | seek(int pos)                                   | Y            |
|                    | seek(int pos, int ref)                          | Y            |
|                    | size()  | Y            |
|                    | tell()  | Y            |
|                    | truncate(int len)                               | Y            |
|                    | write(byte[] buf)                               | Y            |
|                    | write(byte[] buf, int off, int len)             | Y            |
| LargeObjectManager | create()  | Y            |
|                    | create(int mode)                                | Y            |
|                    | createLO()                                      | Y            |
|                    | createLO(int mode)                              | Y            |
|                    | delete(int oid)                                 | Y            |
|                    | delete(long oid)                                | Y            |
|                    | open(int oid)                                   | Y            |
|                    | open(int oid, boolean commitOnClose)            | Y            |
|                    | open(int oid, int mode)                         | Y            |
|                    | open(int oid, int mode, boolean commitOnClose)  | Y            |
|                    | open(long oid)                                  | Y            |
|                    | open(long oid, boolean commitOnClose)           | Y            |
|                    | open(long oid, int mode)                        | Y            |
|                    | open(long oid, int mode, boolean commitOnClose) | Y            |
|                    | unlink(int oid)                                 | Y            |
| unlink(long oid)   | Y   |              |

Y: Supported

**org.postgresql.ssl**

| Interface name                                    | Method name  | jdbc4/jdbc41 |
|---|--|--------------|
| DbKeyStoreSocketFactory                           | getKeyStorePassword()  | Y            |
|   | getKeyStoreStream()  | Y            |
| DbKeyStoreSocketFactory.DbKeyStoreSocketException |  | Y            |
| NonValidatingFactory                              |  | Y            |
| NonValidatingFactory.NonValidatingTM              | checkClientTrusted(java.security.cert.X509Certificate[] certs, java.lang.String authType)              | Y            |
|   | checkServerTrusted(java.security.cert.X509Certificate[] certs, java.lang.String authType)              | Y            |
|   | getAcceptedIssuers()   | Y            |
| WrappedFactory                                    | createSocket(java.net.InetAddress host, int port)  | Y            |
|   | createSocket(java.net.InetAddress address, int port, java.net.InetAddress localAddress, int localPort) | Y            |
|   | createSocket(java.net.Socket socket, java.lang.String host, int port, boolean autoClose)               | Y            |
|   | createSocket(java.lang.String host, int port)  | Y            |
|   | createSocket(java.lang.String host, int port, java.net.InetAddress localHost, int localPort)           | Y            |
|   | getDefaultCipherSuites()   | Y            |
|   | getSupportedCipherSuites()   | Y            |

Y: Supported

### org.postgresql.util

| Interface name    | Method name                  | jdbc4/jdbc41 |
|-------------------|------------------------------|--------------|
| PGInterval        | add(java.util.Calendar cal)  | Y            |
|                   | add(java.util.Date date)     | Y            |
|                   | add(PGInterval interval)     | Y            |
|                   | equals(java.lang.Object obj) | Y            |
|                   | getDays()                    | Y            |
|                   | getHours()                   | Y            |
|                   | getMinutes()                 | Y            |
|                   | getMonths()                  | Y            |
|                   | getSeconds()                 | Y            |
|                   | getValue()                   | Y            |
|                   | getYears()                   | Y            |
|                   | hashCode()                   | Y            |
|                   | scale(int factor)            | Y            |
| setDays(int days) | Y                            |              |

| Interface name     | Method name   | jdbc4/jdbc41 |
|--------------------|---|--------------|
|                    | setHours(int hours)   | Y            |
|                    | setMinutes(int minutes)   | Y            |
|                    | setMonths(int months)   | Y            |
|                    | setSeconds(double seconds)  | Y            |
|                    | setValue(int years, int months, int days, int hours, int minutes, double seconds) | Y            |
|                    | setValue(java.lang.String value)  | Y            |
|                    | setYears(int years)   | Y            |
| PGJDBCMain         | main(java.lang.String[] args)   | Y            |
| PGmoney            | equals(java.lang.Object obj)  | Y            |
|                    | getValue()  | Y            |
|                    | setValue(java.lang.String s)  | Y            |
| PGobject           | clone()   | Y            |
|                    | equals(java.lang.Object obj)  | Y            |
|                    | getType()   | Y            |
|                    | getValue()  | Y            |
|                    | setType(java.lang.String type)  | Y            |
|                    | setValue(java.lang.String value)  | Y            |
|                    | toString()  | Y            |
| ServerErrorMessage | getColumn()   | Y            |
|                    | getConstraint()   | Y            |
|                    | getDatatype()   | Y            |
|                    | getDetail()   | Y            |
|                    | getFile()   | Y            |
|                    | getHint()   | Y            |
|                    | getInternalPosition()   | Y            |
|                    | getInternalQuery()  | Y            |
|                    | getLine()   | Y            |
|                    | getMessage()  | Y            |
|                    | getPosition()   | Y            |
|                    | getRoutine()  | Y            |
|                    | getSchema()   | Y            |
|                    | getSeverity()   | Y            |
|                    | getSQLState()   | Y            |
|                    | getTable()  | Y            |
|                    | getWhere()  | Y            |
| toString()         | Y   |              |

Y: Supported

org.postgresql.xa

| Interface name | Method name | jdbc4/jdbc41 |
|----------------|-------------|--------------|
| PGXADataSource |             | Y            |

Y: Supported

### ConnectionPoolDataSource

| Interface name           | Method name                   | jdbc4/jdbc41 |
|--------------------------|-------------------------------|--------------|
| ConnectionPoolDataSource | getLoginTimeout()             | Y            |
|                          | getLogWriter()                | Y            |
|                          | setLoginTimeout(int seconds)  | Y            |
|                          | setLogWriter(PrintWriter out) | Y            |

Y: Supported



## F.2 ODBC Driver

### F.2.1 List of Supported APIs

The following table shows the support status of APIs:

| Function name        | Support status |
|----------------------|----------------|
| SQLAllocConnect      | Y              |
| SQLAllocEnv          | Y              |
| SQLAllocHandle       | Y              |
| SQLAllocStmt         | Y              |
| SQLBindCol           | Y              |
| SQLBindParameter     | Y              |
| SQLBindParam         | Y              |
| SQLBrowseConnect     | N              |
| SQLBulkOperations    | Y              |
| SQLCancel            | Y              |
| SQLCancelHandle      | N              |
| SQLCloseCursor       | Y              |
| SQLColAttribute      | Y              |
| SQLColAttributeW     | Y              |
| SQLColAttributes     | Y              |
| SQLColAttributesW    | Y              |
| SQLColumnPrivileges  | Y              |
| SQLColumnPrivilegesW | Y              |
| SQLColumns           | Y              |
| SQLColumnsW          | Y              |
| SQLCompleteAsync     | N              |
| SQLConnect           | Y              |

| Function name        | Support status |
|----------------------|----------------|
| SQLConnectW          | Y              |
| SQLCopyDesc          | Y              |
| SQLDataSources       | Y              |
| SQLDataSourcesW      | Y              |
| SQLDescribeCol       | Y              |
| SQLDescribeColW      | Y              |
| SQLDescribeParam     | Y              |
| SQLDisconnect        | Y              |
| SQLDriverConnect     | Y              |
| SQLDriverConnectW    | Y              |
| SQLDrivers           | N              |
| SQLEndTran           | Y              |
| SQLError             | Y              |
| SQLErrorW            | Y              |
| SQLExecDirect        | Y              |
| SQLExecDirectW       | Y              |
| SQLExecute           | Y              |
| SQLExtendedFetch     | Y              |
| SQLFetch             | Y              |
| SQLFetchScroll       | Y              |
| SQLForeignKeys       | Y              |
| SQLForeignKeysW      | Y              |
| SQLFreeConnect       | Y              |
| SQLFreeEnv           | Y              |
| SQLFreeHandle        | Y              |
| SQLFreeStmt          | Y              |
| SQLGetConnectAttr    | Y              |
| SQLGetConnectAttrW   | Y              |
| SQLGetConnectOption  | Y              |
| SQLGetConnectOptionW | Y              |
| SQLGetCursorName     | Y              |
| SQLGetCursorNameW    | Y              |
| SQLGetData           | Y              |
| SQLGetDescField      | Y              |
| SQLGetDescFieldW     | Y              |
| SQLGetDescRec        | Y              |
| SQLGetDescRecW       | Y              |
| SQLGetDiagField      | Y              |
| SQLGetDiagFieldW     | Y              |

| Function name        | Support status |
|----------------------|----------------|
| SQLGetDiagRec        | Y              |
| SQLGetDiagRecW       | Y              |
| SQLGetEnvAttr        | Y              |
| SQLGetFunctions      | Y              |
| SQLGetInfo           | Y              |
| SQLGetInfoW          | Y              |
| SQLGetStmtAttr       | Y              |
| SQLGetStmtAttrW      | Y              |
| SQLGetStmtOption     | Y              |
| SQLGetTypeInfo       | Y              |
| SQLGetTypeInfoW      | Y              |
| SQLMoreResults       | Y              |
| SQLNativeSql         | Y              |
| SQLNativeSqlW        | Y              |
| SQLNumParams         | Y              |
| SQLNumResultCols     | Y              |
| SQLParamData         | Y              |
| SQLParamOptions      | Y              |
| SQLPrepare           | Y              |
| SQLPrepareW          | Y              |
| SQLPrimaryKeys       | Y              |
| SQLPrimaryKeysW      | Y              |
| SQLProcedureColumns  | Y              |
| SQLProcedureColumnsW | Y              |
| SQLProcedures        | Y              |
| SQLProceduresW       | Y              |
| SQLPutData           | Y              |
| SQLRowCount          | Y              |
| SQLSetConnectAttr    | Y              |
| SQLSetConnectAttrW   | Y              |
| SQLSetConnectOption  | Y              |
| SQLSetConnectOptionW | Y              |
| SQLSetCursorName     | Y              |
| SQLSetCursorNameW    | Y              |
| SQLSetDescField      | Y              |
| SQLSetDescRec        | Y              |
| SQLSetEnvAttr        | Y              |
| SQLSetParam          | Y              |
| SQLSetPos            | Y              |

| Function name       | Support status |
|---------------------|----------------|
| SQLSetScrollOptions | N              |
| SQLSetStmtAttr      | Y              |
| SQLSetStmtAttrW     | Y              |
| SQLSetStmtOption    | Y              |
| SQLSpecialColumns   | Y              |
| SQLSpecialColumnsW  | Y              |
| SQLStatistics       | Y              |
| SQLStatisticsW      | Y              |
| SQLTablePrivileges  | Y              |
| SQLTablePrivilegesW | Y              |
| SQLTables           | Y              |
| SQLTablesW          | Y              |
| SQLTransact         | Y              |

Y: Supported  
N: Not supported

## F.3 .NET Data Provider

There are the following two ways to develop applications using Fujitsu Npgsql .NET Data Provider:

- Use the Fujitsu Npgsql.NET Data Provider API (classes and methods) directly.

Fujitsu Npgsql .NET Data Provider is created based on the open source software Npgsql. Refer to the "Npgsql - .Net Data Provider for Postgresql" for information on the APIs:



Refer to the Installation and Setup Guide for Client for the version of Npgsql that Fujitsu Npgsql .NET Data Provider is based on.

- Use the API of the .NET System.Data.Common namespace

It is possible to create applications that do not rely on a provider when you use the System.Data.Common namespace. Refer to the "Writing Provider-Independent Code in ADO.NET" in MSDN Library for information.

The following table indicates whether the System.Data.Common namespace API is supported. Note that API marked "Npgsql extension API" do not exist in the System.Data.Common namespace, but rather are API extended by Npgsql.

Table F.1 Reference

| System.Data.Common class name | Fujitsu Npgsql .NET Data Provider class name | Method (M)/Function (F)/Property (P) |                 | Support status | Note |
|-------------------------------|--|--------------------------------------|-----------------|----------------|------|
|                               |  | Name                                 | Qualifier       |                |      |
| DbCommand                     | NpgsqlCommand                                | CommandText                          | Public Property | Y              |      |
|                               |  | CommandTimeout                       | Public Property | Y              |      |
|                               |  | CommandType                          | Public Property | Y              |      |
|                               |  | Connection                           | Public Property | Y              |      |
|                               |  | Container                            | Public Property | Y              |      |

| System.Data.<br>Common<br>class name | Fujitsu<br>Npgsql .NET<br>Data Provider<br>class name | Method (M)/Function (F)/Property (P) |                    | Support<br>status | Note                 |
|--------------------------------------|---|--------------------------------------|--------------------|-------------------|----------------------|
|                                      |   | Name                                 | Qualifier          |                   |                      |
|                                      |   | DesignTimeVisible                    | Public Property    | Y                 |                      |
|                                      |   | Parameters                           | Public Property    | Y                 |                      |
|                                      |   | Site                                 | Public Property    | Y                 |                      |
|                                      |   | Transaction                          | Public Property    | Y                 |                      |
|                                      |   | UpdatedRowSource                     | Public Property    | Y                 |                      |
|                                      |   | LastInsertedOID                      | Public Property    | Y                 | Npgsql extension API |
|                                      |   | NpgsqlCommand                        | Public Constructor | Y                 | Npgsql extension API |
|                                      |   | Cancel                               | Public method      | Y                 |                      |
|                                      |   | Clone                                | Public method      | Y                 |                      |
|                                      |   | CreateObjRef                         | Public method      | Y                 |                      |
|                                      |   | CreateParameter                      | Public method      | Y                 |                      |
|                                      |   | Dispose                              | Public method      | Y                 |                      |
|                                      |   | Equals                               | Public method      | Y                 |                      |
|                                      |   | ExecuteNonQuery                      | Public method      | Y                 |                      |
|                                      |   | ExecuteReader                        | Public method      | Y                 |                      |
|                                      |   | ExecuteScalar                        | Public method      | Y                 |                      |
|                                      |   | GetHashCode                          | Public method      | Y                 |                      |
|                                      |   | GetLifetimeService                   | Public method      | Y                 |                      |
|                                      |   | GetType                              | Public method      | Y                 |                      |
|                                      |   | InitializeLifetimeService            | Public method      | Y                 |                      |
|                                      |   | Prepare                              | Public method      | Y                 |                      |
|                                      |   | ResetCommandTimeout                  | Public method      | N                 |                      |
|                                      |   | ToString                             | Public method      | Y                 |                      |
| Disposed                             | Public event  | Y                                    |                    |                   |                      |
| DbCommand<br>Builder                 | NpgsqlCommandBuilder                                  | CatalogLocation                      | Public Property    | Y                 |                      |
|                                      |   | CatalogSeparator                     | Public Property    | Y                 |                      |
|                                      |   | ConflictOption                       | Public Property    | Y                 |                      |
|                                      |   | Container                            | Public Property    | Y                 |                      |
|                                      |   | DataAdapter                          | Public Property    | Y                 |                      |
|                                      |   | SchemaSeparator                      | Public Property    | Y                 |                      |
|                                      |   | SetAllValues                         | Public Property    | Y                 |                      |
|                                      |   | QuotePrefix                          | Public Property    | Y                 |                      |
|                                      |   | QuoteSuffix                          | Public Property    | Y                 |                      |
|                                      |   | Site                                 | Public Property    | Y                 |                      |
|                                      |   | NpgsqlCommandBuilder                 | Public Constructor | Y                 | Npgsql extension API |

| System.Data.Common class name | Fujitsu Npgsql .NET Data Provider class name | Method (M)/Function (F)/Property (P) |                 | Support status | Note                 |
|-------------------------------|--|--------------------------------------|-----------------|----------------|----------------------|
|                               |  | Name                                 | Qualifier       |                |                      |
|                               |  | CreateObjRef                         | Public method   | Y              |                      |
|                               |  | Dispose                              | Public method   | Y              |                      |
|                               |  | Equals                               | Public method   | Y              |                      |
|                               |  | GetDeleteCommand                     | Public method   | Y              |                      |
|                               |  | GetHashCode                          | Public method   | Y              |                      |
|                               |  | GetInsertCommand                     | Public method   | Y              |                      |
|                               |  | GetLifetimeService                   | Public method   | Y              |                      |
|                               |  | GetType                              | Public method   | Y              |                      |
|                               |  | GetUpdateCommand                     | Public method   | Y              |                      |
|                               |  | InitializeLifetimeService            | Public method   | Y              |                      |
|                               |  | QuoteIdentifier                      | Public method   | Y              |                      |
|                               |  | RefreshSchema                        | Public method   | Y              |                      |
|                               |  | ToString                             | Public method   | Y              |                      |
|                               |  | UnquoteIdentifier                    | Public method   | Y              |                      |
|                               |  | Disposed                             | Public event    | Y              |                      |
| DbConnection                  | NpgsqlConnection                             | ConnectionString                     | Public Property | Y              |                      |
|                               |  | ConnectionTimeout                    | Public Property | Y              |                      |
|                               |  | Container                            | Public Property | Y              |                      |
|                               |  | Database                             | Public Property | Y              |                      |
|                               |  | Datasource                           | Public Property | Y              |                      |
|                               |  | Host                                 | Public Property | Y              |                      |
|                               |  | Port                                 | Public Property | Y              |                      |
|                               |  | ServerVersion                        | Public Property | Y              |                      |
|                               |  | Site                                 | Public Property | Y              |                      |
|                               |  | State                                | Public Property | Y              |                      |
|                               |  | BackendProtocolVersion               | Public Property | Y              | Npgsql extension API |
|                               |  | ConnectionLifeTime                   | Public Property | Y              | Npgsql extension API |
|                               |  | CommandTimeout                       | Public Property | Y              | Npgsql extension API |
|                               |  | FullState                            | Public Property | Y              | Npgsql extension API |
|                               |  | NpgsqlCompatibilityVersion           | Public Property | Y              | Npgsql extension API |
|                               |  | PostgreSQLVersion                    | Public Property | Y              | Npgsql extension API |
|                               |  | PreloadReader                        | Public Property | Y              | Npgsql extension API |
|                               |  | ProcessID                            | Public Property | Y              | Npgsql extension API |
|                               |  | SSL                                  | Public Property | Y              | Npgsql extension API |
|                               |  | SyncNotification                     | Public Property | Y              | Npgsql extension API |

| System.Data.Common class name     | Fujitsu Npgsql .NET Data Provider class name | Method (M)/Function (F)/Property (P) |                      | Support status | Note                 |
|-----------------------------------|--|--------------------------------------|----------------------|----------------|----------------------|
|                                   |  | Name                                 | Qualifier            |                |                      |
|                                   |  | UseExtendedTypes                     | Public Property      | Y              | Npgsql extension API |
|                                   |  | NpgsqlConnection                     | Public Constructor   | Y              | Npgsql extension API |
|                                   |  | BeginTransaction                     | Public method        | Y              |                      |
|                                   |  | ChangeDatabase                       | Public method        | Y              |                      |
|                                   |  | ClearPool                            | Public method        | Y              |                      |
|                                   |  | Clone                                | Public method        | Y              |                      |
|                                   |  | Close                                | Public method        | Y              |                      |
|                                   |  | CreateCommand                        | Public method        | Y              |                      |
|                                   |  | CreateObjRef                         | Public method        | Y              |                      |
|                                   |  | Dispose                              | Public method        | Y              |                      |
|                                   |  | Equals                               | Public method        | Y              |                      |
|                                   |  | GetHashCode                          | Public method        | Y              |                      |
|                                   |  | GetLifetimeService                   | Public method        | Y              |                      |
|                                   |  | GetSchema                            | Public method        | Y              |                      |
|                                   |  | GetType                              | Public method        | Y              |                      |
|                                   |  | InitializeLifetimeService            | Public method        | Y              |                      |
|                                   |  | Open                                 | Public method        | Y              |                      |
|                                   |  | ToString                             | Public method        | Y              |                      |
|                                   |  | EnlistTransaction                    | Public method        | Y              |                      |
|                                   |  | Disposed                             | Public event         | Y              |                      |
|                                   |  | StateChange                          | Public event         | Y              |                      |
|                                   |  | CertificateSelectionCallback         | Public event         | Y              | Npgsql extension API |
|                                   |  | CertificateValidationCallback        | Public event         | Y              | Npgsql extension API |
|                                   |  | Notice                               | Public event         | Y              | Npgsql extension API |
|                                   |  | Notification                         | Public event         | Y              | Npgsql extension API |
|                                   |  | PrivateKeySelectionCallback          | Public event         | Y              | Npgsql extension API |
| ProvideClientCertificatesCallback | Public event                                 | Y                                    | Npgsql extension API |                |                      |
| DbConnectionStringBuilder         | DbConnectionStringBuilder                    | BrowsableConnectionString            | Public Property      | Y              |                      |
|                                   |  | ConnectionLifetime                   | Public Property      | Y              |                      |
|                                   |  | ConnectionString                     | Public Property      | Y              |                      |
|                                   |  | Count                                | Public Property      | Y              |                      |
|                                   |  | IsFixedSize                          | Public Property      | Y              |                      |
|                                   |  | IsReadOnly                           | Public Property      | Y              |                      |

| System.Data.<br>Common<br>class name | Fujitsu<br>Npgsql .NET<br>Data Provider<br>class name | Method (M)/Function (F)/Property (P) |                    | Support<br>status | Note                 |
|--------------------------------------|---|--------------------------------------|--------------------|-------------------|----------------------|
|                                      |   | Name                                 | Qualifier          |                   |                      |
|                                      |   | Item                                 | Public Property    | Y                 |                      |
|                                      |   | Keys                                 | Public Property    | Y                 |                      |
|                                      |   | MaxPoolSize                          | Public Property    | Y                 |                      |
|                                      |   | MinPoolSize                          | Public Property    | Y                 |                      |
|                                      |   | Password                             | Public Property    | Y                 |                      |
|                                      |   | Pooling                              | Public Property    | Y                 |                      |
|                                      |   | Port                                 | Public Property    | Y                 |                      |
|                                      |   | Values                               | Public Property    | Y                 |                      |
|                                      |   | CommandTimeout                       | Public Property    | Y                 | Npgsql extension API |
|                                      |   | Compatible                           | Public Property    | Y                 | Npgsql extension API |
|                                      |   | Database                             | Public Property    | Y                 | Npgsql extension API |
|                                      |   | Encoding                             | Public Property    | Y                 | Npgsql extension API |
|                                      |   | Enlist                               | Public Property    | Y                 | Npgsql extension API |
|                                      |   | Host                                 | Public Property    | Y                 | Npgsql extension API |
|                                      |   | IntegratedSecurity                   | Public Property    | Y                 | Npgsql extension API |
|                                      |   | PreloadReader                        | Public Property    | Y                 | Npgsql extension API |
|                                      |   | Protocol                             | Public Property    | Y                 | Npgsql extension API |
|                                      |   | SearchPath                           | Public Property    | Y                 | Npgsql extension API |
|                                      |   | SSL                                  | Public Property    | Y                 | Npgsql extension API |
|                                      |   | SslMode                              | Public Property    | Y                 | Npgsql extension API |
|                                      |   | SyncNotification                     | Public Property    | Y                 | Npgsql extension API |
|                                      |   | Timeout                              | Public Property    | Y                 | Npgsql extension API |
|                                      |   | UseExtendedTypes                     | Public Property    | Y                 | Npgsql extension API |
|                                      |   | UserName                             | Public Property    | Y                 | Npgsql extension API |
|                                      |   | NpgsqlConnectionStringBuilder        | Public Constructor | Y                 | Npgsql extension API |
|                                      |   | Add                                  | Public method      | Y                 |                      |
|                                      |   | Clear                                | Public method      | Y                 |                      |
|                                      |   | ContainsKey                          | Public method      | Y                 |                      |
|                                      |   | Equals                               | Public method      | Y                 |                      |
|                                      |   | EquivalentTo                         | Public method      | Y                 |                      |
|                                      |   | GetHashCode                          | Public method      | Y                 |                      |
|                                      |   | GetType                              | Public method      | Y                 |                      |
|                                      |   | Remove                               | Public method      | Y                 |                      |
|                                      |   | ShouldSerialize                      | Public method      | Y                 |                      |
|                                      |   | ToString                             | Public method      | Y                 |                      |
|                                      |   | TryGetValue                          | Public method      | Y                 |                      |

| System.Data.<br>Common<br>class name | Fujitsu<br>Npgsql .NET<br>Data Provider<br>class name | Method (M)/Function (F)/Property (P)   |                      | Support<br>status | Note                 |
|--------------------------------------|---|--|----------------------|-------------------|----------------------|
|                                      |   | Name                                   | Qualifier            |                   |                      |
|                                      |   | Clone                                  | Public method        | Y                 | Npgsql extension API |
| DbDataAdapter                        | NpgsqlDataAdapter                                     | AcceptChangesDuringFill                | Public Property      | Y                 |                      |
|                                      |   | AcceptChangesDuringUpdate              | Public Property      | Y                 |                      |
|                                      |   | Container                              | Public Property      | Y                 |                      |
|                                      |   | ContinueUpdateOnError                  | Public Property      | Y                 |                      |
|                                      |   | DeleteCommand                          | Public Property      | Y                 |                      |
|                                      |   | FillLoadOption                         | Public Property      | Y                 |                      |
|                                      |   | InsertCommand                          | Public Property      | Y                 |                      |
|                                      |   | MissingMappingAction                   | Public Property      | Y                 |                      |
|                                      |   | MissingSchemaAction                    | Public Property      | Y                 |                      |
|                                      |   | ReturnProviderSpecificTypes            | Public Property      | Y                 |                      |
|                                      |   | SelectCommand                          | Public Property      | Y                 |                      |
|                                      |   | Site                                   | Public Property      | Y                 |                      |
|                                      |   | TableMappings                          | Public Property      | Y                 |                      |
|                                      |   | UpdateBatchSize                        | Public Property      | Y                 |                      |
|                                      |   | UpdateCommand                          | Public Property      | Y                 |                      |
|                                      |   | NpgsqlDataAdapter                      | Public Constructor   | Y                 | Npgsql extension API |
|                                      |   | CreateObjRef                           | Public method        | Y                 |                      |
|                                      |   | Dispose                                | Public method        | Y                 |                      |
|                                      |   | Equals                                 | Public method        | Y                 |                      |
|                                      |   | Fill                                   | Public method        | Y                 |                      |
|                                      |   | FillSchema                             | Public method        | Y                 |                      |
|                                      |   | GetFillParameters                      | Public method        | Y                 |                      |
|                                      |   | GetHashCode                            | Public method        | Y                 |                      |
|                                      |   | GetLifetimeService                     | Public method        | Y                 |                      |
|                                      |   | GetType                                | Public method        | Y                 |                      |
|                                      |   | InitializeLifetimeService              | Public method        | Y                 |                      |
|                                      |   | ToString                               | Public method        | Y                 |                      |
|                                      |   | Update                                 | Public method        | Y                 |                      |
|                                      |   | ResetFillLoadOption                    | Public method        | Y                 | Npgsql extension API |
|                                      |   | ShouldSerializeAcceptChangesDuringFill | Public method        | Y                 | Npgsql extension API |
| ShouldSerializeFillLoadOption        | Public method   | Y                                      | Npgsql extension API |                   |                      |

| System.Data.<br>Common<br>class name | Fujitsu<br>Npgsql .NET<br>Data Provider<br>class name | Method (M)/Function (F)/Property (P) |                 | Support<br>status | Note |
|--------------------------------------|---|--------------------------------------|-----------------|-------------------|------|
|                                      |   | Name                                 | Qualifier       |                   |      |
|                                      |   | Disposed                             | Public event    | Y                 |      |
|                                      |   | FillError                            | Public event    | Y                 |      |
|                                      |   | RowUpdated                           | Public event    | Y                 |      |
|                                      |   | RowUpdating                          | Public event    | Y                 |      |
| DbDataReader                         | NpgsqlDataReader                                      | Depth                                | Public Property | Y                 |      |
|                                      |   | IsClosed                             | Public Property | Y                 |      |
|                                      |   | RecordsAffected                      | Public Property | Y                 |      |
|                                      |   | FieldCount                           | Public Property | Y                 |      |
|                                      |   | HasRows                              | Public Property | Y                 |      |
|                                      |   | Item                                 | Public Property | Y                 |      |
|                                      |   | VisibleFieldCount                    | Public Property | Y                 |      |
|                                      |   | Public Constructor                   | Public method   | Y                 |      |
|                                      |   | Close                                | Public method   | Y                 |      |
|                                      |   | CreateObjRef                         | Public method   | Y                 |      |
|                                      |   | Equals                               | Public method   | Y                 |      |
|                                      |   | GetBoolean                           | Public method   | Y                 |      |
|                                      |   | GetByte                              | Public method   | N                 |      |
|                                      |   | GetBytes                             | Public method   | Y                 |      |
|                                      |   | GetChar                              | Public method   | Y                 |      |
|                                      |   | GetChars                             | Public method   | Y                 |      |
|                                      |   | GetDataTypeName                      | Public method   | Y                 |      |
|                                      |   | GetDateTime                          | Public method   | Y                 |      |
|                                      |   | GetDecimal                           | Public method   | Y                 |      |
|                                      |   | GetDouble                            | Public method   | Y                 |      |
|                                      |   | GetFieldType                         | Public method   | Y                 |      |
|                                      |   | GetFloat                             | Public method   | Y                 |      |
|                                      |   | GetGuid                              | Public method   | Y                 |      |
|                                      |   | GetHashCode                          | Public method   | Y                 |      |
|                                      |   | GetInt16                             | Public method   | Y                 |      |
|                                      |   | GetInt32                             | Public method   | Y                 |      |
|                                      |   | GetInt64                             | Public method   | Y                 |      |
|                                      |   | GetLifetimeService                   | Public method   | Y                 |      |
| GetName                              | Public method   | Y                                    |                 |                   |      |
| GetOrdinal                           | Public method   | Y                                    |                 |                   |      |
| GetSchemaTable                       | Public method   | Y                                    |                 |                   |      |
| GetString                            | Public method   | Y                                    |                 |                   |      |
| GetType                              | Public method   | Y                                    |                 |                   |      |

| System.Data.<br>Common<br>class name | Fujitsu<br>Npgsql .NET<br>Data Provider<br>class name | Method (M)/Function (F)/Property (P) |                 | Support<br>status | Note                 |
|--------------------------------------|---|--------------------------------------|-----------------|-------------------|----------------------|
|                                      |   | Name                                 | Qualifier       |                   |                      |
|                                      |   | GetValue                             | Public method   | Y                 |                      |
|                                      |   | GetValues                            | Public method   | Y                 |                      |
|                                      |   | InitializeLifetimeService            | Public method   | Y                 |                      |
|                                      |   | IsDBNull                             | Public method   | Y                 |                      |
|                                      |   | NextResult                           | Public method   | Y                 |                      |
|                                      |   | Read                                 | Public method   | Y                 |                      |
|                                      |   | ToString                             | Public method   | Y                 |                      |
|                                      |   | Dispose                              | Public method   | Y                 |                      |
|                                      |   | GetBitString                         | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetData                              | Public method   | Y                 |                      |
|                                      |   | GetDataTypeId                        | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetDate                              | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetEnumerator                        | Public method   | Y                 |                      |
|                                      |   | GetFieldType                         | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetFieldType                         | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetInterval                          | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetProviderSpecificFieldType         | Public method   | Y                 |                      |
|                                      |   | GetProviderSpecificValue             | Public method   | Y                 |                      |
|                                      |   | GetProviderSpecificValues            | Public method   | Y                 |                      |
|                                      |   | GetTime                              | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetTimeStamp                         | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetTimeStampTZ                       | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetTimeTZ                            | Public method   | Y                 | Npgsql extension API |
|                                      |   | HasOrdinal                           | Public method   | Y                 | Npgsql extension API |
|                                      |   | ReaderClosed                         | Public event    | Y                 | Npgsql extension API |
|                                      |   | Finalize                             | Protect method  | Y                 |                      |
|                                      |   | MemberwiseClone                      | Protect method  | Y                 |                      |
|                                      |   | Dispose                              | Protect method  | Y                 | Npgsql extension API |
|                                      |   | GetDbDataReader                      | Protect method  | Y                 | Npgsql extension API |
|                                      |   | SendClosedEvent                      | Protect method  | Y                 | Npgsql extension API |
| DBError                              | NpgsqlError   | Message                              | Public Property | Y                 |                      |
|                                      |   | Number                               | Public Property | N                 |                      |
|                                      |   | Source                               | Public Property | N                 |                      |
|                                      |   | Code                                 | Public Property | Y                 | Npgsql extension API |

| System.Data.Common class name | Fujitsu Npgsql .NET Data Provider class name | Method (M)/Function (F)/Property (P) |                    | Support status | Note                 |
|-------------------------------|--|--------------------------------------|--------------------|----------------|----------------------|
|                               |  | Name                                 | Qualifier          |                |                      |
|                               |  | Detail                               | Public Property    | Y              | Npgsql extension API |
|                               |  | ErrorSql                             | Public Property    | Y              | Npgsql extension API |
|                               |  | File                                 | Public Property    | Y              | Npgsql extension API |
|                               |  | Hint                                 | Public Property    | Y              | Npgsql extension API |
|                               |  | InternalPosition                     | Public Property    | Y              | Npgsql extension API |
|                               |  | InternalQuery                        | Public Property    | Y              | Npgsql extension API |
|                               |  | Line                                 | Public Property    | Y              | Npgsql extension API |
|                               |  | Position                             | Public Property    | Y              | Npgsql extension API |
|                               |  | Routine                              | Public Property    | Y              | Npgsql extension API |
|                               |  | Severity                             | Public Property    | Y              | Npgsql extension API |
|                               |  | Where                                | Public Property    | Y              | Npgsql extension API |
|                               |  | NpgsqlError                          | Public Constructor | Y              | Npgsql extension API |
|                               |  | Equals                               | Public method      | Y              |                      |
|                               |  | GetHashCode                          | Public method      | Y              |                      |
|                               |  | GetType                              | Public method      | Y              |                      |
|                               |  | ToString                             | Public method      | Y              |                      |
| DBErrorCollection             | Not supported                                | Count                                | Public Property    | N              |                      |
|                               |  | Item                                 | Public Property    | N              |                      |
|                               |  | CopyTo                               | Public method      | N              |                      |
|                               |  | Equals                               | Public method      | N              |                      |
|                               |  | GetHashCode                          | Public method      | N              |                      |
|                               |  | GetType                              | Public method      | N              |                      |
|                               |  | ToString                             | Public method      | N              |                      |
|                               |  | Finalize                             | Protect method     | N              |                      |
|                               |  | MemberwiseClone                      | Protect method     | N              |                      |
| DBException                   | NpgsqlException                              | Data                                 | Public Property    | Y              |                      |
|                               |  | ErrorCode                            | Public Property    | Y              |                      |
|                               |  | Errors                               | Public Property    | Y              |                      |
|                               |  | HelpLink                             | Public Property    | Y              |                      |
|                               |  | InnerException                       | Public Property    | Y              |                      |
|                               |  | Message                              | Public Property    | Y              |                      |
|                               |  | Number                               | Public Property    | N              |                      |
|                               |  | Source                               | Public Property    | Y              |                      |
|                               |  | StackTrace                           | Public Property    | Y              |                      |
|                               |  | TargetSite                           | Public Property    | Y              |                      |
|                               |  | BaseMessage                          | Public Property    | Y              | Npgsql extension API |
|                               |  | Code                                 | Public Property    | Y              | Npgsql extension API |

| System.Data.<br>Common<br>class name | Fujitsu<br>Npgsql .NET<br>Data Provider<br>class name | Method (M)/Function (F)/Property (P) |                       | Support<br>status | Note                 |
|--------------------------------------|---|--------------------------------------|-----------------------|-------------------|----------------------|
|                                      |   | Name                                 | Qualifier             |                   |                      |
|                                      |   | Detail                               | Public Property       | Y                 | Npgsql extension API |
|                                      |   | ErrorSql                             | Public Property       | Y                 | Npgsql extension API |
|                                      |   | File                                 | Public Property       | Y                 | Npgsql extension API |
|                                      |   | Hint                                 | Public Property       | Y                 | Npgsql extension API |
|                                      |   | Item                                 | Public Property       | Y                 | Npgsql extension API |
|                                      |   | Line                                 | Public Property       | Y                 | Npgsql extension API |
|                                      |   | Position                             | Public Property       | Y                 | Npgsql extension API |
|                                      |   | Routine                              | Public Property       | Y                 | Npgsql extension API |
|                                      |   | Severity                             | Public Property       | Y                 | Npgsql extension API |
|                                      |   | Where                                | Public Property       | Y                 | Npgsql extension API |
|                                      |   | NpgsqlException                      | Public Constructor    | Y                 | Npgsql extension API |
|                                      |   | Equals                               | Public method         | Y                 |                      |
|                                      |   | GetBaseException                     | Public method         | Y                 |                      |
|                                      |   | GetHashCode                          | Public method         | Y                 |                      |
|                                      |   | GetObjectData                        | Public method         | Y                 |                      |
|                                      |   | GetType                              | Public method         | Y                 |                      |
|                                      |   | ToString                             | Public method         | Y                 |                      |
|                                      |   | DbProviderFactory                    | NpgsqlProviderFactory | Instance          | Public field         |
| CanCreateDataSourceEnumerator        | Public Property                                       |                                      |                       | Y                 |                      |
| NpgsqlFactory                        | Public Constructor                                    |                                      |                       | Y                 | Npgsql extension API |
| CreateCommand                        | Public method   |                                      |                       | Y                 |                      |
| CreateCommandBuilder                 | Public method   |                                      |                       | Y                 |                      |
| CreateConnection                     | Public method   |                                      |                       | Y                 |                      |
| CreateConnectionStringBuilder        | Public method   |                                      |                       | Y                 |                      |
| CreateDataAdapter                    | Public method   |                                      |                       | Y                 |                      |
| CreateDataSourceEnumerator           | Public method   |                                      |                       | Y                 |                      |
| CreateParameter                      | Public method   |                                      |                       | Y                 |                      |
| CreatePermission                     | Public method   |                                      |                       | Y                 |                      |
| Equals                               | Public method   |                                      |                       | Y                 |                      |
| GetHashCode                          | Public method   |                                      |                       | Y                 |                      |
| GetType                              | Public method   |                                      |                       | Y                 |                      |
| ToString                             | Public method   |                                      |                       | Y                 |                      |
| GetService                           | Public method   | Y                                    | Npgsql extension API  |                   |                      |

| System.Data.Common class name | Fujitsu Npgsql .NET Data Provider class name | Method (M)/Function (F)/Property (P) |                    | Support status | Note                 |
|-------------------------------|--|--------------------------------------|--------------------|----------------|----------------------|
|                               |  | Name                                 | Qualifier          |                |                      |
| DBInfoMessageEventArgs        | Not supported                                | Errors                               | Public Property    | N              |                      |
|                               |  | Message                              | Public Property    | N              |                      |
|                               |  | Source                               | Public Property    | N              |                      |
| DBParameter                   | NpgsqlParameter                              | DbType                               | Public Property    | Y              |                      |
|                               |  | Direction                            | Public Property    | Y              |                      |
|                               |  | IsNullable                           | Public Property    | Y              |                      |
|                               |  | ParameterName                        | Public Property    | Y              |                      |
|                               |  | Precision                            | Public Property    | Y              |                      |
|                               |  | Scale                                | Public Property    | Y              |                      |
|                               |  | Size                                 | Public Property    | Y              |                      |
|                               |  | SourceColumn                         | Public Property    | Y              |                      |
|                               |  | SourceVersion                        | Public Property    | Y              |                      |
|                               |  | Value                                | Public Property    | Y              |                      |
|                               |  | NpgsqlDbType                         | Public Property    | Y              | Npgsql extension API |
|                               |  | NpgsqlValue                          | Public Property    | Y              | Npgsql extension API |
|                               |  | SourceColumnNullMapping              | Public Property    | Y              |                      |
|                               |  | UseCast                              | Public Property    | Y              | Npgsql extension API |
|                               |  | NpgsqlParameter                      | Public Constructor | Y              | Npgsql extension API |
|                               |  | CreateObjRef                         | Public method      | Y              |                      |
|                               |  | Equals                               | Public method      | Y              |                      |
|                               |  | GetHashCode                          | Public method      | Y              |                      |
|                               |  | GetLifetimeService                   | Public method      | Y              |                      |
|                               |  | GetType                              | Public method      | Y              |                      |
|                               |  | InitializeLifetimeService            | Public method      | Y              |                      |
|                               |  | ToString                             | Public method      | Y              |                      |
|                               |  | Clone                                | Public method      | Y              |                      |
| ResetDbType                   | Public method                                | Y                                    |                    |                |                      |
| Finalize                      | Protect method                               | N                                    |                    |                |                      |
| MemberwiseClone               | Protect method                               | N                                    |                    |                |                      |
| DBParameterCollection         | NpgsqlParameterCollection                    | Count                                | Public Property    | Y              |                      |
|                               |  | Item                                 | Public Property    | Y              |                      |
|                               |  | IsFixedSize                          | Public Property    | Y              | Npgsql extension API |
|                               |  | IsReadOnly                           | Public Property    | Y              | Npgsql extension API |
|                               |  | IsSynchronized                       | Public Property    | Y              | Npgsql extension API |
|                               |  | SyncRoot                             | Public Property    | Y              | Npgsql extension API |

| System.Data.<br>Common<br>class name | Fujitsu<br>Npgsql .NET<br>Data Provider<br>class name | Method (M)/Function (F)/Property (P) |                    | Support<br>status | Note                 |
|--------------------------------------|---|--------------------------------------|--------------------|-------------------|----------------------|
|                                      |   | Name                                 | Qualifier          |                   |                      |
|                                      |   | NpgsqlParameterCollection            | Public Constructor | Y                 | Npgsql extension API |
|                                      |   | Add                                  | Public method      | Y                 |                      |
|                                      |   | AddRange                             | Public method      | Y                 |                      |
|                                      |   | Clear                                | Public method      | Y                 |                      |
|                                      |   | Contains                             | Public method      | Y                 |                      |
|                                      |   | CopyTo                               | Public method      | Y                 |                      |
|                                      |   | IndexOf                              | Public method      | Y                 |                      |
|                                      |   | Insert                               | Public method      | Y                 |                      |
|                                      |   | Remove                               | Public method      | Y                 |                      |
|                                      |   | RemoveAt                             | Public method      | Y                 |                      |
|                                      |   | CreateObjRef                         | Public method      | Y                 |                      |
|                                      |   | Equals                               | Public method      | Y                 |                      |
|                                      |   | GetHashCode                          | Public method      | Y                 |                      |
|                                      |   | GetLifetimeService                   | Public method      | Y                 |                      |
|                                      |   | GetType                              | Public method      | Y                 |                      |
|                                      |   | InitializeLifetimeService            | Public method      | Y                 |                      |
|                                      |   | ToString                             | Public method      | Y                 |                      |
|                                      |   | AddWithValue                         | Public method      | Y                 | Npgsql extension API |
|                                      |   | TryGetValue                          | Public method      | Y                 | Npgsql extension API |
|                                      |   | GetEnumerator                        | Public method      | Y                 | Npgsql extension API |
|                                      |   | Finalize                             | Protect method     | N                 |                      |
| MemberwiseClone                      | Protect method  | N                                    |                    |                   |                      |
| DBDataPermission                     | Not supported   | AllowBlankPassword                   | Public Property    | N                 |                      |
|                                      |   | Add                                  | Public method      | N                 |                      |
|                                      |   | Assert                               | Public method      | N                 |                      |
|                                      |   | Copy                                 | Public method      | N                 |                      |
|                                      |   | Demand                               | Public method      | N                 |                      |
|                                      |   | Deny                                 | Public method      | N                 |                      |
|                                      |   | Equals                               | Public method      | N                 |                      |
|                                      |   | FromXml                              | Public method      | N                 |                      |
|                                      |   | GetHashCode                          | Public method      | N                 |                      |
|                                      |   | GetType                              | Public method      | N                 |                      |
|                                      |   | Intersect                            | Public method      | N                 |                      |
|                                      |   | IsSubsetOf                           | Public method      | N                 |                      |
|                                      |   | IsUnrestricted                       | Public method      | N                 |                      |
|                                      |   | PermitOnly                           | Public method      | N                 |                      |

| System.Data.<br>Common<br>class name | Fujitsu<br>Npgsql .NET<br>Data Provider<br>class name | Method (M)/Function (F)/Property (P) |                    | Support<br>status | Note                 |
|--------------------------------------|---|--------------------------------------|--------------------|-------------------|----------------------|
|                                      |   | Name                                 | Qualifier          |                   |                      |
|                                      |   | ToString                             | Public method      | N                 |                      |
|                                      |   | ToXml                                | Public method      | N                 |                      |
|                                      |   | Union                                | Public method      | N                 |                      |
| DBDataPer<br>missionAttrib<br>ute    | Not supported   | Action                               | Public Property    | N                 |                      |
|                                      |   | AllowBlankPassword                   | Public Property    | N                 |                      |
|                                      |   | ConnectionString                     | Public Property    | N                 |                      |
|                                      |   | KeyRestrictionBehavio<br>r           | Public Property    | N                 |                      |
|                                      |   | KeyRestrictions                      | Public Property    | N                 |                      |
|                                      |   | TypeId                               | Public Property    | N                 |                      |
|                                      |   | Unrestricted                         | Public Property    | N                 |                      |
|                                      |   | CreatePermission                     | Public method      | N                 |                      |
|                                      |   | Equals                               | Public method      | N                 |                      |
|                                      |   | GetHashCode                          | Public method      | N                 |                      |
|                                      |   | GetType                              | Public method      | N                 |                      |
|                                      |   | IsDefaultAttribute                   | Public method      | N                 |                      |
|                                      |   | Match                                | Public method      | N                 |                      |
|                                      |   | ShouldSerializeConnec<br>tionString  | Public method      | N                 |                      |
|                                      |   | ShouldSerializeKeyRe<br>strictions   | Public method      | N                 |                      |
| ToString                             | Public method   | N                                    |                    |                   |                      |
| RowUpdated<br>EventArgs              | NpgsqlRowUpd<br>atedEventArgs                         | Command                              | Public Property    | Y                 |                      |
|                                      |   | Errors                               | Public Property    | Y                 |                      |
|                                      |   | Row                                  | Public Property    | Y                 |                      |
|                                      |   | StatementType                        | Public Property    | Y                 |                      |
|                                      |   | Status                               | Public Property    | Y                 |                      |
|                                      |   | TableMapping                         | Public Property    | Y                 |                      |
|                                      |   | RecordsAffected                      | Public Property    | Y                 |                      |
|                                      |   | RowCount                             | Public Property    | Y                 | Npgsql extension API |
|                                      |   | NpgsqlRowUpdatedEv<br>entArgs        | Public Constructor | Y                 | Npgsql extension API |
|                                      |   | Equals                               | Public method      | Y                 |                      |
|                                      |   | GetHashCode                          | Public method      | Y                 |                      |
|                                      |   | GetType                              | Public method      | Y                 |                      |
|                                      |   | ToString                             | Public method      | Y                 |                      |
|                                      |   | CopyToRows                           | Public method      | Y                 | Npgsql extension API |
|                                      |   | Finalize                             | Protect method     | Y                 |                      |

| System.Data.Common class name | Fujitsu Npgsql .NET Data Provider class name | Method (M)/Function (F)/Property (P) |                    | Support status | Note                 |
|-------------------------------|--|--------------------------------------|--------------------|----------------|----------------------|
|                               |  | Name                                 | Qualifier          |                |                      |
|                               |  | MemberwiseClone                      | Protect method     | Y              |                      |
| RowUpdatingEventArgs          | NpgsqlRowUpdatingEventArgs                   | Command                              | Public Property    | Y              |                      |
|                               |  | Errors                               | Public Property    | Y              |                      |
|                               |  | Row                                  | Public Property    | Y              |                      |
|                               |  | StatementType                        | Public Property    | Y              |                      |
|                               |  | Status                               | Public Property    | Y              |                      |
|                               |  | TableMapping                         | Public Property    | Y              |                      |
|                               |  | NpgsqlRowUpdatingEventArgs           | Public Constructor | Y              | Npgsql extension API |
|                               |  | Equals                               | Public method      | Y              |                      |
|                               |  | GetHashCode                          | Public method      | Y              |                      |
|                               |  | GetType                              | Public method      | Y              |                      |
|                               |  | ToString                             | Public method      | Y              |                      |
|                               |  | BaseCommand                          | Protect Property   | Y              |                      |
|                               |  | Finalize                             | Protect method     | Y              |                      |
|                               |  | MemberwiseClone                      | Protect method     | Y              |                      |
| DBTransaction                 | NpgsqlTransaction                            | Connection                           | Public Property    | Y              |                      |
|                               |  | IsolationLevel                       | Public Property    | Y              |                      |
|                               |  | NpgsqlTransaction                    | Public Constructor | Y              | Npgsql extension API |
|                               |  | Commit                               | Public method      | Y              |                      |
|                               |  | CreateObjRef                         | Public method      | Y              |                      |
|                               |  | Dispose                              | Public method      | Y              |                      |
|                               |  | Equals                               | Public method      | Y              |                      |
|                               |  | GetHashCode                          | Public method      | Y              |                      |
|                               |  | GetLifetimeService                   | Public method      | Y              |                      |
|                               |  | GetType                              | Public method      | Y              |                      |
|                               |  | InitializeLifetimeService            | Public method      | Y              |                      |
|                               |  | Rollback                             | Public method      | Y              |                      |
|                               |  | ToString                             | Public method      | Y              |                      |
|                               |  | Save                                 | Public method      | Y              |                      |
| Finalize                      | Protect method                               | N                                    |                    |                |                      |
| MemberwiseClone               | Protect method                               | N                                    |                    |                |                      |
| None applicable               | NpgsqlNotificationEventArgs                  | AdditionalInformation                | Public Property    | Y              | Npgsql extension API |
|                               |  | Condition                            | Public Property    | Y              | Npgsql extension API |
|                               |  | PID                                  | Public Property    | Y              | Npgsql extension API |
|                               |  | Equals                               | Public method      | Y              | Npgsql extension API |
|                               |  | GetHashCode                          | Public method      | Y              | Npgsql extension API |

| System.Data.<br>Common<br>class name | Fujitsu<br>Npgsql .NET<br>Data Provider<br>class name | Method (M)/Function (F)/Property (P) |                 | Support<br>status | Note                 |
|--------------------------------------|---|--------------------------------------|-----------------|-------------------|----------------------|
|                                      |   | Name                                 | Qualifier       |                   |                      |
|                                      |   | GetType                              | Public method   | Y                 | Npgsql extension API |
|                                      |   | ToString                             | Public method   | Y                 | Npgsql extension API |
|                                      |   | Finalize                             | Protect method  | Y                 | Npgsql extension API |
|                                      |   | MemberwiseClone                      | Protect method  | Y                 | Npgsql extension API |
| None<br>applicable                   | NpgsqlEventLo<br>g                                    | EchoMessages                         | Public Property | Y                 | Npgsql extension API |
|                                      |   | Level                                | Public Property | Y                 | Npgsql extension API |
|                                      |   | LogName                              | Public Property | Y                 | Npgsql extension API |
|                                      |   | Equals                               | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetHashCode                          | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetType                              | Public method   | Y                 | Npgsql extension API |
|                                      |   | ToString                             | Public method   | Y                 | Npgsql extension API |
|                                      |   | Finalize                             | Protect method  | Y                 | Npgsql extension API |
|                                      |   | MemberwiseClone                      | Protect method  | Y                 | Npgsql extension API |
| None<br>applicable                   | NpgsqlCopyFor<br>mat                                  | FieldCount                           | Public Property | Y                 | Npgsql extension API |
|                                      |   | IsBinary                             | Public Property | Y                 | Npgsql extension API |
|                                      |   | Equals                               | Public method   | Y                 | Npgsql extension API |
|                                      |   | FieldIsBinary                        | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetHashCode                          | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetType                              | Public method   | Y                 | Npgsql extension API |
|                                      |   | ToString                             | Public method   | Y                 | Npgsql extension API |
| None<br>applicable                   | NpgsqlCopyIn  | CopyBufferSize                       | Public Property | Y                 | Npgsql extension API |
|                                      |   | CopyStream                           | Public Property | Y                 | Npgsql extension API |
|                                      |   | FieldCount                           | Public Property | Y                 | Npgsql extension API |
|                                      |   | IsActive                             | Public Property | Y                 | Npgsql extension API |
|                                      |   | IsBinary                             | Public Property | Y                 | Npgsql extension API |
|                                      |   | NpgsqlCommand                        | Public Property | Y                 | Npgsql extension API |
|                                      |   | Cancel                               | Public method   | Y                 | Npgsql extension API |
|                                      |   | End                                  | Public method   | Y                 | Npgsql extension API |
|                                      |   | Equals                               | Public method   | Y                 | Npgsql extension API |
|                                      |   | FieldIsBinary                        | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetHashCode                          | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetType                              | Public method   | Y                 | Npgsql extension API |
|                                      |   | Start                                | Public method   | Y                 | Npgsql extension API |
|                                      |   | ToString                             | Public method   | Y                 | Npgsql extension API |
|                                      |   | Finalize                             | Protect method  | Y                 | Npgsql extension API |
|                                      |   | MemberwiseClone                      | Protect method  | Y                 | Npgsql extension API |
| None<br>applicable                   | NpgsqlCopyOu<br>t                                     | CopyStream                           | Public Property | Y                 | Npgsql extension API |

| System.Data.<br>Common<br>class name | Fujitsu<br>Npgsql .NET<br>Data Provider<br>class name | Method (M)/Function (F)/Property (P) |                      | Support<br>status | Note                 |
|--------------------------------------|---|--------------------------------------|----------------------|-------------------|----------------------|
|                                      |   | Name                                 | Qualifier            |                   |                      |
|                                      |   | FieldCount                           | Public Property      | Y                 | Npgsql extension API |
|                                      |   | IsActive                             | Public Property      | Y                 | Npgsql extension API |
|                                      |   | IsBinary                             | Public Property      | Y                 | Npgsql extension API |
|                                      |   | NpgsqlCommand                        | Public Property      | Y                 | Npgsql extension API |
|                                      |   | Read                                 | Public Property      | Y                 | Npgsql extension API |
|                                      |   | End                                  | Public method        | Y                 | Npgsql extension API |
|                                      |   | Equals                               | Public method        | Y                 | Npgsql extension API |
|                                      |   | FieldIsBinary                        | Public method        | Y                 | Npgsql extension API |
|                                      |   | GetHashCode                          | Public method        | Y                 | Npgsql extension API |
|                                      |   | GetType                              | Public method        | Y                 | Npgsql extension API |
|                                      |   | Start                                | Public method        | Y                 | Npgsql extension API |
|                                      |   | ToString                             | Public method        | Y                 | Npgsql extension API |
|                                      |   | Finalize                             | Protect method       | Y                 | Npgsql extension API |
|                                      |   | MemberwiseClone                      | Protect method       | Y                 | Npgsql extension API |
| None<br>applicable                   | NpgsqlCopySer<br>ializer                              | DEFAULT_BUFFER_<br>SIZE              | Public field         | Y                 | Npgsql extension API |
|                                      |   | DEFAULT_DELIMIT<br>ER                | Public field         | Y                 | Npgsql extension API |
|                                      |   | DEFAULT_ESCAPE                       | Public field         | Y                 | Npgsql extension API |
|                                      |   | DEFAULT_NULL                         | Public field         | Y                 | Npgsql extension API |
|                                      |   | DEFAULT_QUOTE                        | Public field         | Y                 | Npgsql extension API |
|                                      |   | DEFAULT_SEPARA<br>TOR                | Public field         | Y                 | Npgsql extension API |
|                                      |   | EscapeSequenceFor                    | Protect method       | Y                 | Npgsql extension API |
|                                      |   | BufferSize                           | Public Property      | Y                 | Npgsql extension API |
|                                      |   | Delimiter                            | Public Property      | Y                 | Npgsql extension API |
|                                      |   | Escape                               | Public Property      | Y                 | Npgsql extension API |
|                                      |   | IsActive                             | Public Property      | Y                 | Npgsql extension API |
|                                      |   | Null                                 | Public Property      | Y                 | Npgsql extension API |
|                                      |   | Separator                            | Public Property      | Y                 | Npgsql extension API |
|                                      |   | ToStream                             | Public Property      | Y                 | Npgsql extension API |
|                                      |   | AddBool                              | Public method        | Y                 | Npgsql extension API |
|                                      |   | AddDateTime                          | Public method        | Y                 | Npgsql extension API |
|                                      |   | AddInt32                             | Public method        | Y                 | Npgsql extension API |
|                                      |   | AddInt64                             | Public method        | Y                 | Npgsql extension API |
|                                      |   | AddNull                              | Public method        | Y                 | Npgsql extension API |
|                                      |   | AddNumber                            | Public method        | Y                 | Npgsql extension API |
| AddString                            | Public method   | Y                                    | Npgsql extension API |                   |                      |

| System.Data.Common class name | Fujitsu Npgsql .NET Data Provider class name | Method (M)/Function (F)/Property (P)         |                       | Support status | Note                 |
|-------------------------------|--|--|-----------------------|----------------|----------------------|
|                               |  | Name   | Qualifier             |                |                      |
|                               |  | Close  | Public method         | Y              | Npgsql extension API |
|                               |  | EndRow                                       | Public method         | Y              | Npgsql extension API |
|                               |  | Equals                                       | Public method         | Y              | Npgsql extension API |
|                               |  | Flush  | Public method         | Y              | Npgsql extension API |
|                               |  | FlushFields                                  | Public method         | Y              | Npgsql extension API |
|                               |  | FlushRows                                    | Public method         | Y              | Npgsql extension API |
|                               |  | GetHashCode                                  | Public method         | Y              | Npgsql extension API |
|                               |  | GetType                                      | Public method         | Y              | Npgsql extension API |
|                               |  | ToString                                     | Public method         | Y              | Npgsql extension API |
|                               |  | EscapeSequenceBytes                          | Protect Property      | Y              | Npgsql extension API |
|                               |  | SpaceInBuffer                                | Protect Property      | Y              | Npgsql extension API |
|                               |  | StringsToEscape                              | Protect Property      | Y              | Npgsql extension API |
|                               |  | AddBytes                                     | Protect method        | Y              | Npgsql extension API |
|                               |  | FieldAdded                                   | Protect method        | Y              | Npgsql extension API |
|                               |  | Finalize                                     | Protect method        | Y              | Npgsql extension API |
|                               |  | MakeRoomForBytes                             | Protect method        | Y              | Npgsql extension API |
|                               |  | MemberwiseClone                              | Protect method        | Y              | Npgsql extension API |
|                               |  | PrefixField                                  | Protect method        | Y              | Npgsql extension API |
|                               |  | None applicable                              | NpgsqlNoticeEventArgs | Notice         | Public field         |
| Equals                        | Public method                                |  |                       | Y              | Npgsql extension API |
| GetHashCode                   | Public method                                |  |                       | Y              | Npgsql extension API |
| GetType                       | Public method                                |  |                       | Y              | Npgsql extension API |
| ToString                      | Public method                                |  |                       | Y              | Npgsql extension API |
| Finalize                      | Protect method                               |  |                       | Y              | Npgsql extension API |
| MemberwiseClone               | Protect method                               |  |                       | Y              | Npgsql extension API |
| None applicable               | ServerVersion                                | ProtocolVersion2                             | Public field          | Y              | Npgsql extension API |
|                               |  | ProtocolVersion3                             | Public field          | Y              | Npgsql extension API |
|                               |  | Equality Operator                            | Public                | Y              | Npgsql extension API |
|                               |  | Greater Than Operator                        | Public                | Y              | Npgsql extension API |
|                               |  | Greater Than Or Equal Operator               | Public                | Y              | Npgsql extension API |
|                               |  | Inequality Operator                          | Public                | Y              | Npgsql extension API |
|                               |  | Less Than Operator                           | Public                | Y              | Npgsql extension API |
|                               |  | Less Than Or Equal Operator                  | Public                | Y              | Npgsql extension API |
|                               |  | Implicit ServerVersion to Version Conversion | Public                | Y              | Npgsql extension API |

| System.Data.<br>Common<br>class name | Fujitsu<br>Npgsql .NET<br>Data Provider<br>class name | Method (M)/Function (F)/Property (P)               |                 | Support<br>status | Note                 |
|--------------------------------------|---|--|-----------------|-------------------|----------------------|
|                                      |   | Name   | Qualifier       |                   |                      |
|                                      |   | Implicit Version to<br>ServerVersion<br>Conversion | Public          | Y                 | Npgsql extension API |
|                                      |   | Major  | Public Property | Y                 | Npgsql extension API |
|                                      |   | Minor  | Public Property | Y                 | Npgsql extension API |
|                                      |   | Patch  | Public Property | Y                 | Npgsql extension API |
|                                      |   | Clone  | Public method   | Y                 | Npgsql extension API |
|                                      |   | CompareTo  | Public method   | Y                 | Npgsql extension API |
|                                      |   | Equals   | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetHashCode  | Public method   | Y                 | Npgsql extension API |
|                                      |   | GetType  | Public method   | Y                 | Npgsql extension API |
|                                      |   | ToString   | Public method   | Y                 | Npgsql extension API |

Y: Supported

N: Not supported

## F.4 C Library (libpq)

---



See

.....  
Refer to "libpq - C Library" in "Client Interfaces" in the PostgreSQL Documentation.  
.....

## F.5 Embedded SQL in C

---



See

.....  
Refer to "ECPG - Embedded SQL in C" in "Client Interfaces" in the PostgreSQL Documentation.  
.....

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# FUJITSU Enterprise Postgres 9.5



## Operation Guide

Linux >

Windows >

# FUJITSU Enterprise Postgres 9.5



## Operation Guide *(Linux)*

Linux

J2UL-2118-02ENZO(00)

June 2016

# Preface

---

## Purpose of this document

The FUJITSU Enterprise Postgres database system extends the PostgreSQL features and runs on the Linux platform.

This document is the FUJITSU Enterprise Postgres Operation Guide.

## Intended readers

This document is intended for those who install and operate FUJITSU Enterprise Postgres.

Readers of this document are assumed to have general knowledge of:

- PostgreSQL
- SQL
- Linux

## Structure of this document

This document is structured as follows:

### [Chapter 1 Operating FUJITSU Enterprise Postgres](#)

Describes how to operate FUJITSU Enterprise Postgres.

### [Chapter 2 Starting an Instance and Creating a Database](#)

Describes how to start a FUJITSU Enterprise Postgres instance, and how to create a database.

### [Chapter 3 Backing Up the Database](#)

Describes how to back up the database.

### [Chapter 4 Configuring Secure Communication Using Secure Sockets Layer](#)

Describes communication data encryption between the client and the server.

### [Chapter 5 Protecting Storage Data Using Transparent Data Encryption](#)

Describes how to encrypt the data to be stored in the database.

### [Chapter 6 Data Masking](#)

Describes the data masking feature.

### [Chapter 7 Periodic Operations](#)

Describes the periodic database operations that must be performed on FUJITSU Enterprise Postgres.

### [Chapter 8 Streaming Replication Using WebAdmin](#)

Describes how to create a streaming replication cluster using WebAdmin.

### [Chapter 9 Installing and Operating the In-memory Feature](#)

Describes how to install and operate the in-memory feature.

### [Chapter 10 Actions when an Error Occurs](#)

Describes how to perform recovery when disk failure or data corruption occurs.

### [Appendix A Parameters](#)

Describes the FUJITSU Enterprise Postgres parameters.

### [Appendix B System Administration Functions](#)

Describes the system administration functions of FUJITSU Enterprise Postgres.

### [Appendix C System Views](#)

Describes how to use the system view in FUJITSU Enterprise Postgres.

### [Appendix D Tables Used by Data Masking](#)

Describes the tables used by the data masking feature.

### [Appendix E Activating and Stopping the Web Server Feature of WebAdmin](#)

Describes how to activate and stop WebAdmin (Web server feature).

### [Appendix F WebAdmin Wallet](#)

Describes how to use the Wallet feature of WebAdmin.

### [Appendix G Collecting Failure Investigation Data](#)

Describes how to collect information for initial investigation.

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| Second edition: June 2016<br>First edition: March 2016 |
|--|

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# Chapter 1 Operating FUJITSU Enterprise Postgres

This chapter describes how to operate FUJITSU Enterprise Postgres.

## 1.1 Operating Methods

There are two methods of managing FUJITSU Enterprise Postgres operations:

- Operation management using GUI tools
- Operation management using commands



Before performing switchover or failover operation using database multiplexing, refer to "Database Multiplexing Mode" in the Cluster Operation Guide.

### Operation management using GUI tools

This involves managing operations using the WebAdmin and pgAdmin GUI tools.

- Management using WebAdmin

This removes the requirement for complex environment settings and operational design for backup and recovery that is usually required for running a database. It enables you to easily and reliably monitor the state of the database, create a streaming replication cluster, back up the database, and restore it even if you do not have expert knowledge of databases.

- Management using pgAdmin

When developing applications and maintaining the database, you can use pgAdmin to perform simple operations on database objects, such as:

- Rebuild indexes and update statistics
- Create, delete, and update database objects

In addition, from pgAdmin of FUJITSU Enterprise Postgres, you can use the expanded features provided by FUJITSU Enterprise Postgres on the PostgreSQL SQL commands.



Refer to pgAdmin Help for information on the expanded features of pgAdmin provided by FUJITSU Enterprise Postgres.

### Operation management using commands

You can use commands for configuring and operating the database and managing operations. However, note that if you start managing operations using commands, you cannot switch to WebAdmin-based operation management.



You cannot combine WebAdmin and server commands to perform the following operations:

- Use WebAdmin to operate an instance created using the initdb command
- Use commands to operate an instance created using WebAdmin
- Use WebAdmin to recover a database backed up using commands

For instances created with WebAdmin, however, backup can be obtained with the `pgx_dmpall` command. Also, WebAdmin can perform recovery by using the backup obtained with the `pgx_dmpall` command.

- You can perform backup and restoration in pgAdmin, but the backup data obtained with WebAdmin and pgx\_dmpall is not compatible with the backup data obtained with pgAdmin.
- Refer to pgAdmin Help for other notes on pgAdmin.

## Features used in each phase

The following table lists the features used in each phase for GUI-based operations and command-based operations.

| Operation         |                                  | GUI-based operation  | Command-based operation   |
|-------------------|----------------------------------|--|---|
| Setup             | Creating an instance             | WebAdmin   | initdb command  |
|                   | Creating a standby instance      | WebAdmin<br>WebAdmin performs a base backup of the source instance and creates a standby instance. | pg_basebackup command   |
|                   | Modifying the configuration file | WebAdmin   | Directly edit the configuration file                                    |
| Instance start    |                                  | WebAdmin   | pg_ctl command  |
| Database creation |                                  | pgAdmin  | Specify using the DDL statement, and define using psql and applications |
| Database backup   |                                  | WebAdmin<br>pgx_dmpall command   | pgx_dmpall command  |
| Monitoring        | Database failure                 | WebAdmin(*1)   | Messages output to the system log (*1)                                  |
|                   | Disk space                       | WebAdmin (*1) (*2)   | OS-provided df command (*1)   |
|                   | Connection status                | pgAdmin  | psql command (*3)   |
| Database recovery |                                  | WebAdmin   | pgx_rcvall command  |

\*1: Operations can be monitored using operation management middleware (such as Systemwalker Centric Manager).

\*2: A warning is displayed when disk usage reaches 80%.

\*3: This command searches for pg\_stat\_activity in the standard statistics views and monitors the state.

## 1.2 Activating WebAdmin

This section describes how to activate and log in to WebAdmin.

### 1.2.1 Logging in to WebAdmin

This section describes how to log in to WebAdmin.

#### User environment

One of the following browsers is required for using WebAdmin:

- Internet Explorer 8.0 or later

#### Activation URL for WebAdmin

In the browser address bar, type the activation URL of the WebAdmin window in the following format:

```
http://hostNameOrIpAddress:portNumber/
```

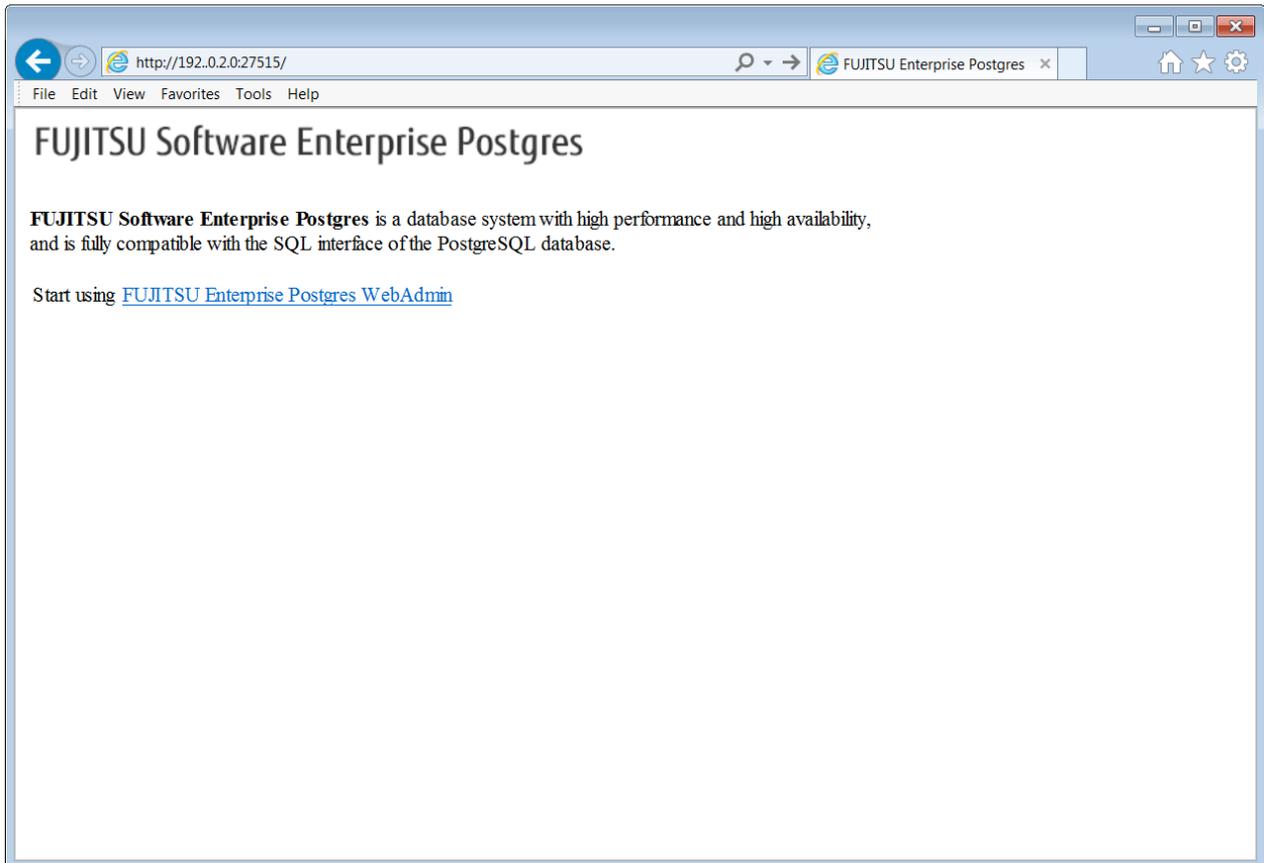
- *hostNameOrIpAddress*: The host name or IP address of the server where FUJITSU Enterprise Postgres is installed.
- *portNumber*: The port number of WebAdmin. The default port number is 27515.

## Example

For a server with IP address "192.0.2.0" and port number "27515"

```
http://192.0.2.0:27515/
```

The activation URL window shown below is displayed.



## Point

- You must activate the Web server feature of WebAdmin before using WebAdmin.
- Refer to "[Appendix E Activating and Stopping the Web Server Feature of WebAdmin](#)" for information on how to activate the Web server feature of WebAdmin.

## Log in to WebAdmin

Click [FUJITSU Enterprise Postgres WebAdmin] in the activation URL window to activate WebAdmin and display the [Log in] window.



|         |          |
|---------|----------|
| User ID | Password |
|---------|----------|

Login

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To log in, specify the following values:

- [User ID]: User ID (OS user account) of the instance administrator
- [Password]: Password corresponding to the user ID

### Point

Use the OS user account as the user ID of the instance administrator. Refer to "Creating an Instance Administrator" in the Installation and Setup Guide for Server for details.

## 1.3 Starting pgAdmin

This section describes how to start pgAdmin, how to add an instance required for managing a database, and how to connect to and disconnect from the instance.

You can use pgAdmin on the Windows client.

### 1.3.1 Starting pgAdmin

This section explains how to start pgAdmin if you are using it from the product "FUJITSU Enterprise Postgres Client (AAbit) x.y SPz" (where AA is "32" or "64", x.y and z are the version numbers (x.y SPz)).

#### Windows(R) 8 or Windows Server(R) 2012

From the [Start] screen, start [pgAdmin III (AAbit) (x.y SPz)].

#### Windows(R) 8.1 or Windows Server(R) 2012 R2

From the [Apps] view, start [pgAdmin III (AAbit) (x.y SPz)].

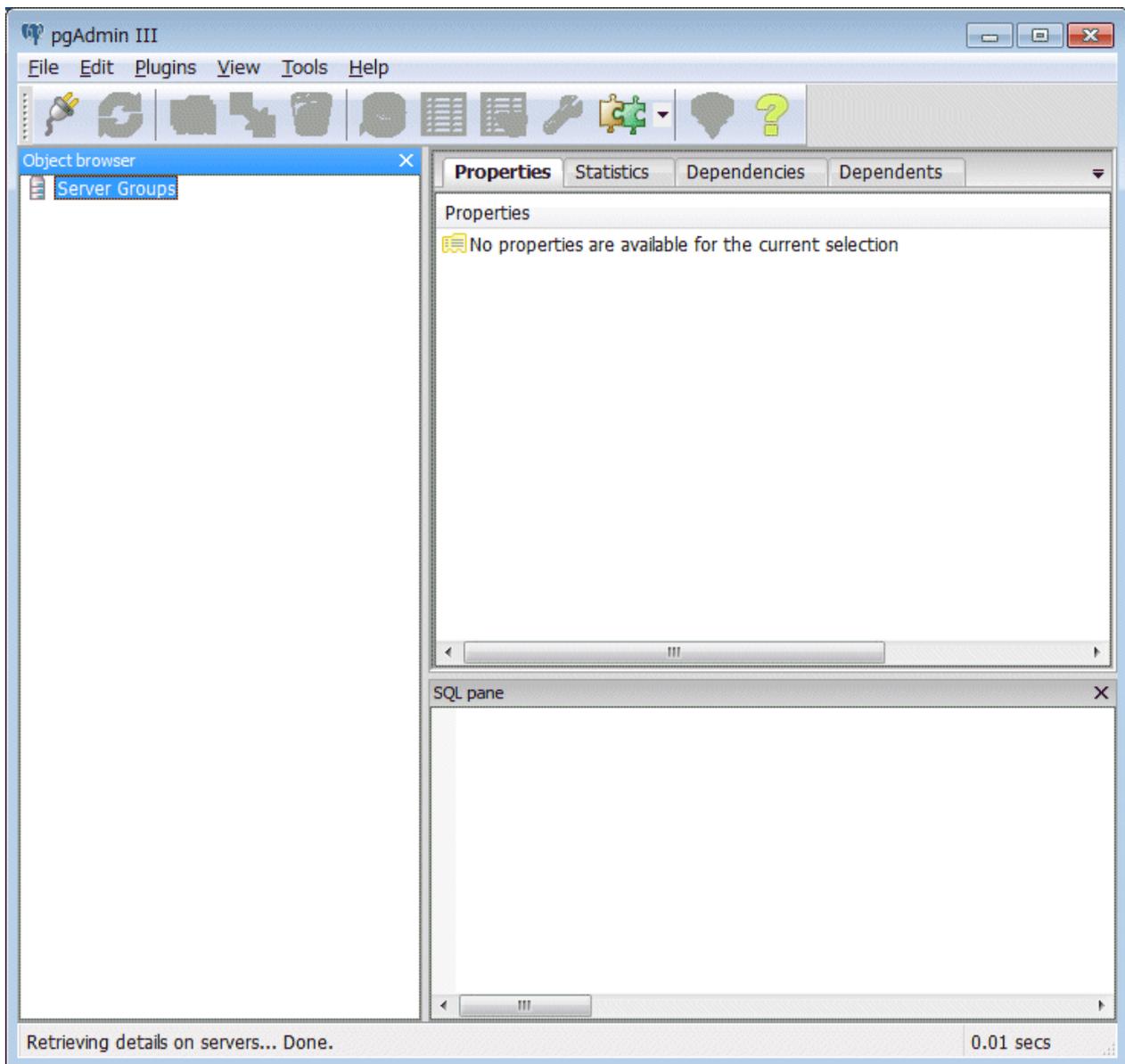
#### Windows(R) 10

Click [Start] >> [All apps] >> [FUJITSU Enterprise Postgres Client(AAbit)] and start [pgAdmin III (AAbit) (x.y SPz)].

## Other operating systems

Click [Start] >> [All Programs] >> [FUJITSU Enterprise Postgres Client(AAbit) x.y SPz] and start [pgAdmin III (AAbit) (x.y SPz)].

The following window is displayed when pgAdmin starts.



### Note

- You must start the instance to be connected to before using pgAdmin.
- Refer to "2.1 Starting and Stopping an Instance" for information on how to start an instance.
- Adobe(R) Reader(R) X is required for browsing the manual from [FUJITSU Enterprise Postgres Help] in pgAdmin.

## 1.3.2 Adding an Instance

This section describes how to add an instance to be connected to.

1. From the [File] menu in pgAdmin, click [Add Server].

2. In the [New Server Registration] window, specify a value for each item.

The screenshot shows a 'New Server Registration' dialog box with the following fields and values:

| Field          | Value                    |
|----------------|--------------------------|
| Name           | db01                     |
| Host           | sv1                      |
| Port           | 27500                    |
| Service        |                          |
| Maintenance DB | postgres                 |
| Username       | fsepuser                 |
| Password       | .....                    |
| Store password | <input type="checkbox"/> |
| Colour         |                          |
| Group          | Servers                  |

([Properties] tab)

- [Name]: Name of the instance to be managed
- [Host]: Host name or IP address of the server where FUJITSU Enterprise Postgres is installed
- [Port]: Port number of the instance
- [Username]: User name of the instance administrator
- [Password]: Password for the user name specified in [Username]

When you add an instance using pgAdmin, the instance is automatically connected to immediately after the addition is completed.

#### Note

If you select [Store password], a file storing the FUJITSU Enterprise Postgres connection password is created in the following location. Set the appropriate access permissions for the password file to protect it from unauthorized access.

- %APPDATA%\postgresql\pgpass.conf

### 1.3.3 Connecting/Disconnecting an Instance

This section describes how to connect pgAdmin to an instance, and how to disconnect it.

## Note

To connect to an instance created using WebAdmin, you must first configure the settings in the [Client Authentication] window of WebAdmin to permit connection from pgAdmin.

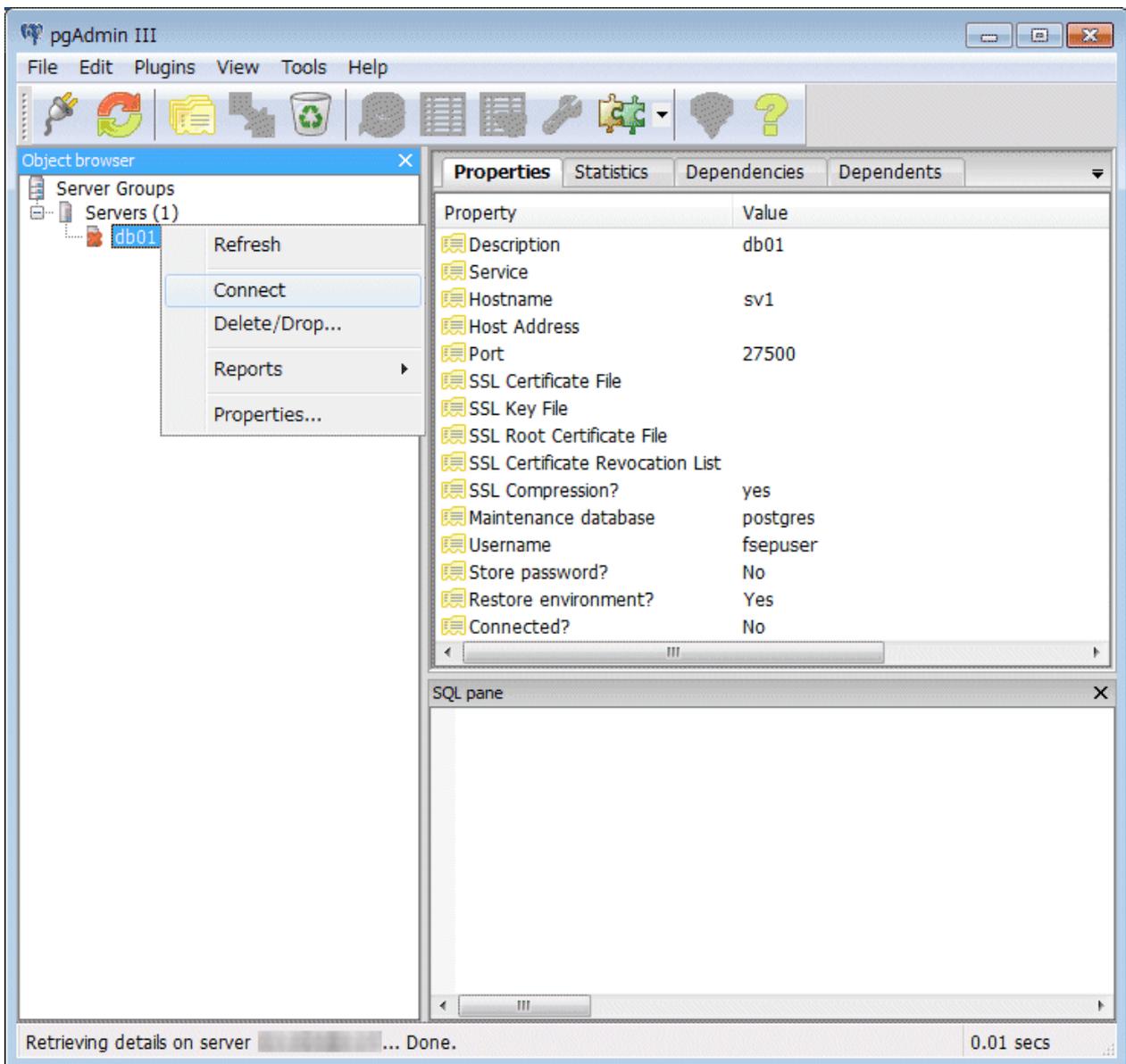
## See

Refer to "Changing the settings" in the Installation and Setup Guide for Server for information on the [Client Authentication] window of WebAdmin.

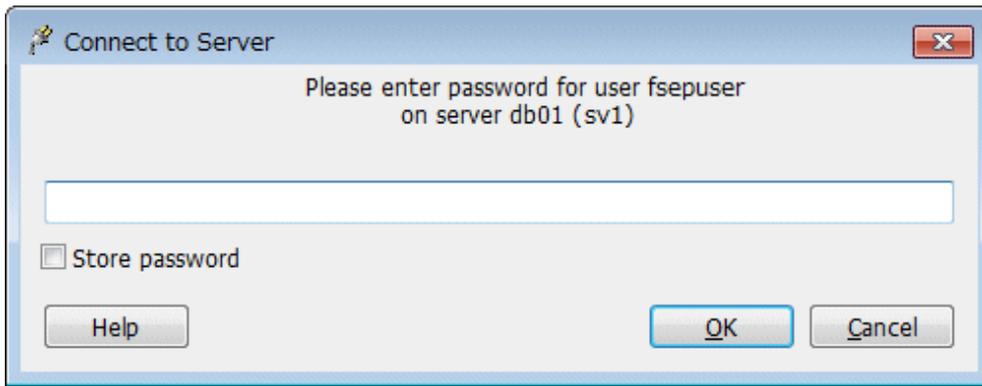
## Connecting to an instance

Starting pgAdmin does not connect it to any instance.

To connect to an instance, right-click the instance in [Object browser] and select [Connect].



If a password was not saved when the instance was added, the following password entry window is displayed.



### Disconnecting from an instance

To disconnect from an instance, right-click the server in [Object browser] in the pgAdmin window and select [Disconnect server].

## 1.4 Operations Using Commands

---

You can operate and manage the database using the following commands:

- Server commands

This group of commands includes commands for creating a database cluster and controlling the database. You can run these commands on the server where the database is operating.

To use these commands, you must configure the environment variables.



See

- Refer to "PostgreSQL Server Applications" under "Reference" in the PostgreSQL Documentation, or "Reference" for information on server commands.
- Refer to "Configure the environment variables" under the procedure for creating an instance in "Using the initdb Command" in the Installation and Setup Guide for Server for information on the values to be set in the environment variables.

- Client commands

This group of commands includes the psql command and commands for extracting the database cluster to a script file. These commands can be executed on the client that can connect to the database, or on the server on which the database is running.

To use these commands, you need to configure the environment variables.



See

- Refer to "PostgreSQL Client Applications" under "Reference" in the PostgreSQL Documentation, or "Reference" for information on client commands.
- Refer to "Configuring Environment Variables" in the Installation and Setup Guide for Client for information on the values to be set in the environment variables.

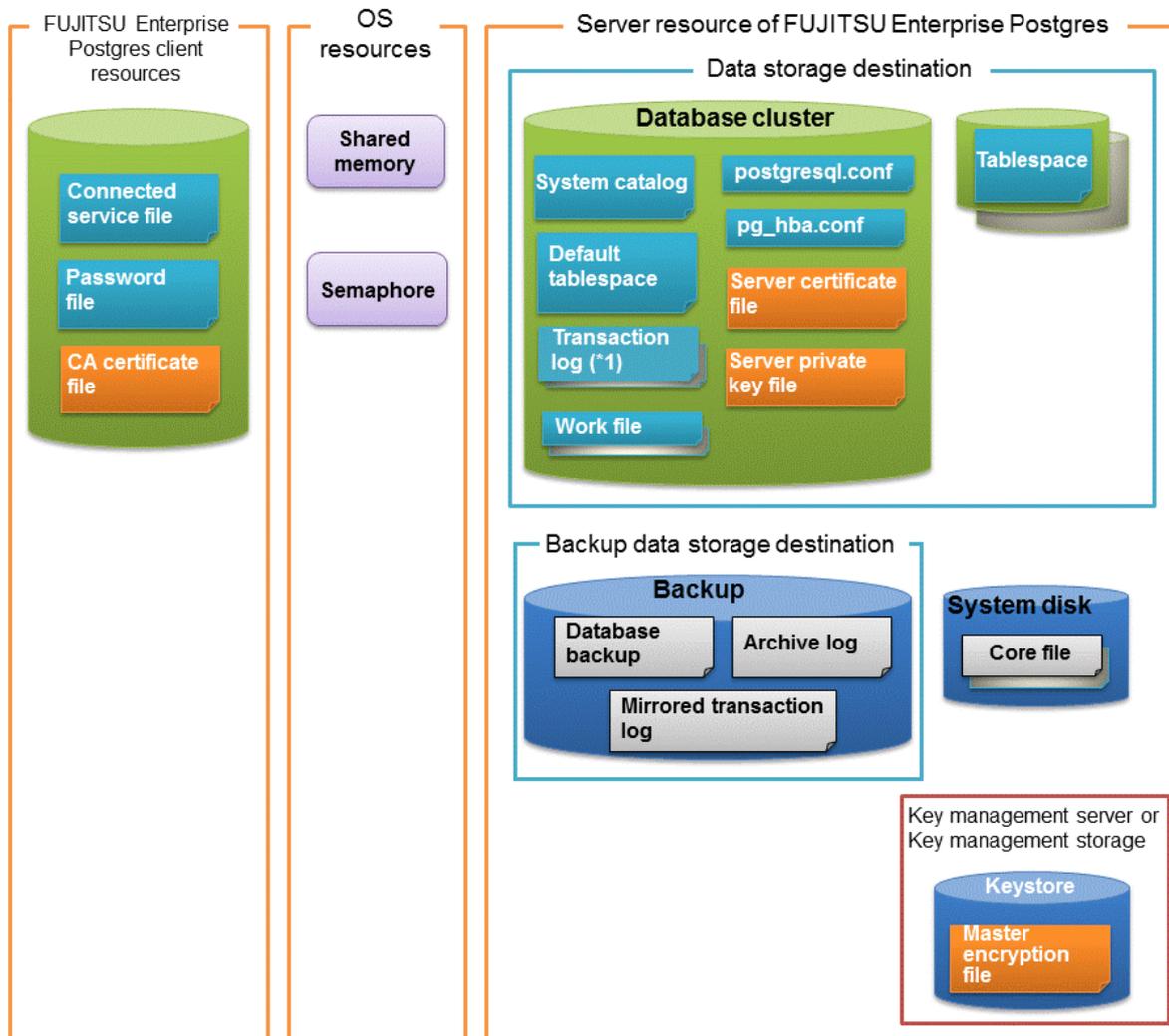
## 1.5 Operating Environment of FUJITSU Enterprise Postgres

---

This section describes the operating environment and the file composition of FUJITSU Enterprise Postgres.

## 1.5.1 Operating Environment

The following figure shows the configuration of the FUJITSU Enterprise Postgres operating environment. The tables given below list the roles of the OS resources and FUJITSU Enterprise Postgres resources.



\*1: To distribute the I/O load, place the transaction log on a different disk from the data storage destination.

Table 1.1 OS resources

| Type          | Role   |
|---------------|--|
| Shared memory | Used when a database process exchanges information with an external process. |
| Semaphore     |  |

Table 1.2 FUJITSU Enterprise Postgres client resources

| Type                    | Role   |
|-------------------------|--|
| Connection service file | Specifies information, such as the host name, user name, and password, for connecting to FUJITSU Enterprise Postgres |
| Password file           | Securely manages the password for connecting to FUJITSU Enterprise Postgres  |
| CA certificate file     | CA (certificate authority) certificate used for server authentication when encrypting communication data             |

Table 1.3 Server resources of FUJITSU Enterprise Postgres

| Type  | Role  |
|---|---|
| Database cluster                                | Database storage area on the database storage disk. It is a collection of databases managed by an instance.   |
| System catalog                                  | Contains information required for the system to run, including the database definition information and the operation information created by the user                          |
| Default tablespace                              | Contains table files and index files stored by default  |
| Transaction log                                 | Contains log information in case of a crash recovery or rollback. This is the same as the WAL (Write Ahead Log).  |
| Work file                                       | Work file used when executing applications or commands  |
| postgresql.conf                                 | Contains information that defines the operating environment of FUJITSU Enterprise Postgres  |
| pg_hba.conf                                     | FUJITSU Enterprise Postgres uses this file to authenticate individual client hosts  |
| Server certificate file                         | Contains information about the server certificate to be used when encrypting communication data and authenticating a server   |
| Server private key file                         | Contains information about the server private key to be used when encrypting communication data and authenticating a server   |
| Tablespace                                      | Stores table files and index files in a separate area from the database cluster   |
| Backup  | Stores the data required for recovering the database when an error, such as disk failure, occurs  |
| Database backup                                 | Contains the backup data for the database   |
| Archive log                                     | Contains the log information for recovery.  |
| Core file                                       | FUJITSU Enterprise Postgres process core file that is output when an error occurs during an FUJITSU Enterprise Postgres process   |
| Key management server or key management storage | Server or storage where the master encryption key file is located   |
| Master encryption key file                      | Contains the master encryption key to be used when encrypting storage data. The master encryption key file is managed on the key management server or key management storage. |

## 1.5.2 File Composition

FUJITSU Enterprise Postgres consists of the following files for controlling and storing the database. The table below shows the relationship between the number of such files and their location within a single instance.

Table 1.4 Number of files within a single instance and how to specify their location

| File type        | Required | Quantity | How to specify the location   |
|------------------|----------|----------|---|
| Program files    | Y        | Multiple | Note that "<xy>" indicates the product version and level.<br><b>64-bit product</b><br>/opt/fsepv<xy>server64<br><b>32-bit product</b><br>/opt/fsepv<xy>server32 |
| Database cluster | Y        | 1        | Specify using WebAdmin or server commands.  |
| Tablespace       | Y        | Multiple | Specify using pgAdmin or the DDL statement.   |
| Backup           | Y        | Multiple | Specify using WebAdmin or server commands.  |

| File type                       | Required | Quantity | How to specify the location   |
|---------------------------------|----------|----------|---|
| Core file                       | Y        | Multiple | Specify using WebAdmin, server commands, or postgresql.conf.          |
| Server certificate file (*1)    | N        | 1        | Specify using postgresql.conf.  |
| Server private key file (*1)    | N        | 1        | Specify using postgresql.conf.  |
| Master encryption key file (*1) | N        | 1        | Specify the directory created as the key store using postgresql.conf. |
| Connection service file (*1)    | N        | 1        | Specify using environment variables.                                  |
| Password file (*1)              | N        | 1        | Specify using environment variables.                                  |
| CA certificate file (*1)        | N        | 1        | Specify using environment variables.                                  |

Y: Mandatory

N: Optional

\*1: Set manually when using the applicable feature.



### Note

- Do not use an NFS for UNIX-type files used in FUJITSU Enterprise Postgres except when creating a database space in a storage device on a network.
- When PRIMECLUSTER GDS is used, the PRIMECLUSTER GDS disk class cannot deploy the FUJITSU Enterprise Postgres resources below to the root class.  
Deploy these resources to the local class or the shared class.
  - Database cluster
  - Tablespace
  - Backup directory
- If anti-virus software is used, set scan exception settings for directories so that none of the files that comprise FUJITSU Enterprise Postgres are scanned for viruses. Alternatively, if the files that comprise FUJITSU Enterprise Postgres are to be scanned for viruses, stop FUJITSU Enterprise Postgres and perform the scan when tasks that use FUJITSU Enterprise Postgres are not operating.

## 1.6 Notes on Compatibility of Applications Used for Operations

When you upgrade FUJITSU Enterprise Postgres to a newer version, there may be some affect on applications due to improvements or enhancements in functionality.

Take this into account when creating applications so that you can maintain compatibility after upgrading to a newer version of FUJITSU Enterprise Postgres.



### See

Refer to "Notes on Application Compatibility" in the Application Development Guide for details.

# Chapter 2 Starting an Instance and Creating a Database

This chapter describes basic operations, from starting an instance to creating a database.

## 2.1 Starting and Stopping an Instance

This section describes how to start and stop an instance.

- [2.1.1 Using WebAdmin](#)
- [2.1.2 Using Server Commands](#)

### Point

To automatically start or stop an instance when the operating system on the database server is started or stopped, refer to "Configuring Automatic Start and Stop of an Instance" in the Installation and Setup Guide for Server and configure the settings.

### Note

The collected statistics are initialized if an instance is stopped in the "Immediate" mode or if it is abnormally terminated. To prepare for such initialization of statistics, consider regular collection of the statistics by using the SELECT statement. Refer to "The Statistics Collector" in "Server Administration" in the PostgreSQL Documentation for information on the statistics.

### 2.1.1 Using WebAdmin

WebAdmin enables you to start or stop an instance and check its operating status.

#### Starting an instance

Start an instance by using the [Instances] tab in WebAdmin.

 is displayed when an instance is stopped.

To start a stopped instance, click .

#### Stopping an instance

Stop an instance by using the [Instances] tab in WebAdmin.

 is displayed when an instance is active.

To stop an active instance, click .

#### Stop mode

Select the mode in which to stop the instance. The following describes the operations of the modes:

| Stop mode       | Connected clients  | Backup being executed using the command                       |
|-----------------|--|---|
| Smart mode (*1) | Waits for all connected clients to be disconnected.  | Waits for backups being executed using the command to finish. |
| Fast mode       | Rolls back all transactions being executed and forcibly disconnects clients.                                       | Terminates backups being executed using the command.          |
| Immediate mode  | All server processes are terminated immediately. Crash recovery is executed the next time the instance is started. |   |

\*1: When the processing to stop the instance in the Smart mode has started and you want to stop immediately, use the following procedure:

1. Restart the Web server feature of WebAdmin.
2. In the [Instances] tab, click .
3. In the [Instances] tab, click , and select the Immediate mode to stop the instance.

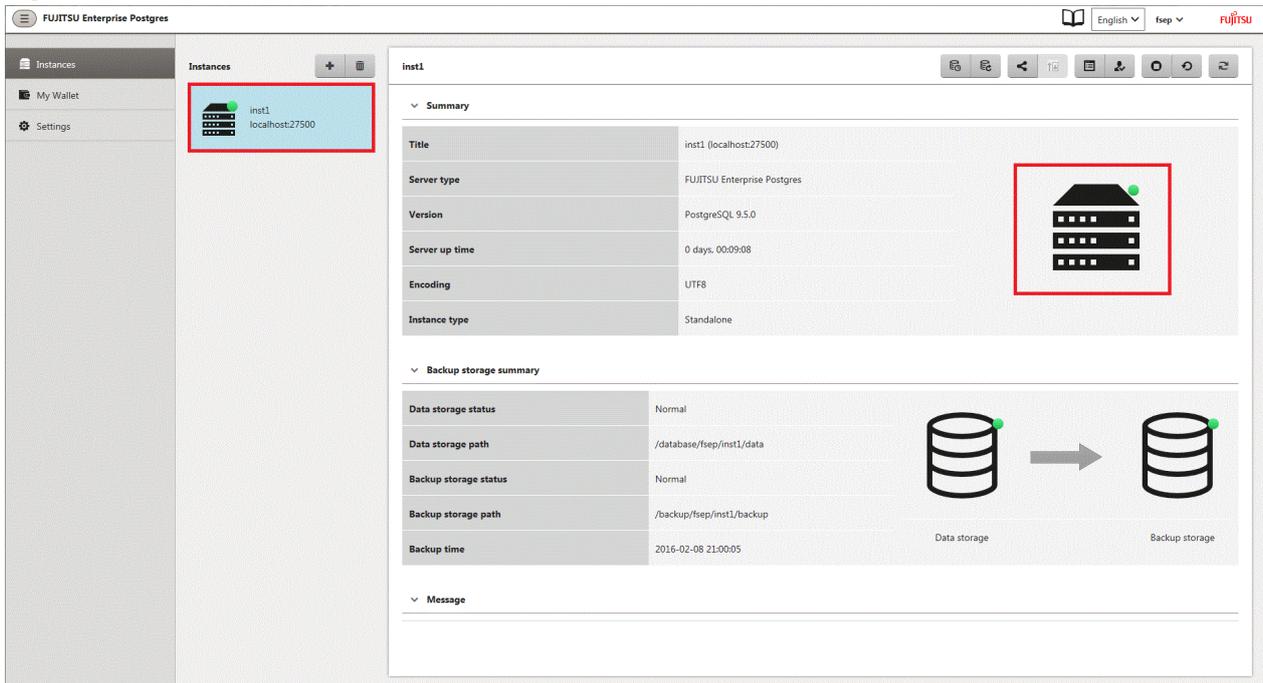
### Checking the operating status of an instance

You can check the operating status of an instance by using the [Instances] tab. The following indicators are used to show the status of a resource.

| Status indicator  | Explanation  |
|---|--|
|  | The resource is operating normally.  |
|  | The resource is stopped.   |
|  | There is an error in the resource.   |
|  | An operation is in progress on this resource or the status is being checked. |
|  | The resource is not operating optimally and needs intervention.              |

If an instance stops abnormally, remove the cause of the stoppage and start the instance by using WebAdmin.

Figure 2.1 Status when an instance is active



The screenshot displays the Fujitsu Enterprise Postgres WebAdmin interface. On the left, a sidebar contains navigation options: 'Instances', 'My Wallet', and 'Settings'. The main area is titled 'Instances' and shows a list of instances. One instance, 'inst1' (localhost:27500), is highlighted with a red box. To the right, the details for 'inst1' are shown. The 'Summary' section includes a table with the following information:

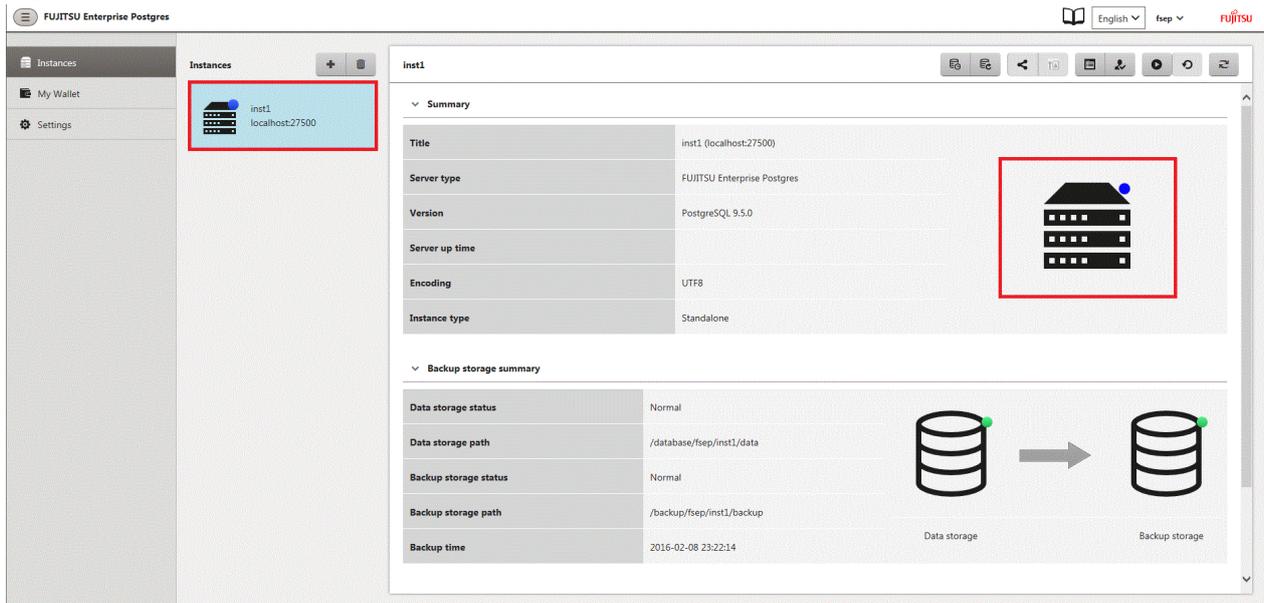
|                |                             |
|----------------|-----------------------------|
| Title          | inst1 (localhost:27500)     |
| Server type    | FUJITSU Enterprise Postgres |
| Version        | PostgreSQL 9.5.0            |
| Server up time | 0 days, 00:09:08            |
| Encoding       | UTF8                        |
| Instance type  | Standalone                  |

Below the summary table, there is a server icon with a green status indicator, also highlighted with a red box. The 'Backup storage summary' section includes another table:

|                       |                           |
|-----------------------|---------------------------|
| Data storage status   | Normal                    |
| Data storage path     | /database/fsep/inst1/data |
| Backup storage status | Normal                    |
| Backup storage path   | /backup/fsep/inst1/backup |
| Backup time           | 2016-02-08 21:00:05       |

Below this table, there is a diagram showing 'Data storage' (represented by a cylinder icon) and 'Backup storage' (represented by another cylinder icon), with an arrow pointing from data storage to backup storage. A 'Message' section is also visible at the bottom.

Figure 2.2 Status when an instance is stopped



### Note

- When operating WebAdmin, click  to update the status. WebAdmin will reflect the latest status of the operation or the instance resources from the server.
- If an error occurs while communicating with the server, there may be no response from WebAdmin. When this happens, close the browser and then log in again. If this does not resolve the issue, check the system log of the server and confirm whether a communication error has occurred.

## 2.1.2 Using Server Commands

Server commands enable you to start or stop an instance and check its operating status.

To use sever commands, configure the environment variables.

### See

Refer to "Configure the environment variables" in the procedure to create instances in "Using the initdb Command" in the Installation and Setup Guide for Server for information on configuring the environment variables.

### Starting an instance

Use the `pg_ctl` command to start an instance.

Specify the following values in the `pg_ctl` command:

- Specify "start" as the mode.
- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- It is recommended to specify the `-w` option, which causes the command to return after waiting for the instance to start. If the `-w` option is not specified, it may not be possible to determine if the starting of the instance completed successfully or if it failed.

If an application, command, or process tries to connect to the database while the instance is starting up, the message "FATAL:*the database system is starting up*(11189)" is output. However, this message may also be output if the instance is started with the `-w` option specified.

This message is output by the `pg_ctl` command to check if the instance has started successfully. Therefore, ignore this message if there are no other applications, commands, or processes that connect to the database.

### Example

```
> pg_ctl start -w -D /database/inst1
```

## Stopping an instance

Use the `pg_ctl` command to stop an instance.

Specify the following values in the `pg_ctl` command:

- Specify "stop" as the mode.
- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

### Example

```
> pg_ctl stop -D /database/inst1
```

## Checking the operating status of an instance

Use the `pg_ctl` command to check the operating status of an instance.

Specify the following values in the `pg_ctl` command:

- Specify "status" as the mode.
- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

### Example

When the instance is active:

```
> pg_ctl status -D /database/inst1
pg_ctl: server is running (PID: 1234)
```

When the instance is inactive:

```
> pg_ctl status -D /database/inst1
pg_ctl: no server running.
```

### See

Refer to "pg\_ctl" under "Reference" in the PostgreSQL Documentation for information on `pg_ctl` command.

## 2.2 Creating a Database

---

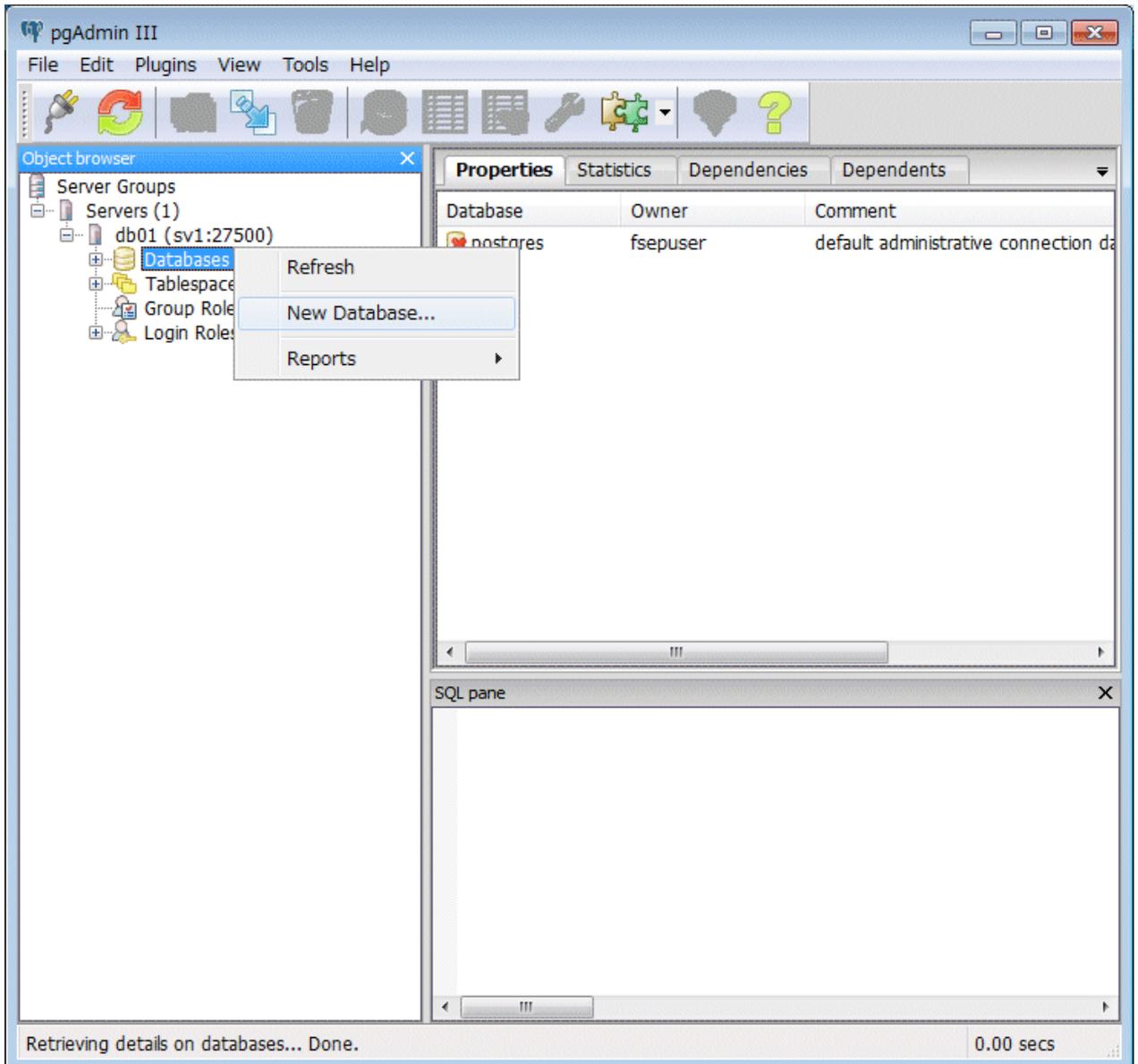
This section explains how to create a database.

- [2.2.1 Using pgAdmin](#)
- [2.2.2 Using Client Commands](#)

## 2.2.1 Using pgAdmin

Follow the procedure below to define a database using pgAdmin.

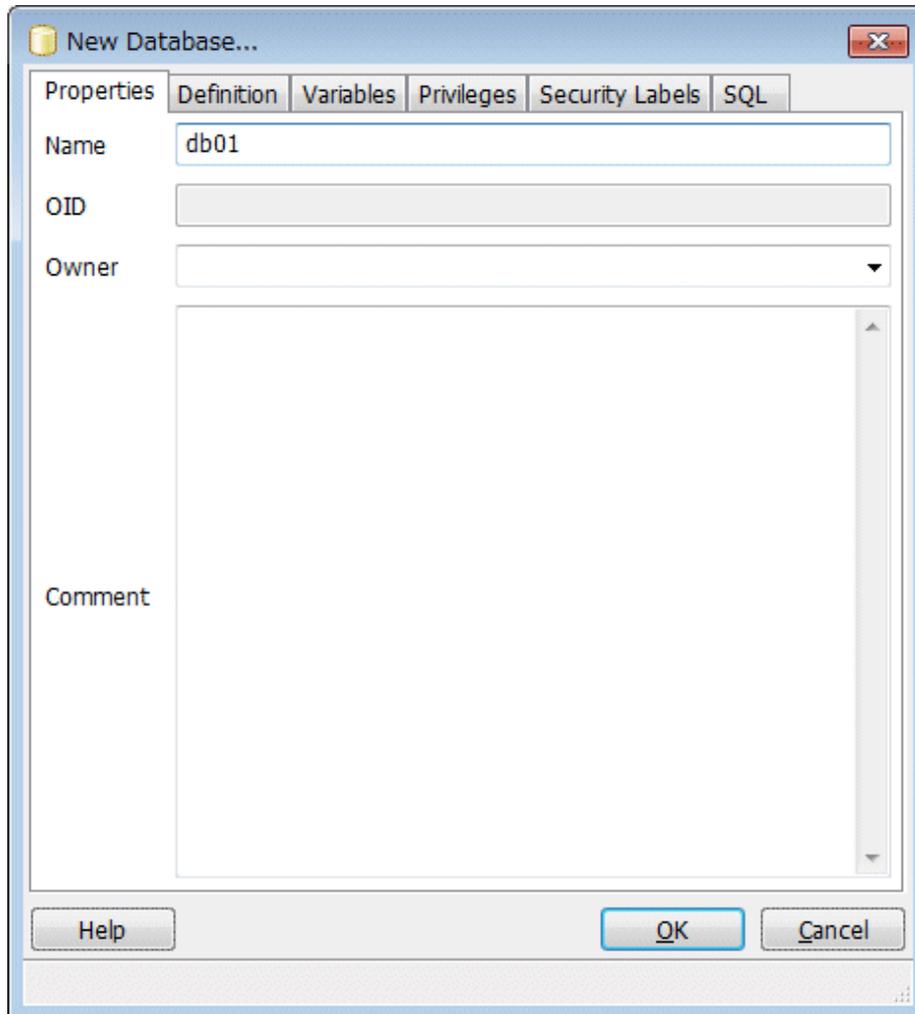
1. In the pgAdmin window, right-click [Database] in [Object browser], and then click [New Database] to display a new database window.



2. Specify appropriate values for the following items in the new database window.

- [Properties] tab

The following example illustrates creation of the database "db01".



- [Name]: Name of the database to be managed

3. Click [OK] to create the database.

## 2.2.2 Using Client Commands

Follow the procedure below to define a database using client commands.

An example of operations on the server is shown below.

1. Use psql command to connect to the postgres database.  
Execute psql postgres.

```
> psql postgres
psql (9.5.2)
Type "help" for help.
```

2. Create the database.

To create the database, execute the CREATE DATABASE databaseName; statement.

```
postgres=# CREATE DATABASE db01;
CREATE DATABASE
```

3. Confirm that the database is created.

Execute the \l+ command, and confirm that the name of the database created in step 2 is displayed.

```
postgres=# \l+
```

4. Disconnect from the postgres database.

Execute \q to terminate the psql command.

```
postgres=# \q
```

You can create a database using the createdb command.



See

.....  
Refer to "Creating a Database" in "Tutorial" in the PostgreSQL Documentation for information on creating a database using the createdb command.  
.....

# Chapter 3 Backing Up the Database

This chapter describes how to back up the database.

## Backup methods

The following backup methods enable you to recover data to a backup point or to the state immediately preceding disk physical breakdown or data logical failure.

- Backup using WebAdmin

This method enables you to back up data through intuitive window operations using the GUI.

WebAdmin is used for recovery.

- Backup using the `pgx_dmpall` command

Execute the `pgx_dmpall` command with a script to perform automatic backup.

To back up data automatically, you must register the process in the automation software of the operating system. Follow the procedure given in the documentation for your operating system.

The `pgx_rcvall` command is used for recovery.

## Approximate backup time

The formula for deriving the approximate backup time when you use WebAdmin or the `pgx_dmpall` command is as follows:

$$\text{backupTime} = \text{dataStorageDestinationUsage} / \text{diskWritePerformance} \times 1.5$$

- *dataStorageDestinationUsage*: Disk usage at the data storage destination
- *diskWritePerformance*: Maximum data volume (bytes/second) that can be written per second in the system environment where operation is performed
- 1.5: Coefficient to factor in tasks other than disk write (which is the most time-consuming step)



### Note

- Backup operation cannot be performed on an instance that is part of a streaming replication cluster in standby mode.
- Use the selected backup method continuously.

There are several differences, such as the data format, across the backup methods. For this reason, the following restrictions apply:

- It is not possible to use one method for backup and another for recovery.
- It is not possible to convert one type of backup data to a different type of backup data.
- There are several considerations for the backup of the keystore and backup of the database in case the data stored in the database is encrypted. Refer to the following for details:
  - [5.6.4 Backing Up and Recovering the Keystore](#)
  - [5.7 Backing Up and Restoring/Recovering the Database](#)
- If you have defined a tablespace, back it up. If you do not back it up, directories for the tablespace are not created during recovery, which may cause the recovery to fail. If the recovery fails, refer to the system log, create the tablespace, and then perform the recovery process again.



### Information

The following methods can also be used to perform backup. Performing a backup using these methods allows you to restore to the point when the backup was performed.

- Backup using an SQL-based dump

Dump the data by using SQL. This backup method also enables data migration.

- File system level backup

This backup method requires you to stop the instance and use OS commands to backup database resources as files.

- Backup by continuous archiving

This is the standard backup method for PostgreSQL.

Refer to "Backup and Restore" in "Server Administration" in the PostgreSQL Documentation for information on these backup methods.

---

## 3.1 Periodic Backup

---

It is recommended that you perform backup periodically.

Backing up data periodically using WebAdmin or the `pgx_dmpall` command has the following advantages:

- This method reduces disk usage, because obsolete archive logs (transaction logs copied to the backup data storage destination) are deleted. It also minimizes the recovery time when an error occurs.

### Backup cycle

The time interval when backup is performed periodically is called the backup cycle. For example, if backup is performed every morning, the backup cycle is 1 day.

The backup cycle depends on the jobs being run, but on FUJITSU Enterprise Postgres it is recommended that operations are run with a backup cycle of at least once per day.

## 3.2 Backup Methods

---

This section describes the methods for backing up the database.

- [3.2.1 Using WebAdmin](#)
- [3.2.2 Using Server Commands](#)

### 3.2.1 Using WebAdmin

---

You can use WebAdmin to perform backup and check the backup status.



If the data to be stored in the database is to be encrypted, it is necessary to enable the automatic opening of the keystore before doing so. Refer to "[5.6.3 Enabling Automatic Opening of the Keystore](#)" for details.

---



WebAdmin uses the labels "Data storage path", "Backup storage path" and "Transaction log path" to indicate "data storage destination", "backup data storage destination" and "transaction log storage destination" respectively. In this manual these terms are used interchangeably.

---

### Backup operation

Follow the procedure below to back up the database.

1. Select the database to back up

In the [Instances] tab, select the instance to be backed up and click .

## 2. Back up the database

The [Backup] dialog box is displayed. To perform backup, click [Yes].  
An instance is automatically started when backup is performed.

### Backup status

If an error occurs and backup fails, [Error] is displayed adjacent to [Data storage destination] or [Backup data storage destination] in the [Instances] tab. An error message is also displayed in the message list.

In this case, the backup data is not optimized. Ensure that you check the backup result whenever you perform backup. If backup fails, [Solution] appears to the right of the error message. Clicking this button displays information explaining how to resolve the cause of the error. Remove the cause of failure, and perform backup again.

The screenshot shows the Fujitsu Enterprise Postgres management console. On the left, there is a sidebar with 'Instances', 'My Wallet', and 'Settings'. The main area displays the 'Instances' tab with a list of instances, including 'inst1' (localhost:27500). The details for 'inst1' are shown in a summary view. The 'Backup storage summary' section contains the following information:

| Backup storage summary |                           |
|------------------------|---------------------------|
| Data storage status    | Normal                    |
| Data storage path      | /database/feep/inst1/data |
| Backup storage status  | Normal                    |
| Backup storage path    | /backup/feep/inst1/backup |
| Backup time            | 2016-02-08 21:00:05       |

Below the table, there is a diagram showing 'Data storage' (represented by a cylinder icon) and 'Backup storage' (represented by a cylinder icon) with an arrow pointing from data storage to backup storage. The 'Backup storage status' field in the table is highlighted with a red box.



### Note

If the data to be stored in the database is to be encrypted, it is necessary to enable the automatic opening of the keystore before doing so. Refer to "[5.6.3 Enabling Automatic Opening of the Keystore](#)" for details.

## 3.2.2 Using Server Commands

Use the `pgx_dmpall` command and `pgx_rcvall` command to perform backup and check the backup result.

### Preparing for backup

You must prepare for backup before actually starting the backup process.

Follow the procedure below.



### See

Refer to "Preparing Directories to Deploy Resources" in the Installation and Setup Guide for Server for information on the location of directories required for backup and for points to take into account.

1. Prepare the backup data storage disk

For backup, prepare a separate disk unit from the database storage disk and mount it using the operating system commands.

2. Create a directory where the backup data will be stored

Create an empty directory.

Set appropriate permissions so that only the instance administrator can access the directory.

Example

```
# mkdir /backup/inst1
# chown fsepuser:fsepuser /backup/inst1
# chmod 700 /backup/inst1
```

3. Specify the settings required for backup

Stop the instance, and set the following parameters in the postgresql.conf file.

Start the instance after editing the postgresql.conf file.

| Parameter name     | Setting   | Description   |
|--------------------|---|---|
| backup_destination | Name of the directory where the backup data will be stored  | Specify the name of the directory where the backup data will be stored.<br><br>Appropriate privileges that allow only the instance administrator to access the directory must already be set.<br><br>Place the backup data storage destination directory outside the data storage destination directory, the tablespace directory, and the transaction log storage destination directory. |
| wal_level          | archive or hot_standby(*1)  | Specify the output level for the transaction log.<br><br>*1: hot_standby is a setting for streaming replication.  |
| archive_mode       | on  | Specify the archive log mode.<br><br>Specify [on] (execute).  |
| archive_command    | ' <i>installationDirectory</i> /bin/pgx_xlogcopy.cmd "%p"<br>" <i>backupDataStorageDestinationDirectory</i> /archived_xlog/%f'' | Specify the path name of the command that will save the transaction log and the storage destination.  |

Refer to "[Appendix A Parameters](#)" and "Write Ahead Log" under "Server Administration" in the PostgreSQL Documentation for information on the parameters.

**Backup operation**

Use the pgx\_dmpall command to perform backup. You can even embed the pgx\_dmpall command in OS automation software to perform backup.

The backup data is stored in the directory specified in the backup\_destination parameter of postgresql.conf.

Specify the data storage destination in the -D option. If the -D option is omitted, the value of the PGDATA environment variable is used by default.

## Example

```
> pgx_dmpall -D /database/inst1
```

## Note

Backup stores the data obtained during the backup and the backup data of the data obtained during previous backup.

If the data to be stored in the database is encrypted, refer to the following and back up the keystore:

- [5.6.4 Backing Up and Recovering the Keystore](#)

## Backup status

Use the `pgx_rcvall` command to check the backup status.

Specify the following values in the `pgx_rcvall` command:

- The `-l` option indicates backup data information.
- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

```
> pgx_rcvall -l -D /database/inst1
Date                Status             Dir
2015-05-01 13:30:40 COMPLETE          /backup/inst1/2015-05-01_13-30-40
```

If an error occurs and backup fails, a message is output to the system log.

In this case, the backup data is not optimized. Ensure that you check the backup result whenever you perform backup. If backup fails, remove the cause of failure and perform backup again.

## See

Refer to "pgx\_dmpall" and "pgx\_rcvall" in the Reference for information on the `pgx_dmpall` command and `pgx_rcvall` command.

## Setting a restore point

In case you want to recover your database to a certain point in time, you can name this particular point in time, which is referred to as the restore point, by using the `psql` command.

By setting a restore point before executing an application, it becomes easy to identify up to which point in time the data will be reverted.

A restore point can be set to any point in time after a backup is executed. However, if a restore point is set before a backup is executed, the database cannot be recovered to that point in time. This is because restore points are recorded in the archive logs, and the archive logs are discarded when backups are executed.

## Example

The following example uses the `psql` command to connect to the database and execute the SQL statement to set a restore point.

However, when considering continued compatibility of applications, do not use functions directly in SQL statements. Refer to "Notes on Application Compatibility" in the Application Development Guide for details.

```
postgres=# SELECT pg_create_restore_point('batch_20150503_1');
LOG:  restore point "batch_20150503_1" created at 0/20000E8
STATEMENT:  select pg_create_restore_point('batch_20150503_1');
pg_create_restore_point
-----
```

```
0/20000E8
(1 row)
```

Refer to "[10.3.2 Using the pgx\\_rcvall Command](#)" for information on using a restore point to recover the database.

### Note

- Name restore points so that they are unique within the database. Add the date and time of setting a restore point to distinguish it from other restore points, as shown below:
  - YYMMDD\_HHMMSS
    - YYMMDD: Indicates the date
    - HHMMSS: Indicates the time
- There is no way to check restore points you have set. Keep a record in, for example, a file.

### See

Refer to "System Administration Functions" under "Functions and Operators" in the PostgreSQL Documentation for information on `pg_create_restore_point`.

# Chapter 4 Configuring Secure Communication Using Secure Sockets Layer

If communication data transferred between a client and a server contains confidential information, encrypting the communication data can protect it against threats, such as eavesdropping on the network.

## 4.1 Configuring Communication Data Encryption

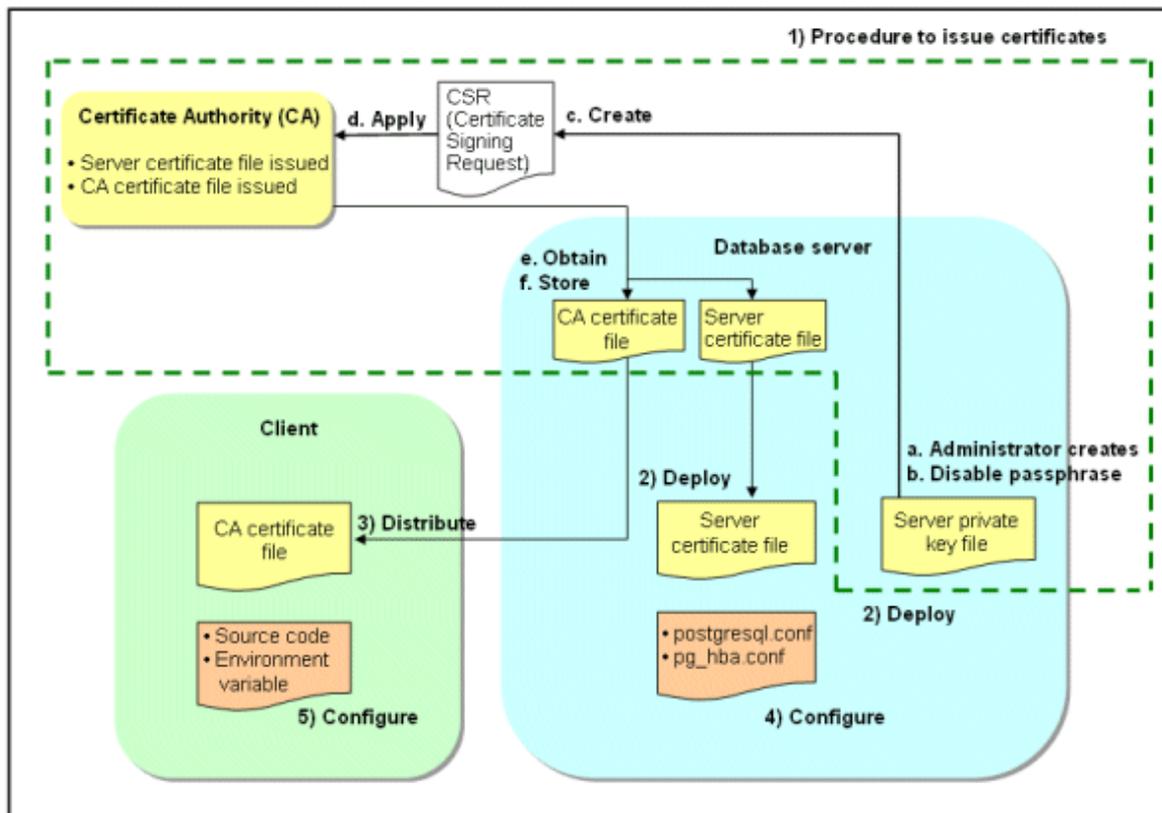
To encrypt communication data transferred between a client and a server, configure communication data encryption as described below. Communication data encryption not only protects the communication content, but it also guards against man-in-the-middle (MITM) attacks (for example, data and password theft through server impersonation).

Table 4.1 Configuration procedure

| Configuration procedure   |
|---|
| 1) Issue a certificate  |
| 2) Deploy a server certificate file and a server private key file |
| 3) Distribute a CA certificate file to the client                 |
| 4) Configure the operating environment for the database server    |
| 5) Configure the operating environment for the client             |

The following figure illustrates the environment for communication data encryption.

Figure 4.1 Environment for communication data encryption



## 4.1.1 Issuing a Certificate

---

For authenticating servers, you must acquire a certificate issued by the certificate authority (CA).

FUJITSU Enterprise Postgres supports X.509 standard PEM format files. If the certificate authority issues a file in DER format, use a tool such as the openssl command to convert the DER format file to PEM format.

The following provides an overview of the procedure. Refer to the procedure published by the public or independent certificate authority (CA) that provides the certificate file for details.

- a. Create a server private key file
- b. Disable the passphrase for the server private key file
- c. Create a CSR (signing request for obtaining a server certificate) from the server private key file
- d. Apply to the certificate authority (CA) for a server certificate
- e. Obtain a server certificate file and a CA certificate file from the certificate authority (CA)
- f. Store the server certificate file and the CA certificate file

Note: If you lose or destroy the certificates, you will need to have them re-issued.

The above procedure enables you to prepare the following files:

- Server private key file
- Server certificate file
- CA certificate file

## 4.1.2 Deploying a Server Certificate File and a Server Private Key File

---

Create a directory on the local disk of the database server and store the server certificate file and the server private key file in it.

Use the operating system features to set access privileges for the server certificate file and the server private key file so that only the database administrator has load privileges.

Back up the server certificate file and the server private key file in the event that data corruption occurs and store them securely.

## 4.1.3 Distributing a CA Certificate File to the Client

---

Create a directory on the local disk of the client and place the distributed CA certificate file there. Use the operating system features to set load privileges to protect the CA certificate file against accidental deletion.

## 4.1.4 Configuring the Operating Environment for the Database Server

---



See

.....  
Refer to "Secure TCP/IP Connections with SSL" under "Server Administration" in the PostgreSQL Documentation for details.  
.....

## 4.1.5 Configuring the Operating Environment for the Client

---



See

.....  
Refer to the following sections in the Application Development Guide for details, depending on your application development environment:

- "Settings for Encrypting Communication Data" under "Setup" in "JDBC Driver"
  - "Settings for Encrypting Communication Data" under "Setup" in "C Library (libpq)"
  - "Settings for Encrypting Communication Data" under "Setup" in "Embedded SQL in C"
- .....

## 4.1.6 Performing Database Multiplexing

---

When you perform communication that uses database multiplexing and a Secure Socket Layer server certificate, certificates with the same "Common Name" must be used. To ensure this, take one of the following actions:

- Create one server certificate, replicate it, and place a copy on each server used for database multiplexing.
- Create a server certificate with the same "Common Name" for each server used for database multiplexing.



See

.....  
Refer to "Using the Application Connection Switch Feature" in the Application Development Guide for information on how to specify applications on the client.  
.....

# Chapter 5 Protecting Storage Data Using Transparent Data Encryption

This chapter describes how to encrypt data to be stored in the database.

## 5.1 Protecting Data Using Encryption

With PostgreSQL, data in a database is protected from access by unauthorized database users through the use of authentication and access controls. However, the OS file is not protected from attackers who bypass the database server's authentication and access controls.

With FUJITSU Enterprise Postgres, data inside the OS file is encrypted, so valuable information is protected even if the file or disk is stolen.

Data to be stored in a database is encrypted when it is written to the data file, and decrypted when it is read.

This is performed automatically by the instance, so the user and the application need not be aware of key management and encryption or decryption. This process is called TDE (Transparent Data Encryption).

The characteristics of TDE are described below.

### Encryption mechanisms

#### Two-layer encryption key and the keystore

In each tablespace, there is a tablespace encryption key that encrypts and decrypts all the data within. The tablespace encryption key is encrypted by the master encryption key and saved.

Only one master encryption key exists in a database cluster. It is encrypted based on a passphrase specified by the user and stored in a keystore. FUJITSU Enterprise Postgres provides a file-based keystore. Attackers who do not know the passphrase cannot read the master encryption key from the keystore.

#### Strong encryption algorithms

TDE uses the Advanced Encryption Standard (AES) as its encryption algorithm. AES was adopted as a standard in 2002 by the United States Federal Government, and is used throughout the world.

#### Faster encryption and decryption based on hardware

TDE minimizes the overhead of encryption and decryption by using the AES-NI (Advanced Encryption Standard New Instructions) built into Intel(R) Xeon(R) processors since the 5600 series. This means that even in situations where previously the minimum encryption target was selected as a tradeoff between performance and security, it is now possible to encrypt all the data of an application.

You can reference a list of processors equipped with AES-NI on the following page at Intel Corporation's website:

<http://ark.intel.com/search/advanced/?s=t&AESTech=true>

#### Zero overhead storage areas

Encryption does not change the size of data stored in tables, indexes, or WAL. There is, therefore, no need for additional estimates or disks.

### Scope of encryption

#### All user data within the specified tablespace

The tablespace is the unit for specifying encryption. All tables, indexes, temporary tables, and temporary indexes created in the encrypted tablespace are encrypted. There is no need for the user to consider which tables and strings to encrypt.

#### Backup data

The `pgx_dmpall` command and `pg_basebackup` command create backup data by copying the OS file. Backups of the encrypted data are, therefore, also encrypted. Information is protected from leakage even if the backup medium is stolen.

#### WAL and temporary files

WAL, which is created by updating encrypted tables and indexes, is encrypted with the same security strength as the update target. When large merges and sorts are performed, the encrypted data is written to a temporary file in encrypted format.

## Streaming replication support

You can combine streaming replication and transparent data encryption. The data and WAL encrypted on the primary server is transferred to the standby server in its encrypted format and stored.

### Note

The following are not encrypted:

- `pg_dump` and `pg_dumpall` output files
- Files output by the `COPY` command
- Notification event payloads that communicate using the `LISTEN` or `NOTIFY` command

## 5.2 Setting the Master Encryption Key

To use transparent data encryption, you must create a keystore and set the master encryption key.

1. In the `keystore_location` parameter of `postgresql.conf`, specify the directory to store the keystore.

Specify a different location for each database cluster.

```
keystore_location = '/key/store/location'
```

Refer to "[Appendix A Parameters](#)" for information on `postgresql.conf`.

After editing the `postgresql.conf` file, either start or restart the instance.

- Using WebAdmin

Refer to "[2.1.1 Using WebAdmin](#)", and restart the instance.

- Using the `pg_ctl` command

Specify the following in the `pg_ctl` command:

- Specify "restart" as the mode.
- Specify the data storage destination directory in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the `-w` option. This means that the command returns after waiting for the instance to start. If the `-w` option is not specified, it may not be possible to determine if the starting of the instance completed successfully or if it failed.

Example

```
> pg_ctl restart -w -D /database/inst1
```

2. Execute an SQL function, such as the one below, to set the master encryption key. This must be performed by the superuser. Execute it as the database superuser.

```
SELECT pgx_set_master_key('passphrase');
```

The value "passphrase" is the passphrase that will be used to open the keystore. The master encryption key is protected by this passphrase, so avoid specifying a short simple string that is easy to guess.

Refer to "[B.2 Transparent Data Encryption Control Functions](#)" for information on the `pgx_set_master_key` function.

### Note

Note that if you forget the passphrase, you will not be able to access the encrypted data. There is no method to retrieve a forgotten passphrase and decrypt data. Do not, under any circumstances, forget the passphrase.

The `pgx_set_master_key` function creates a file with the name `keystore.ks` in the keystore storage destination. It also creates a master encryption key from random bit strings, encrypts it with the specified passphrase, and stores it in `keystore.ks`. At this point, the keystore is open.

---

## 5.3 Opening the Keystore

---

To create encrypted tablespaces and access the encrypted data, you must first open the keystore. When you open the keystore, the master encryption key is loaded into the database server memory and becomes usable for encryption and decryption.

You need to open the keystore each time you start the instance. To open the keystore, the database superuser must execute the following SQL function.

```
SELECT pgx_open_keystore('passphrase');
```

The value "passphrase" is the passphrase specified during creation of the keystore.

Refer to "[B.2 Transparent Data Encryption Control Functions](#)" for information on the `pgx_open_keystore` function.

Note that, in the following cases, the passphrase must be entered when starting the instance, because the encrypted WAL must be decrypted for recovery. In this case, the above-mentioned `pgx_open_keystore` function cannot be executed.

- If performing crash recovery at the time of starting the instance
- If performing recovery using continuous archiving

For the above cases, specify the `--keystore-passphrase` option in the `pg_ctl` command, and then start the instance. This will display the prompt for the passphrase to be entered, as shown below.

```
> pg_ctl --keystore-passphrase start
Enter the passphrase:
The server is starting
>
```



### Point

---

When using an automatically opening keystore, you do not need to enter the passphrase and you can automatically open the keystore when the database server starts. Refer to "[5.6.3 Enabling Automatic Opening of the Keystore](#)" for details.

---

## 5.4 Encrypting a Tablespace

---

The keystore must be open before you can create an encrypted tablespace.

When creating a tablespace that will be encrypted, configure the encryption algorithm in the runtime parameters. For example, to create a tablespace with the name `secure_tablespace` using AES with a key length of 256 bits as the encryption algorithm, configure as shown below.

```
-- Specify the encryption algorithm for the tablespace to be created below
SET tablespace_encryption_algorithm = 'AES256';
CREATE TABLESPACE secure_tablespace LOCATION '/My/Data/Dir';
-- Specify that the tablespace to be created below is not to be encrypted
SET tablespace_encryption_algorithm = 'none';
```

Or

```
CREATE TABLESPACE secure_tablespace LOCATION '/My/Data/Dir' tablespace_encryption_algorithm =
'AES256';
```

You can use AES with a key length of 128 bits or 256 bits as the encryption algorithm. It is recommended that you use 256-bit AES. Refer to "[Appendix A Parameters](#)" for information on how to specify the runtime parameters.

If user provides both GUC and command line options while creating the tablespace, the preference is given to the command line option.

The `pg_default` and `pg_global` tablespaces cannot be encrypted.

Create tables and indexes in the encrypted tablespace that you created. Relations created in the encrypted tablespace are automatically encrypted.



## Example

Example 1: Specifying an encrypted tablespace when creating it

```
CREATE TABLE my_table (...)  
    TABLESPACE secure_tablespace;
```

Example 2: Not explicitly specifying a tablespace when creating it and instead using the default tablespace

```
SET default_tablespace = 'secure_tablespace';  
CREATE TABLE my_table (...);
```

The process is the same for encrypting temporary tables and temporary indexes. In other words, either explicitly specify the `TABLESPACE` clause or list encrypted tablespaces in the `temp_tablespaces` parameter, and then execute `CREATE TEMPORARY TABLE` or `CREATE INDEX`.

If you specify an encrypted tablespace in the `TABLESPACE` clause of the `CREATE DATABASE` statement when creating a database, relations that you create in the database without explicitly specifying a tablespace will be encrypted. Furthermore, the system catalog is also encrypted, so the source code of user-defined functions is also protected.



## Note

An encrypted tablespace cannot be created from the window used for creating the pgAdmin tablespace, or from the query tool. To create an encrypted tablespace, click [PSQL Console] from the [Plugins] menu and create an encrypted tablespace in the psql console window.

## 5.5 Checking an Encrypted Tablespace

The `pgx_tablespaces` system view displays information about whether each tablespace has been encrypted, and about the encryption algorithm. Refer to "[C.1 pgx\\_tablespaces](#)" for information on strings.

You can discover which tablespaces have been encrypted by executing the following SQL statements.

However, when considering continued compatibility of applications, do not reference system catalogs (`pg_tablespace`) directly in SQL statements.

```
SELECT spcname, spcencalgo  
FROM pg_tablespace ts, pgx_tablespaces tsx  
WHERE ts.oid = tsx.spctablespace;
```



## Example

```
postgres=# SELECT spcname, spcencalgo FROM pg_tablespace ts, pgx_tablespaces tsx WHERE ts.oid =  
tsx.spctablespace;  
   spcname   | spcencalgo  
-----+-----  
pg_default   | none  
pg_global    | none  
secure_tablespace | AES256  
(3 rows)
```



See

Refer to "Notes on Application Compatibility" in the Application Development Guide for information on how to maintain application compatibility.

## 5.6 Managing the Keystore

This section describes how to manage the keystore and the master encryption key to guard against the threat of theft.

### 5.6.1 Changing the Master Encryption Key

Using the same encryption key for an extended period gives attackers an opportunity to decipher the encrypted data. It is recommended that you change the key at regular intervals, or whenever the key is exposed to risk.

Adhere to the industry's best practices for encryption algorithms and key management when considering how often the key should be changed. For example, the NIST in the United States has published "NIST Special Publication 800-57". The PCI DSS also refers to this publication. This publication recommends changing the master encryption key once a year.

To change the master encryption key, execute the `pgx_set_master_key` function, which is the same function used for configuring the key. Refer to "[5.2 Setting the Master Encryption Key](#)" for details.

After changing the master encryption key, you must immediately back up the keystore.

### 5.6.2 Changing the Keystore Passphrase

In security policies for organizations, it is usually a requirement that the passphrase be changed whenever a security administrator who knows the passphrase is removed from duties due to transfer or retirement. It is also recommended that the passphrase be changed if it is ever exposed to risks due to deception such as social engineering.

To change the keystore passphrase, execute the following SQL function as a superuser.

```
SELECT pgx_set_keystore_passphrase('oldPassphrase', 'newPassphrase');
```

After changing the passphrase, you must immediately back up the keystore.

Refer to "[B.2 Transparent Data Encryption Control Functions](#)" for information on the `pgx_set_keystore_passphrase` function.

### 5.6.3 Enabling Automatic Opening of the Keystore

When using an automatically opening keystore, you do not need to enter the passphrase and you can automatically open the keystore when the instance starts. Execute the `pgx_keystore` command to enable automatic opening of the keystore.

```
> pgx_keystore --enable-auto-open /key/store/location/keystore.ks
Enter the passphrase:
Automatic opening of the keystore is now enabled
>
```



See

Refer to "`pgx_keystore`" in the Reference for information on `pgx_keystore` command.

When automatic opening is enabled, an automatically opening keystore is created in the same directory as the original keystore. The file name of the automatically opening keystore is `keystore.aks`. The file `keystore.aks` is an obfuscated copy of the decrypted content of the `keystore.ks` file. As long as this file exists, there is no need to enter the passphrase to open the keystore when starting the instance.

Do not delete the original keystore file, `keystore.ks`. It is required for changing the master encryption key and the passphrase. When you change the master encryption key and the passphrase, `keystore.aks` is recreated from the original keystore file, `keystore.ks`.

Protect `keystore.ks`, `keystore.aks`, and the directory that stores the keystore so that only the user who starts the instance can access them.

Configure the permission of the files so that only the user who starts the instance can access the SQL functions and commands that create these files. Accordingly, manually configure the same permission mode if the files are restored.

### Example

```
# chown -R fsepuser:fsepuser /key/store/location
# chmod 700 /key/store/location
# chmod 600 /key/store/location/keystore.ks
# chmod 600 /key/store/location/keystore.aks
```

An automatically opening keystore will only open on the computer where it was created.

To disable automatic opening of the keystore, delete keystore.aks.

### Note

- To use WebAdmin for recovery, you must enable automatic opening of the keystore.
- Refer to "[5.7 Backing Up and Restoring/Recovering the Database](#)" after enabling or reconfiguring encryption to back up the database.
- Specify a different directory from those below as the keystore storage destination:
  - Data storage destination
  - Tablespace storage destination
  - Transaction log storage destination
  - Backup data storage destination

## 5.6.4 Backing Up and Recovering the Keystore

Back up the keystore at the following times in case it is corrupted or lost. Note that you must store the database and the keystore on separate data storage media. Storing both on the same data storage medium risks the danger of the encrypted data being deciphered if the medium is stolen. A passphrase is not required to open an automatically opening keystore, so store this type of keystore in a safe location.

- When the master encryption key is first configured
- When the master encryption key is changed
- When the database is backed up
- When the keystore passphrase is changed

### Point

Do not overwrite an old keystore when backing up a keystore. This is because during database recovery, you must restore the keystore to its state at the time of database backup. When the backup data of the database is no longer required, delete the corresponding keystore.

### Example

- Back up the database and the keystore on May 1, 2015.

```
> pgx_dmpall -D /database/inst1
> cp -p /key/store/location/keystore.ks /keybackup/keystore_20150501.ks
```

Specify the following in the pgx\_dmpall command:

- Specify the data storage destination in the -D option. If the -D option is omitted, the value of the PGDATA environment variable is used by default.

- Change the master encryption key, and back up the keystore on May 5, 2015.

```
> psql -c "SELECT pgx_set_master_key('passphrase') " postgres
> cp -p /key/store/location/keystore.ks /keybackup/keystore_20150505.ks
```

Specify the following in the psql command:

- Specify the SQL function that sets the master encryption key in the -c option.
- Specify the name of the database to be connected to as the argument.

.....

If the keystore is corrupted or lost, restore the keystore containing the latest master encryption key. If there is no keystore containing the latest master encryption key, restore the keystore to its state at the time of database backup, and recover the database from the database backup. This action recovers the keystore to its latest state.

## Example

.....

- Restore the keystore containing the latest master encryption key as of May 5, 2015.

```
> cp -p /keybackup/keystore_20150505.ks /key/store/location/keystore.ks
```

- If there is no backup of the keystore containing the latest master encryption key, recover the keystore by restoring the keystore that was backed up along with the database on 1 May 2015.

```
> cp -p /keybackup/keystore_20150501.ks /key/store/location/keystore.ks
> pgx_rcvall -B /backup/inst1 -D /database/inst1 --keystore-passphrase
```

Specify the following in the pgx\_rcvall command:

- Specify the data storage directory in the -D option. If the -D option is omitted, the value of the PGDATA environment variable is used by default.
  - Specify the backup data storage directory in the -B option.
  - The --keystore-passphrase option prompts you to enter the passphrase to open the keystore.
- .....

If you have restored the keystore, repeat the process of enabling automatic opening of the keystore. This ensures that the contents of the automatically opening keystore (keystore.aks) are identical to the contents of the restored keystore.

It is recommended that you do not back up the automatically opening keystore file, keystore.aks. If the database backup medium and the backup medium storing the automatically opening keystore are both stolen, the attacker will be able to read the data even without knowing the passphrase.

If the automatically opening keystore is corrupted or lost, you must again enable automatic opening. The keystore.aks file will be recreated from keystore.ks at this time.

## See

.....

Refer to "pgx\_rcvall" and "pgx\_dmpall" in the Reference for information on the pgx\_rcvall and pgx\_dmpall commands.

Refer to "psql" under "Reference" in the PostgreSQL Documentation for information on the psql command.

Refer to "[B.2 Transparent Data Encryption Control Functions](#)" for information on the pgx\_set\_master\_key function.

Refer to "[5.6.3 Enabling Automatic Opening of the Keystore](#)" for information on how to enable automatic opening of the keystore.

.....

## 5.7 Backing Up and Restoring/Recovering the Database

---

FUJITSU Enterprise Postgres enables you to use the five backup and recovery methods described below. Regardless of the method you use, you must back up the keystore at the same time.

Note that you must store the database and the keystore on separate data storage media. Storing both on the same data storage medium risks the danger of the encrypted data being deciphered if the medium is stolen.

## Backup and recovery using WebAdmin

### - Backup

WebAdmin backs up encrypted data.

Back up the key store after backing up the database.

### - Recovery

Restore the keystore to its state at the time of database backup. Refer to "[5.6.4 Backing Up and Recovering the Keystore](#)" for details.

Enable automatic opening of the keystore in accordance with the procedure described in "[5.6.3 Enabling Automatic Opening of the Keystore](#)". Then, use WebAdmin to recover the database.

## Backup and recovery using the `pgx_dmpall` and `pgx_rcvall` commands

### - Backup

The `pgx_dmpall` command backs up the encrypted data.

Back up the key store after backing up the database.

### - Recovery

Restore the keystore to its state at the time of the database backup.

Configure automatic opening of the key store as necessary.

If automatic opening of the keystore is not enabled, execute the `pgx_rcvall` command with the `--keystore-passphrase` option specified. This will display the prompt for the passphrase to be entered.

## Example

---

### - Back up the database and the keystore on May 1, 2015.

```
> pgx_dmpall -D /database/inst1
> cp -p /key/store/location/keystore.ks /keybackup/keystore_20150501.ks
```

Specify the following in the `pgx_dmpall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

### - Recover the database and the keystore from the backup taken on May 1, 2015.

```
> cp -p /keybackup/keystore_20150501.ks /key/store/location/keystore.ks
> pgx_keystore --enable-auto-open /key/store/location/keystore.ks (Execute only when enabling
automatic opening)
> pgx_rcvall -B /backup/inst1 -D /database/inst1 --keystore-passphrase
```

Specify the following in the `pgx_rcvall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
  - Specify the backup data storage directory in the `-B` option.
  - The `--keystore-passphrase` option prompts you to enter the passphrase to open the keystore.
-

## Dump and restore using SQL

### - Backup

The files output by the `pg_dump` and `pg_dumpall` commands are not encrypted. You should, therefore, encrypt the files using OpenSSL commands or other means before saving them, as described in "[5.8 Importing and Exporting the Database](#)" below.

Back up the key store after backing up the database.

### - Restore

If the backup data has been encrypted using, for example Open SSL commands, decrypt that data.

The data generated by the `pg_dumpall` command includes a specification to encrypt tablespaces by For this reason, the `pg_restore` command encrypts tablespaces during restoration.

## File system level backup and restore

### - Backup

Stop the instance and backup the data directory and the tablespace directory using the file copy command of the operating system. The files of encrypted tablespaces are backed up in the encrypted state.

Back up the key store after performing the backup.

### - Restore

Restore the keystore to its state at the time of the database backup.

Stop the instance and restore the data directory and the tablespace directory using the file copy command of the operating system.

## Continuous archiving and point-in-time recovery

### - Backup

The `pg_basebackup` command backs up the encrypted data as is.

Back up the key store after performing the backup.

### - Recovery

Restore the keystore to its state at the time of the database backup.

Configure automatic opening of the key store as necessary.

If automatic opening of the keystore is not enabled, execute the `pg_ctl` command to start the instance with the `--keystore-passphrase` option specified. This will display the prompt for the passphrase to be entered.



## See

- Refer to "`pg_ctl`" under "Reference" in the PostgreSQL Documentation for information on the `pg_ctl` command.

- Refer to "Reference" in the PostgreSQL Documentation for information on the following commands:

- `psql`

- `pg_dump`

- `pg_restore`

- `pg_basebackup`

- Refer to the Reference for information on the following commands:

- `pgx_rcvall`

- `pgx_dmpall`

- `pg_dumpall`

If you have restored the keystore, repeat the process of enabling automatic opening of the keystore. This ensures that the contents of the automatically opening keystore (keystore.aks) are identical to the contents of the restored keystore.

Refer to "[5.6.3 Enabling Automatic Opening of the Keystore](#)" for information on how to enable automatic opening of the keystore.

## 5.8 Importing and Exporting the Database

---

The files output by the COPY TO command are not encrypted. Therefore, when transferring files to other systems, you should encrypt files using OpenSSL commands or other means and use scp or sftp to encrypt the data being transferred.

Use a safe method to delete obsolete plain text files.

You can use the following methods to safely delete files:

- shred command



### Example

```
# Export the contents of the table my_table to a CSV file.
> psql -c "COPY my_table TO '/tmp/my_table.csv' (FORMAT CSV)" postgres

# Encrypt the exported file.
> openssl enc -e -aes256 -in my_table.csv -out my_table.csv.enc
(The user is prompted to enter the passphrase to be used for encryption)

# Safely delete plain text files.
> shred -u -x my_table.csv
(Transfer encrypted files to other systems)

# Decrypt the encrypted files on other systems.
> openssl enc -d -aes256 -in my_table.csv.enc -out my_table.csv
(The user is prompted to enter the passphrase to be used for decryption)
```

If you use COPY FROM to import data to tables and indexes in an encrypted tablespace, the imported data is automatically encrypted before being stored.

## 5.9 Encrypting Existing Data

---

You cannot encrypt existing unencrypted tablespaces. In addition, you cannot change encrypted tablespaces so that they do not encrypt.

As an alternative, transfer the tables and indexes to other tablespaces. You can use the following SQL commands for this.

```
ALTER TABLE table_name SET TABLESPACE new_tablespace;
ALTER INDEX index_name SET TABLESPACE new_tablespace;
ALTER DATABASE database_name SET TABLESPACE new_tablespace;
```



### See

Refer to "SQL Commands" under "Reference" in the PostgreSQL Documentation for information on SQL commands.

## 5.10 Operations in Cluster Systems

---

This section describes how to use transparent data encryption on cluster systems such as high-availability systems, streaming replication, C, and the Mirroring Controller option.

## 5.10.1 HA Clusters that do not Use Database Multiplexing

---

Take the following points into account when using transparent data encryption in an HA cluster environment that does not use database multiplexing.

### Placement and automatic opening of the keystore file

There are two alternatives for placing the keystore file:

- Sharing the keystore file
- Placing a copy of the keystore file

#### Sharing the keystore file

This involves using the same keystore file on the primary server and the standby server.

As the standby server is not active while the primary server is running, this file would not be accessed simultaneously, and therefore, it can be shared.

To manage the keystore file in a more secure manner, place it on the key management server or the key management storage isolated in a secure location.

Enable the automatic opening of the keystore on both the primary and standby servers.

#### Placing a copy of the keystore file

This involves placing a copy of the primary server keystore file on the standby server.

You can do this if you cannot prepare a shared server or disk device that can be accessed from both the primary and standby servers.

However, if you change the master encryption key and the passphrase on the primary server, you must copy the keystore file to the standby server again.

To manage the keystore file in a more secure manner, prepare the key management server or the key management storage isolated in a secure location for both the primary and standby servers, and place the keystore files there.

Enable the automatic opening of the keystore on both the primary and standby servers. Note that copying the automatically opening keystore file (keystore.aks) to the standby server does not enable the automatic opening of the keystore.



See

.....  
Refer to the Cluster Operation Guide for information on building a cluster system environment using failover operation.  
.....

## 5.10.2 Database Multiplexing Mode

---

Note the following when using transparent data encryption in environments that use streaming replication, database multiplexing with streaming replication, or the Mirroring Controller option.

### Placing the keystore file

Place a copy of the primary server keystore file on the standby server.

This is required as the keystore file cannot be shared, and both servers may need to access it simultaneously.



Point

.....  
To manage the keystore file in a more secure manner, place it on the key management server or the key management storage isolated in a secure location. A keystore used by both the primary and standby servers can be managed on the same key management server or key management storage.  
.....

However, create different directories for the keystores to be used by the primary server and the standby server. Then copy the keystore for the primary server to the directory used on the standby server.  
.....

## Automatically opening the keystore

You must enable automatic opening of the keystore.

To do this, enable automatic opening of the keystore in all servers that make up database multiplexing. The settings for automatic opening of the keystore include information unique to each server, so simply copying the file does not enable it.

## Changing the passphrase

Changes to the passphrase are reflected in all servers that make up database multiplexing, so no special operation is required.

## Building and starting a standby server

Before using the `pg_basebackup` command or `pgx_rcvall` command to build a standby server, copy the keystore file from the primary server to the standby server. When using an automatically opening keystore, use the copied keystore file to enable automatic opening on the standby server.

Open the keystore each time you start the standby server. This step is necessary for decrypting and restoring encrypted WAL received from the primary server. To open the keystore, specify the `--keystore-passphrase` option in the `pg_ctl` command or `pgx_rcvall` command and enter the passphrase, or use an automatically opening keystore.

## Changing the master encryption key and the passphrase

Change the master encryption key and the passphrase on the primary server. You need not copy the keystore from the primary server to the standby server. You need not even restart the standby server or reopen the keystore. Changes to the master encryption key and the passphrase are reflected in the keystore on the standby server.



See

.....

Refer to "pgx\_rcvall" in the Reference for information on `pgx_rcvall` command.

Refer to "pg\_ctl" under "Reference" in the PostgreSQL Documentation for information on `pg_ctl` command.

Refer to "pg\_basebackup" under "Reference" in the PostgreSQL Documentation for information on `pg_basebackup` command.

Refer to "High Availability, Load Balancing, and Replication" under "Server Administration" in the PostgreSQL Documentation for information on how to set up streaming replication.

.....

## 5.11 Security-Related Notes

---

- stored in a core file, which is a process memory dump. You should, therefore, safely delete the memory dump. You can safely delete files by using the following command:
  - `shred` command
- Unencrypted data may be written from the database server memory to the operating system's swap area. To prevent leakage of information from the swap area, consider either disabling the use of swap area or encrypting the swap area using a full-disk encryption product.
- The content of the server log file is not encrypted. Therefore, in some cases the value of a constant specified in a SQL statement is output to the server log file. To prevent this, consider setting a parameter such as `log_min_error_statement`.
- When executing an SQL function that opens the keystore and modifies the master encryption key, ensure that the SQL statement containing the passphrase is not output to the server log file. To prevent this, consider setting a parameter such as `log_min_error_statement`. If you are executing this type of SQL function on a different computer from the database server, encrypt the communication between the client and the database server with SSL.

## 5.12 Tips for Installing Built Applications

---

With transparent data encryption, you can easily encrypt all the data in an application without modifying the application. Database administrators install built applications in the following manner. However, this procedure stores data to the default tablespace, so take necessary action if processing differs from the original design.

1. (Normal procedure) Create an owner and a database for the built application.

```
CREATE USER crm_admin ...;  
CREATE DATABASE crm_db ...;
```

2. (Procedure for encryption) Create an encrypted tablespace to store the data for the built application.

```
SET tablespace_encryption_algorithm = 'AES256';  
CREATE TABLESPACE crm_tablespace LOCATION '/crm/data';
```

3. (Procedure for encryption) Configure an encrypted tablespace as the default tablespace for the owner of the built application.

```
ALTER USER crm_admin SET default_tablespace = 'crm_tablespace';  
ALTER USER crm_admin SET temp_tablespaces = 'crm_tablespace';
```

4. (Normal procedure) Install the built application. The application installer prompts you to enter the host name and the port number of the database server, the user name, and the database name. The installer uses the entered information to connect to the database server and execute the SQL script. For applications that do not have an installer, the database administrator must manually execute the SQL script.

Normally, the application's SQL script includes logic definition SQL statements, such as CREATE TABLE, CREATE INDEX, and GRANT or REVOKE, converted from the entity-relationship diagram. It does not include SQL statements that create databases, users, and tablespaces. Configuring the default tablespace of the users who will execute the SQL script deploys the objects generated by the SQL script to the tablespace.

# Chapter 6 Data Masking

Data masking is a feature that can change the returned data for queries generated by applications, so that it can be referenced by users. For example, for a query of employee data, digits except the last four digits of an eight-digit employee number can be changed to "\*" so that it can be used for reference.

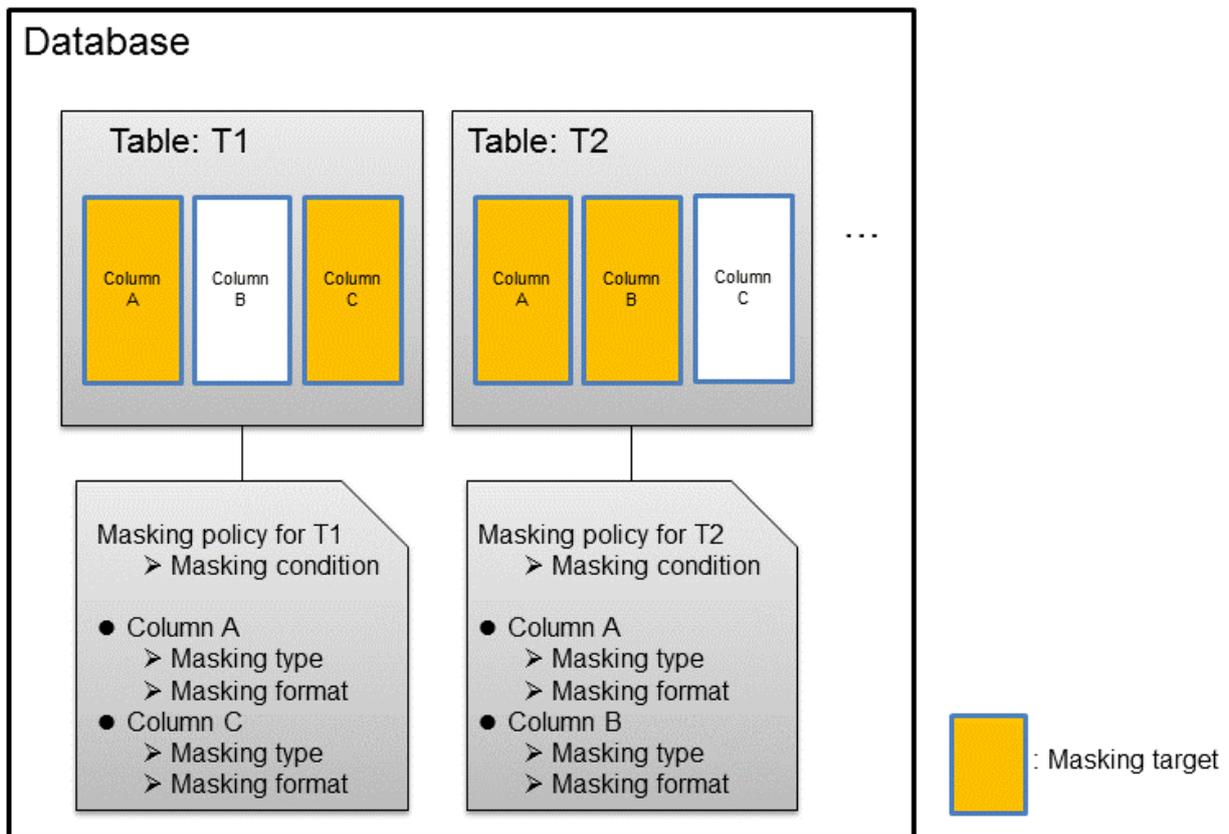
## Note

When using this feature, it is recommended that the changed data be transferred to another medium for users to reference. This is because, if users directly access the database to extract the masked data, there is a possibility that they can deduce the original data by analyzing the masking policy or query result to the masking target column.

## 6.1 Masking Policy

Masking policy is a method of changing data under specific conditions when it is returned for a query from an application. One masking policy can be created per table. You can configure masking target, masking type, masking condition and masking format in a masking policy.

Figure 6.1 Masking policy



## Note

When a masking policy is defined, the search performance for the corresponding table may deteriorate.

## 6.1.1 Masking Target

---

Masking target refers to a column to which a masking policy will be applied. When referring to a masking target or a function that includes a masking target, the execution result will be changed and obtained.

The following commands can change the execution result:

- SELECT
- COPY
- pg\_dump
- pg\_dumpall



- If a masking target other than SELECT target columns is specified, processing will be performed using data before change.
- If a masking target is specified in a function where the data type will be converted, an error will occur.

## 6.1.2 Masking Type

---

Masking type is a method to change column data that is returned from queries. Specify the masking type in the `function_type` parameter. The following masking types can be specified and selected depending on the masking target data type.

### Full masking

All the data in the specified column is changed. The changed value returned to the application that made the query varies depending on the column data type.

For example, 0 is used for a numeric type column and a space is used for a character type column.

### Partial masking

The data in the specified column is partially changed.

For example, digits except the last four digits of an employee number can be changed to "\*".

### Regular expression masking

The data in the specified column is changed via a search that uses a regular expression.

For example, for strings such as email address that can have variable length, "\*" can be used to change characters preceding "@" by using a regular expression. Regular expression masking can only be used for character type data.



- If multiple valid masking targets are specified for a function, the masking type for the left-most masking target will be applied. For example, if "SELECT GREATEST(c1, c2) FROM t1" is executed for numeric type masking target c1 and c2, the masking type for c1 will be applied.
- When masking the data that includes multibyte characters, do not specify partial masking for masking type. The result may not be as expected.

## 6.1.3 Masking Condition

---

Masking condition refers to the conditions configured to perform masking. Specify the masking condition in the `expression` parameter. Changed or actual data can be displayed for different users by defining masking condition. An expression that returns a boolean type result needs to be specified in masking condition and masking is performed only when TRUE is returned. Refer to "Value Expressions" in the PostgreSQL Documentation for information on the expressions that can be specified. Note that expressions that include a column cannot be specified.

For example, when masking data only for "postgres" users, specify `'current_user = "postgres"'` in the masking condition.

## Information

Specify '1=1' so the masking condition is always evaluated to be TRUE and masking is performed all the time.

### 6.1.4 Masking Format

Masking format is a combination of change method and displayed characters when the masking condition is met. Masking format varies depending on the masking type. The following describes the masking format.

#### Full masking

With full masking, all characters are changed to values as determined by the database. Changed characters can be referenced in the `pgx_confidential_values` table. Also, replacement characters can be changed using the `pgx_update_confidential_values` system management function.

#### See

Refer to "6.3 Data Types for Masking" for information on the data types for which data masking can be performed.

#### Partial masking

With partial masking, data is changed according to the content in the `function_parameters` parameter. The method of specifying `function_parameters` varies depending on the data type.

| Category       | Method of specifying <code>function_parameters</code>  |
|----------------|--|
| Numeric type   | <p><i>'replacementCharacter, startPosition, endPosition'</i></p> <ul style="list-style-type: none"> <li>- <i>replacementCharacter</i>: Specify the number to display. Specify a value from 0 to 9.</li> <li>- <i>startPosition</i>: Specify the start position of masking. Specify a positive integer.</li> <li>- <i>endPosition</i>: Specify the end position of masking. Specify a positive integer that is greater than <i>startPosition</i>.</li> </ul> <p> <b>Example</b></p> <p>Specify as below to change the values from the 1st to 5th digits to 9.</p> <pre>function_parameters := '9, 1, 5'</pre> <p>In this example, if the original data is "123456789", it will be changed to "999996789".</p>  |
| Character type | <p><i>'inputFormat, outputFormat, replacementCharacter, startPosition, endPosition'</i></p> <ul style="list-style-type: none"> <li>- <i>inputFormat</i>: Specify the current format of the data. Specify "V" for characters that will potentially be masked, and specify "F" for values such as spaces or hyphens that will not be masked.</li> <li>- <i>outputFormat</i>: Define the method to format the displayed data. Specify "V" for characters that will potentially be masked. Any character to be output can be specified for each character "F" in <i>inputFormat</i>. If you want to output a single quotation mark, specify two of them consecutively.</li> <li>- <i>replacementCharacter</i>: Specify any single character. If you want to output a single quotation mark, specify two of them consecutively.</li> <li>- <i>startPosition</i>: Specify the position of "V" as the start position of masking. For example, to specify the position of the 4th "V" from the left, specify 4. Specify a positive integer.</li> <li>- <i>endPosition</i>: Specify the position of "V" as an end position of masking. When working out the end position, do not include positions of "F". For example, to specify the position of the 11th "V" from the left, specify 11. Specify a positive integer that is greater than <i>startPosition</i>.</li> </ul> |

| Category            | Method of specifying function_parameters  |
|---------------------|---|
|                     |  <b>Example</b><br>.....<br>Specify as below to mask a telephone number other than the first three digits using *.<br>function_parameters := 'VVVFVVVVFVVVV, VVV-VVVV-VVVV, *, 4, 11'<br>In this example, if the original data is "012-3156-7890", it will be changed to "012-****-*****".<br>.....  |
| Date/timestamp type | 'MDYHMS'<br>- M: Masks month. To mask month, enter the month from 1 to 12 after a lowercase letter m. Specify an uppercase letter M to not mask month.<br>- D: Masks date. To mask date, enter the date from 1 to 31 after a lowercase letter d. If a value bigger than the last day of the month is entered, the last day of the month will be displayed. Specify an uppercase letter D to not mask date.<br>- Y: Masks year. To mask year, enter the year from 1 to 9999 after a lowercase letter y. Specify an uppercase letter Y to not mask year.<br>- H: Masks hour. To mask hour, enter the hour from 0 to 23 after a lowercase letter h. Specify an uppercase letter H to not mask hour.<br>- M: Masks minute. To mask minute, enter the minute from 0 to 59 after a lowercase letter m. Specify an uppercase letter M to not mask minute.<br>- S: Masks second. To mask second, enter the second from 0 to 59 after a lowercase letter s. Specify an uppercase letter S to not mask second.<br><br> <b>Example</b><br>.....<br>Specify as below to mask hour, minute, and second and display 00:00:00.<br>function_parameters := 'MDYh0m0s0'<br>In this example, if the original data is "2010-10-10 10:10:10", it will be changed to "2010-10-10 00:00:00".<br>..... |

 **See**

- Refer to "[B.3.2 pgx\\_create\\_confidential\\_policy](#)" for information on function\_parameters.
- Refer to "[6.3 Data Types for Masking](#)" for information on the data types for which masking can be performed.

### Regular expression masking

With regular expression masking, data is changed according to the content of the `regexp_pattern`, `regexp_replacement` and `regexp_flags` parameters. For `regexp_pattern`, specify the search pattern using a regular expression. For `regexp_replacement`, specify the replacement character to use when data matches the search pattern. For `regexp_flags`, specify the regular expression flags.

 **Example**

Specify as below to change all three characters starting from b to X.

```
regexp_pattern := 'b..'
```

```
regexp_replacement:= 'X'
```

```
regexp_flags := 'g'
```

In this example, if the original data is "foobarbaz", it will be changed to "fooXX".

## See

- Refer to "POSIX Regular Expressions" in the PostgreSQL Documentation and check pattern, replacement, and flags for information on the values that can be specified for `regexp_pattern`, `regexp_replacement`, and `regexp_flags`.
- Refer to "6.3 Data Types for Masking" for information on the data types for which masking can be performed.

## Note

- When column data type is `character(n)` or `char(n)` and if the string length after change exceeds *n*, the extra characters will be truncated and only characters up to the *n*th character will be displayed.
- When column data type is `character varying(n)` or `varchar(n)` and if the string length after change exceeds the length before the change, the extra characters will be truncated and only characters up to the length before change will be displayed.

## 6.2 Usage Method

---

### Preparation

The following preparation is required to use this feature.

1. Set the `postgresql.conf` file parameters.  
Prepend `"pgx_datamasking"` to the `shared_preload_libraries` parameter.
2. Restart the instance.
3. Run `CREATE EXTENSION` for the database that will use this feature.

The target database is described as "postgres" here.

Use the `psql` command to connect to the "postgres" database.

### Example

```
postgres=# CREATE EXTENSION pgx_datamasking;  
CREATE EXTENSION
```

### Note

You must always prepend `"pgx_datamasking"` to the `"shared_preload_libraries"` parameter.

### Information

- Specify `"false"` for `pgx_datamasking.enable` to not use this feature. Data will not be masked even if a masking policy is configured. This feature becomes available again once `"true"` is specified for `pgx_datamasking.enable`. This setting can be made by specifying a `SET` statement or specifying a parameter in the `postgresql.conf` file.

Example

```
postgres=# SET pgx_datamasking.enable=false;
```

- Hereafter, also perform this preparatory task for the "template1" database, so that this feature can be used by default when creating a new database.

## Usage

To perform masking, a masking policy needs to be configured. The masking policy can be created, changed, confirmed, enabled, disabled or deleted during operation.

The procedures to perform these tasks are explained below with examples.

1. Creating a masking policy
2. Changing a masking policy
3. Confirming a masking policy
4. Enabling and disabling a masking policy
5. Deleting a masking policy

### Note

Only database superusers can configure masking policies.

## 6.2.1 Creating a Masking Policy

An example of the operation on the server is shown below.

1. Create a masking policy  
Execute the `pgx_create_confidential_policy` system management function to create a masking policy.  
The following values are configured in this example.
  - Masking target: Numeric type `c1`
  - Masking type: FULL
  - Masking condition: `'l=1'`

```
postgres=# select pgx_create_confidential_policy(table_name := 't1', policy_name := 'p1',
expression := 'l=1', column_name := 'c1', function_type := 'FULL');
 pgx_create_confidential_policy
-----
 t
(1 row)
```

2. Confirm the displayed data  
Confirm that the masking target data (column `c1`) has been correctly changed.

```
postgres=# select * from t1;
 c1 |      c2
-----+-----
  0 | 012-3456-7890
  0 | 012-3456-7891
  0 | 012-3456-7892
(3 row)
```

### See

- Refer to "[B.3.2 pgx\\_create\\_confidential\\_policy](#)" for information on the `pgx_create_confidential_policy` system management function.

### Note

- Only one masking policy can be created per table.



2. Confirm information about the masking policy content  
Refer to `pgx_confidential_policies` to confirm the masking policy content.

```
postgres=# select * from pgx_confidential_policies;
 schema_name | table_name | policy_name | expression | enable | policy_description
-----+-----+-----+-----+-----+-----
 public      | t1         | p1          | 1=1        | t      |
(1 row)
```



See

- Refer to "D.1 `pgx_confidential_columns`" for information on the `pgx_confidential_columns` table.
- Refer to "D.2 `pgx_confidential_policies`" for information on the `pgx_confidential_policies` table.

## 6.2.4 Enabling and Disabling a Masking Policy

An example of the operation on the server is shown below.

1. Disable a masking policy  
Execute the `pgx_enable_confidential_policy` system management function to disable a masking policy.

```
postgres=# select pgx_enable_confidential_policy(table_name := 't1', policy_name := 'p1',
enable := 'f');
 pgx_enable_confidential_policy
-----
 t
(1 row)
```

2. Confirm the displayed data  
Confirm that the original data is displayed by disabling the masking policy.

```
postgres=# select * from t1;
 c1 |      c2
----+-----
  1 | 012-3456-7890
  2 | 012-3456-7891
  3 | 012-3456-7892
(3 row)
```

3. Enable a masking policy  
Execute the `pgx_enable_confidential_policy` system management function to enable a masking policy.

```
postgres=# select pgx_enable_confidential_policy(table_name := 't1', policy_name := 'p1',
enable := 't');
 pgx_enable_confidential_policy
-----
 t
(1 row)
```

4. Confirm the displayed data  
Confirm that the masking target data has been correctly changed.

```
postgres=# select * from t1;
 c1 |      c2
----+-----
  0 | 012-****-****
  0 | 012-****-****
  0 | 012-****-****
(3 row)
```



- Refer to "B.3.4 [pgx\\_enable\\_confidential\\_policy](#)" for information on the `pgx_enable_confidential_policy` system management function.

## 6.2.5 Deleting a Masking Policy

An example of the operation on the server is shown below.

1. Delete a masking policy

Execute the `pgx_drop_confidential_policy` system management function to delete a masking policy.

```
postgres=# select pgx_drop_confidential_policy(table_name := 't1', policy_name := 'p1');
pgx_drop_confidential_policy
-----
t
(1 row)
```

2. Confirm the displayed data

Confirm that the original data is displayed by deleting the masking policy.

```
postgres=# select * from t1;
 c1 |      c2
----+-----
  1 | 012-3456-7890
  2 | 012-3456-7891
  3 | 012-3456-7892
(3 row)
```



- Refer to "B.3.3 [pgx\\_drop\\_confidential\\_policy](#)" for information on the `gx_drop_confidential_policy` function.

## 6.3 Data Types for Masking

The data types for which data masking can be performed are shown below.

| Category       | Data type                         | Masking type |                 |                            |
|----------------|-----------------------------------|--------------|-----------------|----------------------------|
|                |                                   | Full masking | Partial masking | Regular expression masking |
| Numeric type   | <code>smallint</code>             | Y            | Y               | N                          |
|                | <code>integer</code>              | Y            | Y               | N                          |
|                | <code>bigint</code>               | Y            | Y               | N                          |
|                | <code>decimal</code>              | Y            | Y               | N                          |
|                | <code>numeric</code>              | Y            | Y               | N                          |
|                | <code>float</code>                | Y            | Y               | N                          |
|                | <code>real</code>                 | Y            | Y               | N                          |
|                | <code>double precision</code>     | Y            | Y               | N                          |
| Character type | <code>character varying(n)</code> | Y            | Y               | Y                          |
|                | <code>varchar(n)</code>           | Y            | Y               | Y                          |

| Category            | Data type             | Masking type |                 |                            |
|---------------------|-----------------------|--------------|-----------------|----------------------------|
|                     |                       | Full masking | Partial masking | Regular expression masking |
|                     | character( <i>n</i> ) | Y            | Y               | Y                          |
|                     | char( <i>n</i> )      | Y            | Y               | Y                          |
| Date/timestamp type | date                  | Y            | Y               | N                          |
|                     | timestamp             | Y            | Y               | N                          |

# Chapter 7 Periodic Operations

This chapter describes the operations that must be performed periodically when running daily database jobs.

## 7.1 Configuring and Monitoring the Log

FUJITSU Enterprise Postgres enables you to output database errors and warnings to a log file.

This information is useful for identifying if errors have occurred and the causes of those errors.

By default, this information is output to the system log. It is recommended that you configure FUJITSU Enterprise Postgres to collect logs from its log files (for example, `log_destination`) before operating FUJITSU Enterprise Postgres.

Periodically monitor the log files to check if any errors have occurred.



See

- Refer to "Error Reporting and Logging" under "Server Administration" in the PostgreSQL Documentation for information on logs.
- Refer to "Configuring Parameters" in the Installation and Setup Guide for Server for information on log settings when operating with WebAdmin.

## 7.2 Monitoring Disk Usage and Securing Free Space

When a database is used for an extended period, free space on the disk is continuously consumed and in some cases the disk space runs out. When this happens, database jobs may stop and no longer run.

You should, therefore, periodically monitor the usage of disk space, and delete obsolete files located in the disk.

Monitor the disk usage of the disk where the following directories are located:

- Data storage destination directory
- Transaction log storage destination (if the transaction log is stored in a different directory from the data storage destination directory)
- Backup data storage destination directory
- Tablespace storage destination directory

### 7.2.1 Monitoring Disk Usage

To check the disk usage, use the following operating system commands:

- `df` command

You can even use SQL statements to check tables and indexes individually.

Refer to "Determining Disk Usage" under "Server Administration" in the PostgreSQL Documentation for information on this method.



Information

If you are using WebAdmin for operations, a warning is displayed when disk usage reaches 80%

### 7.2.2 Securing Free Disk Space

Secure free disk space by using the following operating system commands to delete unnecessary files, other than the database, from the same disk unit.

- `rm` command

You can also secure disk space by performing the following tasks periodically:

- To secure space on the data storage destination disk:

Execute the REINDEX statement. Refer to "7.5 Reorganizing Indexes" for details.

- To secure space on the backup data storage destination disk:

Execute backup using WebAdmin or the pgx\_dmpall command.

## 7.3 Automatically Closing Connections

If an application stops responding and abnormally terminates for any reason, the connection from the application may remain active on the database server. If this situation continues for an extended period, other applications attempting to connect to the database server may encounter an error, or an error indicating that the tables are unavailable may occur.

It is, therefore, recommended that idle connections be closed automatically at regular intervals.

Set the following parameters in the postgresql.conf file to indicate the time permitted to elapse before a connection is closed.

| Parameter name          | Setting  | Description  |
|-------------------------|--|--|
| tcp_keepalives_idle     | Time until keepalive is sent (seconds)<br>If 0, the default value of the system is used. | Sends keepalive to an idle connection at the specified interval in seconds<br>It is recommended to specify 30 seconds. |
| tcp_keepalives_interval | keepalive send interval (seconds)<br>If 0, the default value of the system is used.      | Sends keepalive at the specified interval<br>It is recommended to specify 10 seconds.                                  |



See

Refer to "Connection Settings" under "Server Administration" in the PostgreSQL Documentation for information on the parameters.

## 7.4 Monitoring the Connection State of an Application

FUJITSU Enterprise Postgres does not immediately delete the updated or deleted data. If the VACUUM determines there are no transactions that reference the database, FUJITSU Enterprise Postgres collects obsolete data.

However, obsolete data is not collected if there are connections that have remained active for an extended period or connections occupying resources. In this case the database may expand, causing performance degradation.



See

Refer to "Routine Vacuuming" under "Server Administration" in the PostgreSQL Documentation for information on the VACUUM command.

In such cases, you can minimize performance degradation of the database by monitoring problematic connections.

The following two methods are supported for monitoring connections that have been in the waiting status for an extended period:

- 7.4.1 Using the View (pg\_stat\_activity)
- 7.4.2 Using pgAdmin

### 7.4.1 Using the View (pg\_stat\_activity)

Use the view (pg\_stat\_activity) to identify and monitor connections where the client has been in the waiting status for an extended period.



Example

The example below shows connections where the client has been in the waiting status for at least 60 minutes.

However, when considering continued compatibility of applications, do not reference system catalogs directly in the following SQL statements.

```
postgres=# select * from pg_stat_activity where state='idle in transaction' and current_timestamp >
cast(query_start + interval '60 minutes' as timestamp);
-[ RECORD 1 ]-----+-----
datid          | 13003
datname        | db01
pid            | 4638
usesysid       | 10
username       | fsep
application_name | apl01
client_addr    | 192.33.44.15
client_hostname |
client_port    | 27500
backend_start  | 2015-04-24 09:09:21.730641+09
xact_start     | 2015-04-24 09:09:23.858727+09
query_start    | 2015-04-24 09:09:23.858727+09
state_change   | 2015-04-24 09:09:23.858834+09
waiting        | f
state          | idle in transaction
backend_xid    |
backend_xmin   |
query         | begin;
```

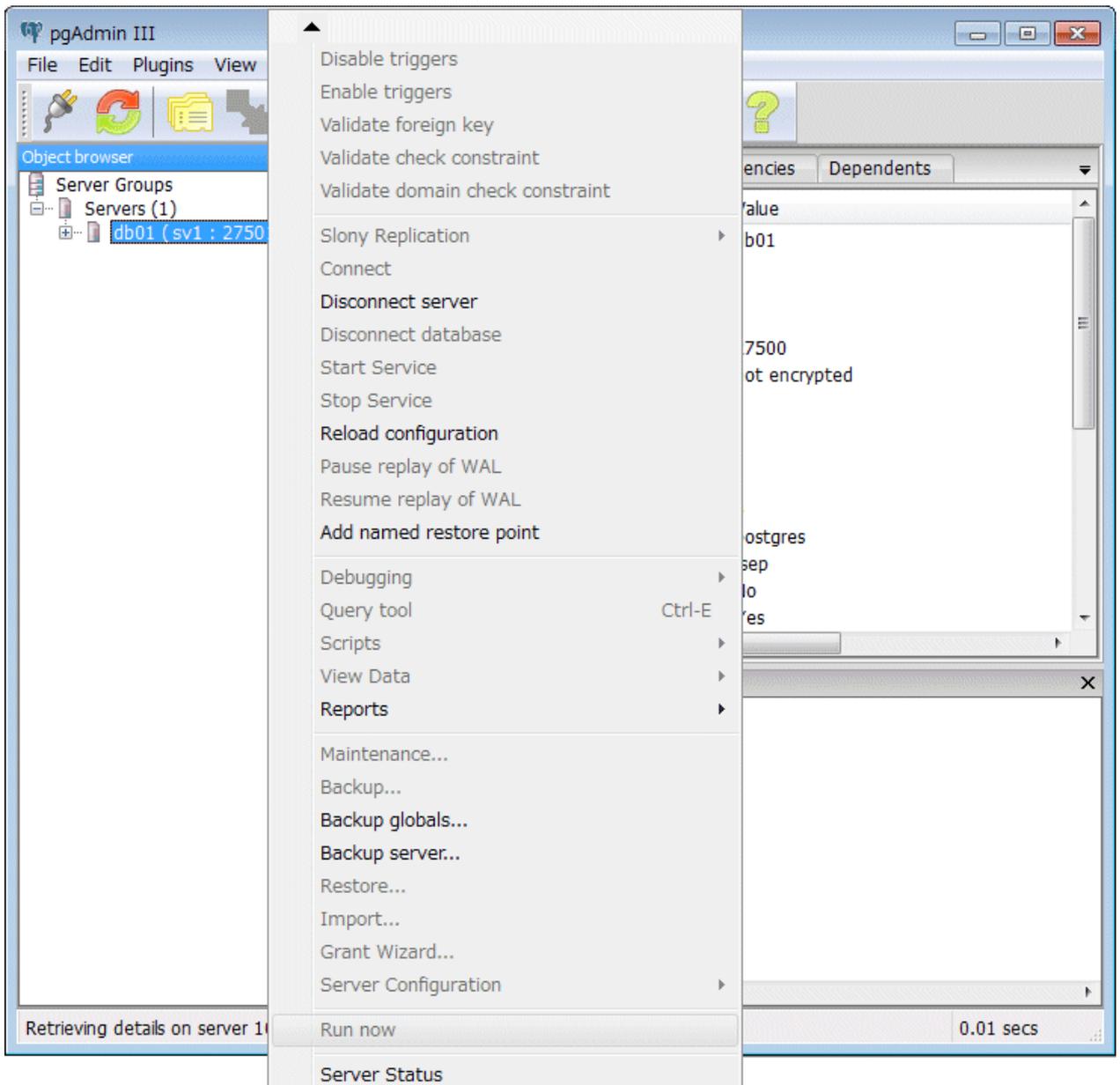
 See

- Refer to "Notes on Application Compatibility" in the Application Development Guide for information on maintaining application compatibility.
- Refer to "The Statistics Collector" under "Server Administration" in the PostgreSQL Documentation for information on pg\_stat\_activity.

## 7.4.2 Using pgAdmin

This section describes the procedure for monitoring connections using [Server Status] in pgAdmin.

1. From the [Tools] menu in pgAdmin, click [Server Status].



- Identify client connections that have been in the waiting state for an extended period.

From the transaction start time displayed under [TX Start], identify connections that have been in the waiting state for an extended period.

The screenshot shows the PostgreSQL Server Status window for server 'db01'. The 'Activity' tab is active, displaying a table of connections. A red box highlights the 'TX start' column for PID 36696, which shows the time '2015-04-28 15:20:59+09'. A callout box points to this time with the text 'Confirmation as for the transaction initiating time.' The 'Locks' tab below shows a lock held by PID 36696 on a transaction (TX 5/25) in an 'Exclusive...' mode. The 'Prepared Transactions' tab is empty.

| PID   | Application name  | Database | Client start           | TX start               | State               | Query             |
|-------|-------------------|----------|------------------------|------------------------|---------------------|-------------------|
| 36478 | pgAdmin III - ... | postgres | 2015-04-28 15:07:09+09 |                        | idle                | SELECT version(); |
| 36696 | psql              | db01     | 2015-04-28 15:20:52+09 | 2015-04-28 15:20:59+09 | idle in transaction | BEGIN;            |

| PID   | Database | Relation | User     | XID  | TX   | Mode         | Granted | Start       | Query  |
|-------|----------|----------|----------|------|------|--------------|---------|-------------|--------|
| 36696 |          |          | fsepuser | 5/25 | 5/25 | Exclusive... | Yes     | 2015-04-... | BEGIN; |

## 7.5 Reorganizing Indexes

Normally, a database defines indexes in tables, but if data is frequently updated, indexes can no longer use free space in the disk efficiently. This situation can also cause a gradual decline in database access performance.

To rearrange used space on the disk and prevent the database access performance from declining, it is recommended that you periodically execute the REINDEX command to reorganize indexes.

Check the disk usage of the data storage destination using the method described in "[7.2 Monitoring Disk Usage and Securing Free Space](#)".



See

Refer to "Routine Reindexing" under "Server Administration" in the PostgreSQL Documentation for information on reorganizing indexes by periodically executing the REINDEX command.

## Point

Typically, reorganize indexes once a month at a suitable time such as when conducting database maintenance. Use SQL statements to check index usage. If this usage is increasing on a daily basis, adjust the frequency of recreating the index as compared to the free disk space.

The following example shows the SQL statements and the output.

However, when considering continued compatibility of applications, do not reference system catalogs and functions directly in the following SQL statements. Refer to "Notes on Application Compatibility" in the Application Development Guide for details.

### [SQL statements]

```
SELECT
  nspname AS schema_name,
  relname AS index_name,
  round(100 * pg_relation_size(indexrelid) / pg_relation_size(indrelid)) / 100 AS index_ratio,
  pg_size_pretty(pg_relation_size(indexrelid)) AS index_size,
  pg_size_pretty(pg_relation_size(indrelid)) AS table_size
FROM pg_index I
  LEFT JOIN pg_class C ON (C.oid = I.indexrelid)
  LEFT JOIN pg_namespace N ON (N.oid = C.relnamespace)
WHERE
  C.relkind = 'i' AND
  pg_relation_size(indrelid) > 0
ORDER BY pg_relation_size(indexrelid) DESC, index_ratio DESC;
```

### [Output]

| schema_name | index_name                | index_ratio | index_size | table_size |
|-------------|---------------------------|-------------|------------|------------|
| public      | pgbench_accounts_pkey     | 0.16        | 2208 KB    | 13 MB      |
| pg_catalog  | pg_depend_depender_index  | 0.6         | 224 KB     | 368 KB     |
| pg_catalog  | pg_depend_reference_index | 0.58        | 216 KB     | 368 KB     |
| ...         |                           |             |            |            |

## See

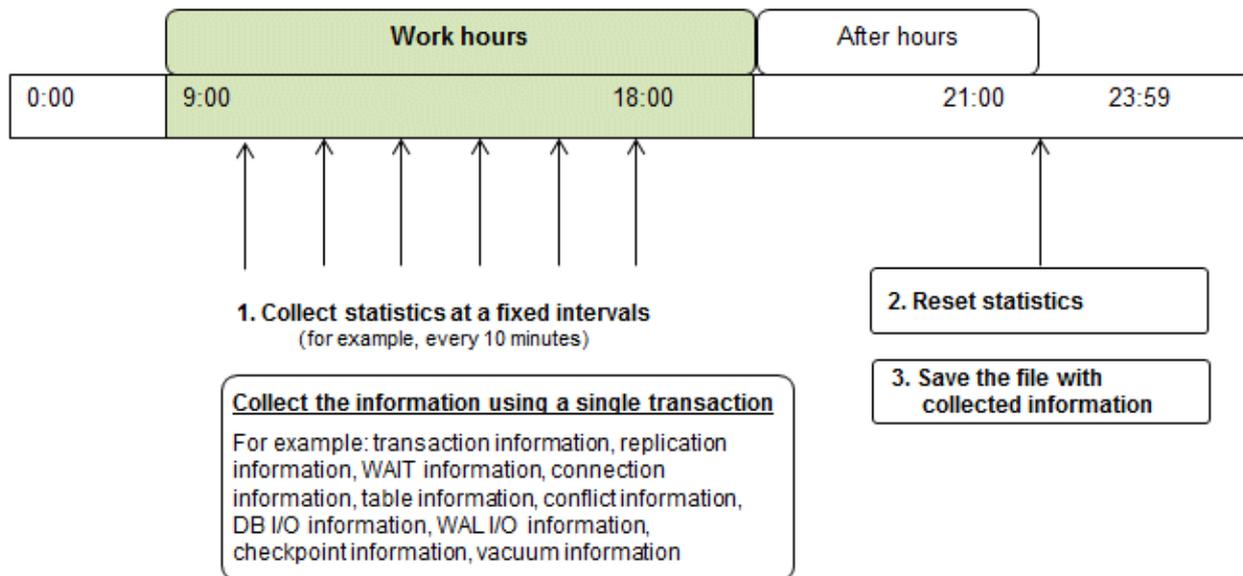
Refer to "Notes on Application Compatibility" in the Application Development Guide for information on maintaining application compatibility.

## 7.6 Monitoring Database Activity

FUJITSU Enterprise Postgres enables you to collect information related to database activity. By monitoring this information, you can check changes in the database status.

This information includes wait information for resources such as internal locks, and is useful for detecting performance bottlenecks. Furthermore, you should collect this information in case you need to request Fujitsu technical support for an investigation.

Figure 7.1 Overview of information collection



1. Collect statistics at fixed intervals during work hours.

Accumulate the collected information into a file.

Wherever possible, collect data from the various statistics views using a single transaction, because it enables you to take a snapshot of system performance at a given moment.

Refer to "7.6.1 Information that can be Collected" for information on the system views that can be collected.

2. Reset statistics after work hours, that is, after jobs have finished.

Refer to "7.6.3 Information Reset" for information on how to reset statistics.

3. Save the file with collected information.

Keep the file with collected information for at least two days, in order to check daily changes in performance and to ensure that the information is not deleted until you have sent a query to Fujitsu technical support.

Where jobs run 24 hours a day, reset statistics and save the file with collected information when the workload is low, for example, at night.

### Note

Statistics cumulatively add the daily database value, so if you do not reset them, the values will exceed the upper limit, and therefore will not provide accurate information.

The subsections below explain the following:

- Information that can be collected
- Collection configuration
- Information reset

## 7.6.1 Information that can be Collected

Information that can be collected is categorized into the following two types:

- Information common to PostgreSQL
- Information added by FUJITSU Enterprise Postgres

### Information common to PostgreSQL



See

Refer to "Monitoring Database Activity" under "Server Administration" in the PostgreSQL Documentation for information on information common to PostgreSQL.

### Information added by FUJITSU Enterprise Postgres

You can collect the following information added by FUJITSU Enterprise Postgres.

Table 7.1 Information added by FUJITSU Enterprise Postgres

| View name          | Description  |
|--------------------|--|
| pgx_stat_lwlock    | Displays statistic related to lightweight lock, with each type of content displayed on a separate line. This information helps to detect bottlenecks.<br>Refer to "C.2 pgx_stat_lwlock" for details.                                 |
| pgx_stat_latch     | Displays statistics related latches, with each type of wait information within FUJITSU Enterprise Postgres displayed on a separate line. This information helps to detect bottlenecks.<br>Refer to "C.3 pgx_stat_latch" for details. |
| pgx_stat_walwriter | Displays statistics related to WAL writing, in a single line.<br>Refer to "C.4 pgx_stat_walwriter" for details.  |
| pgx_stat_sql       | Displays statistics related to SQL statement executions, with each type of SQL statement displayed on a separate line.<br>Refer to "C.5 pgx_stat_sql" for details.   |

## 7.6.2 Collection Configuration

The procedure for configuring collection depends on the information content.

- Information common to PostgreSQL
- Information added by FUJITSU Enterprise Postgres

### Information common to PostgreSQL



See

Refer to "The Statistics Collector" in "Monitoring Database Activity" under "Server Administration" in the PostgreSQL Documentation for information on information common to PostgreSQL.

### Information added by FUJITSU Enterprise Postgres

Information added by FUJITSU Enterprise Postgres is collected by default.

To enable or disable information collection, change the configuration parameters in postgresql.conf. The following table lists the views for which you can enable or disable information collection, and the configuration parameters.

| View name       | Parameter   |
|-----------------|-------------|
| pgx_stat_lwlock | track_waits |
| pgx_stat_latch  |             |
| pgx_stat_sql    | track_sql   |

Remarks: You cannot change the collection status for pgx\_stat\_walwriter.

Refer to "Appendix A Parameters" for information on the parameters.

## 7.6.3 Information Reset

---

This section describes how to reset information.

### Information added by FUJITSU Enterprise Postgres

You can reset information added by FUJITSU Enterprise Postgres by using the `pg_stat_reset_shared` function in the same way as for information common to PostgreSQL.

Configure the following parameters in the `pg_stat_reset_shared` function:

| Function                                | Type of return value | Description  |
|---|----------------------|--|
| <code>pg_stat_reset_shared(text)</code> | void                 | <p>Reset some cluster-wide statistics counters to zero, depending on the argument (requires superuser privileges).</p> <p>Calling <code>pg_stat_reset_shared('lwlock')</code> will zero all counters shown in <code>pgx_stat_lwlock</code>.</p> <p>Similarly, in the following cases, all values of the pertinent statistics counter are reset:</p> <ul style="list-style-type: none"><li>- If <code>pg_stat_reset_shared('latch')</code> is called:<br/>All values displayed in <code>pgx_stat_latch</code></li><li>- If <code>pg_stat_reset_shared('walwriter')</code> is called:<br/>All values displayed in <code>pgx_stat_walwriter</code></li><li>- If <code>pg_stat_reset_shared('sql')</code> is called:<br/>All values displayed in <code>pgx_stat_sql</code></li></ul> |



See

.....  
Refer to "Statistics Functions" in "Monitoring Database Activity" under "Server Administration" in the PostgreSQL Documentation for information on other parameters of the `pg_stat_reset_shared` function.  
.....

# Chapter 8 Streaming Replication Using WebAdmin

This chapter describes how to create a streaming replication cluster using WebAdmin.

## 8.1 Streaming Replication

Streaming replication allows the creation of one or more standby instances, which connect to the master instances and replicate the data using WAL records. The standby instance can be used for read-only operations.

WebAdmin can be used to create a streaming replication cluster. WebAdmin allows the creation of a cluster in the following configurations:

- Master-Standby Configuration: This configuration creates a master and standby instance together.
- Standby Only Configuration: This configuration creates a standby instance from an already existing instance.



### Point

- A standby instance can be created from a standalone instance, a master instance, or even from another standby instance.
- If a streaming replication cluster is created using WebAdmin, the network with the host name (or IP address) specified in [Host name] will be used across sessions of WebAdmin, and also used as the log transfer network.
- To use a network other than the job network as the log transfer network, specify the host name other than the job network one in [Host name].



### See

When a standby instance is created from an existing instance, it is necessary to set the values for the replication-related variables before a standby instance can be created. Refer to "Configuring Parameters" in the Installation and Setup Guide for Server for details.

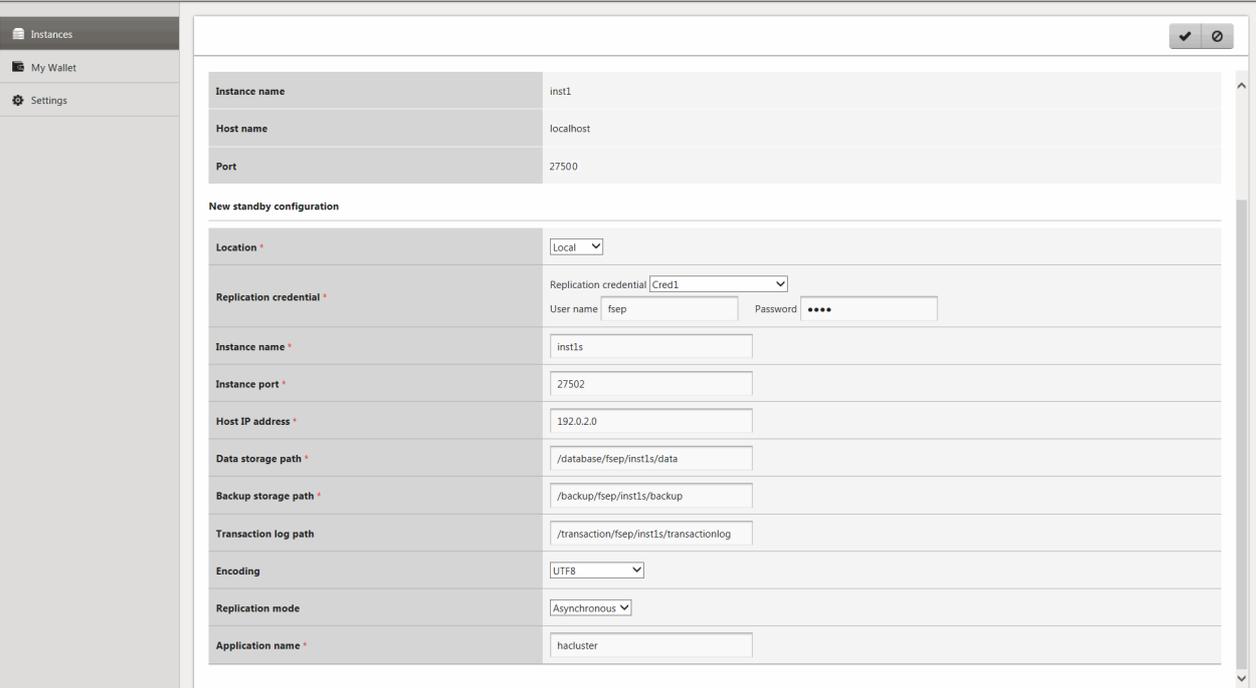
### 8.1.1 Creating a Standby Instance

Follow the procedure below to create a standby instance.

1. In the [Instances] tab, select the instance from which a standby instance is to be created.
2. Click .

3. Enter the information for the standby instance to be created. In the example below, a standby instance is created from instance "inst1".

The instance name, host address and port of the selected instance are already displayed for easy reference.



The screenshot shows the 'New standby configuration' form in the Fujitsu Enterprise Postgres WebAdmin interface. The form is divided into two sections. The top section displays the details of the master instance 'inst1': Instance name (inst1), Host name (localhost), and Port (27500). The bottom section is for configuring the new standby instance. It includes the following fields: Location (Local), Replication credential (Cred1) with sub-fields for User name (fsep) and Password (masked), Instance name (inst1s), Instance port (27502), Host IP address (192.0.2.0), Data storage path (/database/fsep/inst1s/data), Backup storage path (/backup/fsep/inst1s/backup), Transaction log path (/transaction/fsep/inst1s/transactionlog), Encoding (UTF8), Replication mode (Asynchronous), and Application name (hacluster).

Enter the following items:

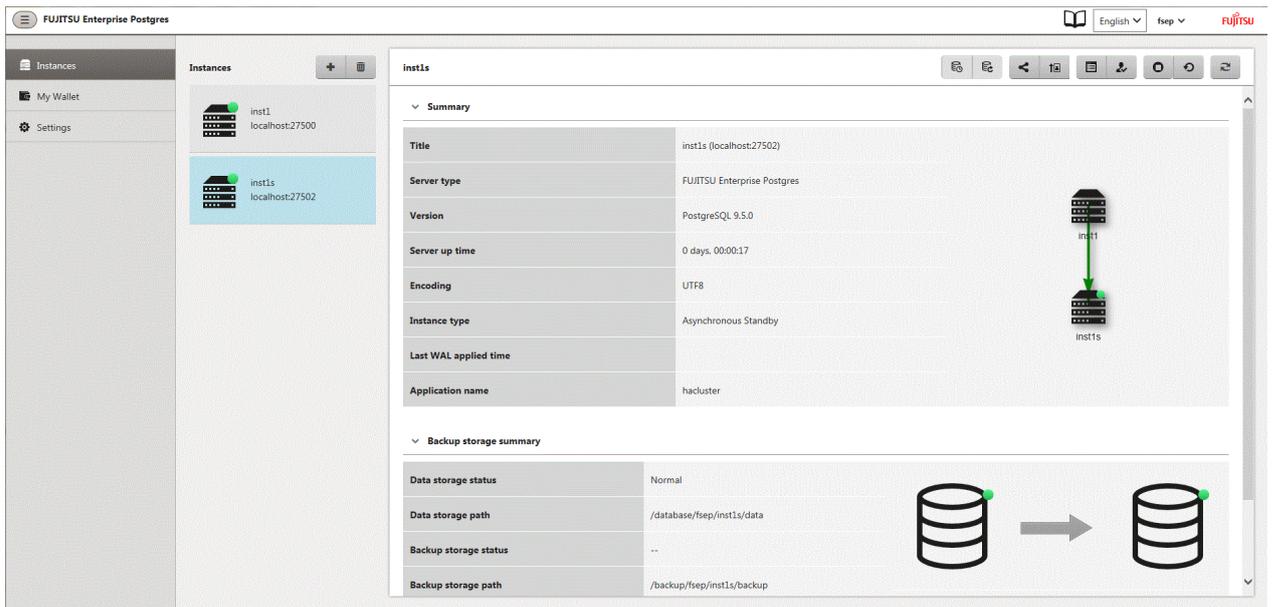
- [Location]: Whether to create the instance in the server that the current user is logged in to, or in a remote server. The default is "Local", which will create the instance in the server machine where WebAdmin is currently running.
- [Replication credential]: The user name and password required for the standby instance to connect to the master instance. The user name and password can be entered or selected from the Wallet. Refer to "[Appendix F WebAdmin Wallet](#)" for information on creating wallet entries.
- [Instance name]: Name of the standby database instance to create.

The name must meet the conditions below:

- Maximum of 16 characters
- The first character must be an ASCII alphabetic character
- The other characters must be ASCII alphanumeric characters
- [Instance port]: Port number of the standby database instance.
- [Host IP address]: The IP address of the server machine where the standby instance is to be created. This information is needed to configure the standby instance to be connected to the master.
- [Data storage path]: Directory where the database data will be stored
- [Backup storage path]: Directory where the database backup will be stored
- [Transaction log path]: Directory where the transaction log will be stored
- [Encoding]: Database encoding system
- [Replication mode]: Whether the standby instance created should be in Asynchronous or Synchronous mode.
- [Application name]: The reference name of the standby instance used to identify it to the master instance.

4. Click  to create the standby instance.

5. Once the standby instance is created successfully, select "inst1s" in the [Instances] tab. The following page will be displayed:



### Note

- Backups are not possible for standby instances in WebAdmin. As a result,  and  are disabled and no value is shown for [Backup storage status] and [Backup time].
- If using WebAdmin to manage Mirroring Controller, the message below may be output to the server log or system log in the standby instance. No action is required, as the instance is running normally.

```
ERROR: pgx_rcvall failed (16491)
ERROR: pgx_rcvall: backup of the database has not yet been performed, or an incorrect backup
storage directory was specified
```

## 8.1.2 Promoting a Standby Instance

Streaming replication between a master and standby instance can be discontinued using WebAdmin.

Follow the procedure below to promote a standby instance to a standalone instance, thereby discontinuing the streaming replication.

1. In the [Instances] tab, select the standby instance that needs to be promoted.
2. Click .
3. Click [Yes] from the confirmation dialog box.

The standby instance will be promoted and will become a standalone instance, which is not part of a streaming replication cluster.

Once the standby instance is promoted to become a standalone instance, the backup storage status will be "Error". This is because no backups are available when the instance is newly promoted to a standalone instance. The status will be reset if a new backup is performed by clicking [Solution] or .

## 8.1.3 Converting an Asynchronous Replication to Synchronous

Streaming replication between a master and standby instance can be configured to be in Asynchronous or Synchronous mode. This mode can be changed even after the standby instance was successfully created.

Follow the procedure below to convert an Asynchronous standby instance to Synchronous.

1. In the [Instances] tab, select the master instance of the relevant cluster.

2. Click .
3. In the [Streaming replication] section, edit the value for [Synchronous standby names].
  - Add the "Application name" of the standby instance you want to be in Synchronous mode.
4. Click .
5. Select the master instance and click .
6. Select the standby instance. [Instance type] will now show the updated status.

### Note

- Converting an Asynchronous standby instance to Synchronous can cause the master instance to queue the incoming transactions until the standby instance is ready. For this reason, it is recommended that this operation be performed during a scheduled maintenance period.
- When adding a synchronous standby instance, FUJITSU Enterprise Postgres will only keep the first entry in [Synchronous standby names] in synchronous state.
- To learn more about the differences between synchronous and asynchronous standby modes and their behavior, refer to "Streaming Replication" in "High Availability, Load Balancing, and Replication" in the PostgreSQL Documentation.

## 8.1.4 Converting a Synchronous Replication to Asynchronous

---

Streaming replication between a master and standby instance can be configured to be in Asynchronous or Synchronous Mode. This mode can be changed even after the standby instance was successfully created.

Follow the procedure below to convert a Synchronous standby instance to Asynchronous.

1. In the [Instances] tab, select the master instance of the relevant cluster.
2. Click .
3. In the [Streaming replication] section, edit the value for [Synchronous standby names].
  - Remove the "Application name" of the standby instance you want to be in Asynchronous mode.
4. Click .
5. Select the master instance and click .
6. Select the standby instance. [Instance type] will now show the updated status.

### Note

To learn more about the differences between synchronous and asynchronous standby modes and their behavior, refer to "Streaming Replication" in "High Availability, Load Balancing, and Replication" in the PostgreSQL Documentation.

# Chapter 9 Installing and Operating the In-memory Feature

The in-memory feature enables fast aggregation using Vertical Columnar Index (VCI) and memory-resident feature.

VCI has a data structure suitable for aggregation, and features parallel scan and disk compression, which enable faster aggregation through reduced disk I/O.

The memory-resident feature reduces disk I/O that occurs during aggregation. It consists of the preload feature that reads VCI data to memory in advance, and the stable buffer feature that suppresses VCI data eviction from memory. The stable buffer feature secures the proportion specified by parameter in the shared memory for VCI.

This chapter describes how to install and operate the in-memory feature.

## 9.1 Installing Vertical Columnar Index (VCI)

This section describes the installation of VCI.

1. [Evaluating whether to Install VCI](#)
2. [Estimating Resources](#)
3. [Setting up](#)

### 9.1.1 Evaluating whether to Install VCI

VCI uses available resources within the server to increase scan performance.

It speeds up processing in many situations, and can be more effective in the following situations:

- Single table processing
- Processing that handles many rows in the table
- Processing that handles some columns in the table
- Processing that performs very heavy aggregation such as simultaneous aggregation of sum and average

VCI will not be used in the following cases, so it is necessary to determine its effectiveness in advance:

- The data type of the target table or column contains VCI restrictions.
- The SQL statement does not meet the VCI operating conditions
- VCI is determined to be slower based on cost estimation



See

- Refer to "9.1.4 Data that can Use VCI" for information on VCI restrictions.
- Refer to "Scan Using a Vertical Columnar Index (VCI)" - "Operating Conditions" in the Application Development Guide for information on VCI operating conditions.

### 9.1.2 Estimating Resources

Estimate resources before setting up VCI.

Select the aggregation that you want to speed up and identify the required column data. The additional resources below are required according to the number of columns.

- Memory

Secure additional capacity required for the disk space for the column for which VCI is to be created.

- Disk

Secure additional disks based on the disk space required for the column for which VCI is to be created, as VCI stores column data as well as existing table data on the disk. It is recommended to provide a separate disk in addition to the existing one, and specify it as the tablespace to avoid impact on any other jobs caused by I/O.



See

Refer to "Estimating Memory Requirements" and "Estimating Database Disk Space Requirements" in the Installation and Setup Guide for Server for information on how to estimate required memory and disk space.

## 9.1.3 Setting up

This section describes how to set up VCI.

### Setup flow

1. [Setting Parameters](#)
2. [Installing the Extensions](#)
3. [Creating VCI](#)
4. [Confirming that VCI has been Created](#)

### 9.1.3.1 Setting Parameters

Edit postgresql.conf to set the required parameters for VCI. After that, start or restart the instance.

The following table lists the parameters that need or are recommended to be configured in advance:

| Parameter name            | Setting value  | Description   | Required |
|---------------------------|--|---|----------|
| shared_preload_libraries  | Literal 'vci, pg_prewarm'                                      | VCI and shared library to be preloaded at server start.   | Y        |
| session_preload_libraries | Literal 'vci, pg_prewarm'                                      | VCI and shared library to be preloaded at connection start.   | Y        |
| reserve_buffer_ratio      | Percentage of shared memory to be used for stable buffer table | Proportion of shared memory to be used for a stable buffer table.                                       | N        |
| vci.control_max_workers   | Number of background workers that manage VCI                   | Number of background workers that manage VCI.<br>Add this value to max_worker_processes.                | N        |
| vci.max_parallel_degree   | Maximum number of background workers used for parallel scan    | Maximum number of background workers used for parallel scan.<br>Add this value to max_worker_processes. | N        |



Example

```
shared_preload_libraries = 'vci, pg_prewarm'
session_preload_libraries = 'vci, pg_prewarm'
reserve_buffer_ratio = 20
vci.control_max_workers = 8
vci.max_parallel_degree = 4
max_worker_processes = 18 # Example: If the initial value was 6, 6 + 8 + 4 = 18
```



See

- Refer to "[Appendix A Parameters](#)" for information on all parameters for VCI. Refer also to default value for each parameter and details such as specification range in the same chapter. Refer to "Server Configuration" under "Server Administration" in the PostgreSQL documentation for information on `shared_preload_libraries`, `session_preload_libraries`, and `max_worker_processes`.
- An error occurs if you use VCI to start instances when `procs` is not mounted. Ensure that `procs` is mounted before starting instances.

### 9.1.3.2 Installing the Extensions

Execute the `CREATE EXTENSION` statement to install the VCI and `pg_prewarm` extensions. Both extensions need to be installed for each database.

- Installing VCI

```
db01=# CREATE EXTENSION vci;
```

- Installing `pg_prewarm`

```
db01=# CREATE EXTENSION pg_prewarm;
```



Note

- Only superusers can install VCI extensions.
- VCI extensions can only be installed in public schema.
- Some operations cannot be performed for VCI extensions. Refer to "[9.2.1 Commands that cannot be Used for VCI](#)" for details.

### 9.1.3.3 Creating a VCI

Execute the `CREATE INDEX` statement with the "`USING vci`" clause to create a VCI for the desired columns and the "`WITH (stable_buffer=true)`" clause to enable the stable buffer feature.

To use a separate disk for the VCI, specify the `TABLESPACE` clause.

```
db01=# CREATE INDEX idx_vci ON table01 USING vci (col01, col02) WITH (stable_buffer=true);
```



Note

- Some table types cannot be specified on the `ON` clause of `CREATE INDEX`. Refer to "[9.1.4.1 Relation Types](#)" for details.
- Some data types cannot be specified on the column specification of `CREATE INDEX`. Refer to "[9.1.4.2 Data Types](#)" for details.
- Some operations cannot be performed for VCI. Refer to "[9.2.1 Commands that cannot be Used for VCI](#)" for details.
- The same column cannot be specified more than once on the column specification of `CREATE INDEX`.
- VCI cannot be created for table columns that belong to the template database.
- `CREATE INDEX` creates multiple views named `vci_10digitRelOid_5digitRelAttr_1charRelType` alongside VCI itself. These are called VCI internal relations. Do not update or delete them as they are used for VCI aggregation.
- All data for the specified column will be replaced in columnar format when VCI is created, so executing `CREATE INDEX` on an existing table with data inserted takes more time compared with a general index (B-tree). Jobs can continue while `CREATE INDEX` is running.

### 9.1.3.4 Confirming that the VCI has been Created

Execute the `SELECT` statement to reference the `pg_indexes` catalog, and confirm that the VCI was created for the target columns.



## Example

```
db01=# SELECT indexdef FROM pg_indexes WHERE indexdef LIKE '%vci%';
          indexdef
-----
CREATE INDEX idx_vci ON table01 USING vci (col01, col02)
(1 row)
```

## 9.1.4 Data that can Use VCI

This section describes on which relation types and for which data types VCIs can be created.

### 9.1.4.1 Relation Types

VCIs cannot be created on some relation types.

The ON clause of CREATE INDEX described in "9.1.3.3 Creating a VCI" cannot specify relations on which VCIs cannot be created.

- Relations on which VCIs can be created
  - Normal tables
  - UNLOGGED TABLEs
- Relations on which VCIs cannot be created
  - Materialized views
  - Temporary tables
  - Views
  - Temporary views
  - Foreign tables

### 9.1.4.2 Data Types

VCIs cannot be created for some data types.

The column specification of CREATE INDEX described in "9.1.3.3 Creating a VCI" cannot specify a column with data type on which VCIs cannot be created.

| Category  | Data type        | Supported by VCI? |
|-----------|------------------|-------------------|
| Numeric   | smallint         | Y                 |
|           | integer          | Y                 |
|           | bigint           | Y                 |
|           | decimal          | Y                 |
|           | numeric          | Y                 |
|           | real             | Y                 |
|           | double precision | Y                 |
|           | serial           | Y                 |
|           | bigserial        | Y                 |
| Monetary  | money            | Y                 |
| Character | varchar(n)       | Y                 |
|           | char(n)          | Y                 |

| Category          | Data type                | Supported by VCI? |
|-------------------|--------------------------|-------------------|
|                   | nchar                    | N                 |
|                   | nvarchar(n)              | N                 |
|                   | text                     | Y                 |
| Binary            | bytea                    | Y                 |
| Date/time         | timestamp                | Y                 |
|                   | timestamp with time zone | Y                 |
|                   | date                     | Y                 |
|                   | time                     | Y                 |
|                   | time with time zone      | Y                 |
|                   | interval                 | Y                 |
| Boolean           | boolean                  | Y                 |
| Geometric         | point                    | N                 |
|                   | line                     | N                 |
|                   | lseg                     | N                 |
|                   | box                      | N                 |
|                   | path                     | N                 |
|                   | polygon                  | N                 |
|                   | circle                   | N                 |
| Network address   | cidr                     | N                 |
|                   | inet                     | N                 |
|                   | macaddr                  | N                 |
| Bit string        | bit(n)                   | Y                 |
|                   | bit varying(n)           | Y                 |
| Text search       | tsvector                 | N                 |
|                   | tsquery                  | N                 |
| UUID              | uuid                     | Y                 |
| XML               | xml                      | N                 |
| JSON              | json                     | N                 |
|                   | jsonb                    | N                 |
| Range             | int4range                | N                 |
|                   | int8range                | N                 |
|                   | numrange                 | N                 |
|                   | tsrange                  | N                 |
|                   | tstzrange                | N                 |
|                   | daterange                | N                 |
| Object identifier | oid                      | N                 |
|                   | regproc                  | N                 |
|                   | regprocedure             | N                 |
|                   | regoper                  | N                 |

| Category  | Data type     | Supported by VCI? |
|---|---------------|-------------------|
|   | regoperator   | N                 |
|   | regclass      | N                 |
|   | regtype       | N                 |
|   | regconfig     | N                 |
|   | regdictionary | N                 |
| Array type  | -             | N                 |
| User-defined type<br>(Basic type, enumerated type,<br>composite type, and range type) | -             | N                 |

## 9.2 Operating VCI

This section describes how to operate VCI.

### 9.2.1 Commands that cannot be Used for VCI

Some operations cannot be performed for VCI extensions and VCI itself.

This section describes SQL commands that cannot be executed for the VCI extensions and VCI itself, and client application commands.

#### SQL commands

- Operations that cannot be performed for the VCI extension

| Command          | Subcommand | Description   |
|------------------|------------|---|
| ALTER EXTENSION  | UPDATE     | The VCI extension cannot be specified.  |
|                  | SET SCHEMA | This operation is not required for VCI.   |
|                  | ADD        |   |
|                  | DROP       |   |
| CREATE EXTENSION | SCHEMA     | The subcommands on the left cannot be performed if the VCI extension is specified.<br>This operation is not required for VCI. |
| DROP EXTENSION   | -          | The VCI extension cannot be specified.<br>(Restriction in this edition.)  |

- Operations that cannot be performed on relations containing a VCI

| Command              | Subcommand        | Description  |
|----------------------|-------------------|--|
| ALTER INDEX          | SET               | The subcommands on the left cannot be performed if a VCI is specified.   |
|                      | SET TABLESPACE    |  |
|                      | ALL IN TABLESPACE | If the operation is required, delete the VCI using DROP INDEX, and re-create it using CREATE INDEX after completing the operation. |
| ALTER OPERATOR CLASS | RENAME TO         | The subcommands on the left cannot be performed if a VCI is specified.   |
|                      | OWNER TO          |  |
|                      | SET SCHEMA        | This operation is not supported in VCI.  |

| Command                | Subcommand   | Description  |
|------------------------|--|--|
| ALTER OPERATOR FAMILY  | ADD  |  |
|                        | DROP   |  |
|                        | RENAME TO  |  |
|                        | OWNER TO   |  |
|                        | SET SCHEMA   |  |
| ALTER TABLE            | ALL IN TABLESPACE <i>name</i><br>[ OWNED BY <i>roleName</i> ] SET<br>TABLESPACE <i>newTablespace</i>   | A tablespace that contains a VCI cannot be specified.<br><br>If the operation is required, delete the VCI using DROP INDEX, and re-create it using CREATE INDEX after completing the operation.  |
|                        | DROP [ COLUMN ] [ IF EXISTS ]<br><i>colName</i> [ RESTRICT   CASCADE ]   | A column that contains a VCI cannot be specified.<br><br>If the operation is required, delete the VCI using DROP INDEX, and re-create it using CREATE INDEX after completing the operation.  |
|                        | ALTER [ COLUMN ] <i>colName</i> [ SET<br>DATA ] TYPE <i>dataType</i> [ COLLATE<br><i>collation</i> ] [ USING <i>expr</i> ]   | A VCI cannot be specified.   |
|                        | CLUSTER ON <i>indexName</i>  | This operation is not supported in VCI.  |
|                        | REPLICA IDENTITY {DEFAULT  <br>USING INDEX <i>indexName</i>   FULL  <br>NOTHING}   |  |
|                        | SET WITH OIDS  | If WITHOUT OIDS is specified for a table that contains a VCI, the SET WITH OIDS clause cannot be used.<br><br>If the operation is required, delete the VCI using DROP INDEX, and re-create it using CREATE INDEX after completing the operation. |
| SET WITHOUT OIDS       | If WITH OIDS is specified for a table that contains a VCI, the SET WITHOUT OIDS clause cannot be used.<br><br>If the operation is required, delete the VCI using DROP INDEX, and re-create it using CREATE INDEX after completing the operation. |  |
| CLUSTER                | -  | A table that contains a VCI and VCI cannot be specified.<br><br>If the operation is required, delete the VCI using DROP INDEX, and re-create it using CREATE INDEX after completing the operation.   |
| CREATE INDEX           | UNIQUE   | The subcommands on the left cannot be performed if a VCI is specified.<br><br>This operation is not supported in VCI.  |
|                        | CONCURRENTLY   |  |
|                        | [ ASC   DESC ]   |  |
|                        | [ NULLS { FIRST   LAST } ]   |  |
|                        | WITH   |  |
|                        | WHERE  |  |
| CREATE OPERATOR CLASS  | -  | A VCI cannot be specified.<br><br>This operation is not supported in VCI.  |
| CREATE OPERATOR FAMILY | -  |  |

| Command      | Subcommand   | Description  |
|--------------|--------------|--|
| CREATE TABLE | EXCLUDE      |  |
| DROP INDEX   | CONCURRENTLY | The subcommands on the left cannot be performed if a VCI is specified.<br>This operation is not supported in VCI.                            |
| REINDEX      | -            | A VCI cannot be specified.<br>This command is not required as VCI uses daemon's automatic maintenance to prevent disk space from increasing. |

### Client application command

- Operations that cannot be performed on relations containing a VCI

| Command   | Description   |
|-----------|---|
| clusterdb | Clustering cannot be performed for tables that contain a VCI. |
| reindexdb | VCIs cannot be specified on the --index option.               |

## 9.2.2 Data Preload Feature

The first aggregation using VCI immediately after an instance is started may take time, because the VCI data has not been loaded to buffer. Therefore, use the preload feature to load the VCI data to buffer in advance when performing VCI aggregation after an instance is started. When using the preload feature, execute the function `pgx_prewarm_vci` to each VCI created with `CREATE INDEX`.

```
db01=# SELECT pgx_prewarm_vci('idx_vci');
```



See

.....  
Refer to "[B.4 VCI Data Load Control Function](#)" for information on `pgx_prewarm_vci`.  
.....

# Chapter 10 Actions when an Error Occurs

This chapter describes the actions to take when an error occurs in the database or an application, while FUJITSU Enterprise Postgres is operating.

Depending on the type of error, it may be necessary to recover the database cluster. The recovery process recovers the following resources:

- Data storage destination
- Transaction log storage destination (if the transaction log is stored in a separate disk from the data storage destination)
- Backup data storage destination

## Note

Even if a disk is not defective, the same input-output error messages, as those generated when the disk is defective, may be output. The recovery actions differ for these error messages.

Check the status of the disk, and select one of the following actions:

- If the disk is defective

Refer to "[10.1 Recovering from Disk Failure \(Hardware\)](#)", and take actions accordingly.

- If the disk is not defective

Refer to "[10.14 I/O Errors Other than Disk Failure](#)", and take actions accordingly.

A few examples of errors generated even if the disk is not defective include:

- Network error with an external disk
- Errors caused by power failure or mounting issues

## Determining the cause of an error

If an error occurs, refer to the WebAdmin message and the server log, and determine the cause of the error.

## See

Refer to "Configuring Parameters" in the Installation and Setup Guide for Server for information on server logs.

## Approximate recovery time

The formulas for deriving the approximate recovery time of resources in each directory are given below.

- Data storage destination or transaction log storage destination

$$\text{Recovery time} = (\text{usageByTheDataStorageDestination} + \text{usageByTheTransactionLogStorageDestination}) / \text{diskWritePerformance} \times 1.5$$

- *usageByTheDataStorageDestination*: Disk space used by the database cluster
  - *usageByTheTransactionLogStorageDestination*: Disk space used by the transaction log stored outside the database cluster
  - *diskWritePerformance*: Measured maximum data volume (bytes/second) that can be written per second in the system environment where the operation is performed
  - 1.5: Coefficient assuming the time excluding disk write, which is the most time-consuming step
- Backup data storage destination

$$\text{Recovery time} = \text{usageByTheBackupDataStorageDestination} / \text{diskWritePerformance} \times 1.5$$

- *usageByTheBackupDataStorageDestination*: Disk space used by the backup data

- *diskWritePerformance*: Measured maximum data volume (bytes/second) that can be written per second in the system environment where the operation is performed
- 1.5: Coefficient assuming the time excluding disk write, which is the most time-consuming step

## 10.1 Recovering from Disk Failure (Hardware)

---

This section describes how to recover database clusters to a point immediately before failure, if a hardware failure occurs in the data storage disk or the backup data storage disk.

There are two methods of recovery:

- [10.1.1 Using WebAdmin](#)
- [10.1.2 Using Server Command](#)

### Point

Back up the database cluster after recovering it. Backup deletes obsolete archive logs (transaction logs copied to the backup data storage destination), freeing up disk space and reducing the recovery time.

### 10.1.1 Using WebAdmin

---

Recover the database cluster by following the appropriate recovery procedure below for the disk where the failure occurred.

#### Note

Recovery operation cannot be performed on an instance that is part of a streaming replication cluster in standby mode.

If disk failure occurs on a standby instance, it may be necessary to delete and re-create the instance.

Recovery operation can be performed on an instance that is part of a streaming replication cluster in "Master" mode. If a recovery operation is performed on a master instance, it will break the replication cluster and streaming replication will stop between the master instance and all its standby instances. In such an event, the standby instances can be promoted to standalone instances or can be deleted and re-created.

#### **If failure occurred in the data storage disk or the transaction log storage disk**

Follow the procedure below to recover the data storage disk or the transaction log storage disk.

1. Stop applications
  - Stop applications that are using the database.
2. Stop the instance
  - Stop the instance. Refer to "[2.1.1 Using WebAdmin](#)" for information on how to stop an instance. WebAdmin automatically stops instances if recovery of the database cluster is performed without stopping the instance.
3. Recover the failed disk
  - Replace the disk, and then recover the volume configuration information.
4. Create a tablespace directory
  - If a tablespace was defined after backup, create a directory for it.
5. Recover the keystore, and enable automatic opening of the keystore
  - Do the following if the data in the database has been encrypted:
    - Restore the keystore to its state at the time of the database backup.
    - Enable automatic opening of the keystore.

## 6. Recover the database cluster

Log in to WebAdmin, and in the [Instances] tab, click [Solution] for the error message.

The screenshot shows the Fujitsu Enterprise Postgres WebAdmin interface. The main content area displays the configuration for instance 'inst1' (localhost:27500). The instance details include:

|                |                             |
|----------------|-----------------------------|
| Title          | inst1 (localhost:27500)     |
| Server type    | FUJITSU Enterprise Postgres |
| Version        | PostgreSQL 9.5.0            |
| Server up time | 0 days, 05:27:10            |
| Encoding       | UTF8                        |
| Instance type  | Standalone                  |

Below the instance details is the 'Backup storage summary' section:

|                       |                           |
|-----------------------|---------------------------|
| Data storage status   | Normal                    |
| Data storage path     | /database/fsep/inst1/data |
| Backup storage status | Error                     |
| Backup storage path   | /backup/fsep/inst1/backup |
| Backup time           | --                        |

A diagram illustrates the data flow from 'Data storage' to 'Backup storage'. At the bottom, a message log shows an error: '2016-02-10 15:55:50 Backup storage path is broken.' A red 'Solution' button is visible next to the message.

## 7. Run recovery

In the [Restore Instance] dialog box, click [Yes].

Instance restore is performed. An instance is automatically started when recovery is successful.



### Note

WebAdmin does not support recovery of hash index. If you are using a hash index, then after recovery, execute the REINDEX command to rebuild it. Use of hash indexes is not recommended.

## 8. Resume applications

Resume applications that are using the database.



### Point

WebAdmin may be unable to detect disk errors, depending on how the error occurred.

If this happens, refer to "[10.10.3 Other Errors](#)" to perform recovery.

## If failure occurred on the backup data storage disk

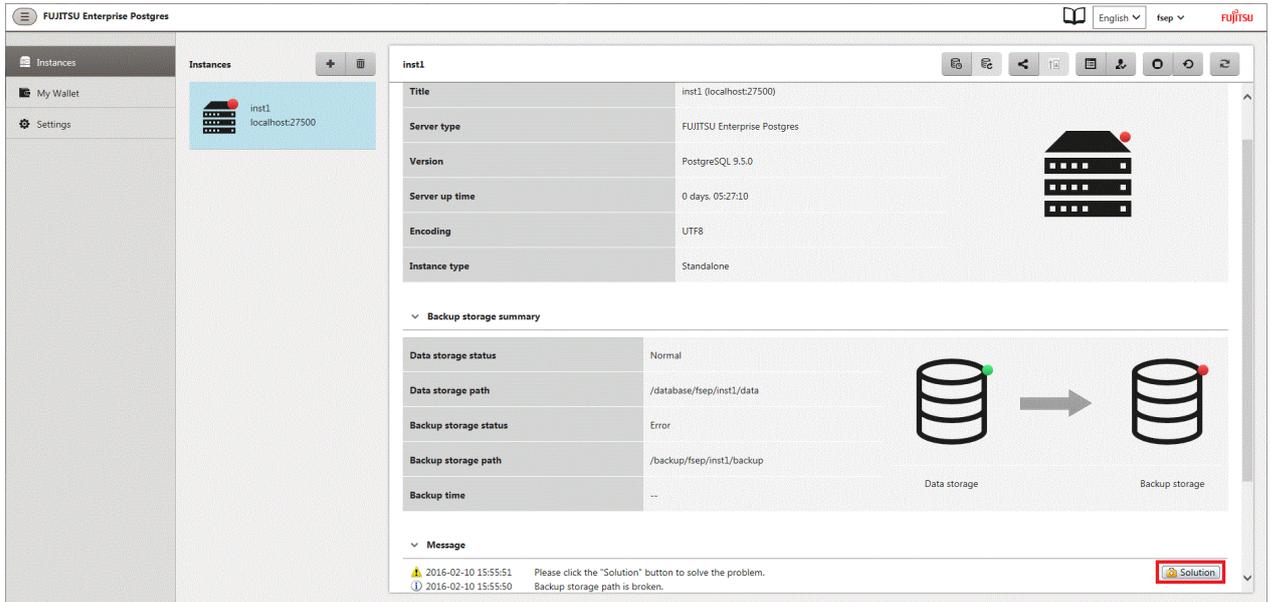
Follow the procedure below to recover the backup data storage disk.

### 1. Recover the failed disk

Replace the disk, and then recover the volume configuration information.

## 2. Recover the backup data

Log in to WebAdmin, and in the [Instance] tab, click [Solution] for the error message.



## 3. Run backup

Perform backup to enable recovery of the backup data. In the [Backup] dialog box, click [Yes]. The backup is performed. An instance is automatically started when backup is performed.

### Point

If you click [Recheck the status], the resources in the data storage destination and the backup data storage destination are reconfirmed. As a result, the following occurs:

- If an error is not detected

The status of the data storage destination and the backup data storage destination returns to normal, and it is possible to perform operations as usual.

- If an error is detected

An error message is displayed in the message list again. Click [Solution], and resolve the problem by following the resolution for the cause of the error displayed in the dialog box.

## 10.1.2 Using Server Command

Recover the database cluster by following the appropriate recovery procedure below for the disk where the failure occurred.

### If failure occurred on the data storage disk or the transaction log storage directory

Follow the procedure below to recover the data storage disk or the transaction log storage directory.

1. Stop applications

Stop applications that are using the database.

2. Stop the instance

Stop the instance, refer to "2.1.2 Using Server Commands" for details.

If the instance fails to stop, refer to "10.11 Actions in Response to Failure to Stop an Instance".

### 3. Recover the failed disk

Replace the disk, and then recover the volume configuration information.

### 4. Create a storage destination directory

- If failure occurred on the data storage disk  
Create a data storage destination directory. If a tablespace was defined, also create a directory for it.
- If failure occurred on the translation log storage disk  
Create a transaction log storage destination directory.

#### Example

To create a data storage destination directory:

```
$ mkdir /database/inst1
$ chown fsepuser:fsepuser /database/inst1
$ chmod 700 /database/inst1
```



Refer to "Preparing Directories to Deploy Resources" under "Setup" in the Installation and Setup Guide for Server for information on how to create a storage directory.

### 5. Recover the keystore, and enable automatic opening of the keystore

When the data in the database has been encrypted, restore the keystore to its state at the time of the database backup. Configure automatic opening of the keystore as necessary.

### 6. Recover the database cluster

Recover the database cluster using the backup data.

Specify the following in the `pgx_rcvall` command:

- Specify the data storage location in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the backup data storage location in the `-B` option.



```
> pgx_rcvall -D /database/inst1 -B /backup/inst1
```



If recovery fails, remove the cause of the error in accordance with the displayed error message and then re-execute the `pgx_rcvall` command.

If the message "pgx\_rcvall: an error occurred during recovery" is displayed, then the log recorded when recovery was executed is output after this message. The cause of the error is output in around the last fifteen lines of the log, so remove the cause of the error in accordance with the message and then re-execute the `pgx_rcvall` command.

The following message displayed during recovery is output as part of normal operation of `pgx_rcvall` command (therefore the user does not need not be concerned).

```
FATAL: The database system is starting
```

### 7. Start the instance

Start the instance.

Refer to "2.1.2 Using Server Commands" for information on how to start an instance.

8. Resume applications

Resume applications that are using the database.

**If failure occurred on the backup data storage disk**

The procedure for recovering the backup data storage disk is described below.

There are two methods of taking action:

- Performing recovery while the instance is active
- Stopping the instance before performing recovery

The following table shows the different steps to be performed depending on whether you stop the instance.

| No | Step   | Instance stopped |     |
|----|--|------------------|-----|
|    |  | No               | Yes |
| 1  | Confirm that transaction log mirroring has stopped | Y                | N   |
| 2  | Stop output of archive logs                        | Y                | N   |
| 3  | Stop applications                                  | N                | Y   |
| 4  | Stop the instance                                  | N                | Y   |
| 5  | Recover the failed disk                            | Y                | Y   |
| 6  | Create a backup data storage destination directory | Y                | Y   |
| 7  | Resume output of archive logs                      | Y                | N   |
| 8  | Resume transaction log mirroring                   | Y                | N   |
| 9  | Start the instance                                 | N                | Y   |
| 10 | Run backup   | Y                | Y   |
| 11 | Resume applications                                | N                | Y   |

Y: Required

N: Not required

The procedure is as follows:

If an instance has not been stopped

1. Confirm that transaction log mirroring has stopped

Use the following SQL function to confirm that transaction log mirroring has stopped.

```
postgres=# SELECT pgx_is_wal_multiplexing_paused();
pgx_is_wal_multiplexing_paused
-----
t
(1 row)
```

If transaction log mirroring has not stopped, then stop it using the following SQL function.

```
postgres=# SELECT pgx_pause_wal_multiplexing();
LOG:  multiplexing of transaction log files has been stopped
pgx_pause_wal_multiplexing
-----
(1 row)
```

## 2. Stop output of archive logs

Transaction logs may accumulate during replacement of backup storage disk, and if the data storage disk or the transaction log storage disk becomes full, there is a risk that operations may not be able to continue.

To prevent this, use the following methods to stop output of archive logs.

### - Changing archive\_command

Specify a command that will surely complete normally, such as "echo skipped archiving WAL file %f" or "/bin/true", so that archive logs will be regarded as having been output.

If you specify echo, a message is output to the server log, so it may be used as a reference when you conduct investigations.

### - Reload the configuration file

Execute the `pg_ctl reload` command or the `pg_reload_conf` SQL function to reload the configuration file.

If you simply want to stop output of errors without the risk that operations will not be able to continue, specify an empty string ("") in `archive_command` and reload the configuration file.

## 3. Recover the failed disk

Replace the disk, and then recover the volume configuration information.

## 4. Create a backup data storage destination

Create a backup data storage destination.

### Example

```
$ mkdir /database/inst1
$ chown fsepuser:fsepuser /database/inst1
$ chmod 700 /database/inst1
```

Refer to "[3.2.2 Using Server Commands](#)" for information on how to create a backup data storage destination.

## 5. Resume output of archive logs

Return the `archive_command` setting to its original value, and reload the configuration file.

## 6. Resume transaction log mirroring

Execute the `pgx_resume_wal_multiplexing` SQL function.

### Example

```
SELECT pgx_resume_wal_multiplexing()
```

## 7. Run backup

Use the `pgx_dmpall` command to back up the database cluster.

Specify the following value in the `pgx_dmpall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

### Example

```
> pgx_dmpall -D /database/inst1
```

## If an instance has been stopped

### 1. Stop applications

Stop applications that are using the database.

### 2. Stop the instance

Stop the instance. Refer to "[2.1.2 Using Server Commands](#)" for details.

If the instance fails to stop, refer to "[10.11 Actions in Response to Failure to Stop an Instance](#)".

### 3. Recover the failed disk

Replace the disk, and then recover the volume configuration information.

### 4. Create a backup data storage destination

Create a backup data storage destination.

#### Example

```
# mkdir /backup/inst1
# chown fsepuser:fsepuser /backup/inst1
# chmod 700 /backup/inst1
```

Refer to "[3.2.2 Using Server Commands](#)" for details.

### 5. Start the instance

Start the instance. Refer to "[2.1.2 Using Server Commands](#)" for information on how to start an instance.

### 6. Run backup

Use the `pgx_dmpall` command to back up the database cluster.

Specify the following value in the `pgx_dmpall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

#### Example

```
> pgx_dmpall -D /database/inst1
```

### 7. Resume applications

Resume applications that are using the database.



#### See

- Refer to "`pgx_rcvall`" and "`pgx_dmpall`" in the Reference for information on the `pgx_rcvall` command and `pgx_dmpall` command.
- Refer to "Write Ahead Log" under "Server Administration" in the PostgreSQL Documentation for information on `archive_command`.
- Refer to "[B.1 WAL Mirroring Control Functions](#)" for information on `pgx_resume_wal_multiplexing`.

## 10.2 Recovering from Data Corruption

If data in a disk is logically corrupted and the database does not operate properly, you can recover the database cluster to its state at the time of backup.

There are two methods of recovery:

- [10.2.1 Using WebAdmin](#)
- [10.2.2 Using the `pgx\_rcvall` Command](#)



#### Note

- Back up the database cluster after recovering it. Backup deletes obsolete archive logs (transaction logs copied to the backup data storage destination), freeing up disk space and reducing the recovery time.
- If you recover data to a point in the past, a new time series (database update history) will start from that recovery point. When recovery is complete, the recovery point is the latest point in the new time series. When you subsequently recover data to the latest state, the database update is re-executed on the new time series.

## 10.2.1 Using WebAdmin

---

If using WebAdmin, recover the data to the point immediately prior to data corruption by using the backup data.

Refer to "[10.1.1 Using WebAdmin](#)" for details.

## 10.2.2 Using the `pgx_rcvall` Command

---

Recover the database cluster by specifying in the `pgx_rcvall` command the date and time of the backup you want to read from. Then re-execute the transaction as required to recover the data.

Follow the procedure below to recover the data storage disk.

### 1. Stop applications

Stop applications that are using the database.

### 2. Stop the instance

Stop the instance. Refer to "[2.1.2 Using Server Commands](#)" for information on how to stop an instance.

If the instance fails to stop, refer to "[10.11 Actions in Response to Failure to Stop an Instance](#)".

### 3. Confirm the backup date and time

Execute the `pgx_rcvall` command to confirm the backup data saved in the backup data storage destination, and determine a date and time prior to data corruption.

Specify the following values in the `pg_rcvall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the backup storage directory in the `-B` option.
- The `-l` option displays the backup data information.

#### Example

```
> pgx_rcvall -D /database/inst1 -B /backup/inst1 -l
Date                Status              Dir
2015-05-20 10:00:00 COMPLETE           /backup/inst1/2015-05-20_10-00-00
```

### 4. Recover the keystore, and enable automatic opening of the keystore

When the data in the database has been encrypted, restore the keystore to its state at the time of the database backup. Configure automatic opening of the keystore as necessary.

### 5. Recover the database cluster

Use the `pgx_rcvall` command to recover the database cluster.

Specify the following values in the `pg_rcvall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the backup storage directory in the `-B` option.
- Specify the recovery date and time in the `-e` option.

#### Example

In the following examples, "May 20, 2015 10:00:00" is specified as the recovery time.

```
> pgx_rcvall -D /database/inst1 -B /backup/inst1 -e '2015-05-20 10:00:00'
```

## Note

If recovery fails, remove the cause of the error in accordance with the displayed error message and then re-execute the `pgx_rcvall` command.

If the message "pgx\_rcvall: an error occurred during recovery" is displayed, then the log recorded when recovery was executed is output after this message. The cause of the error is output in around the last fifteen lines of the log, so remove the cause of the error in accordance with the message and then re-execute the `pgx_rcvall` command.

The following message displayed during recovery is output as part of normal operation of `pgx_rcvall` command (therefore the user does not need not be concerned).

```
FATAL: The database system is starting
```

### 6. Start the instance

Start the instance. Refer to "[2.1.2 Using Server Commands](#)" for information on how to start an instance.

If necessary, re-execute transaction processing from the specified recovery time, and then resume database operations.

## Note

The `pgx_rcvall` command cannot accurately recover a hash index. If you are using a hash index, wait for the instance to start and then execute the `REINDEX` command for the appropriate index.

### 7. Resume applications

Resume applications that are using the database.

## See

Refer to "`pgx_rcvall`" in the Reference for information on the `pgx_rcvall` command.

## 10.3 Recovering from an Incorrect User Operation

---

This section describes how to recover database clusters when data has been corrupted due to erroneous user operations.

There are two methods of recovery:

- [10.3.1 Using WebAdmin](#)
- [10.3.2 Using the `pgx\_rcvall` Command](#)

## Note

- Back up the database cluster after recovering it. Backup deletes obsolete archive logs (transaction logs copied to the backup data storage destination), freeing up disk space and reducing the recovery time.
- If you recover data to a point in the past, a new time series (database update history) will start from that recovery point. When recovery is complete, the recovery point is the latest point in the new time series. When you subsequently recover data to the latest state, the database update is re-executed on the new time series.
- An effective restore point is one created on a time series for which you have made a backup. That is, if you recover data to a point in the past, you cannot use any restore points set after that recovery point. Therefore, once you manage to recover your target past data, make a backup.

### 10.3.1 Using WebAdmin

---

You can use WebAdmin to recover data to a backup point.

## Note

Recovery operation cannot be performed on an instance that is part of a streaming replication cluster in standby mode.

If disk failure occurs on a standby instance, it may be necessary to delete and re-create the instance.

Recovery operation can be performed on an instance that is part of a streaming replication cluster in "Master" mode. If a recovery operation is performed on a master instance, it will break the replication cluster and streaming replication will stop between the master instance and all its standby instances. In such an event, the standby instances can be promoted to standalone instances or can be deleted and re-created.

Follow the procedure below to recover the data in the data storage disk.

1. Stop applications

Stop applications that are using the database.

2. Stop the instance

Stop the instance. Refer to "2.1.1 Using WebAdmin" for information on how to stop an instance.

3. Recover the keystore, and enable automatic opening of the keystore

Do the following if the data in the database has been encrypted:

- Restore the keystore to its state at the time of the database backup.
- Enable automatic opening of the keystore.

4. Recover the database cluster

Log in to WebAdmin, and in the [Instances] tab, select the instance to be recovered and click .

5. Recover to the backup point

In the [Restore Instance] dialog box, click [Yes].

Recovery is performed. An instance is automatically started when recovery is successful.

## Note

WebAdmin cannot accurately recover a hash index. If you are using a hash index, then after recovery, execute the REINDEX command for the appropriate index.

6. Resume database operations

If necessary, re-execute transaction processing from the backup point to when an erroneous operation was performed, and then resume database operations.

## 10.3.2 Using the `pgx_rcvall` Command

The `pgx_rcvall` command recovers database clusters to the restore point created with the server command. Refer to "Setting a restore point" in "3.2.2 Using Server Commands" for information on how to create a restore point.

Follow the procedure below to recover the data in the data storage disk.

1. Stop applications

Stop applications that are using the database.

2. Stop the instance

Stop the instance. Refer to "2.1.2 Using Server Commands" for information on how to stop an instance.

If the instance fails to stop, refer to "10.11 Actions in Response to Failure to Stop an Instance".

### 3. Confirm the restore point

Execute the `pgx_rcvall` command to confirm the backup data saved in the backup data storage destination, and use a restore point recorded in an arbitrary file, as explained in "3.2.2 Using Server Commands", to determine a restore point prior to the erroneous operation.

Specify the following values in the `pg_rcvall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the backup data storage destination in the `-B` option.
- The `-l` option displays the backup data information.

#### Example

```
> pgx_rcvall -D /database/inst1 -B /backup/inst1 -l
Date                Status          Dir
2015-05-01 10:00:00 COMPLETE        /backup/inst1/2015-05-01_10-00-00
```

### 4. Recover the keystore, and enable automatic opening of the keystore

When the data in the database has been encrypted, restore the keystore to its state at the time of the database backup. Configure automatic opening of the keystore as necessary.

### 5. Recover the database cluster

Use the `pgx_rcvall` command to recover the database cluster.

Specify the following values in the `pg_rcvall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the backup data storage destination in the `-B` option.
- The `-n` option recovers the data to the specified restore point.

#### Example

The following example executes the `pgx_rcvall` command with the restore point "batch\_20150503\_1".

```
> pgx_rcvall -D /database/inst1 -B /backup/inst1 -n batch_20150503_1
```

#### Note

If recovery fails, remove the cause of the error in accordance with the displayed error message and then re-execute the `pgx_rcvall` command.

If the message "pgx\_rcvall: an error occurred during recovery" is displayed, then the log recorded when recovery was executed is output after this message. The cause of the error is output in around the last fifteen lines of the log, so remove the cause of the error in accordance with the message and then re-execute the `pgx_rcvall` command.

The following message displayed during recovery is output as part of normal operation of `pgx_rcvall` (therefore the user does not need not be concerned).

```
FATAL: The database system is starting
```

### 6. Start the instance

Start the instance.

Refer to "2.1.2 Using Server Commands" for information on how to start an instance.

## Note

The `pgx_rcvall` command cannot accurately recover a hash index. If you are using a hash index, wait for the instance to start and then execute the `REINDEX` command for the appropriate index.

### 7. Restart operation of the database

If necessary, re-execute transaction processing from the specified recovery time to the point when an erroneous operation was performed, and then resume database operations.

## See

Refer to "`pgx_rcvall`" in the Reference for information on the `pgx_rcvall` command.

## 10.4 Actions in Response to an Application Error

If there is a connection from a client that has been in the waiting state for an extended period, you can minimize performance degradation of the database by closing the problematic connection.

The following methods are available for identifying a connection to be closed:

- `view(pg_stat_activity)` (refer to "[10.4.1 When using the view \(pg\\_stat\\_activity\)](#)")
- `ps` command (refer to "[10.4.2 Using the ps Command](#)")
- `pgAdmin` (refer to "[10.4.3 Using pgAdmin](#)")

Use the system management function (`pg_terminate_backend`) to disconnect connections.

### 10.4.1 When using the view (`pg_stat_activity`)

When using the view (`pg_stat_activity`), follow the procedure below to close a connection.

1. Use `psql` command to connect to the postgres database.

```
> psql postgres
psql (9.5.2)
Type "help" for help.
```

2. Close connections from clients that have been in the waiting state for an extended period.

Use `pg_terminate_backend()` to close connections that have been trying to connect for an extended period.

However, when considering continued compatibility of applications, do not reference or use system catalogs and functions directly in SQL statements. Refer to "Notes on Application Compatibility" in the Application Development Guide for details.

#### Example

The following example closes connections where the client has been in the waiting state for at least 60 minutes.

```
select pid,username,application_name,client_hostname,pg_terminate_backend(pid) from
pg_stat_activity where state='idle in transaction' and current_timestamp > cast(query_start +
interval '60 minutes' as timestamp);
-[ RECORD 1 ]-----+-----
pid                | 4684
username           | fsepuser
application_name   | apl1
client_addr        | 192.11.11.1
pg_terminate_backend | t
```



See

- Refer to "System Administration Functions" under "The SQL Language" in the PostgreSQL Documentation for information on `pg_terminate_backend`.
- Refer to "Notes on Application Compatibility" in the Application Development Guide for information on how to maintain application compatibility.

## 10.4.2 Using the `ps` Command

Follow the procedure below to close a connection using a standard Unix tool (`ps` command).

1. Execute the `ps` command.

Note that "`<xy>`" indicates the product version and level.

```
> ps axwfo user,pid,ppid,TTY,command | grep postgres
fsepuser 19174 18027 pts/1          \_ grep postgres
fsepuser 20517      1 ?          /opt/fsepv<xy>server64/bin/postgres -D /disk01/data
fsepuser 20518 20517 ?          \_ postgres: logger process
fsepuser 20520 20517 ?          \_ postgres: checkpointer process
fsepuser 20521 20517 ?          \_ postgres: writer process
fsepuser 20522 20517 ?          \_ postgres: wal writer process
fsepuser 20523 20517 ?          \_ postgres: autovacuum launcher process
fsepuser 20524 20517 ?          \_ postgres: archiver process
fsepuser 20525 20517 ?          \_ postgres: stats collector process
fsepuser 18673 20517 ?          \_ postgres: fsepuser postgres 192.168.100.1(49448) idle
fsepuser 16643 20517 ?          \_ postgres: fsepuser db01 192.168.100.11(49449) UPDATE waiting
fsepuser 16644 20517 ?          \_ postgres: fsepuser db01 192.168.100.12(49450) idle in transaction
```

Process ID 16643 may be a connection that was established a considerable time ago by the UPDATE statement, or a connection that has occupied resources (waiting).

2. Close connections from clients that have been in the waiting state for an extended period.

Use `pg_terminate_backend()` to close the connection with the process ID identified in step 1 above.

However, when considering continued compatibility of applications, do not reference or use system catalogs and functions directly in SQL statements.

```
postgres=# SELECT pg_terminate_backend (16643);
 pg_terminate_backend
-----
t
(1 row)
```



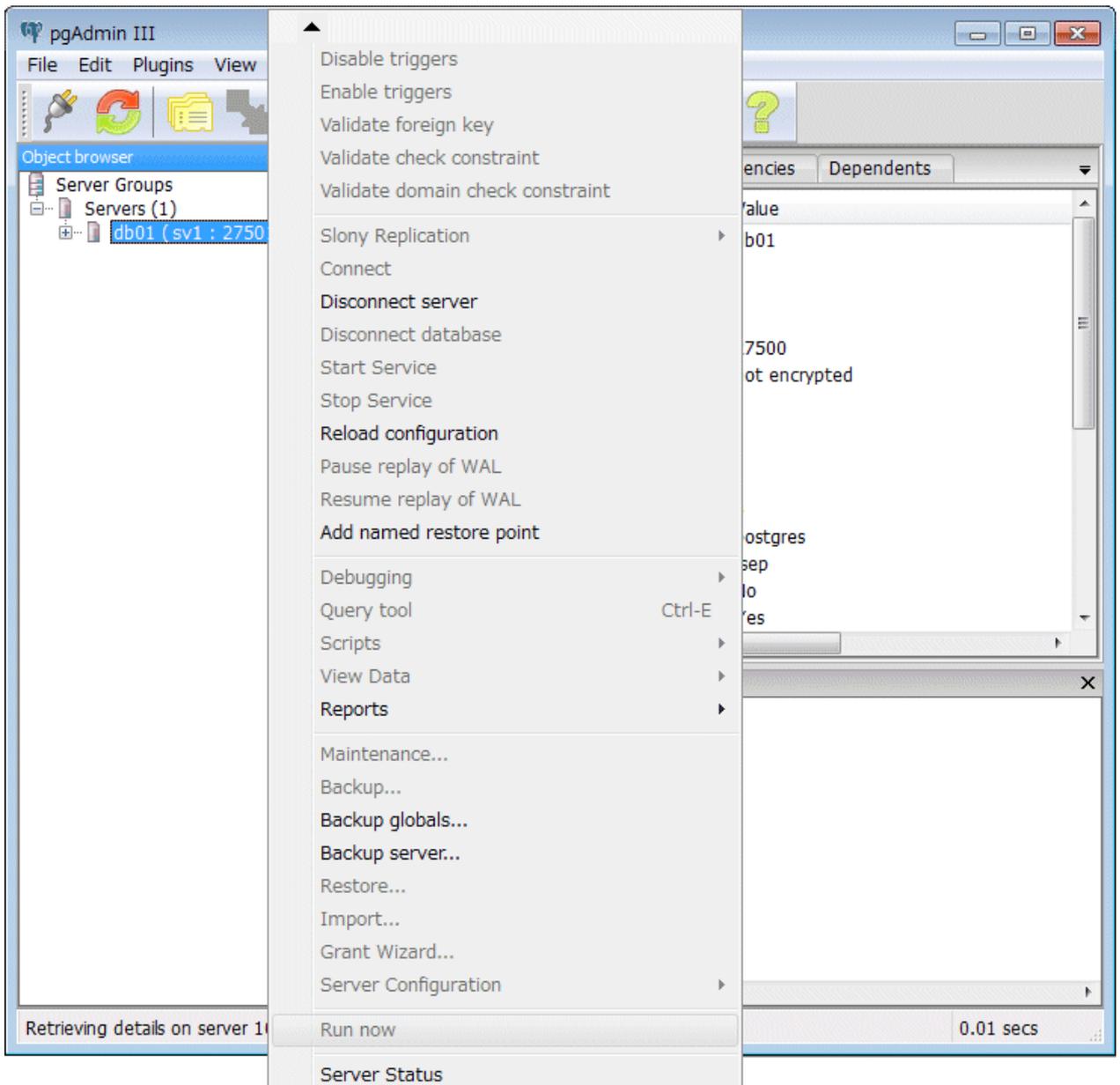
See

- Refer to "System Administration Functions" under "The SQL Language" in the PostgreSQL Documentation for information on `pg_terminate_backend`.
- Refer to "Notes on Application Compatibility" in the Application Development Guide for information on how to maintain application compatibility.

## 10.4.3 Using pgAdmin

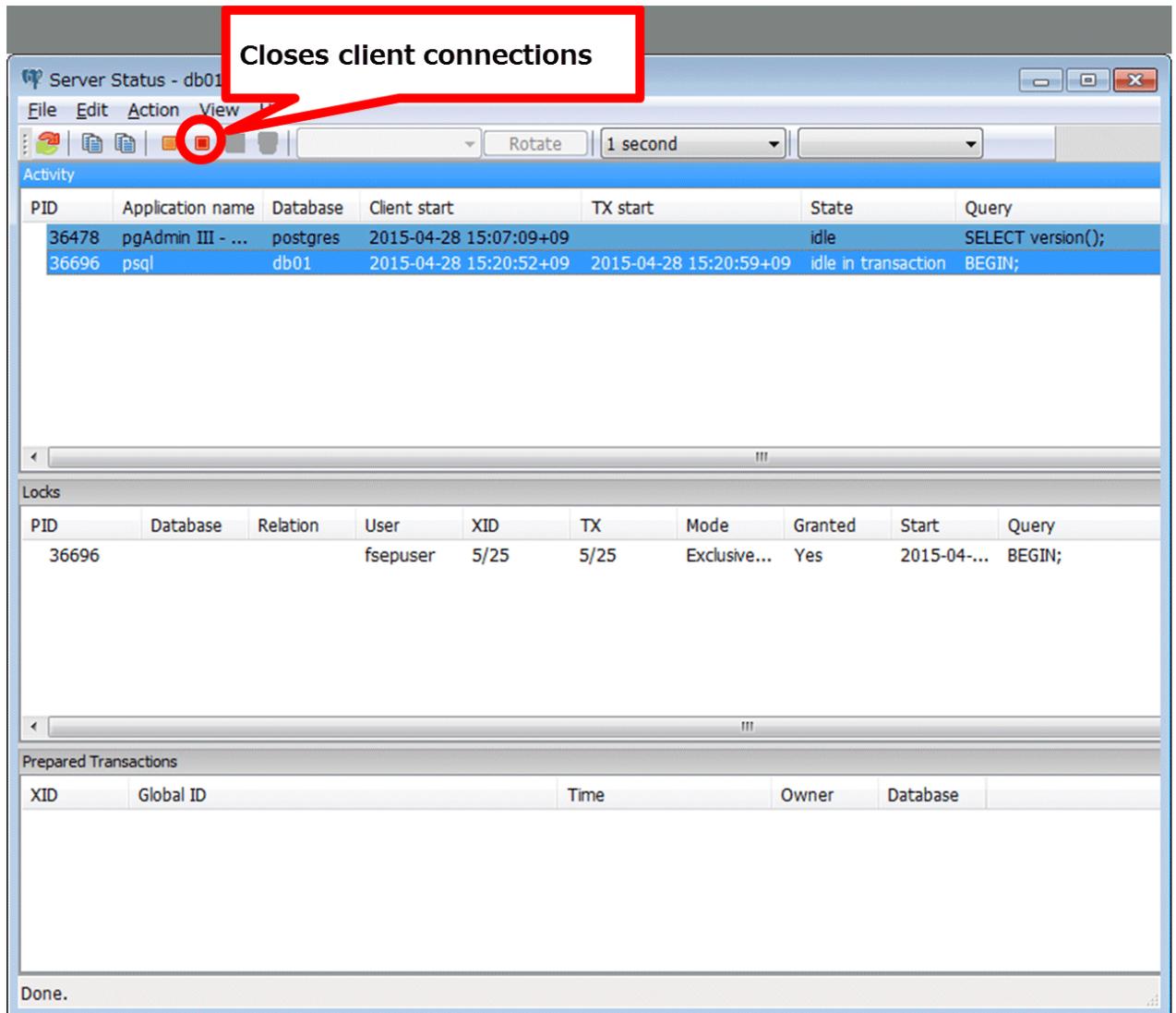
If using pgAdmin, follow the procedure below to close connections.

1. From the [Tools] menu in pgAdmin, click [Server Status].



2. Close client connections that have been in the waiting state for an extended period.

From the transaction start time displayed under [TX Start], select connections that have been in the waiting state for an extended period. Then click the red square button to close the connections.



## 10.5 Actions in Response to an Access Error

If access is denied, grant privileges allowing the instance administrator to operate the following directories and then re-execute operations. Also, refer to the system log and the server log, and confirm that the file system has not been mounted as read-only due to a disk error. If the file system has been mounted as read-only, mount it properly and then re-execute operations.

- Data storage destination
- Tablespace storage destination
- Transaction log storage destination
- Backup data storage destination



See

Refer to "Preparing Directories to Deploy Resources" under "Setup" in the Installation and Setup Guide for Server for information on the privileges required for the directory.

## 10.6 Actions in Response to Insufficient Space on the Data Storage Destination

---

If the data storage destination runs out of space, check if the disk contains any unnecessary files and delete them so that operations can continue.

If deleting unnecessary files does not solve the problem, you must migrate data to a disk with larger capacity.

There are two methods of migrating data:

- [10.6.1 Using a Tablespace](#)
- [10.6.2 Replacing the Disk with a Larger Capacity Disk](#)

### 10.6.1 Using a Tablespace

---

FUJITSU Enterprise Postgres enables you to use a tablespace to change the storage destination of database objects, such as tables and indexes, to a different disk.

The procedure is as follows:

1. Create a tablespace

Use the CREATE TABLESPACE command to create a new tablespace in the prepared disk.

2. Modify the tablespace

Use the ALTER TABLE command to modify tables for the newly defined tablespace.



See

Refer to "SQL Commands" under "Reference" in the PostgreSQL Documentation for information on the CREATE TABLESPACE command and ALTER TABLE command.

### 10.6.2 Replacing the Disk with a Larger Capacity Disk

---

Before replacing the disk with a larger capacity disk, migrate resources at the data storage destination using the backup and recovery features.

There are two methods of performing backup and recovery:

- [10.6.2.1 Using WebAdmin](#)
- [10.6.2.2 Using Server Commands](#)

The following sections describe procedures that use each of these methods to replace the disk and migrate resources at the data storage destination.



Note

- Before replacing the disk, stop applications and instances that are using the database.
- It is recommended that you back up the database cluster following recovery. Backup deletes obsolete archive logs (transaction logs copied to the backup data storage destination), freeing up disk space and reducing the recovery time.

#### 10.6.2.1 Using WebAdmin

Follow the procedure below to replace the disk and migrate resources at the data storage destination by using WebAdmin.

1. Back up files

If the disk at the data storage destination contains any required files, back up the files. It is not necessary to back up the data storage destination.

## 2. Stop applications

Stop applications that are using the database.

## 3. Back up the database cluster

Back up the latest resources at the data storage destination. Refer to "[3.2.1 Using WebAdmin](#)" for details.

## 4. Stop the instance

Stop the instance. Refer to "[2.1.1 Using WebAdmin](#)" for information on how to stop an instance.

## 5. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

## 6. Recover the database cluster

Log in to WebAdmin, and perform recovery operations. Refer to steps 4 ("Create a tablespace directory ") to 7 ("Run recovery") under "If failure occurred in the data storage disk or the transaction log storage disk" in "[10.1.1 Using WebAdmin](#)" for information on the procedure. An instance is automatically started when recovery is successful.

## 7. Resume applications

Resume applications that are using the database.

## 8. Restore the files

Restore the files backed up in step 1.

## 10.6.2.2 Using Server Commands

Follow the procedure below to replace the disk and migrate resources at the data storage destination by using server commands.

### 1. Back up files

If the disk at the data storage destination contains any required files, back up the files. It is not necessary to back up the data storage destination.

### 2. Stop applications

Stop applications that are using the database.

### 3. Back up the database cluster

Back up the latest resources at the data storage destination. Refer to "[3.2.2 Using Server Commands](#)" for details.

### 4. Stop the instance

After backup is complete, stop the instance. Refer to "[2.1.2 Using Server Commands](#)" for information on how to stop an instance.

If the instance fails to stop, refer to "[10.11 Actions in Response to Failure to Stop an Instance](#)".

### 5. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

### 6. Create a data storage destination

Create a data storage destination. If a tablespace was defined, also create a directory for it.

#### Example

```
$ mkdir /database/inst1
$ chown fsepuser:fsepuser /database/inst1
$ chmod 700 /database/inst1
```

### 7. Recover the keystore, and enable automatic opening of the keystore

When the data in the database has been encrypted, restore the keystore to its state at the time of the database backup. Configure automatic opening of the keystore as necessary.

## 8. Recover the database cluster

Use the `pgx_rcvall` command to recover the database cluster.

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the backup storage directory in the `-B` option.

### Example

```
> pgx_rcvall -D /database/inst1 -B /backup/inst1
```

### Note

If recovery fails, remove the cause of the error in accordance with the displayed error message and then re-execute the `pgx_rcvall` command.

If the message "pgx\_rcvall: an error occurred during recovery" is displayed, then the log recorded when recovery was executed is output after this message. The cause of the error is output in around the last fifteen lines of the log, so remove the cause of the error in accordance with the message and then re-execute the `pgx_rcvall` command.

The following message displayed during recovery is output as part of normal operation of `pgx_rcvall` (therefore the user does not need not be concerned).

```
FATAL: The database system is starting
```

### See

Refer to "pgx\_rcvall" in the Reference for information on the `pgx_rcvall` command.

## 9. Start the instance

Start the instance.

Refer to "[2.1.2 Using Server Commands](#)" for information on how to start an instance.

### Note

The `pgx_rcvall` command cannot accurately recover a hash index. If you are using a hash index, wait for the `pgx_rcvall` command to end and then execute the `REINDEX` command for the appropriate index.

## 10. Resume applications

Resume applications that are using the database.

## 11. Restore files

Restore the files backed up in step 1.

# 10.7 Actions in Response to Insufficient Space on the Backup Data Storage Destination

If space runs out on the backup data storage destination, check if the disk contains any unnecessary files and delete them, and then make a backup as required.

If deleting unnecessary files does not solve the problem, take the following action:

- [10.7.1 Temporarily Saving Backup Data](#)
- [10.7.2 Replacing the Disk with a Larger Capacity Disk](#)

## 10.7.1 Temporarily Saving Backup Data

This method involves temporarily moving backup data to a different directory, saving it there, and securing disk space on the backup data storage destination so that a backup can be made normally.

Use this method if you need time to prepare a larger capacity disk.

If space runs out on the backup data storage destination, archive logs can no longer be stored in the backup data storage destination. As a result, transaction logs continue to accumulate in the data storage destination or the transaction log storage destination.

If action is not taken soon, the transaction log storage destination will become full, and operations may not be able to continue.

To prevent this, secure space in the backup data storage destination, so that archive logs can be stored.

There are two methods of taking action:

- [10.7.1.1 Using WebAdmin](#)
- [10.7.1.2 Using Server Commands](#)

### 10.7.1.1 Using WebAdmin

Follow the procedure below to recover the backup data storage disk.

#### 1. Temporarily save backup data

Move backup data to a different directory and temporarily save it, and secure space in the backup data storage destination directory.

The reason for saving the backup data is so that the data in the data storage destination can be recovered even if it is corrupted before you perform recovery. If there is no disk at the save destination and you consider that there is no risk of corruption at the data storage destination, delete the backup data.

The following example saves backup data from the backup data storage destination directory (/backup/inst1) under /mnt/usb/backup.

Example

```
> mkdir /mnt/usb/backup/  
> mv /backup/inst1/* /mnt/usb/backup/
```

#### 2. Back up the database cluster

Back up the latest resources at the data storage destination. Refer to "[3.2.1 Using WebAdmin](#)" for details.

#### 3. Delete temporarily saved backup data

If backup completes normally, the temporarily saved backup data becomes unnecessary and is deleted.

The following example deletes backup data that was temporarily saved in /mnt/usb.

Example

```
> rm -rf /mnt/usb/backup
```

### 10.7.1.2 Using Server Commands

The following describes the procedure for recovering the backup storage disk.

There are two methods of taking action:

- Performing recovery while the instance is active
- Stopping the instance before performing recovery

The following table shows the different steps to be performed depending on whether you stop the instance.

| No | Step                           | Instance stopped |     |
|----|--------------------------------|------------------|-----|
|    |                                | No               | Yes |
| 1  | Stop transaction log mirroring | Y                | N   |

| No | Step                                 | Instance stopped |     |
|----|--------------------------------------|------------------|-----|
|    |                                      | No               | Yes |
| 2  | Stop output of archive logs          | Y                | N   |
| 3  | Stop applications                    | N                | Y   |
| 4  | Stop the instance                    | N                | Y   |
| 5  | Temporarily save backup data         | Y                | Y   |
| 6  | Resume output of archive logs        | Y                | N   |
| 7  | Resume transaction log mirroring     | Y                | N   |
| 8  | Start an instance                    | N                | Y   |
| 9  | Run backup                           | Y                | Y   |
| 10 | Resume applications                  | N                | Y   |
| 11 | Delete temporarily saved backup data | Y                | Y   |

Y: Required

N: Not required

The procedure is as follows:

### Performing recovery while the instance is active

1. Stop transaction log mirroring

Stop transaction log mirroring.

```
postgres=# SELECT pgx_pause_wal_multiplexing();
LOG:  multiplexing of transaction log files has been stopped
pgx_pause_wal_multiplexing
-----
(1 row)
```

2. Stop output of archive logs

Transaction logs may accumulate during replacement of backup storage disk, and if the data storage disk or the transaction log storage disk becomes full, there is a risk that operations may not be able to continue.

To prevent this, use the following methods to stop output of archive logs.

- Changing the archive\_command parameter

Specify a command that will surely complete normally, such as "echo skipped archiving WAL file %f" or "/bin/true", so that archive logs will be regarded as having been output.

If you specify echo, a message is output to the server log, so it may be used as a reference when you conduct investigations.

- Reloading the configuration file

Run the pg\_ctl reload command or the pg\_reload\_conf SQL function.

If you simply want to stop output of errors without the risk that operations will not be able to continue, specify an empty string (") in archive\_command and reload the configuration file.

3. Temporarily save backup data

Move backup data to a different directory and temporarily save it, and secure space in the backup data storage destination directory.

The reason for saving the backup data is so that the data in the data storage destination can be recovered even if it is corrupted before you perform the next step. If there is no disk at the save destination and you consider that there is no risk of corruption at the data storage destination, delete the backup data.

The following example saves backup data from the backup data storage destination directory (/backup/inst1) under /mnt/usb/backup.

#### Example

```
> mkdir /mnt/usb/backup/  
> mv /backup/inst1/* /mnt/usb/backup/
```

#### 4. Resume output of archive logs

Return the archive\_command setting to its original value, and reload the configuration file.

#### 5. Resume transaction log mirroring

Execute the pgx\_resume\_wal\_multiplexing SQL function.

#### Example

```
SELECT pgx_resume_wal_multiplexing()
```

#### 6. Run backup

Use the pgx\_dmpall command to back up the database cluster.

Specify the following option in the pgx\_dmpall command:

- Specify the directory of the data storage destination in the -D option. If the -D option is omitted, the value of the PGDATA environment variable is used by default.

#### Example

```
> pgx_dmpall -D /database/inst1
```

#### 7. Delete temporarily saved backup data

If backup completes normally, the temporarily saved backup data becomes unnecessary and is deleted.

The following example deletes backup data that was temporarily saved in /mnt/usb.

#### Example

```
> rm -rf /mnt/usb/backup
```

## If an instance has been stopped

#### 1. Stop applications

Stop applications that are using the database.

#### 2. Stop the instance

Stop the instance. Refer to "[2.1.2 Using Server Commands](#)" for details.

If the instance fails to stop, refer to "[10.11 Actions in Response to Failure to Stop an Instance](#)".

#### 3. Temporarily save backup data

Move backup data to a different directory and temporarily save it, and secure space in the backup data storage destination directory.

The reason for saving the backup data is so that the data in the data storage destination can be recovered even if it is corrupted before you perform recovery. If there is no disk at the save destination and you consider that there is no risk of corruption at the data storage destination, delete the backup data.

The following example saves backup data from the backup data storage destination directory (/backup/inst1) under /mnt/usb/backup.

#### Example

```
> mkdir /mnt/usb/backup/  
> mv /backup/inst1/* /mnt/usb/backup/
```

#### 4. Start the instance

Start the instance. Refer to "[2.1.2 Using Server Commands](#)" for information on how to start an instance.

#### 5. Run backup

Use the `pgx_dmpall` command to back up the database cluster.

Specify the following value in the `pgx_dmpall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

Example

```
> pgx_dmpall -D /database/inst1
```

#### 6. Resume applications

Resume applications that are using the database.

#### 7. Delete temporarily saved backup data

If backup completes normally, the temporarily saved backup data becomes unnecessary and is deleted.

The following example deletes backup data that was temporarily saved in `/mnt/usb`.

Example

```
> rm -rf /mnt/usb/backup
```



See

- Refer to "`pgx_rcvall`" and "`pgx_dmpall`" in the Reference for information on the `pgx_rcvall` command and `pgx_dmpall` command.
- Refer to "Write Ahead Log" under "Server Administration" in the PostgreSQL Documentation for information on `archive_command`.
- Refer to "[B.1 WAL Mirroring Control Functions](#)" for information on the `pgx_is_wal_multiplexing_paused` and `pgx_resume_wal_multiplexing`.

## 10.7.2 Replacing the Disk with a Larger Capacity Disk

This method involves replacing the disk at the backup data storage destination with a larger capacity disk, so that it does not run out of free space again. After replacing the disk, back up data to obtain a proper backup.

There are two methods of performing backup:

- [10.7.2.1 Using WebAdmin](#)
- [10.7.2.2 Using Server Commands](#)



Note

Before replacing the disk, stop applications that are using the database.

### 10.7.2.1 Using WebAdmin

Follow the procedure below to recover the backup storage disk.

#### 1. Back up files

If the disk at the backup data storage destination contains any required files, back up the files. It is not necessary to back up the backup data storage destination.

## 2. Temporarily save backup data

Save the backup data to a different directory.

The reason for saving the backup data is so that the data in the data storage destination can be recovered even if it is corrupted before you perform the next step. If there is no disk at the save destination and you consider that there is no risk of corruption at the data storage destination, delete the backup data.

The following example saves backup data from the backup data storage destination directory (/backup/inst1) under /mnt/usb/backup.

### Example

```
> mkdir /mnt/usb/backup/  
> mv /backup/inst1/* /mnt/usb/backup/
```

## 3. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

## 4. Run backup

Log in to WebAdmin, and perform recovery operations. Refer to steps 2 ("Recover the backup data") and 3 ("Run backup") under "If failure occurred on the backup storage disk" in "10.1.1 Using WebAdmin".

## 5. Restore files

Restore the files backed up in step 1.

## 6. Delete temporarily saved backup data

If backup completes normally, the temporarily saved backup data becomes unnecessary and is deleted.

The following example deletes backup data that was temporarily saved in /mnt/usb.

### Example

```
> rm -rf /mnt/usb/backup
```

## 10.7.2.2 Using Server Commands

The procedure for recovering the backup data storage disk is described below.

There are two methods of taking action:

- Performing recovery while the instance is active
- Stopping the instance before performing recovery

The following table shows the different steps to be performed depending on whether you stop the instance.

| No | Step   | Instance stopped |     |
|----|--|------------------|-----|
|    |  | No               | Yes |
| 1  | Back up files                                      | Y                | Y   |
| 2  | Temporarily save backup data                       | Y                | Y   |
| 3  | Confirm that transaction log mirroring has stopped | Y                | N   |
| 4  | Stop output of archive logs                        | Y                | N   |
| 5  | Stop applications                                  | N                | Y   |
| 6  | Stop the instance                                  | N                | Y   |
| 7  | Replace with a larger capacity disk                | Y                | Y   |
| 8  | Create a backup storage directory                  | Y                | Y   |
| 9  | Resume output of archive logs                      | Y                | N   |
| 10 | Resume transaction log mirroring                   | Y                | N   |

| No | Step                                 | Instance stopped |     |
|----|--------------------------------------|------------------|-----|
|    |                                      | No               | Yes |
| 11 | Start the instance                   | N                | Y   |
| 12 | Run backup                           | Y                | Y   |
| 13 | Resume applications                  | N                | Y   |
| 14 | Restore files                        | Y                | Y   |
| 15 | Delete temporarily saved backup data | Y                | Y   |

Y: Required

N: Not required

The procedure is as follows:

If an instance has not been stopped

1. Back up files

If the disk at the backup data storage destination contains any required files, back up the files. It is not necessary to back up the backup data storage destination.

2. Temporarily save backup data

Save the backup data to a different directory.

The reason for saving the backup data is so that the data in the data storage destination can be recovered even if it is corrupted before you perform the next step. If there is no disk at the save destination and you consider that there is no risk of corruption at the data storage destination, delete the backup data.

The following example saves backup data from the backup data storage destination directory (/backup/inst1) under /mnt/usb/backup.

Example

```
> mkdir /mnt/usb/backup/
> mv /backup/inst1/* /mnt/usb/backup/
```

3. Confirm that transaction log mirroring has stopped

Use the following SQL function to confirm that transaction log mirroring has stopped.

```
postgres=# SELECT pgx_is_wal_multiplexing_paused();
pgx_is_wal_multiplexing_paused
-----
t
(1 row)
```

If transaction log mirroring has not stopped, then stop it using the following SQL function.

```
postgres=# SELECT pgx_pause_wal_multiplexing();
LOG:  multiplexing of transaction log files has been stopped
pgx_pause_wal_multiplexing
-----
(1 row)
```

4. Stop output of archive logs

Transaction logs may accumulate during replacement of backup storage disk, and if the data storage destination disk or the transaction log storage destination disk becomes full, there is a risk that operations may not be able to continue.

To prevent this, use the following methods to stop output of archive logs.

- Changing the `archive_command` parameter

Specify a command that will surely complete normally, such as "echo skipped archiving WAL file %f" or "/bin/true", so that archive logs will be regarded as having been output.

If you specify echo, a message is output to the server log, so it may be used as a reference when you conduct investigations.

- Reloading the configuration file

Run the `pg_ctl reload` command or the `pg_reload_conf` SQL function.

If you simply want to stop output of errors without the risk that operations will not be able to continue, specify an empty string ("") in `archive_command` and reload the configuration file.

#### 5. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

#### 6. Create a backup data storage destination

Create a backup data storage destination.

##### Example

```
# mkdir /backup/inst1
# chown fsepuser:fsepuser /backup/inst1
# chmod 700 /backup/inst1
```

Refer to "[3.2.2 Using Server Commands](#)" for details.

#### 7. Resume output of archive logs

Return the `archive_command` setting to its original value, and reload the configuration file.

#### 8. Resume transaction log mirroring

Execute the `pgx_resume_wal_multiplexing` SQL function.

##### Example

```
SELECT pgx_resume_wal_multiplexing()
```

#### 9. Run backup

Use the `pgx_dmpall` command to back up the database cluster.

Specify the following value in the `pgx_dmpall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

##### Example

```
> pgx_dmpall -D /database/inst1
```

#### 10. Restore files

Restore the files backed up in step 1.

#### 11. Delete temporarily saved backup data

If backup completes normally, the temporarily saved backup data becomes unnecessary and is deleted.

The following example deletes backup data that was temporarily saved in `/mnt/usb`.

##### Example

```
> rm -rf /mnt/usb/backup
```

## If an instance has been stopped

### 1. Back up files

If the disk at the backup data storage destination contains any required files, back up the files. It is not necessary to back up the backup data storage destination.

### 2. Temporarily save backup data

Save the backup data to a different directory.

The reason for saving the backup data is so that the data in the data storage destination can be recovered even if it is corrupted before you perform the next step. If there is no disk at the save destination and you consider that there is no risk of corruption at the data storage destination, delete the backup data.

The following example saves backup data from the backup data storage destination directory (/backup/inst1) under /mnt/usb/backup.

#### Example

```
> mkdir /mnt/usb/backup/  
> mv /backup/inst1/* /mnt/usb/backup/
```

### 3. Stop applications

Stop applications that are using the database.

### 4. Stop the instance

Stop the instance. Refer to "[2.1.2 Using Server Commands](#)" for information on how to stop an instance.

If the instance fails to stop, refer to "[10.11 Actions in Response to Failure to Stop an Instance](#)".

### 5. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

### 6. Create a backup data storage destination

Create a backup data storage destination.

#### Example

```
# mkdir /backup/inst1  
# chown fsepuser:fsepuser /backup/inst1  
# chmod 700 /backup/inst1
```

Refer to "[3.2.2 Using Server Commands](#)" for details.

### 7. Start the instance

Start the instance. Refer to "[2.1.2 Using Server Commands](#)" for information on how to start an instance.

### 8. Run backup

Use the pgx\_dmpall command to back up the database cluster.

Specify the following value in the pgx\_dmpall command:

- Specify the data storage destination in the -D option. If the -D option is omitted, the value of the PGDATA environment variable is used by default.

#### Example

```
> pgx_dmpall -D /database/inst1
```

### 9. Resume applications

Resume applications that are using the database.

### 10. Restore files

Restore the files backed up in step 1.

## 11. Delete temporarily saved backup data

If backup completes normally, the temporarily saved backup data becomes unnecessary and is deleted.

The following example deletes backup data that was temporarily saved in /mnt/usb.

Example

```
> rm -rf /mnt/usb/backup
```



See

- Refer to "pgx\_rcvall" and "pgx\_dmpall" in the Reference for information on the pgx\_rcvall command and pgx\_dmpall command.
- Refer to "Write Ahead Log" under "Server Administration" in the PostgreSQL Documentation for information on archive\_command.
- Refer to "[B.1 WAL Mirroring Control Functions](#)" for information on the pgx\_is\_wal\_multiplexing\_paused and pgx\_resume\_wal\_multiplexing.

## 10.8 Actions in Response to Insufficient Space on the Transaction Log Storage Destination

If the transaction log storage destination runs out of space, check if the disk contains any unnecessary files and delete them so that operations can continue.

If deleting unnecessary files does not solve the problem, you must migrate data to a disk with larger capacity.

### 10.8.1 Replacing the Disk with a Larger Capacity Disk

Before replacing the disk with a larger capacity disk, migrate resources at the transaction log storage destination using the backup and recovery features.

There are two methods of performing backup and recovery:

- [10.8.1.1 Using WebAdmin](#)
- [10.8.1.2 Using Server Commands](#)

The following sections describe procedures that use each of these methods to replace the disk and migrate resources at the transaction log storage destination.



Note

- Before replacing the disk, stop applications that are using the database.
- It is recommended that you back up the database cluster following recovery. Backup deletes obsolete archive logs (transaction logs copied to the backup data storage destination), freeing up disk space and reducing the recovery time.

#### 10.8.1.1 Using WebAdmin

Follow the procedure below to replace the disk and migrate resources at the transaction log storage destination by using WebAdmin.

##### 1. Back up files

If the disk at the transaction log storage destination contains any required files, back up the files. It is not necessary to back up the transaction log storage destination.

##### 2. Back up the database cluster

Back up the latest data storage destination resources and transaction log storage destination resources (refer to "[3.2.1 Using WebAdmin](#)" for details).

### 3. Stop applications

Stop applications that are using the database.

### 4. Stop the instance

Stop the instance. Refer to "[2.1.1 Using WebAdmin](#)" for information on how to stop an instance. WebAdmin automatically stops instances if recovery of the database cluster is performed without stopping the instance.

### 5. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

### 6. Create a tablespace directory

If a tablespace was defined after backing up, create a directory for it.

### 7. Recover the keystore, and enable automatic opening of the keystore

Do the following if the data in the database has been encrypted:

- Restore the keystore to its state at the time of the database backup.
- Enable automatic opening of the keystore.

### 8. Recover the database cluster

Log in to WebAdmin, and perform recovery operations. Refer to steps 4 ("Create a tablespace directory ") to 7 ("Run Recovery") under " If failure occurred in the data storage disk or the transaction log storage disk " in "[10.1.1 Using WebAdmin](#)" for information on the procedure. An instance is automatically started when recovery is successful.

### 9. Resume applications

Resume applications that are using the database.

### 10. Restore files

Restore the files backed up in step 1.

## 10.8.1.2 Using Server Commands

Follow the procedure below to replace the disk and migrate resources at the transaction log storage destination by using server commands.

#### 1. Back up files

If the disk at the transaction log storage destination contains any required files, back up the files. It is not necessary to back up the transaction log storage destination.

#### 2. Back up the database cluster

Use server commands to back up the latest data storage destination resources and transaction log storage destination resources. Refer to "[3.2.2 Using Server Commands](#)" for information on how to perform backup.

#### 3. Stop applications

Stop applications that are using the database.

#### 4. Stop the instance

After backup is complete, stop the instance. Refer to "[2.1.2 Using Server Commands](#)" for information on how to stop an instance.

If the instance fails to stop, refer to "[10.11 Actions in Response to Failure to Stop an Instance](#)".

#### 5. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

#### 6. Create a transaction log storage destination

Create a transaction log storage destination. If a tablespace was defined, also create a directory for it.

## Example

```
# mkdir /tranlog/inst1
# chown fsepuser:fsepuser /tranlog/inst1
# chmod 700 /tranlog/inst1
```

### 7. Recover the keystore, and enable automatic opening of the keystore

When the data in the database has been encrypted, restore the keystore to its state at the time of the database backup. Configure automatic opening of the keystore as necessary.

### 8. Recover the database cluster

Use the `pgx_rcvall` command to recover the database cluster.

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the backup storage directory in the `-B` option.

## Example

```
> pgx_rcvall -D /database/inst1 -B /backup/inst1
```

## Note

If recovery fails, remove the cause of the error in accordance with the displayed error message and then re-execute the `pgx_rcvall` command.

If the message "pgx\_rcvall: an error occurred during recovery" is displayed, then the log recorded when recovery was executed is output after this message. The cause of the error is output in around the last fifteen lines of the log, so remove the cause of the error in accordance with the message and then re-execute the `pgx_rcvall` command.

The following message displayed during recovery is output as part of normal operation of `pgx_rcvall` command (therefore the user does not need not be concerned).

```
FATAL: The database system is starting
```

## See

Refer to "pgx\_rcvall" in the Reference for information on the `pgx_rcvall` command.

### 9. Start the instance

Start the instance.

Refer to "[2.1.2 Using Server Commands](#)" for information on how to start an instance.

## Note

The `pgx_rcvall` command cannot accurately recover a hash index. If you are using a hash index, wait for the instance to start and then execute the `REINDEX` command for the appropriate index.

### 10. Resume applications

Resume applications that are using the database.

### 11. Restore files

Restore the files backed up in step 1.

## 10.9 Errors in More Than One Storage Disk

---

If an error occurs in the storage destination disks or resources are corrupted, determine the cause of the error from system logs and server logs and remove the cause.

If errors occur in either of the following combinations, you cannot recover the database.

Recreate the instance, and rebuild the runtime environment.

| Data storage disk | Transaction log storage disk | Backup data storage disk |
|-------------------|------------------------------|--------------------------|
| Error             | -                            | Error                    |
| -                 | Error                        | Error                    |



Refer to "Setup" in the Installation and Setup Guide for Server for information on how to create an instance and build the runtime environment.

## 10.10 Actions in Response to Instance Startup Failure

---

If an instance fails to start, refer to the system log and the server log, and determine the cause of the failure.

If using WebAdmin, remove the cause of the error. Then, click [Solution] and [Recheck the status] and confirm that the instance is in the normal state.

The following sections describe common causes of errors and the actions to take.

### 10.10.1 Errors in the Configuration File

---

If you have directly edited the configuration file using a text editor or changed the settings using WebAdmin, refer to the system log and the server log, confirm that no messages relating to the files below have been output.

- postgresql.conf
- pg\_hba.conf



Refer to the following for information on the parameters in the configuration file:

- "Configuring Parameters" in the Installation and Setup Guide for Server
- "[Appendix A Parameters](#)"
- "Server Configuration" and "Client Authentication" under "Server Administration" in the PostgreSQL Documentation

### 10.10.2 Errors Caused by Power Failure or Mounting Issues

---

If mounting is cancelled after restarting the server, for example, because the disk device for each storage destination disk was not turned on, or because automatic mounting has not been set, then starting an instance will fail.

Refer to "[10.14.2 Errors Caused by Power Failure or Mounting Issues](#)", and take actions accordingly.

### 10.10.3 Other Errors

---

This section describes the recovery procedure to be used if you cannot take any action or the instance cannot start even after you have referred to the system log and the server log.

There are two methods of recovery:

- [10.10.3.1 Using WebAdmin](#)
- [10.10.3.2 Using Server Commands](#)

Note that recovery will not be possible if there is an error at the backup data storage destination. If the problem cannot be resolved, contact Fujitsu technical support.

### 10.10.3.1 Using WebAdmin

Follow the procedure below to perform recovery.

1. Delete the data storage destination directory and the transaction log storage destination directory  
Back up the data storage destination directory and the transaction log storage destination directory before deleting them.
2. Reconfirm the status  
Log in to WebAdmin, and in the [Instances] tab, click [Solution] for the error message.  
Click [Recheck the status] to reconfirm the storage destination resources.
3. Run recovery  
Restore the database cluster after WebAdmin detects an error.  
Refer to "[10.2.1 Using WebAdmin](#)" for details.

### 10.10.3.2 Using Server Commands

Follow the procedure below to recover the database.

1. Delete the data storage destination directory and the transaction log storage destination directory  
Save the data storage destination directory and the transaction log storage destination directory, and then delete them.
2. Execute recovery  
Use the `pgx_rcvall` command to recover the database cluster.  
Refer to "[10.2.2 Using the pgx\\_rcvall Command](#)" for details.

## 10.11 Actions in Response to Failure to Stop an Instance

---

If an instance fails to stop, refer to the system log and the server log, and determine the cause of the failure.

If the instance cannot stop despite taking action, perform the following operation to stop the instance.

There are two methods of recovery:

- [10.11.1 Using WebAdmin](#)
- [10.11.2 Using Server Commands](#)

### 10.11.1 Using WebAdmin

---

In the [Instances] tab, click  and select the Fast stop mode or the Immediate stop mode to stop the instance. Forcibly terminate the server process from WebAdmin if the instance cannot be stopped.

Refer to "[2.1.1 Using WebAdmin](#)" for information on the stop modes.

### 10.11.2 Using Server Commands

---

There are three methods:

- Stopping the Instance Using the Fast Mode

If backup is in progress, then terminate it, roll back all executing transactions, forcibly close client connections, and then stop the instance.

- Stopping the Instance Using the Immediate Mode

Forcibly terminate the instance immediately. A crash recovery is run when the instance is restarted.

- Forcibly Stopping the Server Process

Reliably stops the server process when the other methods are unsuccessful.

## 10.11.2.1 Stopping the Instance Using the Fast Mode

Specify "-m fast" in the pg\_ctl command to stop the instance.

If the instance fails to stop when you use this method, stop the instance as described in "[10.11.2.2 Stopping the Instance Using the Immediate Mode](#)" or "[10.11.2.3 Forcibly Stopping the Server Process](#)".

### Example

```
> pg_ctl stop -D /database/inst1 -m fast
```

## 10.11.2.2 Stopping the Instance Using the Immediate Mode

Specify "-m immediate" in the pg\_ctl command to stop the instance.

If the instance fails to stop when you use this method, stop the instance as described in "[10.11.2.3 Forcibly Stopping the Server Process](#)".

### Example

```
> pg_ctl stop -D /database/inst1 -m immediate
```

## 10.11.2.3 Forcibly Stopping the Server Process

If both the Fast mode and the Immediate mode fail to stop the instance, use the kill command or the kill parameter of the pg\_ctl command to forcibly stop the server process.

The procedure is as follows:

1. Execute the ps command

Note that "<xy>" indicates the product version and level.

```
> ps axwfo user,pid,ppid,TTY,command | grep postgres
fsepuser 19174 18027 pts/1          \_ grep postgres
fsepuser 20517      1 ?          /opt/fsepv<xy>server64/bin/postgres -D /database/inst1
fsepuser 20518 20517 ?          \_ postgres: logger process
fsepuser 20520 20517 ?          \_ postgres: checkpointer process
fsepuser 20521 20517 ?          \_ postgres: writer process
fsepuser 20522 20517 ?          \_ postgres: wal writer process
fsepuser 20523 20517 ?          \_ postgres: autovacuum launcher process
fsepuser 20524 20517 ?          \_ postgres: archiver process
fsepuser 20525 20517 ?          \_ postgres: stats collector process
```

The process ID (20517) indicates the server process.

2. Forcibly stop the server process

As instance manager, forcibly stop the server process.

Using the `pg_ctl` command

```
> pg_ctl kill SIGQUIT 20517
```

Using the `kill` command

```
> kill -s SIGQUIT 20517
```

## 10.12 Actions in Response to Failure to Create a Streaming Replication Standby Instance

---

When creating a streaming replication standby instance using WebAdmin, if the instance creation fails, refer to the system log and the server log, and determine the cause of the failure.

When an error occurs in the creation of the standby instance using WebAdmin, it is unlikely that the partially created standby instance can be resumed to complete the operation.

In such a scenario, fix the cause of the error, delete the partially created standby instance, and then create a new standby instance. This recommendation is based on the following assumptions:

- As the instance is yet to be created completely, there are no applications connecting to the database.
- The standby instance is in error state and is not running.
- There are no backups for the standby instance and as a result, it cannot be recovered.

Refer to "Deleting Instances" in the Installation and Setup Guide for details on how to delete a instance.

## 10.13 Actions in Response to Error in a Distributed Transaction

---

If a system failure (such as server failure) occurs in an application that uses distributed transactions (such as .NET TransactionScope), then transactions may be changed to the in-doubt state. At that point, resources accessed by the transaction will be locked, and rendered unusable by other transactions.

The following describes how to check for in-doubt transactions, and how to resolve them.

### How to check for in-doubt transactions

The following shows how to check for them:

If the server fails

1. An in-doubt transaction will have occurred if a message similar to the one below is output to the log when the server is restarted.

Example

```
LOG: Restoring prepared transaction 2103.
```

2. Refer to system view `pg_prepared_xacts` to obtain information about the prepared transaction.

If the transaction identifier of the prepared transaction in the list (in the transaction column of `pg_prepared_xacts`) is the same as the identifier of the in-doubt transaction obtained from the log output when the server was restarted, then that row is the information about the in-doubt transaction.

Example

```
postgres=# select * from pg_prepared_xacts;
 transaction | gid          | prepared | owner    | database
-----+-----+-----+-----+-----
 2103 | 374cc221-f6dc-4b73-9d62-d4fec9b430cd | 2015-05-06 16:28:48.471+08 | postgres |
postgres (1 row)
```

Information about the in-doubt transaction is output to the row with the transaction ID 2103 in the transaction column.

## If the client fails

If there are no clients connected and there is a prepared transaction in `pg_prepared_xacts`, then you can determine that the transaction is in the in-doubt state.

If at least one client is connected and there is a prepared transaction in `pg_prepared_xacts`, you cannot determine whether there is a transaction in the in-doubt state. In this case, use the following query to determine the in-doubt transaction from the acquired database name, user name, the time `PREPARE TRANSACTION` was executed, and the information about the table name accessed.

```
select gid,x.database,owner,prepared,l.relation::regclass as relation from pg_prepared_xacts x
left join pg_locks l on l.virtualtransaction = '-1/'||x.transaction and l.locktype='relation';
```

If it still cannot be determined from this information, wait a few moments and then check `pg_prepared_xacts` again.

If there is a transaction that has continued since the last time you checked, then it is likely that it is the one in the in-doubt state.

### Point

As you can see from the explanations in this section, there is no one way to definitively determine in-doubt transactions.

Consider collecting other supplementary information (for example, logging on the client) or performing other operations (for example, allocating database users per job).

## How to resolve in-doubt transactions

From the system view `pg_prepared_xacts` mentioned above, obtain the global transaction identifier (in the `gid` column of `pg_prepared_xacts`) for the in-doubt transaction, and issue either a `ROLLBACK PREPARED` statement or `COMMIT PREPARED` statement to resolve the in-doubt transaction.

### Example

- Rolling back in-doubt transactions

```
postgres=# rollback prepared '374cc221-f6dc-4b73-9d62-d4fec9b430cd';
ROLLBACK PREPARED
```

- Committing in-doubt transactions

```
postgres=# commit prepared '374cc221-f6dc-4b73-9d62-d4fec9b430cd';
COMMIT PREPARED
```

## 10.14 I/O Errors Other than Disk Failure

---

Even if a disk is not defective, the same input-output error messages, as those generated when the disk is defective, may be output.

A few examples of such errors are given below. The appropriate action for each error is explained respectively.

- [10.14.1 Network Error with an External Disk](#)
- [10.14.2 Errors Caused by Power Failure or Mounting Issues](#)

### 10.14.1 Network Error with an External Disk

---

This is an error that occurs in the network path to/from an external disk.

Determine the cause of the error by checking the information in the system log and the server log, the disk access LED, network wiring, and network card status. Take appropriate action to remove the cause of the error, for example, replace problematic devices.

## **10.14.2 Errors Caused by Power Failure or Mounting Issues**

---

These are errors that occur when the disk device is not turned on, automatic mounting of the disk was not set, or mounting was accidentally cancelled.

In this case, check the information in the system log and the server log, the disk access LED, and whether the disk is mounted correctly. If problems are detected, take appropriate action.

If mounting has been cancelled, it is possible that mounting was accidentally cancelled, or automatic mounting at the time of starting the operating system is not set. In this case, set the mounting to be performed automatically.

# Appendix A Parameters

This appendix describes the parameters to be set in the postgresql.conf file of FUJITSU Enterprise Postgres.

The postgresql.conf file is located in the data storage destination.

- core\_directory (string)

This parameter specifies the directory where the corefile is to be output. If this parameter is omitted, the data storage destination is used by default. This parameter can only be set when specified on starting an instance. It cannot be changed dynamically, while an instance is active.

- core\_contents (string)

This parameter specifies the contents to be included in the corefile.

- full: Outputs all contents of the server process memory to the corefile.
- none: Does not output a corefile.
- minimum: Outputs only non-shared memory server processes to the corefile. This reduces the size of the corefile. However, in some cases, this file may not contain sufficient information for examining the factor that caused the corefile to be output.

If this parameter is omitted, "minimum" is used by default. This parameter can only be set when specified on starting an instance. It cannot be changed dynamically, while an instance is active.

- keystore\_location (string)

This parameter specifies the directory that stores the keystore file. Specify a different location from other database clusters. This parameter can only be set when specified on starting an instance. It cannot be changed dynamically, while an instance is active.

- tablespace\_encryption\_algorithm (string)

This parameter specifies the encryption algorithm for tablespaces that will be created. Valid values are AES128, AES256, and none. If you specify "none", encryption is not performed. The default value is "none". To perform encryption, it is recommended that you specify AES256. Only superusers can change this setting.

- backup\_destination (string)

This parameter specifies the absolute path of the directory where pgx\_dmpall will store the backup data. Specify a different location from other database clusters. This parameter can only be set when specified on starting an instance. It cannot be changed dynamically, while an instance is active.

Place this directory on a different disk from the data directory to be backed up and the tablespace directory. Ensure that users do not store arbitrary files in this directory, because the contents of this directory are managed by the database system.

- search\_path (string)

When using the SUBSTR function compatible with Oracle databases, set "oracle" and "pg\_catalog" in the search\_path parameter. You must specify "oracle" before "pg\_catalog".

## Example

```
search_path = '$user', public, oracle, pg_catalog'
```

## Information

- The search\_path feature specifies the priority of the schema search path. The SUBSTR function in Oracle database is defined in the oracle schema.
- Refer to "Statement Behavior" under "Server Administration" in the PostgreSQL Documentation for information on search\_path.

- track\_waits (string)

This parameter enables collection of statistics for pgx\_stat\_lwlock and pgx\_stat\_latch.

- on: Enables collection of statistics.
- off: Disables collection of statistics.

If this parameter is omitted, "on" is assumed.

Only superusers can change this setting.

- track\_sql (string)

This parameter enables collection of statistics for pgx\_stat\_sql.

- on: Enables collection of statistics.
- off: Disables collection of statistics.

If this parameter is omitted, "on" is assumed.

Only superusers can change this setting.

#### Parameters for parallel scan

- enable\_parallelagg (boolean)

This parameter enables or disables the query planner's use of parallel aggregation plan. If set to "off", parallel aggregation plan will not be used. Normally, use the default value when using the parallel scan feature.

- Valid values: on or off, 1 or 0
- Default value: on

- enable\_parallelscan (boolean)

This parameter enables or disables the query planner's use of parallel scan plan. If set to "off", parallel scan plan will not be used. Normally, use the default value when using the parallel scan feature.

- Valid values: on or off, 1 or 0
- Default value: on

- max\_parallel\_degree (4-byte signed integer)

This parameter specifies the maximum number of parallel processes (background processes) to be used per SQL statement. If set to "0", no parallel processes will be generated, and therefore execution plans will not be able to use parallel scan. When using the parallel scan feature, specify this parameter.

- Minimum value: 0
- Maximum value: 8388607
- Default value: 0

- parallel\_scan\_pages\_threshold (4-byte signed integer)

If the target table size is equal to the specified threshold (number of pages) or more, the query planner considers the parallel scan plan as an option. Normally, use the default value when using the parallel scan feature.

- Minimum value: 1
- Maximum value: 4-byte signed integer
- Default value: 1000

- parallel\_setup\_cost (double precision floating point)

This parameter sets the estimated cost of the planner for starting parallel processes. This value is used to calculate the cost for the parallel scan plan.

- Minimum value: 0
- Maximum value: Maximum value of double precision floating point
- Default value: 1000.0

- parallel\_tuple\_cost (double precision floating point)

This parameter sets the estimated cost of the planner for transferring rows from parallel processes to backend processes. This value is used to calculate the cost for the parallel scan plan.

- Minimum value: 0
- Maximum value: Maximum value of double precision floating point
- Default value: 0.1

#### Parameters for the in-memory feature

- reserve\_buffer\_ratio (numerical value)

This parameter specifies the proportion of shared memory to be used for a stable buffer table.

- Minimum value: 0
- Maximum value: 80

If this parameter is omitted, 0 will be used.

- vci.control\_max\_workers (numerical value)

This parameter specifies the number of background workers that manage VCI. The number of workers for the entire instance is limited by max\_worker\_processes, so add the value specified here to max\_worker\_processes.

- Minimum value: 1
- Maximum value: 8388607

If this parameter is omitted or a value outside this range is specified, 8 will be used.

- vci.enable (string)

This parameter enables or disables VCI.

- on: Enables VCI.
- off: Disables VCI.

If this parameter is omitted, "on" will be used.

- vci.log\_query (string)

This parameter enables or disables log output when VCI is not used due to insufficient memory specified by vci.max\_local\_ros.

- on: Enables log output.
- off: Disables log output.

If this parameter is omitted, "off" will be used.

- vci.maintenance\_work\_mem (numerical value)

This parameter specifies the maximum memory size used for maintenance of VCI (when executing CREATE INDEX, for example).

- Minimum value: 1 MB
- Maximum value: Maximum value that can be expressed as a 4-byte signed integer

If this parameter is omitted or a value outside this range is specified, 256 MB will be used.

- vci.max\_local\_ros (numerical value)

This parameter specifies the maximum memory size used for VCI scan.

- Minimum value: 64 MB
- Maximum value: Maximum value that can be expressed as a 4-byte signed integer

If this parameter is omitted or a value outside this range is specified, 64 MB will be used.

## Information

The maximum value that can be expressed as a 4-byte signed integer changes according to the operating system. Follow the definition of the operating system in use.

### - vci.max\_parallel\_degree (numerical value)

This parameter specifies the maximum number of background workers used for parallel scan. The number of workers for the entire instance is limited by `max_worker_processes`, so add the value specified here to `max_worker_processes`.

A value from -8388607 to 8388607 can be specified.

- Integer (1 or greater): Parallel scan is performed using the specified degree of parallelism.
- 0: Stops the parallel scan process.
- Negative number: The specified value minus the maximum number of CPUs obtained from the environment is used as the degree of parallelism and parallel scan is performed.

If this parameter is omitted or a value outside this range is specified, "0" will be used.

### - vci.shared\_work\_mem (numerical value)

This parameter specifies the maximum memory size used for VCI parallel scan.

- Minimum value: 32 MB
- Maximum value: Maximum value that can be expressed as a 4-byte signed integer

If this parameter is omitted or a value outside this range is specified, 1 GB will be used.

## See

Refer to "Server Configuration" under "Server Administration" in the PostgreSQL Documentation for information on other `postgresql.conf` parameters.

## Appendix B System Administration Functions

This appendix describes the system administration functions of FUJITSU Enterprise Postgres.



See

Refer to "System Administration Functions" under "The SQL Language" in the PostgreSQL Documentation for information on other system administration functions.

### B.1 WAL Mirroring Control Functions

The following table lists the functions that can be used for backup and recovery based on WAL mirroring.

Table B.1 WAL mirroring control functions

| Name  | Return type | Description                                  |
|---|-------------|--|
| <code>pgx_pause_wal_multiplexing()</code>     | void        | Stops WAL multiplexing                       |
| <code>pgx_resume_wal_multiplexing()</code>    | void        | Resumes WAL multiplexing                     |
| <code>pgx_is_wal_multiplexing_paused()</code> | boolean     | Returns true if WAL multiplexing has stopped |

If WAL multiplexing has not been configured, these functions return an error. Setting the `backup_destination` parameter in `postgresql.conf` configures WAL multiplexing.

Only superusers can execute these functions.

### B.2 Transparent Data Encryption Control Functions

The following table lists the functions that can be used for transparent data encryption.

Table B.2 Transparent data encryption control functions

| Name   | Return type | Description                     |
|--|-------------|---------------------------------|
| <code>pgx_open_keystore(<i>passphrase</i>)</code>                                    | void        | Opens the keystore              |
| <code>pgx_set_master_key(<i>passphrase</i>)</code>                                   | void        | Sets the master encryption key  |
| <code>pgx_set_keystore_passphrase(<i>oldPassphrase</i>, <i>newPassphrase</i>)</code> | void        | Changes the keystore passphrase |

The `pgx_open_keystore` function uses the specified passphrase to open the keystore. When the keystore is opened, the master encryption key is loaded into the database server memory. In this way, you can access the encrypted data and create encrypted tablespaces. If the keystore is already open, this function returns an error.

Only superusers can execute this function. Also, this function cannot be executed within a transaction block.

The `pgx_set_master_key` function generates a master encryption key and stores it in the keystore. If the keystore does not exist, this function creates a keystore. If the keystore already exists, this function modifies the master encryption key. If the keystore has not been opened, this function opens it.

The passphrase is a string of 8 to 200 bytes.

Only superusers can execute this function. Also, this function cannot be executed within a transaction block. Processing is not affected by whether the keystore is open.

The `pgx_set_keystore_passphrase` function changes the keystore passphrase. Specify the current passphrase in *oldPassphrase*, and a new passphrase in *newPassphrase*.

The passphrase is a string of 8 to 200 bytes.

Only superusers can execute this function. Also, this function cannot be executed within a transaction block. Processing is not affected by whether the keystore is open.

## B.3 Data Masking Control Functions

---

The table below lists the functions that can be used for data masking.

Table B.3 Data masking control functions

| Name   | Return type | Description  |
|--|-------------|--|
| <a href="#">pgx_alter_confidential_policy</a>  | boolean     | Changes masking policies   |
| <a href="#">pgx_create_confidential_policy</a> | boolean     | Creates masking policies   |
| <a href="#">pgx_drop_confidential_policy</a>   | boolean     | Deletes masking policies   |
| <a href="#">pgx_enable_confidential_policy</a> | boolean     | Enables or disables masking policies   |
| <a href="#">pgx_update_confidential_values</a> | boolean     | Changes replacement characters when full masking is specified for masking type |

### B.3.1 `pgx_alter_confidential_policy`

---

#### Description

Changes masking policies

#### Format

The format varies depending on the content to be changed. The format is shown below.

- Common format

```
common_arg:
[schema_name      := 'schemaName', ]


```

- Add a masking target to a masking policy

```
pgx_alter_confidential_policy(
  commonArg,
  [action           := 'ADD_COLUMN', ]
  column_name      := 'columnName'
  [, function_type  := 'FULL'] |
  [, function_type  := 'PARTIAL', partialOpt] |
  [, function_type  := 'REGEXP', regexpOpt]
)
```

```
partialOpt:
function_parameters := 'maskingFormat'
```

```
regexpOpt:
regexp_pattern      := 'regexpPattern',
regexp_replacement  := 'regexpReplacementChar',
[, regexp_flags     := 'regexpFlags']
```

- Delete a masking target from a masking policy

```
pgx_alter_confidential_policy(
  commonArg,
  action          := 'DROP_COLUMN',
  column_name     := 'col umnName'
)
```

- Change the masking condition

```
pgx_alter_confidential_policy(
  commonArg,
  action          := 'MODIFY_EXPRESSION',
  expression      := 'expressi on'
)
```

- Change the content of a masking policy set for a masking target

```
pgx_alter_confidential_policy(
  commonArg,
  action          := 'MODIFY_COLUMN',
  column_name     := 'col umnName'
  [, function_type := 'FULL'] |
  [, function_type := 'PARTIAL', parti al Opt] |
  [, function_type := 'REGEXP', regexpOpt]
)
```

```
parti al Opt:
function_parameters := 'maski ngFormat'
```

```
regexpOpt:
regexp_pattern      := 'regexpPattern',
regexp_replacement  := 'regexpRepl acementChar',
[, regexp_flags     := 'regexpFl ags']
```

- Change the masking policy description

```
pgx_alter_confidential_policy(
  commonArg,
  action          := 'SET_POLICY_DESCRIPTION',
  policy_description := 'pol icyDesc'
)
```

- Change the masking target description

```
pgx_alter_confidential_policy(
  commonArg,
  action          := 'SET_COLUMN_DESCRIPTION',
  column_name     := 'col umnName',
  column_description := 'col umnDesc'
)
```

## Argument

The argument varies depending on the content to be changed. Details are as follows.

- Common arguments

| Masking type for which an argument can be specified | Argument    | Data type   | Description  | Default value |
|---|-------------|-------------|--|---------------|
| All   | schema_name | varchar(63) | Schema name of table for which a masking policy is applied | 'public'      |
|   | table_name  | varchar(63) | Name of table for which a masking policy is applied        | Mandatory     |
|   | policy_name | varchar(63) | Masking policy name  | Mandatory     |

- Add a masking target to a masking policy

| Masking type for which an argument can be specified | Argument            | Data type     | Description  | Default value |
|---|---------------------|---------------|--|---------------|
| All   | action              | varchar(63)   | 'ADD_COLUMN'   | 'ADD_COLUMN'  |
|   | column_name         | varchar(63)   | Masking target name  | Mandatory     |
|   | function_type       | varchar(63)   | Masking type<br>- 'FULL': Full masking<br>- 'PARTIAL': Partial masking<br>- 'REGEXP': Regular expression masking | 'FULL'        |
| Partial masking                                     | function_parameters | varchar(1024) | Masking format for partial masking   | Mandatory     |
| Regular expression masking                          | regexp_pattern      | varchar(1024) | Search pattern for regular expression masking  | Mandatory     |
|   | regexp_replacement  | varchar(1024) | Replacement character/string for regular expression masking  | Mandatory     |
|   | regexp_flags        | varchar(20)   | Regular expression flags   | NULL          |

- Delete a masking target from a masking policy

| Masking type for which an argument can be specified | Argument    | Data type   | Description         | Default value |
|---|-------------|-------------|---------------------|---------------|
| All   | action      | varchar(63) | 'DROP_COLUMN'       | Mandatory     |
|   | column_name | varchar(63) | Masking target name | Mandatory     |

- Change the masking condition

| Masking type for which an argument can be specified | Argument   | Data type     | Description                     | Default value |
|---|------------|---------------|---------------------------------|---------------|
| All   | action     | varchar(63)   | 'MODIFY_EXPRESSION'             | Mandatory     |
|   | expression | varchar(1024) | Masking condition to be changed | Mandatory     |

- Change the content of a masking policy set for a masking target

| Masking type for which an argument can be specified | Argument            | Data type     | Description  | Default value |
|---|---------------------|---------------|--|---------------|
| All   | action              | varchar(63)   | 'MODIFY_COLUMN'  | Mandatory     |
|   | column_name         | varchar(63)   | Masking target name  | Mandatory     |
|   | function_type       | varchar(63)   | Masking type<br>- 'FULL': Full masking<br>- 'PARTIAL': Partial masking<br>- 'REGEXP': Regular expression masking | 'FULL'        |
| Partial masking                                     | function_parameters | varchar(1024) | Masking format for partial masking   | Mandatory     |
| Regular expression masking                          | regexp_pattern      | varchar(1024) | Search pattern for regular expression masking  | Mandatory     |
|   | regexp_replacement  | varchar(1024) | Replacement character/string for regular expression masking  | Mandatory     |
|   | regexp_flags        | varchar(20)   | Regular expression flags   | NULL          |

- Change the masking policy description

| Masking type for which an argument can be specified | Argument           | Data type     | Description                | Default value |
|---|--------------------|---------------|----------------------------|---------------|
| All   | action             | varchar(63)   | 'SET_POLICY_DESCRIPTION'   | Mandatory     |
|   | policy_description | varchar(1024) | Masking policy description | Mandatory     |

- Change the masking target description

| Masking type for which an argument can be specified | Argument           | Data type     | Description                | Default value |
|---|--------------------|---------------|----------------------------|---------------|
| All   | action             | varchar(63)   | 'SET_COLUMN_DESCRIPTION'   | Mandatory     |
|   | column_name        | varchar(63)   | Masking target name        | Mandatory     |
|   | column_description | varchar(1024) | Masking target description | Mandatory     |

Details about whether arguments can be omitted are as follows.

| Argument    | Mandatory or optional |                 |                            |             |                   |               |                 |                            |                        |                        |
|-------------|-----------------------|-----------------|----------------------------|-------------|-------------------|---------------|-----------------|----------------------------|------------------------|------------------------|
|             | ADD_COLUMN            |                 |                            | DROP_COLUMN | MODIFY_EXPRESSION | MODIFY_COLUMN |                 |                            | SET_POLICY_DESCRIPTION | SET_COLUMN_DESCRIPTION |
|             | Full masking          | Partial masking | Regular expression masking |             |                   | Full masking  | Partial masking | Regular expression masking |                        |                        |
| schema_name | Y                     | Y               | Y                          | Y           | Y                 | Y             | Y               | Y                          | Y                      | Y                      |
| table_name  | N                     | N               | N                          | N           | N                 | N             | N               | N                          | N                      | N                      |

| Argument            | Mandatory or optional |                 |                            |             |                   |               |                 |                            |                        |                        |
|---------------------|-----------------------|-----------------|----------------------------|-------------|-------------------|---------------|-----------------|----------------------------|------------------------|------------------------|
|                     | ADD_COLUMN            |                 |                            | DROP_COLUMN | MODIFY_EXPRESSION | MODIFY_COLUMN |                 |                            | SET_POLICY_DESCRIPTION | SET_COLUMN_DESCRIPTION |
|                     | Full masking          | Partial masking | Regular expression masking |             |                   | Full masking  | Partial masking | Regular expression masking |                        |                        |
| policy_name         | N                     | N               | N                          | N           | N                 | N             | N               | N                          | N                      | N                      |
| action              | Y                     | Y               | Y                          | N           | N                 | N             | N               | N                          | N                      | N                      |
| column_name         | N                     | N               | N                          | N           | -                 | N             | N               | N                          | -                      | N                      |
| function_type       | Y                     | N               | N                          | -           | -                 | Y             | N               | N                          | -                      | -                      |
| expression          | -                     | -               | -                          | -           | N                 | -             | -               | -                          | -                      | -                      |
| policy_description  | -                     | -               | -                          | -           | -                 | -             | -               | -                          | N                      | -                      |
| column_description  | -                     | -               | -                          | -           | -                 | -             | -               | -                          | -                      | N                      |
| function_parameters | -                     | N               | -                          | -           | -                 | -             | N               | -                          | -                      | -                      |
| regexp_pattern      | -                     | -               | N                          | -           | -                 | -             | -               | N                          | -                      | -                      |
| regexp_replacement  | -                     | -               | N                          | -           | -                 | -             | -               | N                          | -                      | -                      |
| regexp_flags        | -                     | -               | Y                          | -           | -                 | -             | -               | Y                          | -                      | -                      |

Y: Can be omitted; N: Cannot be omitted; -: Ignored when specified

### Return value

| Return value | Description      |
|--------------|------------------|
| TRUE         | Ended normally   |
| FALSE        | Ended abnormally |

### Execution example 1

Adding masking policy p1 to masking target c2

```
postgres=# select pgx_alter_confidential_policy(table_name := 't1', policy_name := 'p1', action :=
'ADD_COLUMN', column_name := 'c2', function_type := 'PARTIAL', function_parameters := 'VVVFVVVFVVVV,
VVV-VVVV-VVVV, *, 4, 11');
pgx_alter_confidential_policy
-----
t
(1 row)
```

### Execution example 2

Deleting masking target c1 from masking policy p1

```
postgres=# select pgx_alter_confidential_policy(table_name := 't1', policy_name := 'p1', action :=
'DROP_COLUMN', column_name := 'c1');
pgx_alter_confidential_policy
-----
t
(1 row)
```

### Execution example 3

Changing the masking condition for masking policy p1

```
postgres=# select pgx_alter_confidential_policy(table_name := 't1', policy_name := 'p1', action :=
'MODIFY_EXPRESSION', expression := 'false');
pgx_alter_confidential_policy
-----
t
(1 row)
```

### Execution example 4

Changing the content of masking policy p1 set for masking target c2

```
postgres=# select pgx_alter_confidential_policy(table_name := 't1', policy_name := 'p1', action :=
'MODIFY_COLUMN', column_name := 'c2', function_type := 'FULL');
pgx_alter_confidential_policy
-----
t
(1 row)
```

### Execution example 5

Changing the description of masking policy p1

```
postgres=# select pgx_alter_confidential_policy(table_name := 't1', policy_name := 'p1', action :=
'SET_POLICY_DESCRIPTION', policy_description := 'this policy is an example. ');
pgx_alter_confidential_policy
-----
t
(1 row)
```

### Execution example 6

Changing the description of masking target c2

```
postgres=# select pgx_alter_confidential_policy(table_name := 't1', policy_name := 'p1', action :=
'SET_COLUMN_DESCRIPTION', column_name := 'c2', column_description := 'c2 column is FULL. ');
pgx_alter_confidential_policy
-----
t
(1 row)
```

### Description

- The arguments for the `pgx_alter_confidential_policy` system management function can be specified in any order.
- The action parameters below can be specified. When action parameters are omitted, `ADD_COLUMN` is applied.

| Parameter                           | Description   |
|-------------------------------------|---|
| <code>ADD_COLUMN</code>             | Adds a masking target to a masking policy.                        |
| <code>DROP_COLUMN</code>            | Deletes a masking target from a masking policy.                   |
| <code>MODIFY_EXPRESSION</code>      | Changes expression.   |
| <code>MODIFY_COLUMN</code>          | Changes the content of a masking policy set for a masking target. |
| <code>SET_POLICY_DESCRIPTION</code> | Changes <code>policy_description</code> .                         |
| <code>SET_COLUMN_DESCRIPTION</code> | Changes <code>column_description</code> .                         |

- The `function_parameters` argument is enabled when the `function_type` is `PARTIAL`. If the `function_type` is other than `PARTIAL`, it will be ignored.

- The arguments below are enabled when the function\_type is REGEXP. If the function\_type is other than REGEXP, these arguments will be ignored.

- regexp\_pattern
- regexp\_replacement
- regexp\_flags



- Refer to "String Constants" in the PostgreSQL Documentation for information on the strings to specify for arguments.
- Refer to "POSIX Regular Expressions" in the PostgreSQL Documentation and check pattern, replacement, and flags for information on the values that can be specified for regexp\_pattern, regexp\_replacement, and regexp\_flags.

## B.3.2 pgx\_create\_confidential\_policy

### Description

Creates masking policies

### Format

The format varies depending on the masking type. The format is shown below.

```
pgx_create_confidential_policy(
[schema_name      := 'schemaName' ,]
table_name       := 'tableName' ,
policy_name      := 'policyName' ,
expression       := 'expression'
[, enable        := 'policyStatus']
[, policy_description := 'policyDesc']
[, column_name    := 'columnName'
  [, function_type := 'FULL'] |
  [, function_type := 'PARTIAL', partialOpt] |
  [, function_type := 'REGEXP', regexpOpt]
[, column_description := 'columnDesc']
])
```

```
partialOpt:
function_parameters := 'maskingFormat'
```

```
regexpOpt:
regexp_pattern      := 'regexpPattern' ,
regexp_replacement := 'regexpReplacementChar' ,
[, regexp_flags    := 'regexpFlags']
```

### Argument

Details are as follows.

| Masking type for which an argument can be specified | Argument    | Data type   | Description  | Default value |
|---|-------------|-------------|--|---------------|
| All   | schema_name | varchar(63) | Schema name of table for which the masking policy is created | 'public'      |
|   | table_name  | varchar(63) | Name of table for which the masking policy is created        | Mandatory     |

| Masking type for which an argument can be specified | Argument            | Data type     | Description  | Default value |
|---|---------------------|---------------|--|---------------|
|   | policy_name         | varchar(63)   | Masking policy name  | Mandatory     |
|   | expression          | varchar(1024) | Masking condition  | Mandatory     |
|   | enable              | boolean       | Masking policy status<br>- 't': Enabled<br>- 'f': Disabled   | 't'           |
|   | policy_description  | varchar(1024) | Masking policy description   | NULL          |
|   | column_name         | varchar(63)   | Masking target name  | NULL          |
|   | function_type       | varchar(63)   | Masking type<br>- 'FULL': Full masking<br>- 'PARTIAL': Partial masking<br>- 'REGEXP': Regular expression masking | 'FULL'        |
|   | column_description  | varchar(1024) | Masking target description   | NULL          |
| Partial masking                                     | function_parameters | varchar(1024) | Masking format for partial masking   | Mandatory     |
| Regular expression masking                          | regexp_pattern      | varchar(1024) | Search pattern for regular expression masking  | Mandatory     |
|   | regexp_replacement  | varchar(1024) | Replacement character/string for regular expression masking  | Mandatory     |
|   | regexp_flags        | varchar(20)   | Regular expression flags   | NULL          |

Details about whether arguments can be omitted are as follows.

| Argument            | Mandatory or optional |                 |                            |
|---------------------|-----------------------|-----------------|----------------------------|
|                     | Full masking          | Partial masking | Regular expression masking |
| schema_name         | Y                     | Y               | Y                          |
| table_name          | N                     | N               | N                          |
| policy_name         | N                     | N               | N                          |
| expression          | N                     | N               | N                          |
| enable              | Y                     | Y               | Y                          |
| policy_description  | Y                     | Y               | Y                          |
| column_name         | Y                     | Y               | Y                          |
| function_type       | Y                     | Y               | Y                          |
| column_description  | Y                     | Y               | Y                          |
| function_parameters | -                     | N               | -                          |
| regexp_pattern      | -                     | -               | N                          |
| regexp_replacement  | -                     | -               | N                          |
| regexp_flags        | -                     | -               | Y                          |

Y: Can be omitted; N: Cannot be omitted; -: Ignored when specified

## Return value

| Return value | Description      |
|--------------|------------------|
| TRUE         | Ended normally   |
| FALSE        | Ended abnormally |

## Execution example 1

Creating masking policy p1 that does not contain a masking target

```
postgres=# select pgx_create_confidential_policy(table_name := 't1', policy_name := 'p1',
expression := 'l=1');
pgx_create_confidential_policy
-----
t
(1 row)
```

## Execution example 2

Creating masking policy p1 that contains masking target c1 of which the masking type is full masking

```
postgres=# select pgx_create_confidential_policy(schema_name := 'public', table_name := 't1',
policy_name := 'p1', expression := 'l=1', enable := 't', policy_description := 'this policy is an
example.', column_name := 'c1', function_type := 'FULL', column_description := 'c1 column is FULL.');
```

```
pgx_create_confidential_policy
-----
t
(1 row)
```

## Execution example 3

Creating masking policy p1 that contains masking target c2 of which the masking type is partial masking

```
postgres=# select pgx_create_confidential_policy( table_name := 't1', policy_name := 'p1',
expression := 'l=1', column_name := 'c2', function_type := 'PARTIAL', function_parameters :=
'VVVFVVVFVVVV, VVV-VVVV-VVVV, *, 4, 11');
```

```
pgx_create_confidential_policy
-----
t
(1 row)
```

## Execution example 4

Creating masking policy p1 that contains masking target c3 of which the masking type is regular expression masking

```
postgres=# select pgx_create_confidential_policy( table_name := 't1', policy_name := 'p1',
expression := 'l=1', column_name := 'c3', function_type := 'REGEXP', regexp_pattern := '(.*)(@.*)',
regexp_replacement := 'xxx\2', regexp_flags := 'g');
```

```
pgx_create_confidential_policy
-----
t
(1 row)
```

## Description

- The arguments for the `pgx_create_confidential_policy` system management function can be specified in any order.
- If `column_name` is omitted, only masking policies that do not contain masking target will be created.
- One masking policy can be created for each table. Use the `pgx_alter_confidential_policy` system management function to add a masking target to a masking policy.

- The `function_parameters` argument is enabled when the `function_type` is `PARTIAL`. If the `function_type` is other than `PARTIAL`, it will be ignored.
- The arguments below are enabled when the `function_type` is `REGEXP`. If the `function_type` is other than `REGEXP`, these arguments will be ignored.
  - `regexp_pattern`
  - `regexp_replacement`
  - `regexp_flags`

### Note

If a table for which a masking policy is to be applied is deleted, delete the masking policy as well.

### See

- Refer to "String Constants" in the PostgreSQL Documentation for information on the strings to specify for arguments.
- Refer to "POSIX Regular Expressions" in the PostgreSQL Documentation and check `pattern`, `replacement`, and `flags` for information on the values that can be specified for `regexp_pattern`, `regexp_replacement`, and `regexp_flags`.

## B.3.3 `pgx_drop_confidential_policy`

### Description

Deletes masking policies

### Format

```
pgx_drop_confidential_policy(
[schema_name      := 'schemaName' , ]
table_name       := 'tableName' ,
policy_name      := 'policyName'
)
```

### Argument

Details are as follows.

| Argument                 | Data type                | Description  | Default value |
|--------------------------|--------------------------|--|---------------|
| <code>schema_name</code> | <code>varchar(63)</code> | Schema name of table for which a masking policy is deleted | 'public'      |
| <code>table_name</code>  | <code>varchar(63)</code> | Name of table for which a masking policy is deleted        | Mandatory     |
| <code>policy_name</code> | <code>varchar(63)</code> | Masking policy name  | Mandatory     |

Details about whether arguments can be omitted are as follows.

| Argument                 | Mandatory or optional |
|--------------------------|-----------------------|
| <code>schema_name</code> | Y                     |
| <code>table_name</code>  | N                     |
| <code>policy_name</code> | N                     |

Y: Can be omitted; N: Cannot be omitted

## Return value

| Return value | Description      |
|--------------|------------------|
| TRUE         | Ended normally   |
| FALSE        | Ended abnormally |

## Execution example

Deleting masking policy p1

```
postgres=# select pgx_drop_confidential_policy(table_name := 't1', policy_name := 'p1');
pgx_drop_confidential_policy
-----
t
(1 row)
```

## Description

The arguments for the `pgx_drop_confidential_policy` system management function can be specified in any order.



### Note

If a table for which a masking policy is to be applied is deleted, delete the masking policy as well.



### See

Refer to "String Constants" in the PostgreSQL Documentation for information on the strings to specify for arguments.

## B.3.4 pgx\_enable\_confidential\_policy

### Description

Enables or disables masking policies

### Format

```
pgx_enable_confidential_policy(  
[schema_name      := 'schemaName', ]  
table_name        := 'tableName',  
policy_name       := 'policyName',  
enable            := 'policyStatus'  
)
```

### Argument

Details are as follows.

| Argument                 | Data type                | Description  | Default value |
|--------------------------|--------------------------|--|---------------|
| <code>schema_name</code> | <code>varchar(63)</code> | Schema name of table for which a masking policy is enabled or disabled | 'public'      |
| <code>table_name</code>  | <code>varchar(63)</code> | Name of table for which a masking policy is enabled or disabled        | Mandatory     |
| <code>policy_name</code> | <code>varchar(63)</code> | Masking policy name  | Mandatory     |
| <code>enable</code>      | <code>boolean</code>     | Masking policy status<br>- 't': Enabled                                | Mandatory     |

| Argument | Data type | Description     | Default value |
|----------|-----------|-----------------|---------------|
|          |           | - 'f': Disabled |               |

Details about whether arguments can be omitted are as follows.

| Argument    | Mandatory or optional |
|-------------|-----------------------|
| schema_name | Y                     |
| table_name  | N                     |
| policy_name | N                     |
| enable      | N                     |

Y: Can be omitted; N: Cannot be omitted

### Return value

| Return value | Description      |
|--------------|------------------|
| TRUE         | Ended normally   |
| FALSE        | Ended abnormally |

### Execution example

Enabling masking policy p1

```
postgres=# select pgx_enable_confidential_policy(table_name := 't1', policy_name := 'p1', enable :=
't');
 pgx_enable_confidential_policy
-----
 t
(1 row)
```

### Description

The arguments for the pgx\_enable\_confidential\_policy system management function can be specified in any order.



Refer to "String Constants" in the PostgreSQL Documentation for information on the strings to specify for arguments.

## B.3.5 pgx\_update\_confidential\_values

### Description

Changes replacement characters when full masking is specified for masking type

### Format

```
pgx_update_confidential_values(
[number_value := 'numberValue']
[, char_value := 'charValue']
[, varchar_value := 'varcharValue']
[, date_value := 'dateValue']
[, ts_value := 'tsValue']
)
```

## Argument

Details are as follows.

| Argument      | Data type  | Description                             |
|---------------|------------|---|
| number_value  | integer    | Replacement character in numeric type   |
| char_value    | varchar(1) | Replacement character in char type      |
| varchar_value | varchar(1) | Replacement character in varchar type   |
| date_value    | date       | Replacement character in date type      |
| ts_value      | timestamp  | Replacement character in timestamp type |

## Return value

| Return value | Description      |
|--------------|------------------|
| TRUE         | Ended normally   |
| FALSE        | Ended abnormally |

## Execution example

Using '\*' as a replacement character in char type and varchar type

```
postgres=# select pgx_update_confidential_values(char_value := '*', varchar_value := '*');
pgx_update_confidential_values
-----
t
(1 row)
```

## Description

- The arguments for the pgx\_update\_confidential\_values system management function can be specified in any order.
- Specify one or more arguments for the pgx\_update\_confidential\_values system management function. A replacement character is not changed for an omitted argument.



See

Refer to "String Constants" in the PostgreSQL Documentation for information on the strings to specify for arguments.

## B.4 VCI Data Load Control Function

The table below lists the function that loads VCI data to buffer cache.

Table B.4 VCI data load control function

| Name                                | Return type | Description                         |
|-------------------------------------|-------------|-------------------------------------|
| pgx_prewarm_vci(vci_index regclass) | int8        | Loads the VCI data to buffer cache. |

pgx\_prewarm\_vci loads the specified VCI data to buffer cache and returns the number of blocks of the loaded VCI data.

The aggregation process using VCI may take time immediately after an instance is started, because the VCI data has not been loaded to buffer cache. Therefore, the first aggregation process can be sped up by executing pgx\_prewarm\_vci after an instance is started.

The amount of memory required for preloading is the number of blocks returned by pgx\_prewarm\_vci multiplied by the size of one block.

This function can only be executed if the user has reference privilege to the VCI index and execution privilege to the pg\_prewarm function.

## Appendix C System Views

This appendix describes how to use the system views in FUJITSU Enterprise Postgres.



See

Refer to "System Views" under "Internals" in the PostgreSQL Documentation for information on other system views.

### C.1 pgx\_tablespaces

The `pgx_tablespaces` catalog provides information related to the encryption of tablespaces.

| Name                       | Type              | References                     | Description                     |
|----------------------------|-------------------|--------------------------------|---------------------------------|
| <code>spctablespace</code> | <code>oid</code>  | <code>pg_tablespace.oid</code> | Tablespace OID                  |
| <code>spcencalgo</code>    | <code>text</code> |                                | Tablespace encryption algorithm |

The `spcencalgo` string displays one of the following values:

- none: Tablespace is not encrypted
- AES128: AES with key length of 128 bits
- AES256: AES with key length of 256 bits

### C.2 pgx\_stat\_lwlock

The `pgx_stat_lwlock` view displays statistics related to lightweight locks, with each type of content displayed on a separate line.

Table C.1 `pgx_stat_lwlock` view

| Column                       | Type                                 | Description  |
|------------------------------|--------------------------------------|--|
| <code>lwlock_name</code>     | <code>name</code>                    | Name of the lightweight lock   |
| <code>total_waits</code>     | <code>bigint</code>                  | Number of waits caused by the lightweight lock                       |
| <code>total_wait_time</code> | <code>double precision</code>        | Number of milliseconds spent in waits caused by the lightweight lock |
| <code>stats_reset</code>     | <code>timestamp with timezone</code> | Last time at which this statistics was reset                         |

### C.3 pgx\_stat\_latch

The `pgx_stat_latch` view displays statistics related to latches, with each type of wait information within FUJITSU Enterprise Postgres displayed on a separate line.

Table C.2 `pgx_stat_latch` view

| Column                       | Type                                 | Description   |
|------------------------------|--------------------------------------|---|
| <code>latch_name</code>      | <code>name</code>                    | Name of the latch   |
| <code>total_waits</code>     | <code>bigint</code>                  | Number of waits caused a wait                             |
| <code>total_wait_time</code> | <code>double precision</code>        | Number of milliseconds spent in waits caused by the latch |
| <code>stats_reset</code>     | <code>timestamp with timezone</code> | Last time at which this statistic was reset               |

### C.4 pgx\_stat\_walwriter

The `pgx_stat_walwriter` view display statistics related to WAL writing, in a single line.

Table C.3 pgx\_stat\_walwriter view

| Column           | Type                    | Description  |
|------------------|-------------------------|--|
| dirty_writes     | bigint                  | Number of times old WAL buffers were written to the disk because the WAL buffer was full when WAL records were added |
| writes           | bigint                  | Number of WAL writes   |
| write_blocks     | bigint                  | Number of WAL write blocks   |
| total_write_time | double precision        | Number of milliseconds spent on WAL writing  |
| stats_reset      | timestamp with timezone | Last time at which this statistic was reset  |

## C.5 pgx\_stat\_sql

The pgx\_stat\_sql view displays statistics related to SQL statement executions, with each type of SQL statement displayed on a separate line.

Table C.4 pgx\_stat\_sql view

| Column                   | Type                    | Description  |
|--------------------------|-------------------------|--|
| selects                  | bigint                  | Number of SELECT statements executed                           |
| inserts                  | bigint                  | Number of INSERT statements executed                           |
| deletes                  | bigint                  | Number of DELETE statements executed                           |
| updates                  | bigint                  | Number of UPDATE statements executed                           |
| selects_with_parallelism | bigint                  | Number of times parallel scan was used in SELECT statements    |
| inserts_with_parallelism | bigint                  | Not used   |
| deletes_with_parallelism | bigint                  | Not used   |
| updates_with_parallelism | bigint                  | Not used   |
| copies_with_parallelism  | bigint                  | Not used   |
| declares                 | bigint                  | Number of DECLARE statements executed (number of cursor OPENS) |
| fetches                  | bigint                  | Number of FETCH statements executed                            |
| checkpoints              | bigint                  | Number of CHECKPOINT statements executed                       |
| clusters                 | bigint                  | Number of CLUSTER statements executed                          |
| copies                   | bigint                  | Number of COPY statements executed                             |
| reindexes                | bigint                  | Number of REINDEX statements executed                          |
| truncates                | bigint                  | Number of TRUNCATE statements executed                         |
| locks                    | bigint                  | Number of times a lock occurred                                |
| stats_reset              | timestamp with timezone | Last time at which this statistic was reset                    |



| Name               | Type          | Description                       |
|--------------------|---------------|-----------------------------------|
|                    |               | - 't': Enabled<br>- 'f': Disabled |
| policy_description | varchar(1024) | Masking policy description        |

### Execution example

```
postgres=# select * from pgx_confidential_policies;
 schema_name | table_name | policy_name | expression | enable | policy_description
-----+-----+-----+-----+-----+-----
 public      | t1         | p1          | 1=1        | t      |
(1 row)
```

## D.3 pgx\_confidential\_values

This table provides information on replacement characters when full masking is specified for masking type.

| Name            | Data type  | Description    | Default value         |
|-----------------|------------|----------------|-----------------------|
| number_value    | integer    | Numeric        | 0                     |
| char_value      | varchar(1) | char type      | Spaces                |
| varchar_value   | varchar(1) | varchar type   | Spaces                |
| date_value      | date       | date type      | '1970-01-01'          |
| timestamp_value | timestamp  | timestamp type | '1970-01-01 00:00:00' |

### Execution example

```
postgres=# select * from pgx_confidential_values;
 number_value | char_value | varchar_value | date_value | ts_value
-----+-----+-----+-----+-----
          0 |           |              | 1970-01-01 | 1970-01-01 00:00:00
(1 row)
```

# Appendix E Activating and Stopping the Web Server Feature of WebAdmin

To use WebAdmin for creating and managing a FUJITSU Enterprise Postgres instance on a server where FUJITSU Enterprise Postgres is installed, you must first activate the Web server feature of WebAdmin.

This appendix describes how to activate and stop the Web server feature of WebAdmin.

Note that "<xy>" in paths indicates the product version and level.

## E.1 Activating the Web Server Feature of WebAdmin

Follow the procedure below to activate the Web server feature of WebAdmin.

1. Change to superuser

Acquire superuser privileges on the system.

Example

```
$ su -  
Password:*****
```

2. Activate the Web server feature of WebAdmin

Execute the WebAdminStart command to activate the Web server feature of WebAdmin.

Example

If FUJITSU Enterprise Postgres is installed in /opt/fsepv<xy>server64:

```
# cd /opt/fsepv<xy>server64/gui/sbin  
# ./WebAdminStart
```

## E.2 Stopping the Web Server Feature of WebAdmin

This section describes how to stop the Web server feature of WebAdmin.

Follow the procedure below to stop the Web server feature of WebAdmin.

1. Change to superuser

Acquire superuser privileges on the system.

Example

```
$ su -  
Password:*****
```

2. Stop the Web server feature of WebAdmin

Execute the WebAdminStop command to stop the Web server feature of WebAdmin.

Example

If FUJITSU Enterprise Postgres is installed in /opt/fsepv<xy>server64:

```
# cd /opt/fsepv<xy>server64/gui/sbin  
# ./WebAdminStop
```

# Appendix F WebAdmin Wallet

This appendix describes how to use the Wallet feature of WebAdmin.

When a remote instance or a standby instance is created, it is necessary to provide user name and password for authentication with the remote machine or the database instance.

The Wallet feature in WebAdmin is a convenient way to create and store these credentials.

Once created, these credentials can be repeatedly used in one or more instances.

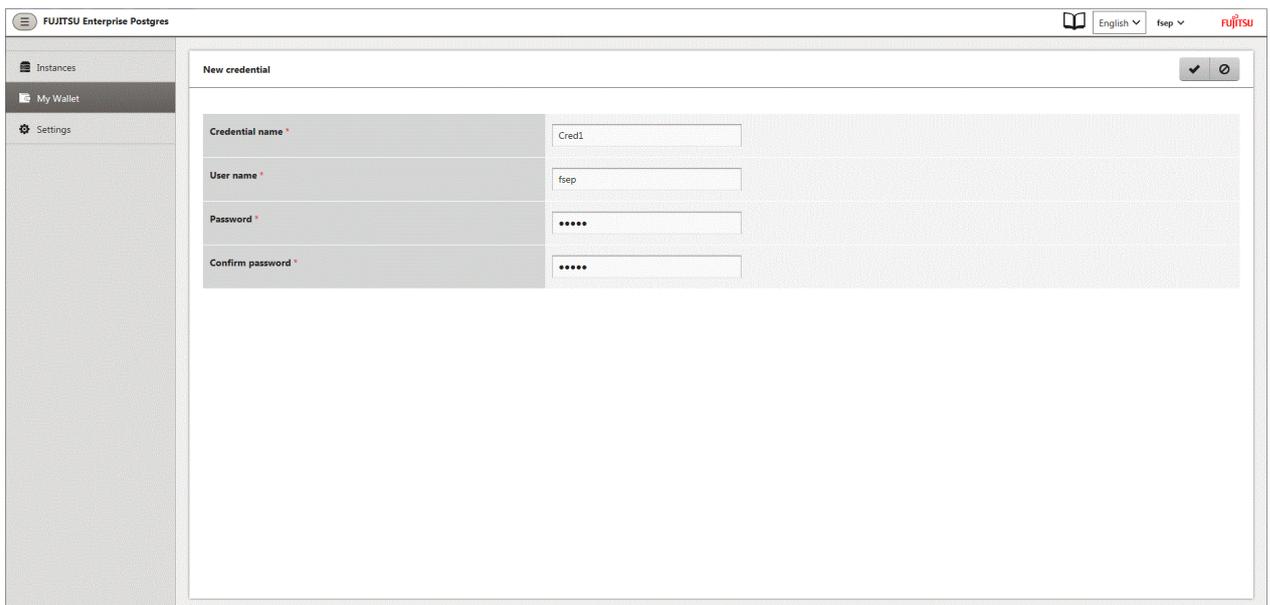
## Note

It is not mandatory to create a credential in the Wallet. It is possible to create a remote instance or a standby instance without creating any credential in the Wallet.

If no credential is created beforehand, a user name and password can be entered in the instance creation page. When creating a "Remote" instance, if operating system credentials are entered without using a credential stored in the Wallet, WebAdmin automatically creates a credential with the given user name and password, and stores it in the user's wallet for future use.

## F.1 Creating a Credential

1. In the [My Wallet] tab, click . The [New credential] page will be displayed.
2. Enter the information for the credentials.



Enter the following items:

- [Credential name]: Name of the credential

The name must meet the conditions below:

- Maximum of 16 characters
- The first character must be an ASCII alphabetic character
- The other characters must be ASCII alphanumeric characters
- [User name]: The operating system user name or database instance user name that will be used later
- [Password]: Password for the user

- [Confirm password]: Reenter the password.

3. Click  to store the credential.

## F.2 Using a Credential

Once a credential is created in the Wallet, it can be used during remote instance creation or standby instance creation.

The following page uses the credential that was created in the previous section.

The screenshot shows the 'Create new instance' configuration page in the Fujitsu Enterprise Postgres interface. The page is titled 'Create new instance' and features a sidebar with 'Instances', 'My Wallet', and 'Settings'. The main content area is divided into several sections:

- Configuration type:** A dropdown menu set to 'Standalone configuration'.
- Standalone configuration:**
  - Location:** A dropdown menu set to 'Remote'.
  - Instance name:** A text input field containing 'inst2'.
  - Instance port:** A text input field containing '27502'.
  - Host name:** A text input field containing 'standbyHost'.
  - Operating system credential:** A dropdown menu set to 'Cred1'. Below it, the 'User name' is 'fsep' and the 'Password' is masked with '\*\*\*\*'.
  - Data storage path:** A text input field containing '/database/fsep/inst2/data'.
  - Backup storage path:** A text input field containing '/backup/fsep/inst2/backup'.
  - Transaction log path:** A text input field containing '/transaction/fsep/inst2/transactionlog'.
  - Encoding:** A dropdown menu set to 'UTF8'.
- Remote WebAdmin port:**
  - Remote WebAdmin port for standalone:** A text input field containing '27515'.

When "Cred1" is selected in [Operating system credential], the user name and password are automatically populated from the credential.

## Appendix G Collecting Failure Investigation Data

If the cause of an error that occurs while building the environment or during operations is unclear, data must be collected for initial investigation.

This appendix describes how to collect data for initial investigation.

Use FJQSS (Information Collection Tool) to collect data for initial investigation.



See

Refer to the FJQSS manual for information on how to use FJQSS.



Note

When using FJQSS to collect data for initial investigation, you must set the following environment variables:

- Environment variables required for using FUJITSU Enterprise Postgres  
Refer to "Setup" in the Install and Setup Guide for Server for details.
- PGDATA  
Set the data storage destination.
- PGPORT  
Set the instance port number. This does not need to be set if the default port number (27500) has not been changed.
- PGUSER  
Set the database superuser.  
Set the database superuser so that client authentication is possible.  
FJQSS establishes a TCP/IP connection with the template1 database and collects data from the database.
- FSEP\_HOME  
Set the FUJITSU Enterprise Postgres installation directory.

In addition, when using database multiplexing, set the following environment variables:

- MCONTROLDIR  
Refer to "Mirroring Controller Resources" in the Cluster Operation Guide for information on the Mirroring Controller management directory.



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# FUJITSU Enterprise Postgres 9.5



## Operation Guide *(Windows)*

Windows

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# Preface

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## Purpose of this document

The FUJITSU Enterprise Postgres database system extends the PostgreSQL features and runs on the Windows platform.

This document is the FUJITSU Enterprise Postgres Operation Guide.

## Intended readers

This document is intended for those who install and operate FUJITSU Enterprise Postgres.

Readers of this document are assumed to have general knowledge of:

- PostgreSQL
- SQL
- Windows

## Structure of this document

This document is structured as follows:

### [Chapter 1 Operating FUJITSU Enterprise Postgres](#)

Describes how to operate FUJITSU Enterprise Postgres.

### [Chapter 2 Starting an Instance and Creating a Database](#)

Describes how to start a FUJITSU Enterprise Postgres instance, and how to create a database.

### [Chapter 3 Backing Up the Database](#)

Describes how to back up the database.

### [Chapter 4 Configuring Secure Communication Using Secure Sockets Layer](#)

Describes communication data encryption between the client and the server.

### [Chapter 5 Protecting Storage Data Using Transparent Data Encryption](#)

Describes how to encrypt the data to be stored in the database.

### [Chapter 6 Data Masking](#)

Describes the data masking feature.

### [Chapter 7 Periodic Operations](#)

Describes the periodic database operations that must be performed on FUJITSU Enterprise Postgres.

### [Chapter 8 Streaming Replication Using WebAdmin](#)

Describes how to create a streaming replication cluster using WebAdmin.

### [Chapter 9 Installing and Operating the In-memory Feature](#)

Describes how to install and operate the in-memory feature.

### [Chapter 10 Actions when an Error Occurs](#)

Describes how to perform recovery when disk failure or data corruption occurs.

### [Appendix A Parameters](#)

Describes the FUJITSU Enterprise Postgres parameters.

### [Appendix B System Administration Functions](#)

Describes the system administration functions of FUJITSU Enterprise Postgres.

### [Appendix C System Views](#)

Describes how to use the system view in FUJITSU Enterprise Postgres.

### [Appendix D Tables Used by Data Masking](#)

Describes the tables used by the data masking feature.

### [Appendix E Activating and Stopping the Web Server Feature of WebAdmin](#)

Describes how to activate and stop WebAdmin (Web server feature).

### [Appendix F WebAdmin Wallet](#)

Describes how to use the Wallet feature of WebAdmin.

### [Appendix G Collecting Failure Investigation Data](#)

Describes how to collect information for initial investigation.

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# Chapter 1 Operating FUJITSU Enterprise Postgres

This chapter describes how to operate FUJITSU Enterprise Postgres.

## 1.1 Operating Methods

There are two methods of managing FUJITSU Enterprise Postgres operations:

- Operation management using GUI tools
- Operation management using commands



Before performing switchover or failover operation using database multiplexing, refer to "Database Multiplexing Mode" in the Cluster Operation Guide.

### Operation management using GUI tools

This involves managing operations using the WebAdmin and pgAdmin GUI tools.

- Management using WebAdmin

This removes the requirement for complex environment settings and operational design for backup and recovery that is usually required for running a database. It enables you to easily and reliably monitor the state of the database, create a streaming replication cluster, back up the database, and restore it even if you do not have expert knowledge of databases.

- Management using pgAdmin

When developing applications and maintaining the database, you can use pgAdmin to perform simple operations on database objects, such as:

- Rebuild indexes and update statistics
- Create, delete, and update database objects

In addition, from pgAdmin of FUJITSU Enterprise Postgres, you can use the expanded features provided by FUJITSU Enterprise Postgres on the PostgreSQL SQL commands.



Refer to pgAdmin Help for information on the expanded features of pgAdmin provided by FUJITSU Enterprise Postgres.

### Operation management using commands

You can use commands for configuring and operating the database and managing operations. However, note that if you start managing operations using commands, you cannot switch to WebAdmin-based operation management.



You cannot combine WebAdmin and server commands to perform the following operations:

- Use WebAdmin to operate an instance created using the initdb command
- Use commands to operate an instance created using WebAdmin
- Use WebAdmin to recover a database backed up using commands

For instances created with WebAdmin, however, backup can be obtained with the `pgx_dmpall` command. Also, WebAdmin can perform recovery by using the backup obtained with the `pgx_dmpall` command.

- You can perform backup and restoration in pgAdmin, but the backup data obtained with WebAdmin and pgx\_dmpall is not compatible with the backup data obtained with pgAdmin.
- Refer to pgAdmin Help for other notes on pgAdmin.

## Features used in each phase

The following table lists the features used in each phase for GUI-based operations and command-based operations.

| Operation         |                                  | GUI-based operation  | Command-based operation   |
|-------------------|----------------------------------|--|---|
| Setup             | Creating an instance             | WebAdmin   | initdb command  |
|                   | Creating a standby instance      | WebAdmin<br>WebAdmin performs a base backup of the source instance and creates a standby instance. | pg_basebackup command   |
|                   | Modifying the configuration file | WebAdmin   | Directly edit the configuration file  |
| Instance start    |                                  | WebAdmin   | OS-provided net command or sc command   |
| Database creation |                                  | pgAdmin  | Specify using the DDL statement, and define using psql and applications                     |
| Database backup   |                                  | WebAdmin<br>pgx_dmpall command   | pgx_dmpall command  |
| Monitoring        | Database failure                 | WebAdmin(*1)   | Messages output to the event log (*1)   |
|                   | Disk space                       | WebAdmin (*1) (*2)   | OS-provided fsutil command (check available capacity) and dir command (check used capacity) |
|                   | Connection status                | pgAdmin  | psql command (*3)   |
| Database recovery |                                  | WebAdmin   | pgx_rcvall command  |

\*1: Operations can be monitored using operation management middleware (such as Systemwalker Centric Manager).

\*2: A warning is displayed when disk usage reaches 80%.

\*3: This command searches for pg\_stat\_activity in the standard statistics views and monitors the state.

## 1.2 Activating WebAdmin

This section describes how to activate and log in to WebAdmin.

### 1.2.1 Logging in to WebAdmin

This section describes how to log in to WebAdmin.

#### User environment

One of the following browsers is required for using WebAdmin:

- Internet Explorer 8.0 or later

## Activation URL for WebAdmin

In the browser address bar, type the activation URL of the WebAdmin window in the following format:

```
http://hostNameOrIpAddress:portNumber/
```

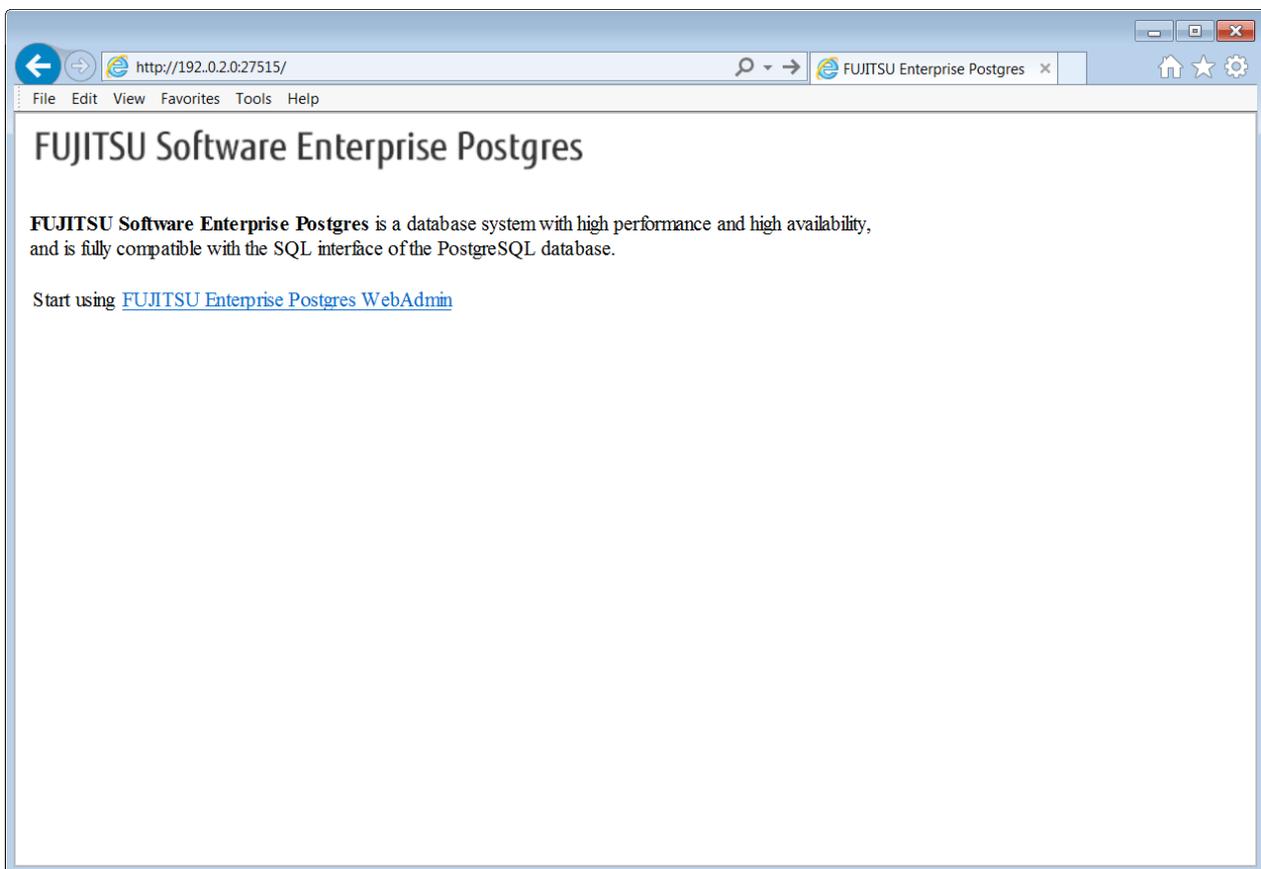
- *hostNameOrIpAddress*: The host name or IP address of the server where FUJITSU Enterprise Postgres is installed.
- *portNumber*: The port number of WebAdmin. The default port number is 27515.

### Example

For a server with IP address "192.0.2.0" and port number "27515"

```
http://192.0.2.0:27515/
```

The activation URL window shown below is displayed.



### Point

- You must activate the Web server feature of WebAdmin before using WebAdmin.
- Refer to "[Appendix E Activating and Stopping the Web Server Feature of WebAdmin](#)" for information on how to activate the Web server feature of WebAdmin.

## Log in to WebAdmin

Click [FUJITSU Enterprise Postgres WebAdmin] in the activation URL window to activate WebAdmin and display the [Log in] window.



|         |          |
|---------|----------|
| User ID | Password |
|---------|----------|

Login

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To log in, specify the following values:

- [User ID]: User ID (OS user account) of the instance administrator
- [Password]: Password corresponding to the user ID

### Point

Use the OS user account as the user ID of the instance administrator. Refer to "Creating an Instance Administrator" in the Installation and Setup Guide for Server for details.

## 1.3 Starting pgAdmin

This section describes how to start pgAdmin, how to add an instance required for managing a database, and how to connect to and disconnect from the instance.

You can use pgAdmin on the Windows client.

### 1.3.1 Starting pgAdmin

This section explains how to start pgAdmin if you are using it from the product "FUJITSU Enterprise Postgres Client (AAbit) x.y SPz" (where AA is "32" or "64", x.y and z are the version numbers (x.y SPz)).

#### Windows(R) 8 or Windows Server(R) 2012

From the [Start] screen, start [pgAdmin III (AAbit) (x.y SPz)].

#### Windows(R) 8.1 or Windows Server(R) 2012 R2

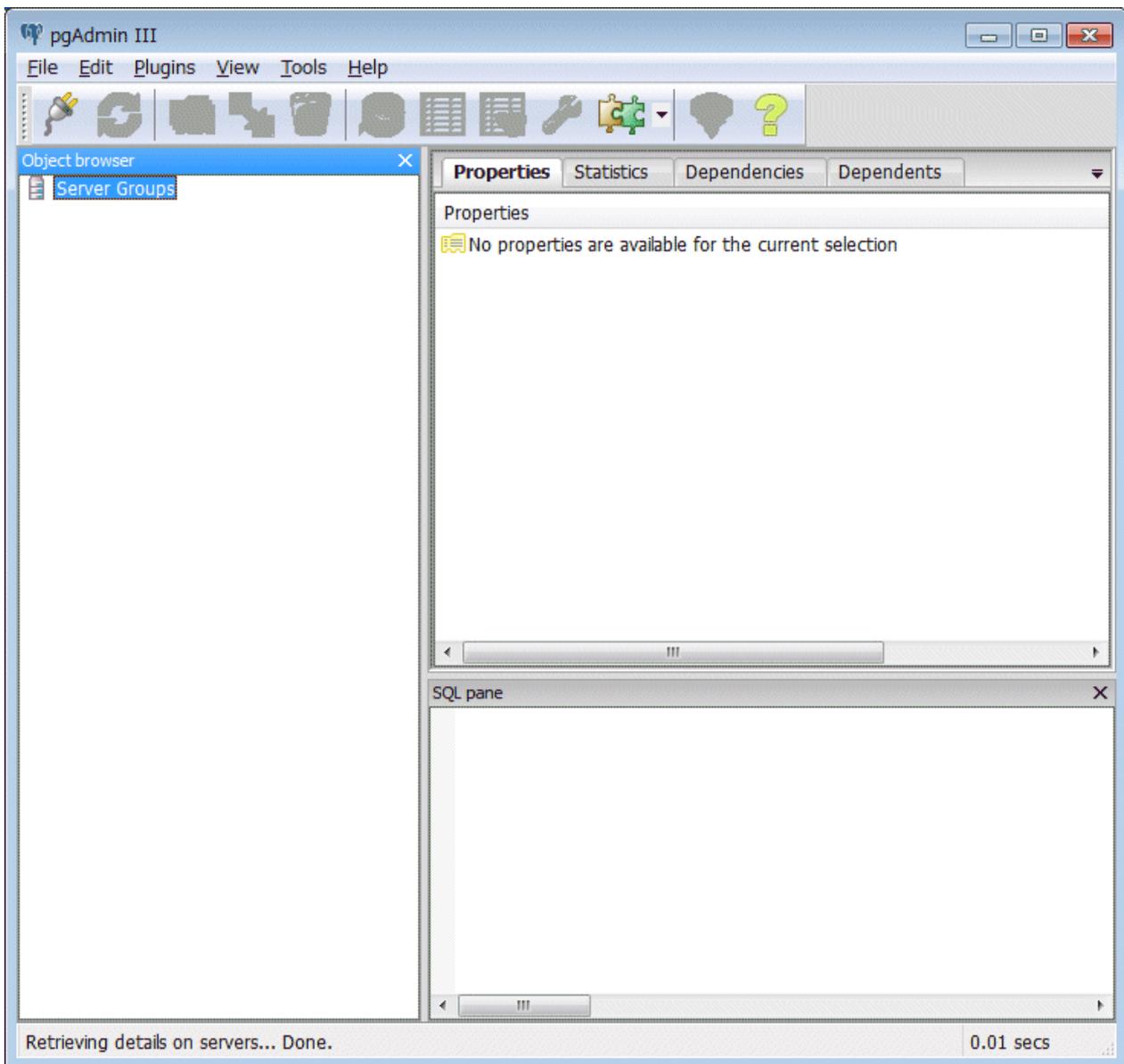
From the [Apps] view, start [pgAdmin III (AAbit) (x.y SPz)].

#### Windows(R) 10

Click [Start] >> [All apps] >> [FUJITSU Enterprise Postgres Client(AAbit)] and start [pgAdmin III (AAbit) (x.y SPz)].

## Other operating systems

Click [Start] >> [All Programs] >> [FUJITSU Enterprise Postgres Client(AAbit) x.y SPz] and start [pgAdmin III (AAbit) (x.y SPz)].  
The following window is displayed when pgAdmin starts.



### Note

- You must start the instance to be connected to before using pgAdmin.
- Refer to "2.1 Starting and Stopping an Instance" for information on how to start an instance.
- Adobe(R) Reader(R) X is required for browsing the manual from [FUJITSU Enterprise Postgres Help] in pgAdmin.

## 1.3.2 Adding an Instance

This section describes how to add an instance to be connected to.

1. From the [File] menu in pgAdmin, click [Add Server].

2. In the [New Server Registration] window, specify a value for each item.

The screenshot shows a 'New Server Registration' dialog box with the following fields and values:

| Field          | Value                    |
|----------------|--------------------------|
| Name           | db01                     |
| Host           | sv1                      |
| Port           | 27500                    |
| Service        |                          |
| Maintenance DB | postgres                 |
| Username       | fsepuser                 |
| Password       | .....                    |
| Store password | <input type="checkbox"/> |
| Colour         |                          |
| Group          | Servers                  |

([Properties] tab)

- [Name]: Name of the instance to be managed
- [Host]: Host name or IP address of the server where FUJITSU Enterprise Postgres is installed
- [Port]: Port number of the instance
- [Username]: User name of the instance administrator
- [Password]: Password for the user name specified in [Username]

When you add an instance using pgAdmin, the instance is automatically connected to immediately after the addition is completed.

#### Note

If you select [Store password], a file storing the FUJITSU Enterprise Postgres connection password is created in the following location. Set the appropriate access permissions for the password file to protect it from unauthorized access.

- %APPDATA%\postgresql\pgpass.conf

### 1.3.3 Connecting/Disconnecting an Instance

This section describes how to connect pgAdmin to an instance, and how to disconnect it.

## Note

To connect to an instance created using WebAdmin, you must first configure the settings in the [Client Authentication] window of WebAdmin to permit connection from pgAdmin.

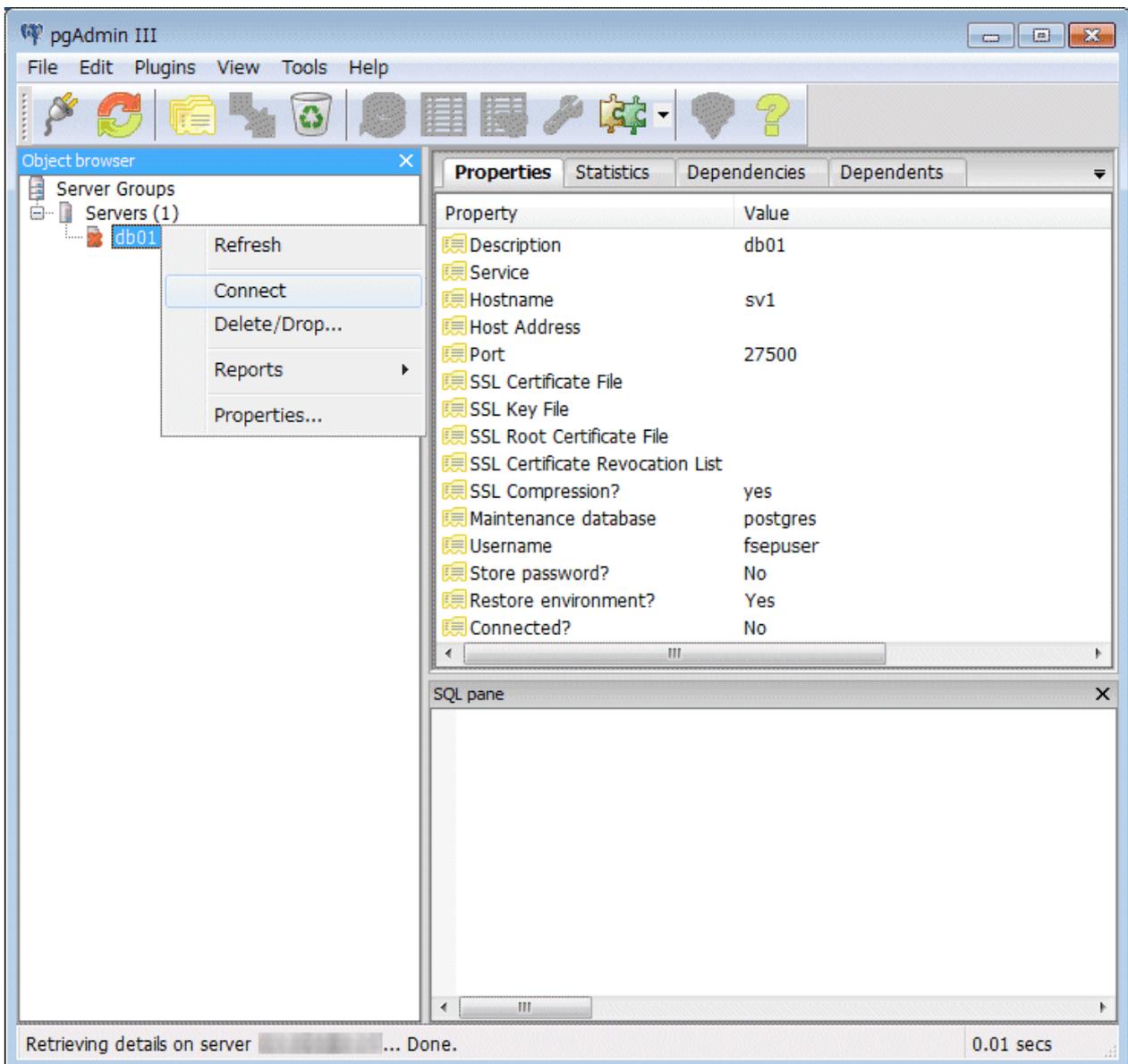
## See

Refer to "Changing the settings" in the Installation and Setup Guide for Server for information on the [Client Authentication] window of WebAdmin.

## Connecting to an instance

Starting pgAdmin does not connect it to any instance.

To connect to an instance, right-click the instance in [Object browser] and select [Connect].



If a password was not saved when the instance was added, the following password entry window is displayed.



### Disconnecting from an instance

To disconnect from an instance, right-click the server in [Object browser] in the pgAdmin window and select [Disconnect server].

## 1.4 Operations Using Commands

---

You can operate and manage the database using the following commands:

#### - Server commands

This group of commands includes commands for creating a database cluster and controlling the database. You can run these commands on the server where the database is operating.

To use these commands, you must configure the environment variables.



See

- Refer to "PostgreSQL Server Applications" under "Reference" in the PostgreSQL Documentation, or "Reference" for information on server commands.
- Refer to "Configure the environment variables" under the procedure for creating an instance in "Using the initdb Command" in the Installation and Setup Guide for Server for information on the values to be set in the environment variables.

#### - Client commands

This group of commands includes the psql command and commands for extracting the database cluster to a script file. These commands can be executed on the client that can connect to the database, or on the server on which the database is running.

To use these commands, you need to configure the environment variables.



See

- Refer to "PostgreSQL Client Applications" under "Reference" in the PostgreSQL Documentation, or "Reference" for information on client commands.
- Refer to "Configuring Environment Variables" in the Installation and Setup Guide for Client for information on the values to be set in the environment variables.

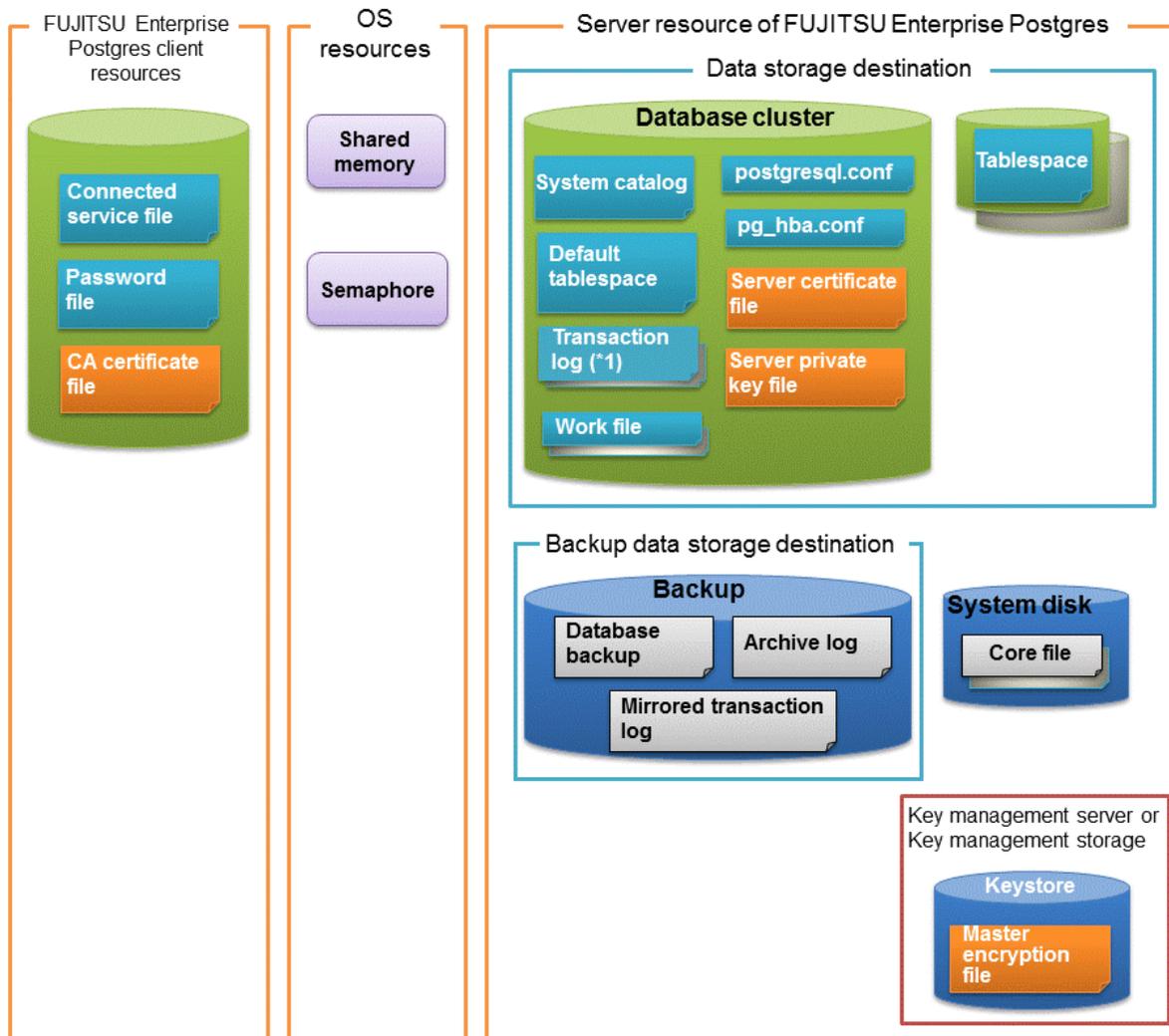
## 1.5 Operating Environment of FUJITSU Enterprise Postgres

---

This section describes the operating environment and the file composition of FUJITSU Enterprise Postgres.

## 1.5.1 Operating Environment

The following figure shows the configuration of the FUJITSU Enterprise Postgres operating environment. The tables given below list the roles of the OS resources and FUJITSU Enterprise Postgres resources.



\*1: To distribute the I/O load, place the transaction log on a different disk from the data storage destination.

Table 1.1 OS resources

| Type          | Role   |
|---------------|--|
| Shared memory | Used when a database process exchanges information with an external process. |
| Semaphore     |  |

Table 1.2 FUJITSU Enterprise Postgres client resources

| Type                    | Role   |
|-------------------------|--|
| Connection service file | Specifies information, such as the host name, user name, and password, for connecting to FUJITSU Enterprise Postgres |
| Password file           | Securely manages the password for connecting to FUJITSU Enterprise Postgres  |
| CA certificate file     | CA (certificate authority) certificate used for server authentication when encrypting communication data             |

Table 1.3 Server resources of FUJITSU Enterprise Postgres

| Type  | Role  |
|---|---|
| Database cluster                                | Database storage area on the database storage disk. It is a collection of databases managed by an instance.   |
| System catalog                                  | Contains information required for the system to run, including the database definition information and the operation information created by the user                          |
| Default tablespace                              | Contains table files and index files stored by default  |
| Transaction log                                 | Contains log information in case of a crash recovery or rollback. This is the same as the WAL (Write Ahead Log).  |
| Work file                                       | Work file used when executing applications or commands  |
| postgresql.conf                                 | Contains information that defines the operating environment of FUJITSU Enterprise Postgres  |
| pg_hba.conf                                     | FUJITSU Enterprise Postgres uses this file to authenticate individual client hosts  |
| Server certificate file                         | Contains information about the server certificate to be used when encrypting communication data and authenticating a server   |
| Server private key file                         | Contains information about the server private key to be used when encrypting communication data and authenticating a server   |
| Tablespace                                      | Stores table files and index files in a separate area from the database cluster   |
| Backup  | Stores the data required for recovering the database when an error, such as disk failure, occurs  |
| Database backup                                 | Contains the backup data for the database   |
| Archive log                                     | Contains the log information for recovery.  |
| Core file                                       | FUJITSU Enterprise Postgres process core file that is output when an error occurs during an FUJITSU Enterprise Postgres process   |
| Key management server or key management storage | Server or storage where the master encryption key file is located   |
| Master encryption key file                      | Contains the master encryption key to be used when encrypting storage data. The master encryption key file is managed on the key management server or key management storage. |

## 1.5.2 File Composition

FUJITSU Enterprise Postgres consists of the following files for controlling and storing the database. The table below shows the relationship between the number of such files and their location within a single instance.

Table 1.4 Number of files within a single instance and how to specify their location

| File type        | Required | Quantity | How to specify the location  |
|------------------|----------|----------|--|
| Program files    | Y        | Multiple | Note that "<xy>" indicates the product version and level.<br><b>64-bit product</b><br>%Program Files%\Fujitsu\fsepv<xy>server64<br><b>32-bit product (when installed on a 64-bit OS)</b><br>%Program Files(x86)%\Fujitsu\fsepv<xy>server32<br><b>32-bit product (when installed on a 32-bit OS)</b><br>%Program Files%\Fujitsu\fsepv<xy>server32 |
| Database cluster | Y        | 1        | Specify using WebAdmin or server commands.   |
| Tablespace       | Y        | Multiple | Specify using pgAdmin or the DDL statement.  |
| Backup           | Y        | Multiple | Specify using WebAdmin or server commands.   |

| File type                       | Required | Quantity | How to specify the location   |
|---------------------------------|----------|----------|---|
| Core file                       | Y        | Multiple | Specify using WebAdmin, server commands, or postgresql.conf.          |
| Server certificate file (*1)    | N        | 1        | Specify using postgresql.conf.  |
| Server private key file (*1)    | N        | 1        | Specify using postgresql.conf.  |
| Master encryption key file (*1) | N        | 1        | Specify the directory created as the key store using postgresql.conf. |
| Connection service file (*1)    | N        | 1        | Specify using environment variables.                                  |
| Password file (*1)              | N        | 1        | Specify using environment variables.                                  |
| CA certificate file (*1)        | N        | 1        | Specify using environment variables.                                  |

Y: Mandatory

N: Optional

\*1: Set manually when using the applicable feature.



### Note

If anti-virus software is used, set scan exception settings for directories so that none of the files that comprise FUJITSU Enterprise Postgres are scanned for viruses. Alternatively, if the files that comprise FUJITSU Enterprise Postgres are to be scanned for viruses, stop FUJITSU Enterprise Postgres and perform the scan when tasks that use FUJITSU Enterprise Postgres are not operating.

## 1.6 Notes on Compatibility of Applications Used for Operations

When you upgrade FUJITSU Enterprise Postgres to a newer version, there may be some affect on applications due to improvements or enhancements in functionality.

Take this into account when creating applications so that you can maintain compatibility after upgrading to a newer version of FUJITSU Enterprise Postgres.



### See

Refer to "Notes on Application Compatibility" in the Application Development Guide for details.

# Chapter 2 Starting an Instance and Creating a Database

This chapter describes basic operations, from starting an instance to creating a database.

## 2.1 Starting and Stopping an Instance

This section describes how to start and stop an instance.

- [2.1.1 Using WebAdmin](#)
- [2.1.2 Using Commands](#)

### Point

To automatically start or stop an instance when the operating system on the database server is started or stopped, refer to "Configuring Automatic Start and Stop of an Instance" in the Installation and Setup Guide for Server and configure the settings.

### Note

The collected statistics are initialized if an instance is stopped in the "Immediate" mode or if it is abnormally terminated. To prepare for such initialization of statistics, consider regular collection of the statistics by using the SELECT statement. Refer to "The Statistics Collector" in "Server Administration" in the PostgreSQL Documentation for information on the statistics.

### 2.1.1 Using WebAdmin

WebAdmin enables you to start or stop an instance and check its operating status.

#### Starting an instance

Start an instance by using the [Instances] tab in WebAdmin.

 is displayed when an instance is stopped.

To start a stopped instance, click .

#### Stopping an instance

Stop an instance by using the [Instances] tab in WebAdmin.

 is displayed when an instance is active.

To stop an active instance, click .

#### Stop mode

Select the mode in which to stop the instance. The following describes the operations of the modes:

| Stop mode       | Connected clients  | Backup being executed using the command                       |
|-----------------|--|---|
| Smart mode (*1) | Waits for all connected clients to be disconnected.  | Waits for backups being executed using the command to finish. |
| Fast mode       | Rolls back all transactions being executed and forcibly disconnects clients.                                       | Terminates backups being executed using the command.          |
| Immediate mode  | All server processes are terminated immediately. Crash recovery is executed the next time the instance is started. |   |

\*1: When the processing to stop the instance in the Smart mode has started and you want to stop immediately, use the following procedure:

1. Restart the Web server feature of WebAdmin.
2. In the [Instances] tab, click .
3. In the [Instances] tab, click , and select the Immediate mode to stop the instance.

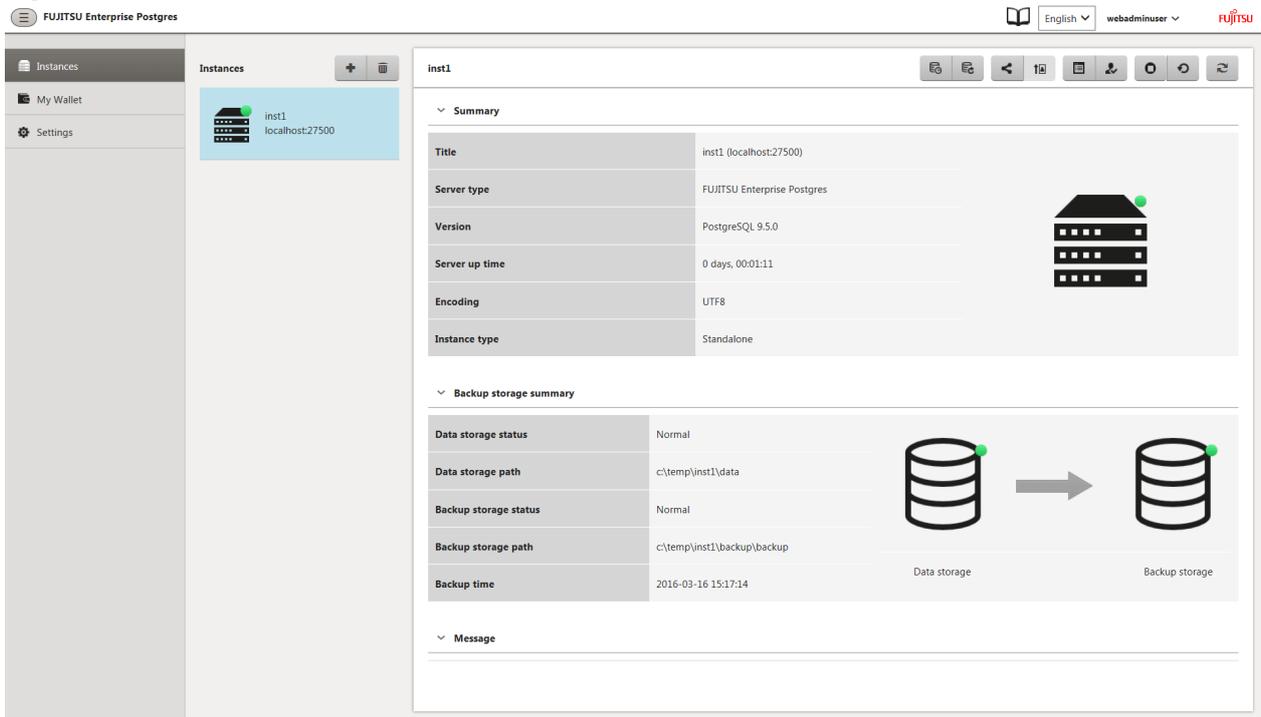
## Checking the operating status of an instance

You can check the operating status of an instance by using the [Instances] tab. The following indicators are used to show the status of a resource.

| Status indicator  | Explanation  |
|---|--|
|  | The resource is operating normally.  |
|  | The resource is stopped.   |
|  | There is an error in the resource.   |
|  | An operation is in progress on this resource or the status is being checked. |
|  | The resource is not operating optimally and needs intervention.              |

If an instance stops abnormally, remove the cause of the stoppage and start the instance by using WebAdmin.

Figure 2.1 Status when an instance is active

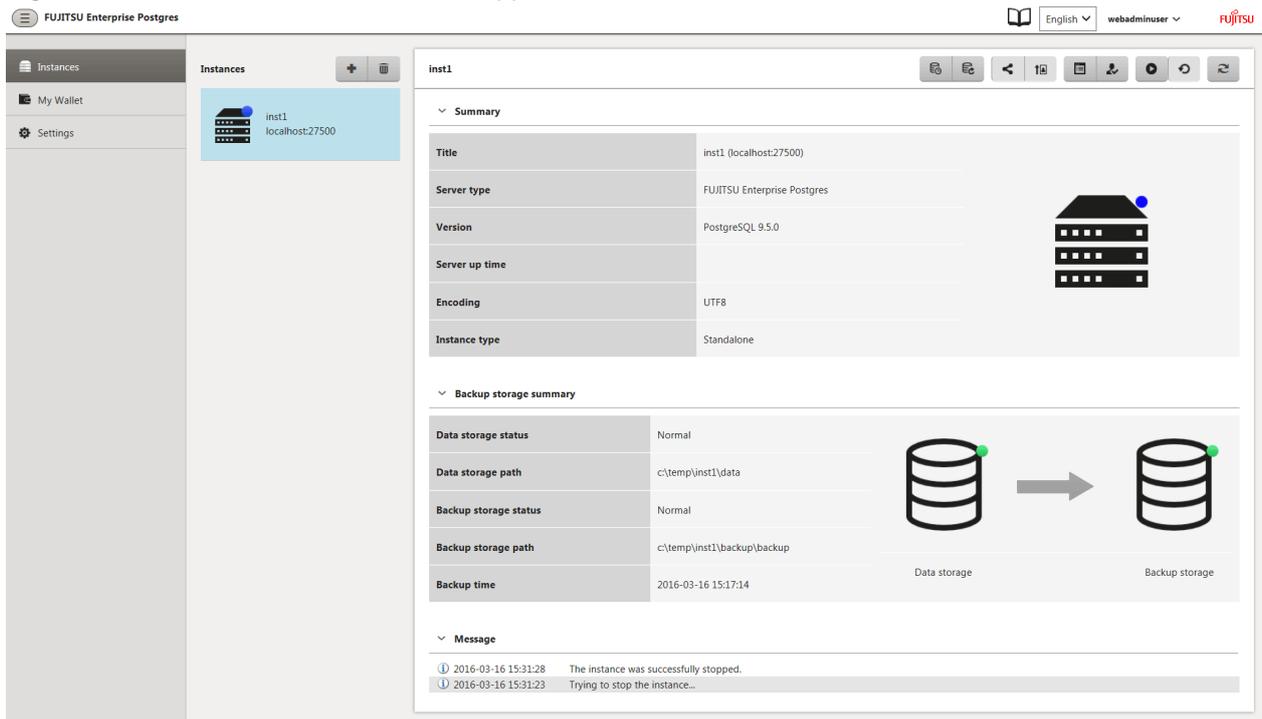


The screenshot displays the WebAdmin interface for Fujitsu Enterprise Postgres. The main content area shows the details for instance 'inst1' (localhost:27500). The status is 'Normal', indicated by a green circle icon. The instance is a Standalone type, running PostgreSQL 9.5.0 on a FUJITSU Enterprise Postgres server type. The server has been up for 0 days, 00:01:11, using UTF8 encoding. The backup storage summary shows that both data and backup storage are in a 'Normal' state. The data storage path is c:\temp\inst1\data, and the backup storage path is c:\temp\inst1\backup\backup. The last backup was performed on 2016-03-16 15:17:14. A diagram illustrates the flow from 'Data storage' to 'Backup storage'.

| Summary        |                             |
|----------------|-----------------------------|
| Title          | inst1 (localhost:27500)     |
| Server type    | FUJITSU Enterprise Postgres |
| Version        | PostgreSQL 9.5.0            |
| Server up time | 0 days, 00:01:11            |
| Encoding       | UTF8                        |
| Instance type  | Standalone                  |

| Backup storage summary |                             |
|------------------------|-----------------------------|
| Data storage status    | Normal                      |
| Data storage path      | c:\temp\inst1\data          |
| Backup storage status  | Normal                      |
| Backup storage path    | c:\temp\inst1\backup\backup |
| Backup time            | 2016-03-16 15:17:14         |

Figure 2.2 Status when an instance is stopped



### Note

- When operating WebAdmin, click  to update the status. WebAdmin will reflect the latest status of the operation or the instance resources from the server.
- If an error occurs while communicating with the server, there may be no response from WebAdmin. When this happens, close the browser and then log in again. If this does not resolve the issue, check the event log of the server and confirm whether a communication error has occurred.
- The following message is output during startup of an instance when the startup process is operating normally, therefore, the user does not need to be aware of this message:

```
FATAL: the database system is starting up
```

## 2.1.2 Using Commands

The Windows service-related commands enable you to start or stop an instance and to check its operating state.

If you are to use Windows services, you should register instances in Windows services.

### See

Refer to "When an instance was created with WebAdmin" in "Configuring Automatic Start and Stop of an Instance" in the Installation Guide for Server for information on registering instances in Windows services.

### Note

While it is also possible for you to execute the `pg_ctl` command to start and stop instances without having to register instances in Windows services, it is recommended that you use Windows services to start and stop instances for the following reason:

- If you use the `pg_ctl` command to start an instance, the instance will be started as a user process. Therefore, when you close the [Command Prompt] window in which you executed the command, Windows forces the postgres process to stop.
- 

## Starting an instance

You can start an instance by specifying the service name in the `net start` command or `sc start` command.

Also, you can use the following procedure to start an instance in the Windows services window:

1. Display the [Services] window
  - Windows Server(R) 2012 and Windows Server(R) 2012 R2:  
In the [Start] screen, select [Administrative Tools], and then click [Services].
  - All other operating systems:  
In the [Start] menu, select [Administrative Tools], and then click [Services].
2. Start a service  
Select the instance name that you wish to start from the services list, and click [Start Service].

## Stopping an instance

You can stop an instance by specifying the service name in the `net stop` command or `sc stop` command.

Also, you can use the following procedure to stop an instance in the Windows services window:

1. Display the [Services] window
  - Windows Server(R) 2012 and Windows Server(R) 2012 R2:  
In the [Start] screen, select [Administrative Tools], and then click [Services].
  - All other operating systems:  
In the [Start] menu, select [Administrative Tools], and then click [Services].
2. Stop the service  
Select the instance name that you wish to stop from the services list, and click [Stop Service]. If you stop a service while applications and commands are running, FUJITSU Enterprise Postgres will force those applications and commands to close and will stop normally.

## Checking the operating state of an instance

Use the following procedure to check if an instance is operating correctly immediately after performing the operation to start an instance:

1. Display the [Services] window  
In the [Start] menu, select [Administrative Tools], and then click [Services].
2. Check the state of the service  
In the services list, check the state of the services for the applicable FUJITSU Enterprise Postgres.

To check the operating state of an instance during operation, use the `pg_ctl` command.

Specify the following in the `pg_ctl` command:

- Specify "status" as the mode.
- Specify the data storage destination directory in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.



### Example

---

When the instance is active:

```
> pg_ctl status -D D:\database\inst1
pg_ctl: server is running (PID: 1234)
```

When the instance is inactive:

```
> pg_ctl status -D D:\database\inst1
pg_ctl: no server running
```

---

### Information

You can also use the net start command or sc query command to check the operating state of an instance.

---

### See

Refer to "pg\_ctl" in "Reference" in the PostgreSQL Documentation for information on the pg\_ctl command.

---

## 2.2 Creating a Database

This section explains how to create a database.

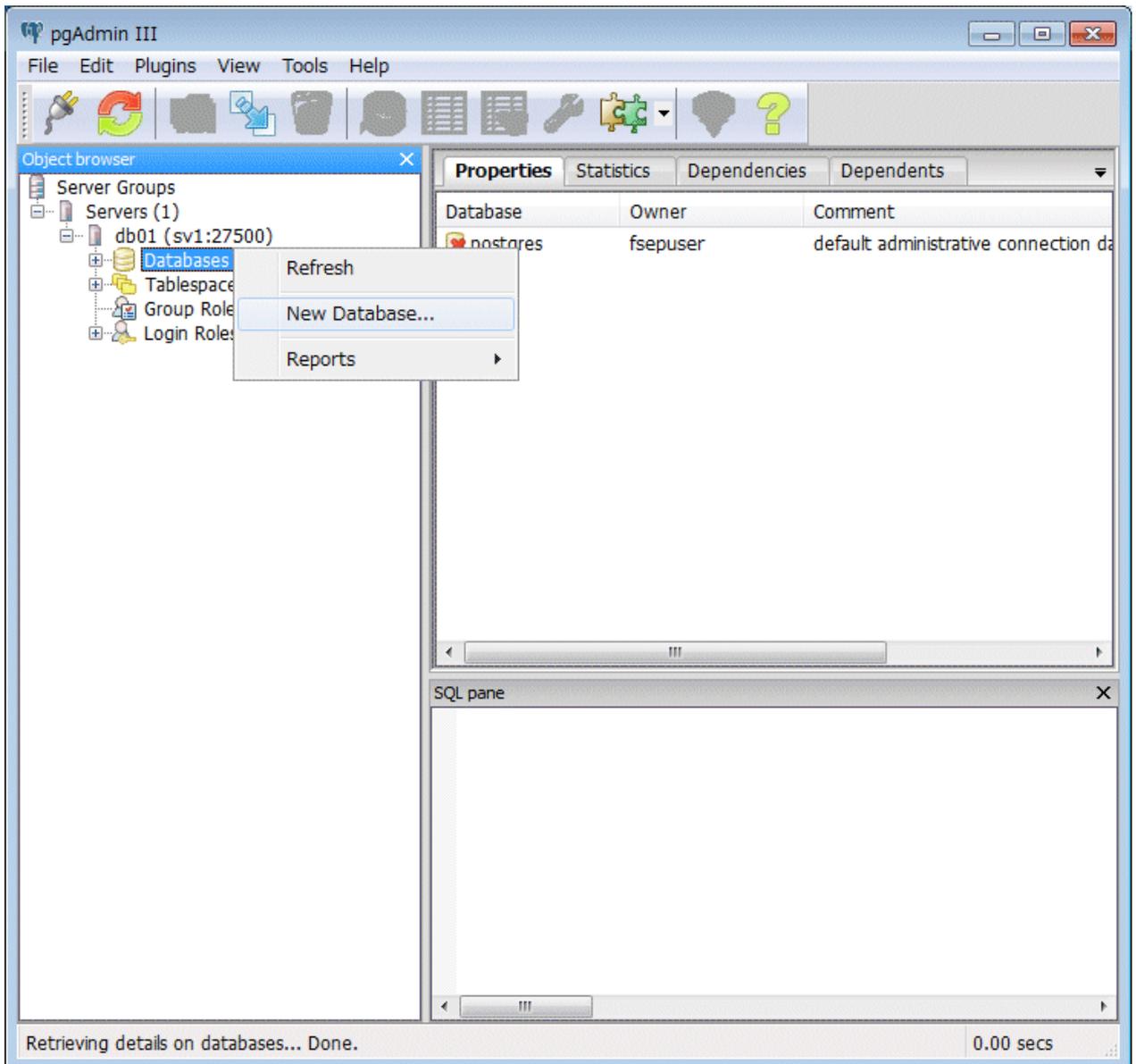
- [2.2.1 Using pgAdmin](#)
- [2.2.2 Using Client Commands](#)

---

### 2.2.1 Using pgAdmin

Follow the procedure below to define a database using pgAdmin.

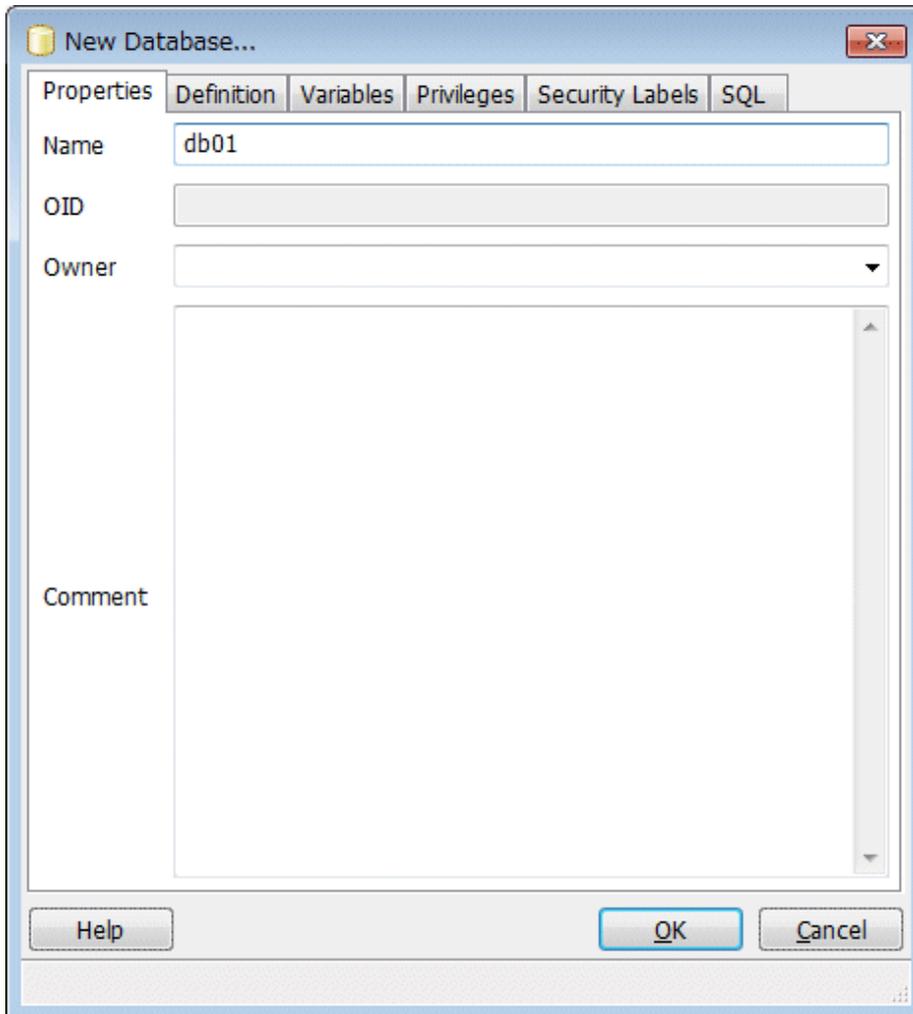
1. In the pgAdmin window, right-click [Database] in [Object browser], and then click [New Database] to display a new database window.



2. Specify appropriate values for the following items in the new database window.

- [Properties] tab

The following example illustrates creation of the database "db01".



- [Name]: Name of the database to be managed

3. Click [OK] to create the database.

## 2.2.2 Using Client Commands

Follow the procedure below to define a database using client commands.

An example of operations on the server is shown below.

1. Use psql command to connect to the postgres database.  
Execute psql postgres.

```
> psql postgres
psql (9.5.2)
Type "help" for help.
```

2. Create the database.

To create the database, execute the CREATE DATABASE databaseName; statement.

```
postgres=# CREATE DATABASE db01;
CREATE DATABASE
```

3. Confirm that the database is created.

Execute the \l+ command, and confirm that the name of the database created in step 2 is displayed.

```
postgres=# \l+
```

4. Disconnect from the postgres database.

Execute \q to terminate the psql command.

```
postgres=# \q
```

You can create a database using the createdb command.



**See**

.....  
Refer to "Creating a Database" in "Tutorial" in the PostgreSQL Documentation for information on creating a database using the createdb command.  
.....

# Chapter 3 Backing Up the Database

This chapter describes how to back up the database.

## Backup methods

The following backup methods enable you to recover data to a backup point or to the state immediately preceding disk physical breakdown or data logical failure.

- Backup using WebAdmin

This method enables you to back up data through intuitive window operations using the GUI.

WebAdmin is used for recovery.

- Backup using the `pgx_dmpall` command

Execute the `pgx_dmpall` command with a script to perform automatic backup.

To back up data automatically, you must register the process in the automation software of the operating system. Follow the procedure given in the documentation for your operating system.

The `pgx_rcvall` command is used for recovery.

## Approximate backup time

The formula for deriving the approximate backup time when you use WebAdmin or the `pgx_dmpall` command is as follows:

$$\text{backupTime} = \text{dataStorageDestinationUsage} / \text{diskWritePerformance} \times 1.5$$

- *dataStorageDestinationUsage*: Disk usage at the data storage destination
- *diskWritePerformance*: Maximum data volume (bytes/second) that can be written per second in the system environment where operation is performed
- 1.5: Coefficient to factor in tasks other than disk write (which is the most time-consuming step)



### Note

- Backup operation cannot be performed on an instance that is part of a streaming replication cluster in standby mode.
- Use the selected backup method continuously.

There are several differences, such as the data format, across the backup methods. For this reason, the following restrictions apply:

- It is not possible to use one method for backup and another for recovery.
- It is not possible to convert one type of backup data to a different type of backup data.
- There are several considerations for the backup of the keystore and backup of the database in case the data stored in the database is encrypted. Refer to the following for details:
  - [5.6.4 Backing Up and Recovering the Keystore](#)
  - [5.7 Backing Up and Restoring/Recovering the Database](#)
- If you have defined a tablespace, back it up. If you do not back it up, directories for the tablespace are not created during recovery, which may cause the recovery to fail. If the recovery fails, refer to the event log, create the tablespace, and then perform the recovery process again.
- If performing backups with WebAdmin, the following password file is temporarily created during backup for WebAdmin to connect to the database:

- `userProfileFolder\localSettingsFolder\Fujitsu\fsdp_version\instanceName\pgpass.conf`

Therefore, when you are backing up corefiles created in the `core_directory` parameter of `postgresql.conf`, or log files created in the `log_directory` parameter of `postgresql.conf`, ensure not to back up the password files located in the same directories at the same time.

## Information

---

The following methods can also be used to perform backup. Performing a backup using these methods allows you to restore to the point when the backup was performed.

- Backup using an SQL-based dump

Dump the data by using SQL. This backup method also enables data migration.

- File system level backup

This backup method requires you to stop the instance and use OS commands to backup database resources as files.

- Backup by continuous archiving

This is the standard backup method for PostgreSQL.

Refer to "Backup and Restore" in "Server Administration" in the PostgreSQL Documentation for information on these backup methods.

---

## 3.1 Periodic Backup

---

It is recommended that you perform backup periodically.

Backing up data periodically using WebAdmin or the `pgx_dmpall` command has the following advantages:

- This method reduces disk usage, because obsolete archive logs (transaction logs copied to the backup data storage destination) are deleted. It also minimizes the recovery time when an error occurs.

### Backup cycle

The time interval when backup is performed periodically is called the backup cycle. For example, if backup is performed every morning, the backup cycle is 1 day.

The backup cycle depends on the jobs being run, but on FUJITSU Enterprise Postgres it is recommended that operations are run with a backup cycle of at least once per day.

## 3.2 Backup Methods

---

This section describes the methods for backing up the database.

- [3.2.1 Using WebAdmin](#)
- [3.2.2 Using Server Commands](#)

### 3.2.1 Using WebAdmin

---

You can use WebAdmin to perform backup and check the backup status.

#### Note

---

If the data to be stored in the database is to be encrypted, it is necessary to enable the automatic opening of the keystore before doing so. Refer to "[5.6.3 Enabling Automatic Opening of the Keystore](#)" for details.

---

#### Note

---

WebAdmin uses the labels "Data storage path", "Backup storage path" and "Transaction log path" to indicate "data storage destination", "backup data storage destination" and "transaction log storage destination" respectively. In this manual these terms are used interchangeably.

---

## Backup operation

Follow the procedure below to back up the database.

1. Select the database to back up

In the [Instances] tab, select the instance to be backed up and click .

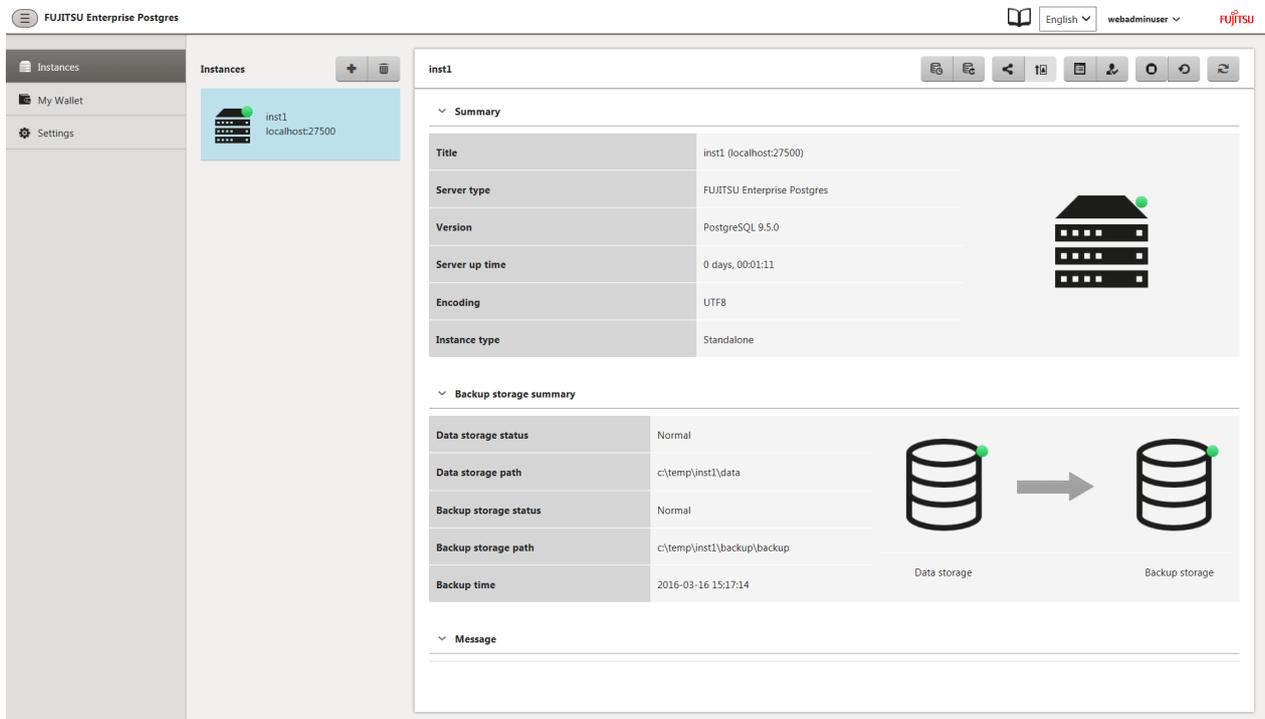
2. Back up the database

The [Backup] dialog box is displayed. To perform backup, click [Yes].  
An instance is automatically started when backup is performed.

## Backup status

If an error occurs and backup fails, [Error] is displayed adjacent to [Data storage destination] or [Backup data storage destination] in the [Instances] tab. An error message is also displayed in the message list.

In this case, the backup data is not optimized. Ensure that you check the backup result whenever you perform backup. If backup fails, [Solution] appears to the right of the error message. Clicking this button displays information explaining how to resolve the cause of the error. Remove the cause of failure, and perform backup again.



The screenshot shows the Fujitsu Enterprise Postgres web interface. The left sidebar contains navigation options: Instances, My Wallet, and Settings. The main area displays the 'Instances' tab with a list of instances, including 'inst1' at 'localhost:27500'. The right pane shows the details for 'inst1', including a 'Summary' section with the following information:

|                |                             |
|----------------|-----------------------------|
| Title          | inst1 (localhost:27500)     |
| Server type    | FUJITSU Enterprise Postgres |
| Version        | PostgreSQL 9.5.0            |
| Server up time | 0 days, 00:01:11            |
| Encoding       | UTF8                        |
| Instance type  | Standalone                  |

Below the summary is a 'Backup storage summary' section with the following information:

|                       |                             |
|-----------------------|-----------------------------|
| Data storage status   | Normal                      |
| Data storage path     | c:\temp\inst1\data          |
| Backup storage status | Normal                      |
| Backup storage path   | c:\temp\inst1\backup\backup |
| Backup time           | 2016-03-16 15:17:14         |

The backup storage summary section also includes a diagram showing data storage (represented by a cylinder icon) being moved to backup storage (represented by another cylinder icon) via an arrow. The backup time is 2016-03-16 15:17:14.

### Note

If the data to be stored in the database is to be encrypted, it is necessary to enable the automatic opening of the keystore before doing so. Refer to "[5.6.3 Enabling Automatic Opening of the Keystore](#)" for details.

## 3.2.2 Using Server Commands

Use the `pgx_dmpall` command and `pgx_rcvall` command to perform backup and check the backup result.

### Preparing for backup

You must prepare for backup before actually starting the backup process.

Follow the procedure below.



See

Refer to "Preparing Directories to Deploy Resources" in the Installation and Setup Guide for Server for information on the location of directories required for backup and for points to take into account.

1. Prepare the backup data storage disk

For backup, prepare a separate disk unit from the database storage disk and mount it using the operating system commands.

2. Create a directory where the backup data will be stored

Create an empty directory.

In [Properties] in Windows(R) Explorer, set appropriate permissions so that only the instance administrator can access the directory.



See

Refer to [Help and Support] in Windows(R) for information on [Properties].

3. Specify the settings required for backup

Stop the instance, and set the following parameters in the postgresql.conf file.

Start the instance after editing the postgresql.conf file.

| Parameter name     | Setting   | Description   |
|--------------------|---|---|
| backup_destination | Name of the directory where the backup data will be stored  | Specify the name of the directory where the backup data will be stored.<br><br>Appropriate privileges that allow only the instance administrator to access the directory must already be set.<br><br>Place the backup data storage destination directory outside the data storage destination directory, the tablespace directory, and the transaction log storage destination directory. |
| wal_level          | archive or hot_standby(*1)  | Specify the output level for the transaction log.<br><br>*1: hot_standby is a setting for streaming replication.  |
| archive_mode       | on  | Specify the archive log mode.<br><br>Specify [on] (execute).  |
| archive_command    | 'cmd /c "" <i>installationDirectory</i> \bin\<br>\pgx_xlogcopy.cmd" "%p"<br>" <i>backupDataStorageDestinationDirectory</i> \<br>\archived_xlog\%f"' | Specify the path name of the command that will save the transaction log and the storage destination.<br><br>Note the following when specifying the path:<br><br>- Specify \\ as the path delimiter.<br><br>- Enclose the path in double quotes (") if it contains spaces.   |

Refer to "[Appendix A Parameters](#)" and "Write Ahead Log" under "Server Administration" in the PostgreSQL Documentation for information on the parameters.

## Backup operation

Use the `pgx_dmpall` command to perform backup. You can even embed the `pgx_dmpall` command in OS automation software to perform backup.

The backup data is stored in the directory specified in the `backup_destination` parameter of `postgresql.conf`.

Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.



### Example

```
> pgx_dmpall -D D:\database\inst1
```



### Note

Backup stores the data obtained during the backup and the backup data of the data obtained during previous backup.

If the data to be stored in the database is encrypted, refer to the following and back up the keystore:

- [5.6.4 Backing Up and Recovering the Keystore](#)

## Backup status

Use the `pgx_rcvall` command to check the backup status.

Specify the following values in the `pgx_rcvall` command:

- The `-l` option indicates backup data information.
- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

```
> pgx_rcvall -l -D D:\database\inst1
Date                Status             Dir
2015-05-01 13:30:40 COMPLETE          E:\backup\inst1\2015-05-01_13-30-40
```

If an error occurs and backup fails, a message is output to the event log.

In this case, the backup data is not optimized. Ensure that you check the backup result whenever you perform backup. If backup fails, remove the cause of failure and perform backup again.



### See

Refer to "pgx\_dmpall" and "pgx\_rcvall" in the Reference for information on the `pgx_dmpall` command and `pgx_rcvall` command.

## Setting a restore point

In case you want to recover your database to a certain point in time, you can name this particular point in time, which is referred to as the restore point, by using the `psql` command.

By setting a restore point before executing an application, it becomes easy to identify up to which point in time the data will be reverted.

A restore point can be set to any point in time after a backup is executed. However, if a restore point is set before a backup is executed, the database cannot be recovered to that point in time. This is because restore points are recorded in the archive logs, and the archive logs are discarded when backups are executed.

## Example

The following example uses the psql command to connect to the database and execute the SQL statement to set a restore point.

However, when considering continued compatibility of applications, do not use functions directly in SQL statements. Refer to "Notes on Application Compatibility" in the Application Development Guide for details.

```
postgres=# SELECT pg_create_restore_point('batch_20150503_1');
LOG:  restore point "batch_20150503_1" created at 0/20000E8
STATEMENT:  select pg_create_restore_point('batch_20150503_1');
 pg_create_restore_point
-----
 0/20000E8
(1 row)
```

Refer to "[10.3.2 Using the pgx\\_rcvall Command](#)" for information on using a restore point to recover the database.

## Note

- Name restore points so that they are unique within the database. Add the date and time of setting a restore point to distinguish it from other restore points, as shown below:
  - YYMMDD\_HHMMSS
    - YYMMDD: Indicates the date
    - HHMMSS: Indicates the time
- There is no way to check restore points you have set. Keep a record in, for example, a file.

## See

Refer to "System Administration Functions" under "Functions and Operators" in the PostgreSQL Documentation for information on `pg_create_restore_point`.

# Chapter 4 Configuring Secure Communication Using Secure Sockets Layer

If communication data transferred between a client and a server contains confidential information, encrypting the communication data can protect it against threats, such as eavesdropping on the network.

## 4.1 Configuring Communication Data Encryption

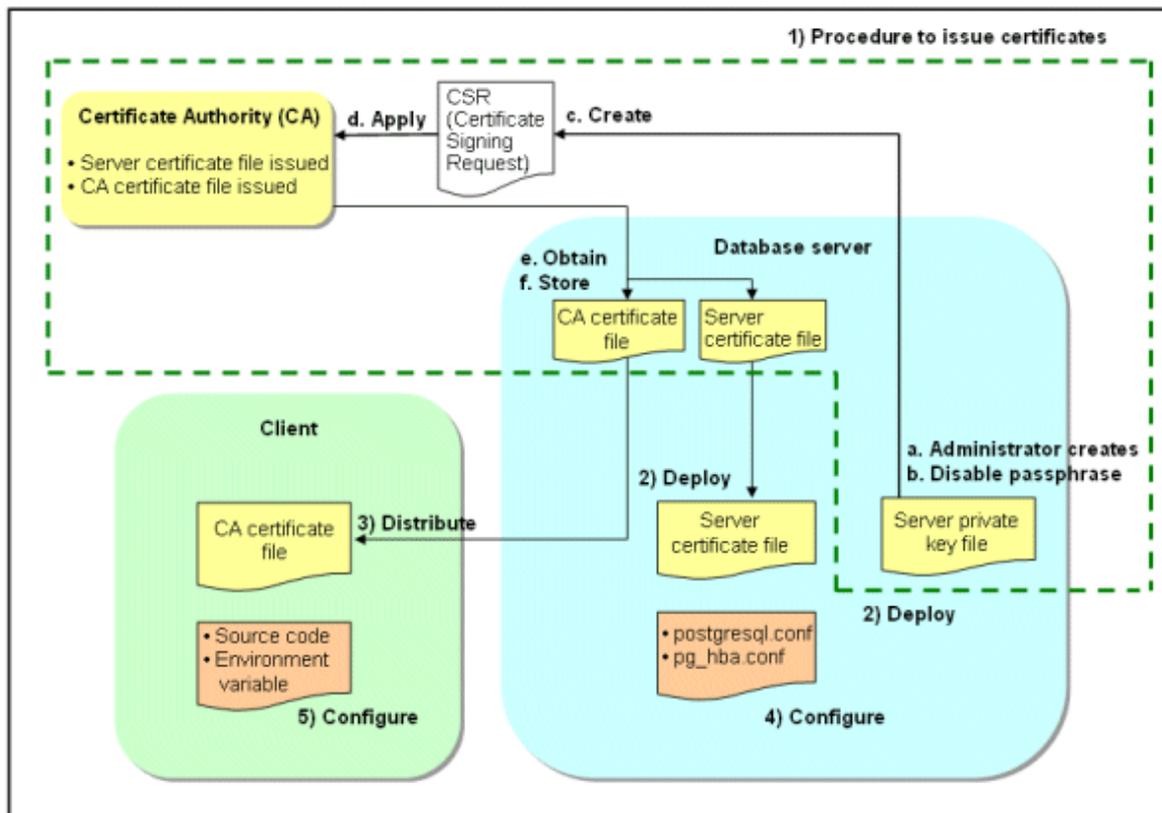
To encrypt communication data transferred between a client and a server, configure communication data encryption as described below. Communication data encryption not only protects the communication content, but it also guards against man-in-the-middle (MITM) attacks (for example, data and password theft through server impersonation).

Table 4.1 Configuration procedure

| Configuration procedure   |
|---|
| 1) Issue a certificate  |
| 2) Deploy a server certificate file and a server private key file |
| 3) Distribute a CA certificate file to the client                 |
| 4) Configure the operating environment for the database server    |
| 5) Configure the operating environment for the client             |

The following figure illustrates the environment for communication data encryption.

Figure 4.1 Environment for communication data encryption



## 4.1.1 Issuing a Certificate

---

For authenticating servers, you must acquire a certificate issued by the certificate authority (CA).

FUJITSU Enterprise Postgres supports X.509 standard PEM format files. If the certificate authority issues a file in DER format, use a tool such as the openssl command to convert the DER format file to PEM format.

The following provides an overview of the procedure. Refer to the procedure published by the public or independent certificate authority (CA) that provides the certificate file for details.

- a. Create a server private key file
- b. Disable the passphrase for the server private key file
- c. Create a CSR (signing request for obtaining a server certificate) from the server private key file
- d. Apply to the certificate authority (CA) for a server certificate
- e. Obtain a server certificate file and a CA certificate file from the certificate authority (CA)
- f. Store the server certificate file and the CA certificate file

Note: If you lose or destroy the certificates, you will need to have them re-issued.

The above procedure enables you to prepare the following files:

- Server private key file
- Server certificate file
- CA certificate file

## 4.1.2 Deploying a Server Certificate File and a Server Private Key File

---

Create a directory on the local disk of the database server and store the server certificate file and the server private key file in it.

Use the operating system features to set access privileges for the server certificate file and the server private key file so that only the database administrator has load privileges.

Back up the server certificate file and the server private key file in the event that data corruption occurs and store them securely.

## 4.1.3 Distributing a CA Certificate File to the Client

---

Create a directory on the local disk of the client and place the distributed CA certificate file there. Use the operating system features to set load privileges to protect the CA certificate file against accidental deletion.

## 4.1.4 Configuring the Operating Environment for the Database Server

---



See

.....  
Refer to "Secure TCP/IP Connections with SSL" under "Server Administration" in the PostgreSQL Documentation for details.  
.....

## 4.1.5 Configuring the Operating Environment for the Client

---



See

.....  
Refer to the following sections in the Application Development Guide for details, depending on your application development environment:

- "Settings for Encrypting Communication Data" under "Setup" in "JDBC Driver"
  - "Settings for Encrypting Communication Data" under "Setup" in "C Library (libpq)"
  - "Settings for Encrypting Communication Data" under "Setup" in "Embedded SQL in C"
- .....

## 4.1.6 Performing Database Multiplexing

---

When you perform communication that uses database multiplexing and a Secure Socket Layer server certificate, certificates with the same "Common Name" must be used. To ensure this, take one of the following actions:

- Create one server certificate, replicate it, and place a copy on each server used for database multiplexing.
- Create a server certificate with the same "Common Name" for each server used for database multiplexing.



See

.....  
Refer to "Using the Application Connection Switch Feature" in the Application Development Guide for information on how to specify applications on the client.  
.....

# Chapter 5 Protecting Storage Data Using Transparent Data Encryption

This chapter describes how to encrypt data to be stored in the database.

## 5.1 Protecting Data Using Encryption

With PostgreSQL, data in a database is protected from access by unauthorized database users through the use of authentication and access controls. However, the OS file is not protected from attackers who bypass the database server's authentication and access controls.

With FUJITSU Enterprise Postgres, data inside the OS file is encrypted, so valuable information is protected even if the file or disk is stolen.

Data to be stored in a database is encrypted when it is written to the data file, and decrypted when it is read.

This is performed automatically by the instance, so the user and the application need not be aware of key management and encryption or decryption. This process is called TDE (Transparent Data Encryption).

The characteristics of TDE are described below.

### Encryption mechanisms

#### Two-layer encryption key and the keystore

In each tablespace, there is a tablespace encryption key that encrypts and decrypts all the data within. The tablespace encryption key is encrypted by the master encryption key and saved.

Only one master encryption key exists in a database cluster. It is encrypted based on a passphrase specified by the user and stored in a keystore. FUJITSU Enterprise Postgres provides a file-based keystore. Attackers who do not know the passphrase cannot read the master encryption key from the keystore.

#### Strong encryption algorithms

TDE uses the Advanced Encryption Standard (AES) as its encryption algorithm. AES was adopted as a standard in 2002 by the United States Federal Government, and is used throughout the world.

#### Faster encryption and decryption based on hardware

TDE minimizes the overhead of encryption and decryption by using the AES-NI (Advanced Encryption Standard New Instructions) built into Intel(R) Xeon(R) processors since the 5600 series. This means that even in situations where previously the minimum encryption target was selected as a tradeoff between performance and security, it is now possible to encrypt all the data of an application.

You can reference a list of processors equipped with AES-NI on the following page at Intel Corporation's website:

<http://ark.intel.com/search/advanced/?s=t&AESTech=true>

#### Zero overhead storage areas

Encryption does not change the size of data stored in tables, indexes, or WAL. There is, therefore, no need for additional estimates or disks.

### Scope of encryption

#### All user data within the specified tablespace

The tablespace is the unit for specifying encryption. All tables, indexes, temporary tables, and temporary indexes created in the encrypted tablespace are encrypted. There is no need for the user to consider which tables and strings to encrypt.

#### Backup data

The `pgx_dmpall` command and `pg_basebackup` command create backup data by copying the OS file. Backups of the encrypted data are, therefore, also encrypted. Information is protected from leakage even if the backup medium is stolen.

#### WAL and temporary files

WAL, which is created by updating encrypted tables and indexes, is encrypted with the same security strength as the update target. When large merges and sorts are performed, the encrypted data is written to a temporary file in encrypted format.

## Streaming replication support

You can combine streaming replication and transparent data encryption. The data and WAL encrypted on the primary server is transferred to the standby server in its encrypted format and stored.

### Note

The following are not encrypted:

- `pg_dump` and `pg_dumpall` output files
- Files output by the `COPY` command
- Notification event payloads that communicate using the `LISTEN` or `NOTIFY` command

## 5.2 Setting the Master Encryption Key

---

To use transparent data encryption, you must create a keystore and set the master encryption key.

1. In the `keystore_location` parameter of `postgresql.conf`, specify the directory to store the keystore.

Specify a different location for each database cluster.

```
keystore_location = 'C:\\key\\store\\location'
```

Refer to "[Appendix A Parameters](#)" for information on `postgresql.conf`.

After editing the `postgresql.conf` file, either start or restart the instance.

- Using WebAdmin

Refer to "[2.1.1 Using WebAdmin](#)", and restart the instance.

- Using commands

Refer to "[2.1.2 Using Commands](#)", and restart the instance.

2. Execute an SQL function, such as the one below, to set the master encryption key. This must be performed by the superuser. Execute it as the database superuser.

```
SELECT pgx_set_master_key('passphrase');
```

The value "passphrase" is the passphrase that will be used to open the keystore. The master encryption key is protected by this passphrase, so avoid specifying a short simple string that is easy to guess.

Refer to "[B.2 Transparent Data Encryption Control Functions](#)" for information on the `pgx_set_master_key` function.

### Note

Note that if you forget the passphrase, you will not be able to access the encrypted data. There is no method to retrieve a forgotten passphrase and decrypt data. Do not, under any circumstances, forget the passphrase.

The `pgx_set_master_key` function creates a file with the name `keystore.ks` in the keystore storage destination. It also creates a master encryption key from random bit strings, encrypts it with the specified passphrase, and stores it in `keystore.ks`. At this point, the keystore is open.

## 5.3 Opening the Keystore

---

To create encrypted tablespaces and access the encrypted data, you must first open the keystore. When you open the keystore, the master encryption key is loaded into the database server memory and becomes usable for encryption and decryption.

You need to open the keystore each time you start the instance. To open the keystore, the database superuser must execute the following SQL function.

```
SELECT pgx_open_keystore('passphrase');
```

The value "passphrase" is the passphrase specified during creation of the keystore.

Refer to "[B.2 Transparent Data Encryption Control Functions](#)" for information on the `pgx_open_keystore` function.

Note that, in the following cases, the passphrase must be entered when starting the instance, because the encrypted WAL must be decrypted for recovery. In this case, the above-mentioned `pgx_open_keystore` function cannot be executed.

- If performing crash recovery at the time of starting the instance
- If performing recovery using continuous archiving

For the above cases, select one of the following methods:

- Use an automatically opening keystore

Select this method if ease of operation has priority over enhanced security. When using an automatically opening keystore, the content of the keystore file is decrypted and a copy of the keystore file is generated. Although the content of this file is obfuscated, the level of security becomes slightly weaker.

Select this method if performing operations using WebAdmin.

- Enter a passphrase when starting an instance

Select this method if enhanced security has priority over ease of operation.

Specify the `--keystore-passphrase` in the `pg_ctl` command and start the instance. This displays the prompt that asks for the passphrase to be entered.

```
> pg_ctl --keystore-passphrase start
Enter the passphrase:
The server is currently initiating
>
```

After performing the above operation, use the `pg_ctl` command to stop the instance.

Then start the instance in Windows services. Refer to "[2.1.2 Using Commands](#)" for information on how to start an instance in Windows services.



When using an automatically opening keystore, you do not need to enter the passphrase and you can automatically open the keystore when the database server starts. Refer to "[5.6.3 Enabling Automatic Opening of the Keystore](#)" for details.

## 5.4 Encrypting a Tablespace

The keystore must be open before you can create an encrypted tablespace.

When creating a tablespace that will be encrypted, configure the encryption algorithm in the runtime parameters. For example, to create a tablespace with the name `secure_tablespace` using AES with a key length of 256 bits as the encryption algorithm, configure as shown below.

```
-- Specify the encryption algorithm for the tablespace to be created below
SET tablespace_encryption_algorithm = 'AES256';
CREATE TABLESPACE secure_tablespace LOCATION 'C:\My\Data\Dir';
-- Specify that the tablespace to be created below is not to be encrypted
SET tablespace_encryption_algorithm = 'none';
```

Or

```
CREATE TABLESPACE secure_tablespace LOCATION '\My\Data\Dir' tablespace_encryption_algorithm =
'AES256';
```

You can use AES with a key length of 128 bits or 256 bits as the encryption algorithm. It is recommended that you use 256-bit AES. Refer to "[Appendix A Parameters](#)" for information on how to specify the runtime parameters.

If user provides both GUC and command line options while creating the tablespace, the preference is given to the command line option.

The `pg_default` and `pg_global` tablespaces cannot be encrypted.

Create tables and indexes in the encrypted tablespace that you created. Relations created in the encrypted tablespace are automatically encrypted.



## Example

Example 1: Specifying an encrypted tablespace when creating it

```
CREATE TABLE my_table (...)  
    TABLESPACE secure_tablespace;
```

Example 2: Not explicitly specifying a tablespace when creating it and instead using the default tablespace

```
SET default_tablespace = 'secure_tablespace';  
CREATE TABLE my_table (...);
```

The process is the same for encrypting temporary tables and temporary indexes. In other words, either explicitly specify the `TABLESPACE` clause or list encrypted tablespaces in the `temp_tablespaces` parameter, and then execute `CREATE TEMPORARY TABLE` or `CREATE INDEX`.

If you specify an encrypted tablespace in the `TABLESPACE` clause of the `CREATE DATABASE` statement when creating a database, relations that you create in the database without explicitly specifying a tablespace will be encrypted. Furthermore, the system catalog is also encrypted, so the source code of user-defined functions is also protected.



## Note

An encrypted tablespace cannot be created from the window used for creating the pgAdmin tablespace, or from the query tool. To create an encrypted tablespace, click [PSQL Console] from the [Plugins] menu and create an encrypted tablespace in the psql console window.

## 5.5 Checking an Encrypted Tablespace

The `pgx_tablespaces` system view displays information about whether each tablespace has been encrypted, and about the encryption algorithm. Refer to "[C.1 pgx\\_tablespaces](#)" for information on strings.

You can discover which tablespaces have been encrypted by executing the following SQL statements.

However, when considering continued compatibility of applications, do not reference system catalogs (`pg_tablespace`) directly in SQL statements.

```
SELECT spcname, spcencalgo  
FROM pg_tablespace ts, pgx_tablespaces tsx  
WHERE ts.oid = tsx.spctablespace;
```



## Example

```
postgres=# SELECT spcname, spcencalgo FROM pg_tablespace ts, pgx_tablespaces tsx WHERE ts.oid =  
tsx.spctablespace;  
   spcname   | spcencalgo  
-----+-----  
pg_default  | none  
pg_global   | none  
secure_tablespace | AES256  
(3 rows)
```



See

Refer to "Notes on Application Compatibility" in the Application Development Guide for information on how to maintain application compatibility.

## 5.6 Managing the Keystore

This section describes how to manage the keystore and the master encryption key to guard against the threat of theft.

### 5.6.1 Changing the Master Encryption Key

Using the same encryption key for an extended period gives attackers an opportunity to decipher the encrypted data. It is recommended that you change the key at regular intervals, or whenever the key is exposed to risk.

Adhere to the industry's best practices for encryption algorithms and key management when considering how often the key should be changed. For example, the NIST in the United States has published "NIST Special Publication 800-57". The PCI DSS also refers to this publication. This publication recommends changing the master encryption key once a year.

To change the master encryption key, execute the `pgx_set_master_key` function, which is the same function used for configuring the key. Refer to "[5.2 Setting the Master Encryption Key](#)" for details.

After changing the master encryption key, you must immediately back up the keystore.

### 5.6.2 Changing the Keystore Passphrase

In security policies for organizations, it is usually a requirement that the passphrase be changed whenever a security administrator who knows the passphrase is removed from duties due to transfer or retirement. It is also recommended that the passphrase be changed if it is ever exposed to risks due to deception such as social engineering.

To change the keystore passphrase, execute the following SQL function as a superuser.

```
SELECT pgx_set_keystore_passphrase('oldPassphrase', 'newPassphrase');
```

After changing the passphrase, you must immediately back up the keystore.

Refer to "[B.2 Transparent Data Encryption Control Functions](#)" for information on the `pgx_set_keystore_passphrase` function.

### 5.6.3 Enabling Automatic Opening of the Keystore

When using an automatically opening keystore, you do not need to enter the passphrase and you can automatically open the keystore when the instance starts. Execute the `pgx_keystore` command to enable automatic opening of the keystore.

```
> pgx_keystore --enable-auto-open C:\key\store\location\keystore.ks
Enter the passphrase:
Automatic opening of the keystore is now enabled
>
```



See

Refer to "`pgx_keystore`" in the Reference for information on `pgx_keystore` command.

When automatic opening is enabled, an automatically opening keystore is created in the same directory as the original keystore. The file name of the automatically opening keystore is `keystore.aks`. The file `keystore.aks` is an obfuscated copy of the decrypted content of the `keystore.ks` file. As long as this file exists, there is no need to enter the passphrase to open the keystore when starting the instance.

Do not delete the original keystore file, `keystore.ks`. It is required for changing the master encryption key and the passphrase. When you change the master encryption key and the passphrase, `keystore.aks` is recreated from the original keystore file, `keystore.ks`.

Protect `keystore.ks`, `keystore.aks`, and the directory that stores the keystore so that only the user who starts the instance can access them.

Configure the permission of the files so that only the user who starts the instance can access the SQL functions and commands that create these files. Accordingly, manually configure the same permission mode if the files are restored.

Set the permission mode in [Properties] in Windows(R) Explorer.



Refer to [Help and Support] in Windows(R) for information on [Properties].

An automatically opening keystore will only open on the computer where it was created.

To disable automatic opening of the keystore, delete keystore.aks.



- To use WebAdmin for recovery, you must enable automatic opening of the keystore.
- Refer to "[5.7 Backing Up and Restoring/Recovering the Database](#)" after enabling or reconfiguring encryption to back up the database.
- Specify a different directory from those below as the keystore storage destination:
  - Data storage destination
  - Tablespace storage destination
  - Transaction log storage destination
  - Backup data storage destination

## 5.6.4 Backing Up and Recovering the Keystore

Back up the keystore at the following times in case it is corrupted or lost. Note that you must store the database and the keystore on separate data storage media. Storing both on the same data storage medium risks the danger of the encrypted data being deciphered if the medium is stolen. A passphrase is not required to open an automatically opening keystore, so store this type of keystore in a safe location.

- When the master encryption key is first configured
- When the master encryption key is changed
- When the database is backed up
- When the keystore passphrase is changed



Do not overwrite an old keystore when backing up a keystore. This is because during database recovery, you must restore the keystore to its state at the time of database backup. When the backup data of the database is no longer required, delete the corresponding keystore.



- Back up the database and the keystore on May 1, 2015.

```
> pgx_dmpall -D D:\database\inst1  
> copy C:\key\store\location\keystore.ks C:\keybackup\keystore_20150501.ks
```

Specify the following in the pgx\_dmpall command:

- Specify the data storage destination in the -D option. If the -D option is omitted, the value of the PGDATA environment variable is used by default.

- Change the master encryption key, and back up the keystore on May 5, 2015.

```
> psql -c "SELECT pgx_set_master_key('passphrase') " postgres
> copy C:\key\store\location\keystore.ks C:\keybackup\keystore_20150505.ks
```

Specify the following in the psql command:

- Specify the SQL function that sets the master encryption key in the -c option.
- Specify the name of the database to be connected to as the argument.

.....

If the keystore is corrupted or lost, restore the keystore containing the latest master encryption key. If there is no keystore containing the latest master encryption key, restore the keystore to its state at the time of database backup, and recover the database from the database backup. This action recovers the keystore to its latest state.

## Example

.....

- Restore the keystore containing the latest master encryption key as of May 5, 2015.

```
> copy C:\keybackup\keystore_20150505.ks C:\key\store\location\keystore.ks
```

- If there is no backup of the keystore containing the latest master encryption key, recover the keystore by restoring the keystore that was backed up along with the database on 1 May 2015.

```
> copy C:\keybackup\keystore_20150501.ks C:\key\store\location\keystore.ks
> pgx_rcvall -B E:\backup\inst1 -D D:\database\inst1 --keystore-passphrase
```

Specify the following in the pgx\_rcvall command:

- Specify the data storage directory in the -D option. If the -D option is omitted, the value of the PGDATA environment variable is used by default.
  - Specify the backup data storage directory in the -B option.
  - The --keystore-passphrase option prompts you to enter the passphrase to open the keystore.
- .....

If you have restored the keystore, repeat the process of enabling automatic opening of the keystore. This ensures that the contents of the automatically opening keystore (keystore.aks) are identical to the contents of the restored keystore.

It is recommended that you do not back up the automatically opening keystore file, keystore.aks. If the database backup medium and the backup medium storing the automatically opening keystore are both stolen, the attacker will be able to read the data even without knowing the passphrase.

If the automatically opening keystore is corrupted or lost, you must again enable automatic opening. The keystore.aks file will be recreated from keystore.ks at this time.

## See

.....

Refer to "pgx\_rcvall" and "pgx\_dmpall" in the Reference for information on the pgx\_rcvall and pgx\_dmpall commands.

Refer to "psql" under "Reference" in the PostgreSQL Documentation for information on the psql command.

Refer to "[B.2 Transparent Data Encryption Control Functions](#)" for information on the pgx\_set\_master\_key function.

Refer to "[5.6.3 Enabling Automatic Opening of the Keystore](#)" for information on how to enable automatic opening of the keystore.

.....

## 5.7 Backing Up and Restoring/Recovering the Database

---

FUJITSU Enterprise Postgres enables you to use the five backup and recovery methods described below. Regardless of the method you use, you must back up the keystore at the same time.

Note that you must store the database and the keystore on separate data storage media. Storing both on the same data storage medium risks the danger of the encrypted data being deciphered if the medium is stolen.

## Backup and recovery using WebAdmin

### - Backup

WebAdmin backs up encrypted data.

Back up the key store after backing up the database.

### - Recovery

Restore the keystore to its state at the time of database backup. Refer to "[5.6.4 Backing Up and Recovering the Keystore](#)" for details.

Enable automatic opening of the keystore in accordance with the procedure described in "[5.6.3 Enabling Automatic Opening of the Keystore](#)". Then, use WebAdmin to recover the database.

## Backup and recovery using the `pgx_dmpall` and `pgx_rcvall` commands

### - Backup

The `pgx_dmpall` command backs up the encrypted data.

Back up the key store after backing up the database.

### - Recovery

Restore the keystore to its state at the time of the database backup.

Configure automatic opening of the key store as necessary.

If automatic opening of the keystore is not enabled, execute the `pgx_rcvall` command with the `--keystore-passphrase` option specified. This will display the prompt for the passphrase to be entered.



## Example

### - Back up the database and the keystore on May 1, 2015.

```
> pgx_dmpall -D D:\database\inst1
> copy C:\key\store\location\keystore.ks C:\keybackup\keystore_20150501.ks
```

Specify the following in the `pgx_dmpall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

### - Recover the database and the keystore from the backup taken on May 1, 2015.

```
> copy C:\keybackup\keystore_20150501.ks C:\key\store\location\keystore.ks
> pgx_keystore --enable-auto-open C:\key\store\location\keystore.ks (Execute only when enabling
automatic opening)
> pgx_rcvall -B E:\backup\inst1 -D D:\database\inst1 --keystore-passphrase
```

Specify the following in the `pgx_rcvall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the backup data storage directory in the `-B` option.
- The `--keystore-passphrase` option prompts you to enter the passphrase to open the keystore.

## Dump and restore using SQL

### - Backup

The files output by the `pg_dump` and `pg_dumpall` commands are not encrypted. You should, therefore, encrypt the files using OpenSSL commands or other means before saving them, as described in "[5.8 Importing and Exporting the Database](#)" below.

Back up the key store after backing up the database.

### - Restore

If the backup data has been encrypted using, for example Open SSL commands, decrypt that data.

The data generated by the `pg_dumpall` command includes a specification to encrypt tablespaces by For this reason, the `pg_restore` command encrypts tablespaces during restoration.

## File system level backup and restore

### - Backup

Stop the instance and backup the data directory and the tablespace directory using the file copy command of the operating system. The files of encrypted tablespaces are backed up in the encrypted state.

Back up the key store after performing the backup.

### - Restore

Restore the keystore to its state at the time of the database backup.

Stop the instance and restore the data directory and the tablespace directory using the file copy command of the operating system.

## Continuous archiving and point-in-time recovery

### - Backup

The `pg_basebackup` command backs up the encrypted data as is.

Back up the key store after performing the backup.

### - Recovery

Restore the keystore to its state at the time of the database backup.

Configure automatic opening of the key store as necessary.

If automatic opening of the keystore is not enabled, refer to "[5.3 Opening the Keystore](#)" for information on starting an instance by specifying `pg_ctl --keystore-passphrase start`.



## See

- Refer to "Reference" in the PostgreSQL Documentation for information on the following commands:

- `psql`
- `pg_dump`
- `pg_restore`
- `pg_basebackup`

- Refer to the Reference for information on the following commands:

- `pgx_rcvall`
- `pgx_dmpall`
- `pg_dumpall`

If you have restored the keystore, repeat the process of enabling automatic opening of the keystore This ensures that the contents of the automatically opening keystore (keystore.aks) are identical to the contents of the restored keystore.

Refer to "5.6.3 Enabling Automatic Opening of the Keystore" for information on how to enable automatic opening of the keystore.

## 5.8 Importing and Exporting the Database

---

The files output by the COPY TO command are not encrypted. Therefore, when transferring files to other systems, you should encrypt files using OpenSSL commands, or use file transfer software that performs encrypted communication for Windows, to encrypt the data being transferred.

Use a safe method to delete obsolete plain text files.

You can use the following methods to safely delete files:

- fsutil command



### Example

---

```
# Export the contents of the table my_table to a CSV file.
> psql -c "COPY my_table TO 'C:\WINDOWS\Temp\my_table.csv' (FORMAT CSV)" postgres
# Encrypt the exported file.
> C:\OpenSSL-Win32\bin\openssl enc -e -aes256 -in C:\WINDOWS\Temp\my_table.csv -out my_table.csv.enc
(The user is prompted to enter the passphrase to be used for encryption)

# Check the size of plain text files, and delete them after zero padding
> dir C:\WINDOWS\Temp\my_table.csv
> fsutil file setzerodata offset=0 length=7 C:\WINDOWS\Temp\my_table.csv
> del C:\WINDOWS\Temp\my_table.csv

# Decrypt the encrypted files on other systems.
> C:\OpenSSL-Win32\bin\openssl enc -d -aes256 -in my_table.csv.enc -out my_table.csv
(The user is prompted to enter the passphrase to be used for decryption)
```

---

If you use COPY FROM to import data to tables and indexes in an encrypted tablespace, the imported data is automatically encrypted before being stored.

## 5.9 Encrypting Existing Data

---

You cannot encrypt existing unencrypted tablespaces. In addition, you cannot change encrypted tablespaces so that they do not encrypt.

As an alternative, transfer the tables and indexes to other tablespaces. You can use the following SQL commands for this.

```
ALTER TABLE table_name SET TABLESPACE new_tablespace;
ALTER INDEX index_name SET TABLESPACE new_tablespace;
ALTER DATABASE database_name SET TABLESPACE new_tablespace;
```



### See

---

Refer to "SQL Commands" under "Reference" in the PostgreSQL Documentation for information on SQL commands.

---

## 5.10 Operations in Cluster Systems

---

This section describes how to use transparent data encryption on cluster systems such as high-availability systems, streaming replication, and database multiplexing.

### 5.10.1 HA Clusters that do not Use Database Multiplexing

---

Take the following points into account when using transparent data encryption in an HA cluster environment that does not use database multiplexing.

## Placement and automatic opening of the keystore file

There are two alternatives for placing the keystore file:

- Sharing the keystore file
- Placing a copy of the keystore file

### Sharing the keystore file

This involves using the same keystore file on the primary server and the standby server.

As the standby server is not active while the primary server is running, this file would not be accessed simultaneously, and therefore, it can be shared.

To manage the keystore file in a more secure manner, place it on the key management server or the key management storage isolated in a secure location.

Enable the automatic opening of the keystore on both the primary and standby servers.

### Placing a copy of the keystore file

This involves placing a copy of the primary server keystore file on the standby server.

You can do this if you cannot prepare a shared server or disk device that can be accessed from both the primary and standby servers.

However, if you change the master encryption key and the passphrase on the primary server, you must copy the keystore file to the standby server again.

To manage the keystore file in a more secure manner, prepare the key management server or the key management storage isolated in a secure location for both the primary and standby servers, and place the keystore files there.

Enable the automatic opening of the keystore on both the primary and standby servers. Note that copying the automatically opening keystore file (keystore.aks) to the standby server does not enable the automatic opening of the keystore.



See

.....  
Refer to the Cluster Operation Guide for information on building a cluster system environment using failover operation.  
.....

## 5.10.2 Database Multiplexing Mode

---

Note the following when using transparent data encryption in environments that use streaming replication, or database multiplexing with streaming replication.

### Placing the keystore file

Place a copy of the primary server keystore file on the standby server.

This is required as the keystore file cannot be shared, and both servers may need to access it simultaneously.



Point

.....  
To manage the keystore file in a more secure manner, place it on the key management server or the key management storage isolated in a secure location. A keystore used by both the primary and standby servers can be managed on the same key management server or key management storage.

However, create different directories for the keystores to be used by the primary server and the standby server. Then copy the keystore for the primary server to the directory used on the standby server.  
.....

### Automatically opening the keystore

You must enable automatic opening of the keystore.

To do this, enable automatic opening of the keystore in all servers that make up database multiplexing. The settings for automatic opening of the keystore include information unique to each server, so simply copying the file does not enable it.

## Changing the passphrase

Changes to the passphrase are reflected in all servers that make up database multiplexing, so no special operation is required.

## Building and starting a standby server

Before using the `pg_basebackup` command or `pgx_rcvall` command to build a standby server, copy the keystore file from the primary server to the standby server. When using an automatically opening keystore, use the copied keystore file to enable automatic opening on the standby server.

Open the keystore each time you start the standby server. This step is necessary for decrypting and restoring encrypted WAL received from the primary server. To open the keystore, specify the `--keystore-passphrase` option in the `pg_ctl` command or `pgx_rcvall` command and enter the passphrase, or use an automatically opening keystore.

If specifying `--keystore-passphrase` in the `pg_ctl` command, refer to "5.3 Opening the Keystore" for details.

## Changing the master encryption key and the passphrase

Change the master encryption key and the passphrase on the primary server. You need not copy the keystore from the primary server to the standby server. You need not even restart the standby server or reopen the keystore. Changes to the master encryption key and the passphrase are reflected in the keystore on the standby server.



See

Refer to "pgx\_rcvall" in the Reference for information on `pgx_rcvall` command.

Refer to "pg\_basebackup" under "Reference" in the PostgreSQL Documentation for information on `pg_basebackup` command.

Refer to "High Availability, Load Balancing, and Replication" under "Server Administration" in the PostgreSQL Documentation for information on how to set up streaming replication.

## 5.11 Security-Related Notes

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- Decrypted data is cached in the database server memory (shared buffer). As a result, unencrypted data is stored in a minidump, which is the process memory dump. You should, therefore, safely delete the memory dump. You can safely delete files by using the following command:
  - `fsutil` command
- Unencrypted data may be written from the database server memory to the operating system's swap area. To prevent leakage of information from the swap area, consider either disabling the use of swap area or encrypting the swap area using a full-disk encryption product.
- The content of the server log file is not encrypted. Therefore, in some cases the value of a constant specified in a SQL statement is output to the server log file. To prevent this, consider setting a parameter such as `log_min_error_statement`.
- When executing an SQL function that opens the keystore and modifies the master encryption key, ensure that the SQL statement containing the passphrase is not output to the server log file. To prevent this, consider setting a parameter such as `log_min_error_statement`. If you are executing this type of SQL function on a different computer from the database server, encrypt the communication between the client and the database server with SSL.

## 5.12 Tips for Installing Built Applications

---

With transparent data encryption, you can easily encrypt all the data in an application without modifying the application. Database administrators install built applications in the following manner. However, this procedure stores data to the default tablespace, so take necessary action if processing differs from the original design.

1. (Normal procedure) Create an owner and a database for the built application.

```
CREATE USER crm_admin ...;
CREATE DATABASE crm_db ...;
```

2. (Procedure for encryption) Create an encrypted tablespace to store the data for the built application.

```
SET tablespace_encryption_algorithm = 'AES256';  
CREATE TABLESPACE crm_tablespace LOCATION 'C:\crm\data';
```

3. (Procedure for encryption) Configure an encrypted tablespace as the default tablespace for the owner of the built application.

```
ALTER USER crm_admin SET default_tablespace = 'crm_tablespace';  
ALTER USER crm_admin SET temp_tablespaces = 'crm_tablespace';
```

4. (Normal procedure) Install the built application. The application installer prompts you to enter the host name and the port number of the database server, the user name, and the database name. The installer uses the entered information to connect to the database server and execute the SQL script. For applications that do not have an installer, the database administrator must manually execute the SQL script.

Normally, the application's SQL script includes logic definition SQL statements, such as CREATE TABLE, CREATE INDEX, and GRANT or REVOKE, converted from the entity-relationship diagram. It does not include SQL statements that create databases, users, and tablespaces. Configuring the default tablespace of the users who will execute the SQL script deploys the objects generated by the SQL script to the tablespace.

# Chapter 6 Data Masking

Data masking is a feature that can change the returned data for queries generated by applications, so that it can be referenced by users. For example, for a query of employee data, digits except the last four digits of an eight-digit employee number can be changed to "\*" so that it can be used for reference.

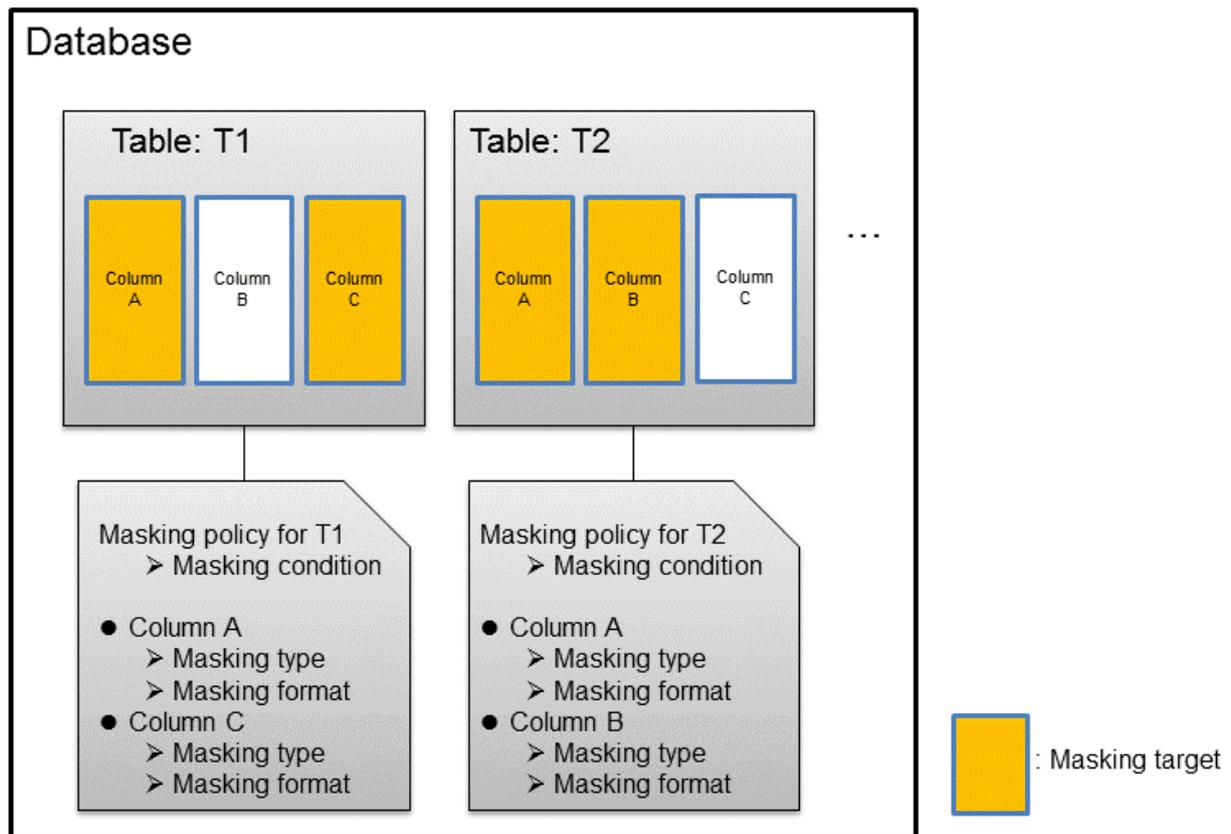
## Note

When using this feature, it is recommended that the changed data be transferred to another medium for users to reference. This is because, if users directly access the database to extract the masked data, there is a possibility that they can deduce the original data by analyzing the masking policy or query result to the masking target column.

## 6.1 Masking Policy

Masking policy is a method of changing data under specific conditions when it is returned for a query from an application. One masking policy can be created per table. You can configure masking target, masking type, masking condition and masking format in a masking policy.

Figure 6.1 Masking policy



## Note

When a masking policy is defined, the search performance for the corresponding table may deteriorate.

## 6.1.1 Masking Target

---

Masking target refers to a column to which a masking policy will be applied. When referring to a masking target or a function that includes a masking target, the execution result will be changed and obtained.

The following commands can change the execution result:

- SELECT
- COPY
- pg\_dump
- pg\_dumpall



- If a masking target other than SELECT target columns is specified, processing will be performed using data before change.
- If a masking target is specified in a function where the data type will be converted, an error will occur.

## 6.1.2 Masking Type

---

Masking type is a method to change column data that is returned from queries. Specify the masking type in the `function_type` parameter. The following masking types can be specified and selected depending on the masking target data type.

### Full masking

All the data in the specified column is changed. The changed value returned to the application that made the query varies depending on the column data type.

For example, 0 is used for a numeric type column and a space is used for a character type column.

### Partial masking

The data in the specified column is partially changed.

For example, digits except the last four digits of an employee number can be changed to "\*".

### Regular expression masking

The data in the specified column is changed via a search that uses a regular expression.

For example, for strings such as email address that can have variable length, "\*" can be used to change characters preceding "@" by using a regular expression. Regular expression masking can only be used for character type data.



- If multiple valid masking targets are specified for a function, the masking type for the left-most masking target will be applied. For example, if "SELECT GREATEST(c1, c2) FROM t1" is executed for numeric type masking target c1 and c2, the masking type for c1 will be applied.
- When masking the data that includes multibyte characters, do not specify partial masking for masking type. The result may not be as expected.

## 6.1.3 Masking Condition

---

Masking condition refers to the conditions configured to perform masking. Specify the masking condition in the `expression` parameter. Changed or actual data can be displayed for different users by defining masking condition. An expression that returns a boolean type result needs to be specified in masking condition and masking is performed only when TRUE is returned. Refer to "Value Expressions" in the PostgreSQL Documentation for information on the expressions that can be specified. Note that expressions that include a column cannot be specified.

For example, when masking data only for "postgres" users, specify `'current_user = "postgres"'` in the masking condition.

## Information

Specify '1=1' so the masking condition is always evaluated to be TRUE and masking is performed all the time.

### 6.1.4 Masking Format

Masking format is a combination of change method and displayed characters when the masking condition is met. Masking format varies depending on the masking type. The following describes the masking format.

#### Full masking

With full masking, all characters are changed to values as determined by the database. Changed characters can be referenced in the `pgx_confidential_values` table. Also, replacement characters can be changed using the `pgx_update_confidential_values` system management function.

#### See

Refer to "6.3 Data Types for Masking" for information on the data types for which data masking can be performed.

#### Partial masking

With partial masking, data is changed according to the content in the `function_parameters` parameter. The method of specifying `function_parameters` varies depending on the data type.

| Category       | Method of specifying <code>function_parameters</code>  |
|----------------|--|
| Numeric type   | <p><i>'replacementCharacter, startPosition, endPosition'</i></p> <ul style="list-style-type: none"> <li>- <i>replacementCharacter</i>: Specify the number to display. Specify a value from 0 to 9.</li> <li>- <i>startPosition</i>: Specify the start position of masking. Specify a positive integer.</li> <li>- <i>endPosition</i>: Specify the end position of masking. Specify a positive integer that is greater than <i>startPosition</i>.</li> </ul> <p> <b>Example</b></p> <p>Specify as below to change the values from the 1st to 5th digits to 9.</p> <pre>function_parameters := '9, 1, 5'</pre> <p>In this example, if the original data is "123456789", it will be changed to "999996789".</p>  |
| Character type | <p><i>'inputFormat, outputFormat, replacementCharacter, startPosition, endPosition'</i></p> <ul style="list-style-type: none"> <li>- <i>inputFormat</i>: Specify the current format of the data. Specify "V" for characters that will potentially be masked, and specify "F" for values such as spaces or hyphens that will not be masked.</li> <li>- <i>outputFormat</i>: Define the method to format the displayed data. Specify "V" for characters that will potentially be masked. Any character to be output can be specified for each character "F" in <i>inputFormat</i>. If you want to output a single quotation mark, specify two of them consecutively.</li> <li>- <i>replacementCharacter</i>: Specify any single character. If you want to output a single quotation mark, specify two of them consecutively.</li> <li>- <i>startPosition</i>: Specify the position of "V" as the start position of masking. For example, to specify the position of the 4th "V" from the left, specify 4. Specify a positive integer.</li> <li>- <i>endPosition</i>: Specify the position of "V" as an end position of masking. When working out the end position, do not include positions of "F". For example, to specify the position of the 11th "V" from the left, specify 11. Specify a positive integer that is greater than <i>startPosition</i>.</li> </ul> |

| Category            | Method of specifying function_parameters  |
|---------------------|---|
|                     |  <b>Example</b><br>.....<br>Specify as below to mask a telephone number other than the first three digits using *.<br>function_parameters := 'VVVFVVVVFVVVV, VVV-VVVV-VVVV, *, 4, 11'<br>In this example, if the original data is "012-3156-7890", it will be changed to "012-****-*****".<br>.....  |
| Date/timestamp type | 'MDYHMS'<br><ul style="list-style-type: none"> <li>- M: Masks month. To mask month, enter the month from 1 to 12 after a lowercase letter m. Specify an uppercase letter M to not mask month.</li> <li>- D: Masks date. To mask date, enter the date from 1 to 31 after a lowercase letter d. If a value bigger than the last day of the month is entered, the last day of the month will be displayed. Specify an uppercase letter D to not mask date.</li> <li>- Y: Masks year. To mask year, enter the year from 1 to 9999 after a lowercase letter y. Specify an uppercase letter Y to not mask year.</li> <li>- H: Masks hour. To mask hour, enter the hour from 0 to 23 after a lowercase letter h. Specify an uppercase letter H to not mask hour.</li> <li>- M: Masks minute. To mask minute, enter the minute from 0 to 59 after a lowercase letter m. Specify an uppercase letter M to not mask minute.</li> <li>- S: Masks second. To mask second, enter the second from 0 to 59 after a lowercase letter s. Specify an uppercase letter S to not mask second.</li> </ul><br> <b>Example</b><br>.....<br>Specify as below to mask hour, minute, and second and display 00:00:00.<br>function_parameters := 'MDYh0m0s0'<br>In this example, if the original data is "2010-10-10 10:10:10", it will be changed to "2010-10-10 00:00:00".<br>..... |

 **See**

- Refer to "[B.3.2 pgx\\_create\\_confidential\\_policy](#)" for information on function\_parameters.
- Refer to "[6.3 Data Types for Masking](#)" for information on the data types for which masking can be performed.

### Regular expression masking

With regular expression masking, data is changed according to the content of the `regexp_pattern`, `regexp_replacement` and `regexp_flags` parameters. For `regexp_pattern`, specify the search pattern using a regular expression. For `regexp_replacement`, specify the replacement character to use when data matches the search pattern. For `regexp_flags`, specify the regular expression flags.

 **Example**

Specify as below to change all three characters starting from b to X.

```
regexp_pattern := 'b..'
```

```
regexp_replacement:= 'X'
```

```
regexp_flags := 'g'
```

In this example, if the original data is "foobarbaz", it will be changed to "fooXX".

## See

- Refer to "POSIX Regular Expressions" in the PostgreSQL Documentation and check pattern, replacement, and flags for information on the values that can be specified for `regexp_pattern`, `regexp_replacement`, and `regexp_flags`.
- Refer to "6.3 Data Types for Masking" for information on the data types for which masking can be performed.

## Note

- When column data type is `character(n)` or `char(n)` and if the string length after change exceeds *n*, the extra characters will be truncated and only characters up to the *n*th character will be displayed.
- When column data type is `character varying(n)` or `varchar(n)` and if the string length after change exceeds the length before the change, the extra characters will be truncated and only characters up to the length before change will be displayed.

## 6.2 Usage Method

---

### Preparation

The following preparation is required to use this feature.

1. Set the `postgresql.conf` file parameters.  
Prepend `"pgx_datamasking"` to the `shared_preload_libraries` parameter.
2. Restart the instance.
3. Run `CREATE EXTENSION` for the database that will use this feature.

The target database is described as "postgres" here.

Use the `psql` command to connect to the "postgres" database.

### Example

```
postgres=# CREATE EXTENSION pgx_datamasking;  
CREATE EXTENSION
```

### Note

You must always prepend `"pgx_datamasking"` to the `"shared_preload_libraries"` parameter.

### Information

- Specify `"false"` for `pgx_datamasking.enable` to not use this feature. Data will not be masked even if a masking policy is configured. This feature becomes available again once `"true"` is specified for `pgx_datamasking.enable`. This setting can be made by specifying a `SET` statement or specifying a parameter in the `postgresql.conf` file.

Example

```
postgres=# SET pgx_datamasking.enable=false;
```

- Hereafter, also perform this preparatory task for the "template1" database, so that this feature can be used by default when creating a new database.

## Usage

To perform masking, a masking policy needs to be configured. The masking policy can be created, changed, confirmed, enabled, disabled or deleted during operation.

The procedures to perform these tasks are explained below with examples.

1. Creating a masking policy
2. Changing a masking policy
3. Confirming a masking policy
4. Enabling and disabling a masking policy
5. Deleting a masking policy

### Note

Only database superusers can configure masking policies.

## 6.2.1 Creating a Masking Policy

An example of the operation on the server is shown below.

1. Create a masking policy  
Execute the `pgx_create_confidential_policy` system management function to create a masking policy.  
The following values are configured in this example.
  - Masking target: Numeric type `c1`
  - Masking type: FULL
  - Masking condition: `'l=1'`

```
postgres=# select pgx_create_confidential_policy(table_name := 't1', policy_name := 'p1',
expression := 'l=1', column_name := 'c1', function_type := 'FULL');
 pgx_create_confidential_policy
-----
 t
(1 row)
```

2. Confirm the displayed data  
Confirm that the masking target data (column `c1`) has been correctly changed.

```
postgres=# select * from t1;
 c1 |      c2
-----+-----
  0 | 012-3456-7890
  0 | 012-3456-7891
  0 | 012-3456-7892
(3 row)
```

### See

- Refer to "[B.3.2 pgx\\_create\\_confidential\\_policy](#)" for information on the `pgx_create_confidential_policy` system management function.

### Note

- Only one masking policy can be created per table.



2. Confirm information about the masking policy content

Refer to `pgx_confidential_policies` to confirm the masking policy content.

```
postgres=# select * from pgx_confidential_policies;
 schema_name | table_name | policy_name | expression | enable | policy_description
-----+-----+-----+-----+-----+-----
 public      | t1         | p1          | 1=1        | t      |
(1 row)
```



See

- Refer to "D.1 [pgx\\_confidential\\_columns](#)" for information on the `pgx_confidential_columns` table.
- Refer to "D.2 [pgx\\_confidential\\_policies](#)" for information on the `pgx_confidential_policies` table.

## 6.2.4 Enabling and Disabling a Masking Policy

An example of the operation on the server is shown below.

1. Disable a masking policy

Execute the `pgx_enable_confidential_policy` system management function to disable a masking policy.

```
postgres=# select pgx_enable_confidential_policy(table_name := 't1', policy_name := 'p1',
enable := 'f');
 pgx_enable_confidential_policy
-----
 t
(1 row)
```

2. Confirm the displayed data

Confirm that the original data is displayed by disabling the masking policy.

```
postgres=# select * from t1;
 c1 |      c2
----+-----
  1 | 012-3456-7890
  2 | 012-3456-7891
  3 | 012-3456-7892
(3 row)
```

3. Enable a masking policy

Execute the `pgx_enable_confidential_policy` system management function to enable a masking policy.

```
postgres=# select pgx_enable_confidential_policy(table_name := 't1', policy_name := 'p1',
enable := 't');
 pgx_enable_confidential_policy
-----
 t
(1 row)
```

4. Confirm the displayed data

Confirm that the masking target data has been correctly changed.

```
postgres=# select * from t1;
 c1 |      c2
----+-----
  0 | 012-****-****
  0 | 012-****-****
  0 | 012-****-****
(3 row)
```



- Refer to "B.3.4 [pgx\\_enable\\_confidential\\_policy](#)" for information on the `pgx_enable_confidential_policy` system management function.

## 6.2.5 Deleting a Masking Policy

An example of the operation on the server is shown below.

1. Delete a masking policy

Execute the `pgx_drop_confidential_policy` system management function to delete a masking policy.

```
postgres=# select pgx_drop_confidential_policy(table_name := 't1', policy_name := 'p1');
pgx_drop_confidential_policy
-----
t
(1 row)
```

2. Confirm the displayed data

Confirm that the original data is displayed by deleting the masking policy.

```
postgres=# select * from t1;
 c1 |      c2
-----+-----
  1 | 012-3456-7890
  2 | 012-3456-7891
  3 | 012-3456-7892
(3 row)
```



- Refer to "B.3.3 [pgx\\_drop\\_confidential\\_policy](#)" for information on the `gx_drop_confidential_policy` function.

## 6.3 Data Types for Masking

The data types for which data masking can be performed are shown below.

| Category       | Data type                         | Masking type |                 |                            |
|----------------|-----------------------------------|--------------|-----------------|----------------------------|
|                |                                   | Full masking | Partial masking | Regular expression masking |
| Numeric type   | <code>smallint</code>             | Y            | Y               | N                          |
|                | <code>integer</code>              | Y            | Y               | N                          |
|                | <code>bigint</code>               | Y            | Y               | N                          |
|                | <code>decimal</code>              | Y            | Y               | N                          |
|                | <code>numeric</code>              | Y            | Y               | N                          |
|                | <code>float</code>                | Y            | Y               | N                          |
|                | <code>real</code>                 | Y            | Y               | N                          |
|                | <code>double precision</code>     | Y            | Y               | N                          |
| Character type | <code>character varying(n)</code> | Y            | Y               | Y                          |
|                | <code>varchar(n)</code>           | Y            | Y               | Y                          |

| Category            | Data type             | Masking type |                 |                            |
|---------------------|-----------------------|--------------|-----------------|----------------------------|
|                     |                       | Full masking | Partial masking | Regular expression masking |
|                     | character( <i>n</i> ) | Y            | Y               | Y                          |
|                     | char( <i>n</i> )      | Y            | Y               | Y                          |
| Date/timestamp type | date                  | Y            | Y               | N                          |
|                     | timestamp             | Y            | Y               | N                          |

# Chapter 7 Periodic Operations

This chapter describes the operations that must be performed periodically when running daily database jobs.

## 7.1 Configuring and Monitoring the Log

FUJITSU Enterprise Postgres enables you to output database errors and warnings to a log file.

This information is useful for identifying if errors have occurred and the causes of those errors.

By default, this information is output to the event log. It is recommended that you configure FUJITSU Enterprise Postgres to collect logs from its log files (for example, `log_destination`) before operating FUJITSU Enterprise Postgres.

Periodically monitor the log files to check if any errors have occurred.



- Refer to "Error Reporting and Logging" under "Server Administration" in the PostgreSQL Documentation for information on logs.
- Refer to "Configuring Parameters" in the Installation and Setup Guide for Server for information on log settings when operating with WebAdmin.

## 7.2 Monitoring Disk Usage and Securing Free Space

When a database is used for an extended period, free space on the disk is continuously consumed and in some cases the disk space runs out. When this happens, database jobs may stop and no longer run.

You should, therefore, periodically monitor the usage of disk space, and delete obsolete files located in the disk.

Monitor the disk usage of the disk where the following directories are located:

- Data storage destination directory
- Transaction log storage destination (if the transaction log is stored in a different directory from the data storage destination directory)
- Backup data storage destination directory
- Tablespace storage destination directory

### 7.2.1 Monitoring Disk Usage

To check the disk usage, use the following operating system commands:

- `fsutil volume diskfree` command

You can even use SQL statements to check tables and indexes individually.

Refer to "Determining Disk Usage" under "Server Administration" in the PostgreSQL Documentation for information on this method.



If you are using WebAdmin for operations, a warning is displayed when disk usage reaches 80%

### 7.2.2 Securing Free Disk Space

Secure free disk space by using the following operating system commands to delete unnecessary files, other than the database, from the same disk unit.

- `del` command

You can also secure disk space by performing the following tasks periodically:

- To secure space on the data storage destination disk:

Execute the REINDEX statement. Refer to "7.5 Reorganizing Indexes" for details.

- To secure space on the backup data storage destination disk:

Execute backup using WebAdmin or the pgx\_dmpall command.

## 7.3 Automatically Closing Connections

If an application stops responding and abnormally terminates for any reason, the connection from the application may remain active on the database server. If this situation continues for an extended period, other applications attempting to connect to the database server may encounter an error, or an error indicating that the tables are unavailable may occur.

It is, therefore, recommended that idle connections be closed automatically at regular intervals.

Set the following parameters in the postgresql.conf file to indicate the time permitted to elapse before a connection is closed.

| Parameter name          | Setting  | Description  |
|-------------------------|--|--|
| tcp_keepalives_idle     | Time until keepalive is sent (seconds)<br>If 0, the default value of the system is used. | Sends keepalive to an idle connection at the specified interval in seconds<br>It is recommended to specify 30 seconds. |
| tcp_keepalives_interval | keepalive send interval (seconds)<br>If 0, the default value of the system is used.      | Sends keepalive at the specified interval<br>It is recommended to specify 10 seconds.                                  |



### Note

The maximum number of connections allowed is 125, unless the desktop heap setting is changed.



### See

Refer to "Connection Settings" under "Server Administration" in the PostgreSQL Documentation for information on the parameters.

## 7.4 Monitoring the Connection State of an Application

FUJITSU Enterprise Postgres does not immediately delete the updated or deleted data. If the VACUUM determines there are no transactions that reference the database, FUJITSU Enterprise Postgres collects obsolete data.

However, obsolete data is not collected if there are connections that have remained active for an extended period or connections occupying resources. In this case the database may expand, causing performance degradation.



### See

Refer to "Routine Vacuuming" under "Server Administration" in the PostgreSQL Documentation for information on the VACUUM command.

In such cases, you can minimize performance degradation of the database by monitoring problematic connections.

The following two methods are supported for monitoring connections that have been in the waiting status for an extended period:

- [7.4.1 Using the View \(pg\\_stat\\_activity\)](#)
- [7.4.2 Using pgAdmin](#)

## 7.4.1 Using the View (pg\_stat\_activity)

---

Use the view (pg\_stat\_activity) to identify and monitor connections where the client has been in the waiting status for an extended period.



### Example

---

The example below shows connections where the client has been in the waiting status for at least 60 minutes.

However, when considering continued compatibility of applications, do not reference system catalogs directly in the following SQL statements.

```
postgres=# select * from pg_stat_activity where state='idle in transaction' and current_timestamp >
cast(query_start + interval '60 minutes' as timestamp);
-[ RECORD 1 ]-----+-----
datid          | 13003
datname        | db01
pid            | 4638
usesysid      | 10
username      | fsep
application_name | ap101
client_addr    | 192.33.44.15
client_hostname |
client_port    | 27500
backend_start  | 2015-04-24 09:09:21.730641+09
xact_start     | 2015-04-24 09:09:23.858727+09
query_start    | 2015-04-24 09:09:23.858727+09
state_change   | 2015-04-24 09:09:23.858834+09
waiting        | f
state          | idle in transaction
backend_xid    |
backend_xmin   |
query         | begin;
```



### See

---

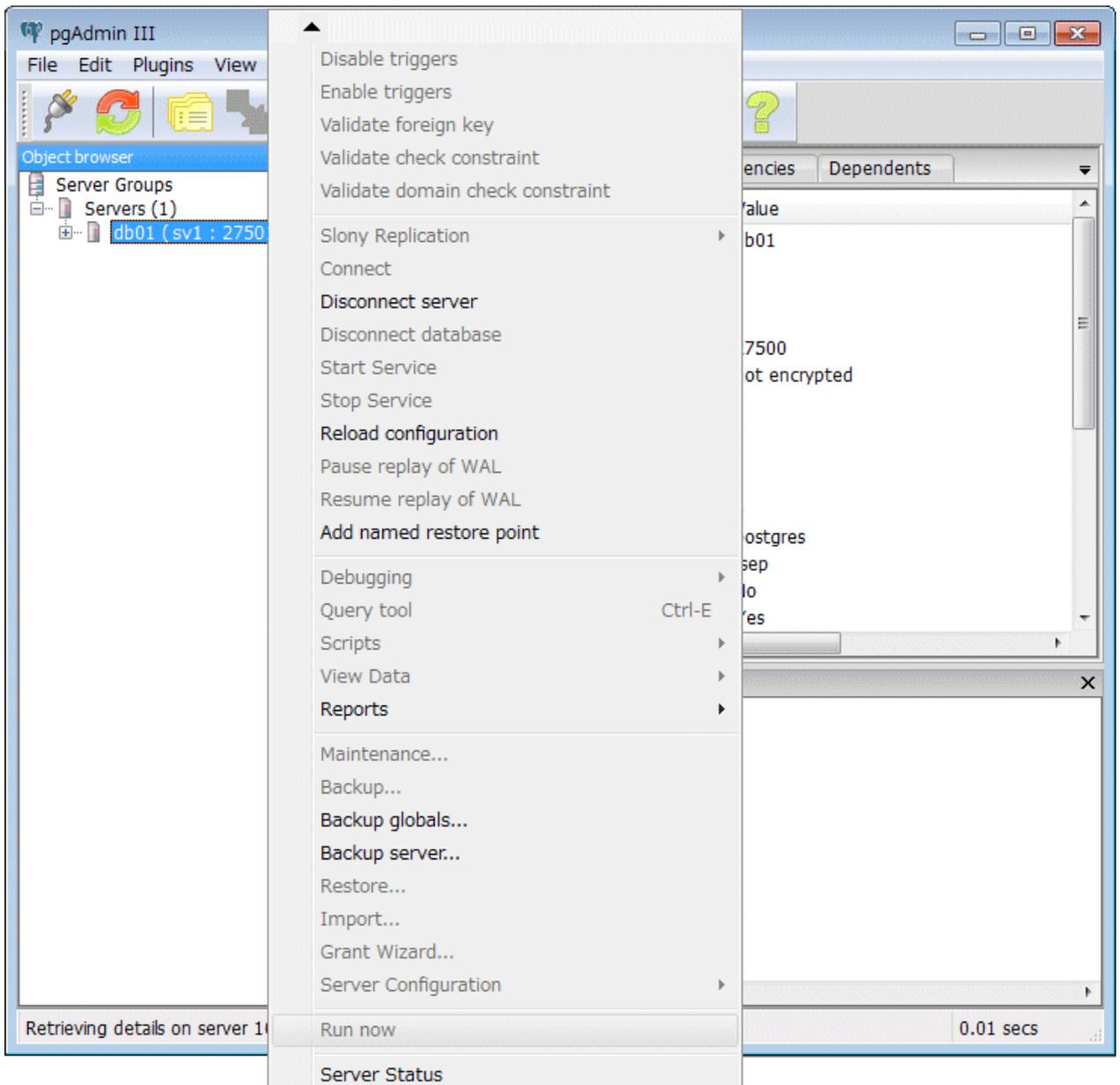
- Refer to "Notes on Application Compatibility" in the Application Development Guide for information on maintaining application compatibility.
  - Refer to "The Statistics Collector" under "Server Administration" in the PostgreSQL Documentation for information on pg\_stat\_activity.
- 

## 7.4.2 Using pgAdmin

---

This section describes the procedure for monitoring connections using [Server Status] in pgAdmin.

1. From the [Tools] menu in pgAdmin, click [Server Status].



- Identify client connections that have been in the waiting state for an extended period.

From the transaction start time displayed under [TX Start], identify connections that have been in the waiting state for an extended period.

The screenshot shows the PostgreSQL Server Status window for server 'db01'. The 'Activity' tab is active, displaying a table of connections. A red box highlights the 'TX start' column for PID 36696, which shows the time '2015-04-28 15:20:59+09'. A callout box points to this value with the text 'Confirmation as for the transaction initiating time.' Below the Activity tab, the 'Locks' tab shows a lock held by PID 36696. The 'Prepared Transactions' tab is empty.

| PID   | Application name  | Database | Client start           | TX start               | State               | Query             |
|-------|-------------------|----------|------------------------|------------------------|---------------------|-------------------|
| 36478 | pgAdmin III - ... | postgres | 2015-04-28 15:07:09+09 |                        | idle                | SELECT version(); |
| 36696 | psql              | db01     | 2015-04-28 15:20:52+09 | 2015-04-28 15:20:59+09 | idle in transaction | BEGIN;            |

| PID   | Database | Relation | User     | XID  | TX   | Mode         | Granted | Start       | Query  |
|-------|----------|----------|----------|------|------|--------------|---------|-------------|--------|
| 36696 |          |          | fsepuser | 5/25 | 5/25 | Exclusive... | Yes     | 2015-04-... | BEGIN; |

## 7.5 Reorganizing Indexes

Normally, a database defines indexes in tables, but if data is frequently updated, indexes can no longer use free space in the disk efficiently. This situation can also cause a gradual decline in database access performance.

To rearrange used space on the disk and prevent the database access performance from declining, it is recommended that you periodically execute the REINDEX command to reorganize indexes.

Check the disk usage of the data storage destination using the method described in "[7.2 Monitoring Disk Usage and Securing Free Space](#)".



See

Refer to "Routine Reindexing" under "Server Administration" in the PostgreSQL Documentation for information on reorganizing indexes by periodically executing the REINDEX command.

## Point

Typically, reorganize indexes once a month at a suitable time such as when conducting database maintenance. Use SQL statements to check index usage. If this usage is increasing on a daily basis, adjust the frequency of recreating the index as compared to the free disk space.

The following example shows the SQL statements and the output.

However, when considering continued compatibility of applications, do not reference system catalogs and functions directly in the following SQL statements. Refer to "Notes on Application Compatibility" in the Application Development Guide for details.

### [SQL statements]

```
SELECT
  nspname AS schema_name,
  relname AS index_name,
  round(100 * pg_relation_size(indexrelid) / pg_relation_size(indrelid)) / 100 AS index_ratio,
  pg_size_pretty(pg_relation_size(indexrelid)) AS index_size,
  pg_size_pretty(pg_relation_size(indrelid)) AS table_size
FROM pg_index I
  LEFT JOIN pg_class C ON (C.oid = I.indexrelid)
  LEFT JOIN pg_namespace N ON (N.oid = C.relnamespace)
WHERE
  C.relkind = 'i' AND
  pg_relation_size(indrelid) > 0
ORDER BY pg_relation_size(indexrelid) DESC, index_ratio DESC;
```

### [Output]

| schema_name | index_name                | index_ratio | index_size | table_size |
|-------------|---------------------------|-------------|------------|------------|
| public      | pgbench_accounts_pkey     | 0.16        | 2208 KB    | 13 MB      |
| pg_catalog  | pg_depend_depender_index  | 0.6         | 224 KB     | 368 KB     |
| pg_catalog  | pg_depend_reference_index | 0.58        | 216 KB     | 368 KB     |
| ...         |                           |             |            |            |

## See

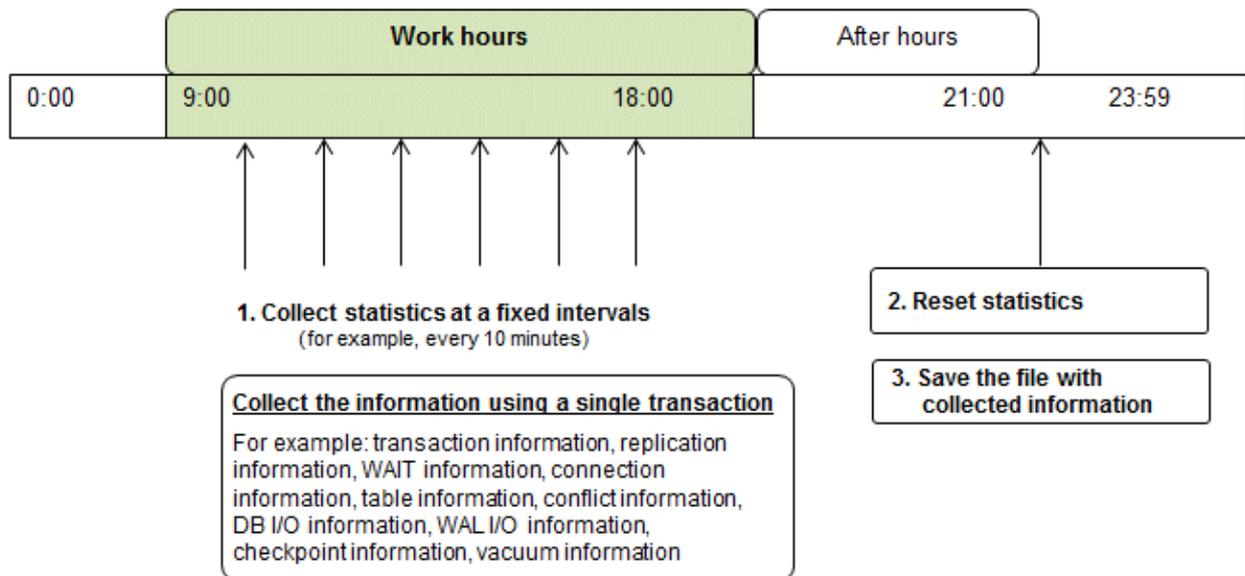
Refer to "Notes on Application Compatibility" in the Application Development Guide for information on maintaining application compatibility.

## 7.6 Monitoring Database Activity

FUJITSU Enterprise Postgres enables you to collect information related to database activity. By monitoring this information, you can check changes in the database status.

This information includes wait information for resources such as internal locks, and is useful for detecting performance bottlenecks. Furthermore, you should collect this information in case you need to request Fujitsu technical support for an investigation.

Figure 7.1 Overview of information collection



1. Collect statistics at fixed intervals during work hours.

Accumulate the collected information into a file.

Wherever possible, collect data from the various statistics views using a single transaction, because it enables you to take a snapshot of system performance at a given moment.

Refer to "7.6.1 Information that can be Collected" for information on the system views that can be collected.

2. Reset statistics after work hours, that is, after jobs have finished.

Refer to "7.6.3 Information Reset" for information on how to reset statistics.

3. Save the file with collected information.

Keep the file with collected information for at least two days, in order to check daily changes in performance and to ensure that the information is not deleted until you have sent a query to Fujitsu technical support.

Where jobs run 24 hours a day, reset statistics and save the file with collected information when the workload is low, for example, at night.



### Note

Statistics cumulatively add the daily database value, so if you do not reset them, the values will exceed the upper limit, and therefore will not provide accurate information.

The subsections below explain the following:

- Information that can be collected
- Collection configuration
- Information reset

## 7.6.1 Information that can be Collected

Information that can be collected is categorized into the following two types:

- Information common to PostgreSQL
- Information added by FUJITSU Enterprise Postgres

### Information common to PostgreSQL



See

Refer to "Monitoring Database Activity" under "Server Administration" in the PostgreSQL Documentation for information on information common to PostgreSQL.

### Information added by FUJITSU Enterprise Postgres

You can collect the following information added by FUJITSU Enterprise Postgres.

Table 7.1 Information added by FUJITSU Enterprise Postgres

| View name          | Description  |
|--------------------|--|
| pgx_stat_lwlock    | Displays statistic related to lightweight lock, with each type of content displayed on a separate line. This information helps to detect bottlenecks.<br>Refer to "C.2 pgx_stat_lwlock" for details.                                 |
| pgx_stat_latch     | Displays statistics related latches, with each type of wait information within FUJITSU Enterprise Postgres displayed on a separate line. This information helps to detect bottlenecks.<br>Refer to "C.3 pgx_stat_latch" for details. |
| pgx_stat_walwriter | Displays statistics related to WAL writing, in a single line.<br>Refer to "C.4 pgx_stat_walwriter" for details.  |
| pgx_stat_sql       | Displays statistics related to SQL statement executions, with each type of SQL statement displayed on a separate line.<br>Refer to "C.5 pgx_stat_sql" for details.   |

## 7.6.2 Collection Configuration

The procedure for configuring collection depends on the information content.

- Information common to PostgreSQL
- Information added by FUJITSU Enterprise Postgres

### Information common to PostgreSQL



See

Refer to "The Statistics Collector" in "Monitoring Database Activity" under "Server Administration" in the PostgreSQL Documentation for information on information common to PostgreSQL.

### Information added by FUJITSU Enterprise Postgres

Information added by FUJITSU Enterprise Postgres is collected by default.

To enable or disable information collection, change the configuration parameters in postgresql.conf. The following table lists the views for which you can enable or disable information collection, and the configuration parameters.

| View name       | Parameter   |
|-----------------|-------------|
| pgx_stat_lwlock | track_waits |
| pgx_stat_latch  |             |
| pgx_stat_sql    | track_sql   |

Remarks: You cannot change the collection status for pgx\_stat\_walwriter.

Refer to "Appendix A Parameters" for information on the parameters.

## 7.6.3 Information Reset

---

This section describes how to reset information.

### Information added by FUJITSU Enterprise Postgres

You can reset information added by FUJITSU Enterprise Postgres by using the `pg_stat_reset_shared` function in the same way as for information common to PostgreSQL.

Configure the following parameters in the `pg_stat_reset_shared` function:

| Function                                | Type of return value | Description  |
|---|----------------------|--|
| <code>pg_stat_reset_shared(text)</code> | void                 | <p>Reset some cluster-wide statistics counters to zero, depending on the argument (requires superuser privileges).</p> <p>Calling <code>pg_stat_reset_shared('lwlock')</code> will zero all counters shown in <code>pgx_stat_lwlock</code>.</p> <p>Similarly, in the following cases, all values of the pertinent statistics counter are reset:</p> <ul style="list-style-type: none"><li>- If <code>pg_stat_reset_shared('latch')</code> is called:<br/>All values displayed in <code>pgx_stat_latch</code></li><li>- If <code>pg_stat_reset_shared('walwriter')</code> is called:<br/>All values displayed in <code>pgx_stat_walwriter</code></li><li>- If <code>pg_stat_reset_shared('sql')</code> is called:<br/>All values displayed in <code>pgx_stat_sql</code></li></ul> |



See

.....  
Refer to "Statistics Functions" in "Monitoring Database Activity" under "Server Administration" in the PostgreSQL Documentation for information on other parameters of the `pg_stat_reset_shared` function.  
.....

# Chapter 8 Streaming Replication Using WebAdmin

This chapter describes how to create a streaming replication cluster using WebAdmin.

## 8.1 Streaming Replication

Streaming replication allows the creation of one or more standby instances, which connect to the master instances and replicate the data using WAL records. The standby instance can be used for read-only operations.

WebAdmin can be used to create a streaming replication cluster. WebAdmin allows the creation of a cluster in the following configurations:

- Master-Standby Configuration: This configuration creates a master and standby instance together.
- Standby Only Configuration: This configuration creates a standby instance from an already existing instance.



### Point

- A standby instance can be created from a standalone instance, a master instance, or even from another standby instance.
- If a streaming replication cluster is created using WebAdmin, the network with the host name (or IP address) specified in [Host name] will be used across sessions of WebAdmin, and also used as the log transfer network.
- To use a network other than the job network as the log transfer network, specify the host name other than the job network one in [Host name].



### See

When a standby instance is created from an existing instance, it is necessary to set the values for the replication-related variables before a standby instance can be created. Refer to "Configuring Parameters" in the Installation and Setup Guide for Server for details.

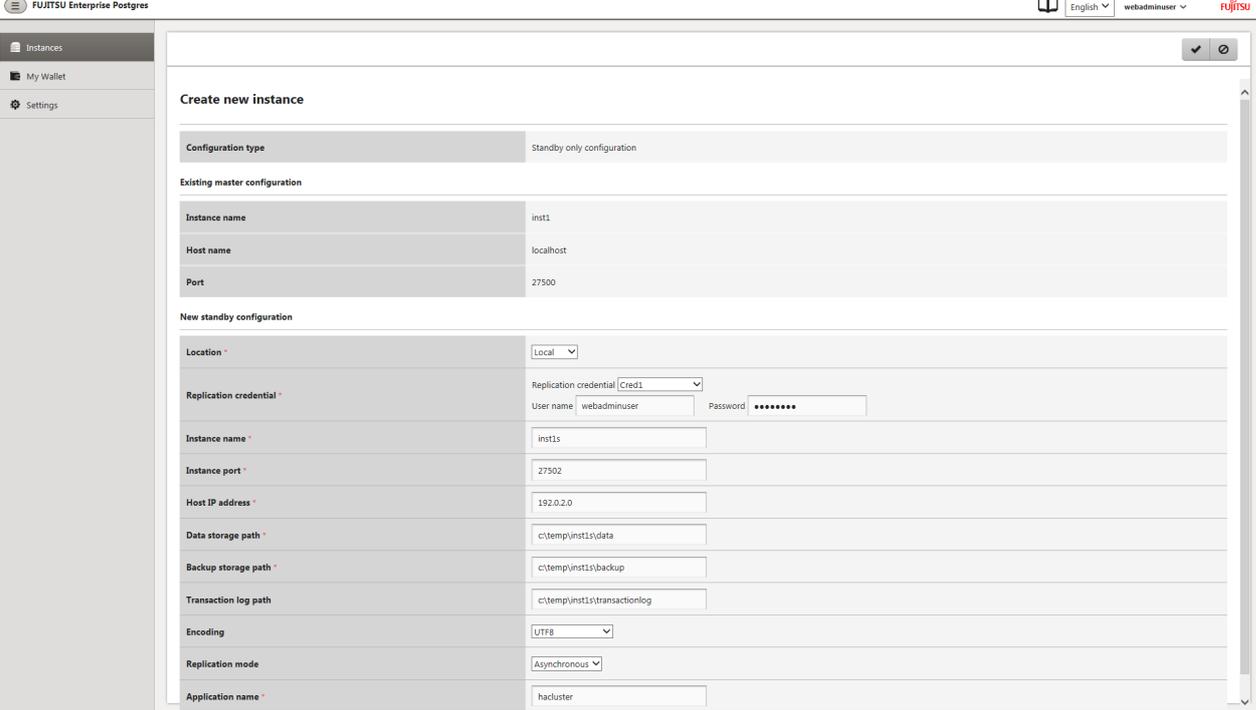
### 8.1.1 Creating a Standby Instance

Follow the procedure below to create a standby instance.

1. In the [Instances] tab, select the instance from which a standby instance is to be created.
2. Click .

3. Enter the information for the standby instance to be created. In the example below, a standby instance is created from instance "inst1".

The instance name, host address and port of the selected instance are already displayed for easy reference.



The screenshot shows the 'Create new instance' form in the Fujitsu Enterprise Postgres WebAdmin interface. The form is organized into several sections:

- Configuration type:** Standby only configuration
- Existing master configuration:**
  - Instance name: inst1
  - Host name: localhost
  - Port: 27500
- New standby configuration:**
  - Location: Local
  - Replication credential: Cred1 (with fields for User name: webadminuser and Password: [masked])
  - Instance name: inst1s
  - Instance port: 27502
  - Host IP address: 192.0.2.0
  - Data storage path: c:\temp\inst1s\data
  - Backup storage path: c:\temp\inst1s\backup
  - Transaction log path: c:\temp\inst1s\transactionlog
  - Encoding: UTF8
  - Replication mode: Asynchronous
  - Application name: hacluster

Enter the following items:

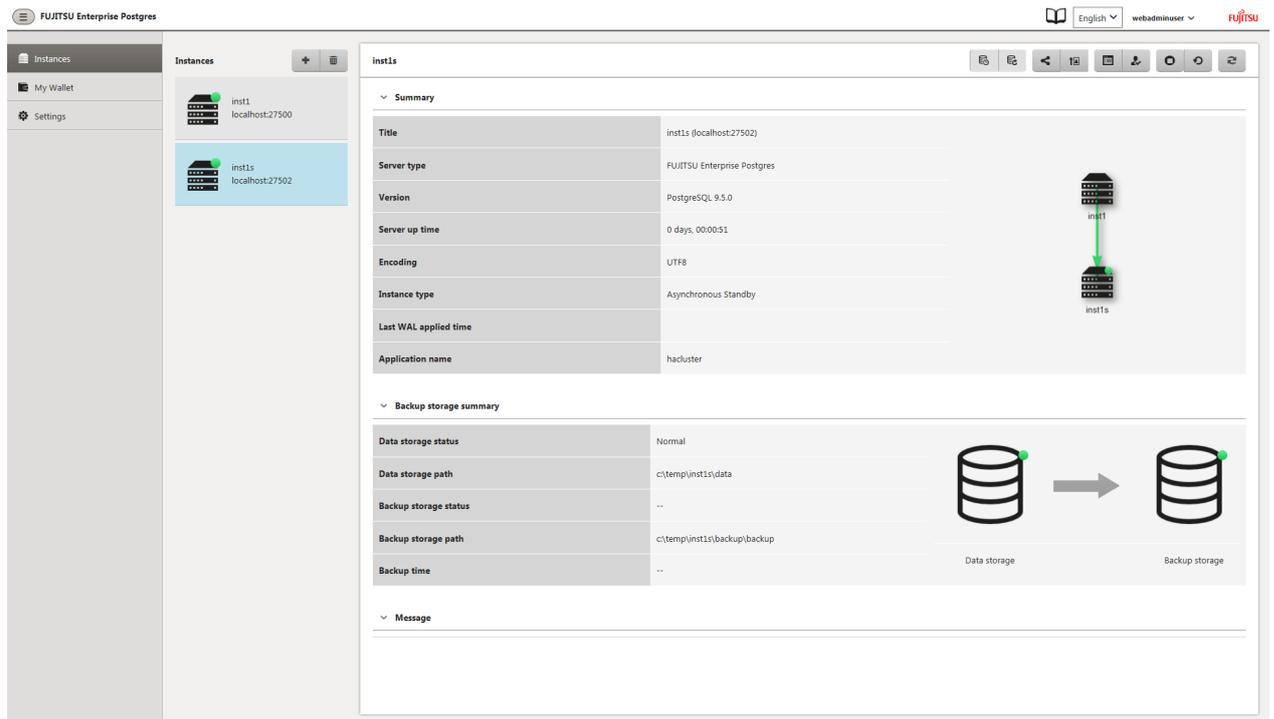
- [Location]: Whether to create the instance in the server that the current user is logged in to, or in a remote server. The default is "Local", which will create the instance in the server machine where WebAdmin is currently running.
- [Replication credential]: The user name and password required for the standby instance to connect to the master instance. The user name and password can be entered or selected from the Wallet. Refer to "[Appendix F WebAdmin Wallet](#)" for information on creating wallet entries.
- [Instance name]: Name of the standby database instance to create.

The name must meet the conditions below:

- Maximum of 16 characters
- The first character must be an ASCII alphabetic character
- The other characters must be ASCII alphanumeric characters
- [Instance port]: Port number of the standby database instance.
- [Host IP address]: The IP address of the server machine where the standby instance is to be created. This information is needed to configure the standby instance to be connected to the master.
- [Data storage path]: Directory where the database data will be stored
- [Backup storage path]: Directory where the database backup will be stored
- [Transaction log path]: Directory where the transaction log will be stored
- [Encoding]: Database encoding system
- [Replication mode]: Whether the standby instance created should be in Asynchronous or Synchronous mode.
- [Application name]: The reference name of the standby instance used to identify it to the master instance.

4. Click  to create the standby instance.

5. Once the standby instance is created successfully, select "inst1s" in the [Instances] tab. The following page will be displayed:



### Note

- Backups are not possible for standby instances in WebAdmin. As a result, and are disabled and no value is shown for [Backup storage status] and [Backup time].
- If using WebAdmin to manage Mirroring Controller, the message below may be output to the server log or system log in the standby instance. No action is required, as the instance is running normally.

```
ERROR: pgx_rcvall failed (16491)
ERROR: pgx_rcvall: backup of the database has not yet been performed, or an incorrect backup
storage directory was specified
```

## 8.1.2 Promoting a Standby Instance

Streaming replication between a master and standby instance can be discontinued using WebAdmin.

Follow the procedure below to promote a standby instance to a standalone instance, thereby discontinuing the streaming replication.

1. In the [Instances] tab, select the standby instance that needs to be promoted.
2. Click .
3. Click [Yes] from the confirmation dialog box.

The standby instance will be promoted and will become a standalone instance, which is not part of a streaming replication cluster.

Once the standby instance is promoted to become a standalone instance, the backup storage status will be "Error". This is because no backups are available when the instance is newly promoted to a standalone instance. The status will be reset if a new backup is performed by clicking [Solution] or .

## 8.1.3 Converting an Asynchronous Replication to Synchronous

Streaming replication between a master and standby instance can be configured to be in Asynchronous or Synchronous mode. This mode can be changed even after the standby instance was successfully created.

Follow the procedure below to convert an Asynchronous standby instance to Synchronous.

1. In the [Instances] tab, select the master instance of the relevant cluster.
2. Click .
3. In the [Streaming replication] section, edit the value for [Synchronous standby names].
  - Add the "Application name" of the standby instance you want to be in Synchronous mode.
4. Click .
5. Select the master instance and click .
6. Select the standby instance. [Instance type] will now show the updated status.

### Note

- Converting an Asynchronous standby instance to Synchronous can cause the master instance to queue the incoming transactions until the standby instance is ready. For this reason, it is recommended that this operation be performed during a scheduled maintenance period.
- When adding a synchronous standby instance, FUJITSU Enterprise Postgres will only keep the first entry in [Synchronous standby names] in synchronous state.
- To learn more about the differences between synchronous and asynchronous standby modes and their behavior, refer to "Streaming Replication" in "High Availability, Load Balancing, and Replication" in the PostgreSQL Documentation.

## 8.1.4 Converting a Synchronous Replication to Asynchronous

Streaming replication between a master and standby instance can be configured to be in Asynchronous or Synchronous Mode. This mode can be changed even after the standby instance was successfully created.

Follow the procedure below to convert a Synchronous standby instance to Asynchronous.

1. In the [Instances] tab, select the master instance of the relevant cluster.
2. Click .
3. In the [Streaming replication] section, edit the value for [Synchronous standby names].
  - Remove the "Application name" of the standby instance you want to be in Asynchronous mode.
4. Click .
5. Select the master instance and click .
6. Select the standby instance. [Instance type] will now show the updated status.

### Note

To learn more about the differences between synchronous and asynchronous standby modes and their behavior, refer to "Streaming Replication" in "High Availability, Load Balancing, and Replication" in the PostgreSQL Documentation.

# Chapter 9 Installing and Operating the In-memory Feature

The in-memory feature enables fast aggregation using Vertical Clustered Index (VCI) and memory-resident feature.

VCI has a data structure suitable for aggregation, and features parallel scan and disk compression, which enable faster aggregation through reduced disk I/O.

The memory-resident feature reduces disk I/O that occurs during aggregation. It consists of the preload feature that reads VCI data to memory in advance, and the stable buffer feature that suppresses VCI data eviction from memory. The stable buffer feature secures the proportion specified by parameter in the shared memory for VCI.

This chapter describes how to install and operate the in-memory feature.

## 9.1 Installing Vertical Clustered Index (VCI)

This section describes the installation of VCI.

1. [Evaluating whether to Install VCI](#)
2. [Estimating Resources](#)
3. [Setting up](#)

### 9.1.1 Evaluating whether to Install VCI

VCI uses available resources within the server to increase scan performance.

It speeds up processing in many situations, and can be more effective in the following situations:

- Single table processing
- Processing that handles many rows in the table
- Processing that handles some columns in the table
- Processing that performs very heavy aggregation such as simultaneous aggregation of sum and average

VCI will not be used in the following cases, so it is necessary to determine its effectiveness in advance:

- The data type of the target table or column contains VCI restrictions.
- The SQL statement does not meet the VCI operating conditions
- VCI is determined to be slower based on cost estimation



If performing operations that use VCI, the `full_page_writes` parameter setting in `postgresql.conf` must be enabled (on). For this reason, if this parameter is disabled (off), operations that use VCI return an error. In addition, to perform operations for tables that do not create a VCI when the `full_page_writes` parameter setting is temporarily disabled (off), do not create a VCI or perform operations to tables that created a VCI during that time.



- Refer to "9.1.4 Data that can Use VCI" for information on VCI restrictions.
- Refer to "Scan Using a Vertical Clustered Index (VCI)" - "Operating Conditions" in the Application Development Guide for information on VCI operating conditions.

### 9.1.2 Estimating Resources

Estimate resources before setting up VCI.

Select the aggregation that you want to speed up and identify the required column data. The additional resources below are required according to the number of columns.

- Memory

Secure additional capacity required for the disk space for the column for which VCI is to be created.

- Disk

Secure additional disks based on the disk space required for the column for which VCI is to be created, as VCI stores column data as well as existing table data on the disk. It is recommended to provide a separate disk in addition to the existing one, and specify it as the tablespace to avoid impact on any other jobs caused by I/O.



See

Refer to "Estimating Memory Requirements" and "Estimating Database Disk Space Requirements" in the Installation and Setup Guide for Server for information on how to estimate required memory and disk space.

### 9.1.3 Setting up

This section describes how to set up VCI.

#### Setup flow

1. [Setting Parameters](#)
2. [Installing the Extensions](#)
3. [Creating VCI](#)
4. [Confirming that VCI has been Created](#)

#### 9.1.3.1 Setting Parameters

Edit postgresql.conf to set the required parameters for VCI. After that, start or restart the instance.

The following table lists the parameters that need or are recommended to be configured in advance:

| Parameter name            | Setting value  | Description   | Required |
|---------------------------|--|---|----------|
| shared_preload_libraries  | Literal 'vci, pg_prewarm'  | VCI and shared library to be preloaded at server start.   | Y        |
| session_preload_libraries | Literal 'vci, pg_prewarm'  | VCI and shared library to be preloaded at connection start.   | Y        |
| reserve_buffer_ratio      | Percentage of shared memory to be used for stable buffer table                   | Proportion of shared memory to be used for a stable buffer table.   | N        |
| vci.control_max_workers   | Number of background workers that manage VCI                                     | Number of background workers that manage VCI.<br><br>Add this value to max_worker_processes.                | N        |
| vci.max_parallel_degree   | Maximum number of background workers used for parallel scan                      | Maximum number of background workers used for parallel scan.<br><br>Add this value to max_worker_processes. | N        |
| vci.smc_directory         | Directory name in which a temporary file is created as the dynamic shared memory | Directory name in which a temporary file is created as the  | N        |

| Parameter name | Setting value | Description                                      | Required |
|----------------|---------------|--|----------|
|                |               | dynamic shared memory during a scan using a VCI. |          |

### Example

```
shared_preload_libraries = 'vci, pg_prewarm'
session_preload_libraries = 'vci, pg_prewarm'
reserve_buffer_ratio = 20
vci.control_max_workers = 8
vci.max_parallel_degree = 4
max_worker_processes = 18 # Example: If the initial value was 6, 6 + 8 + 4 = 18
vci.smc_directory = 'E:\\vci\\work'
```

### Note

If performing operations that use VCI, do not delete the shared library names specified to "shared\_preload\_libraries" and "session\_preload\_libraries". If operations that access VCI are performed after the VCI was defined, unexpected behavior may occur.

### See

- Refer to "[Appendix A Parameters](#)" for information on all parameters for VCI. Refer also to default value for each parameter and details such as specification range in the same chapter. Refer to "Server Configuration" under "Server Administration" in the PostgreSQL documentation for information on shared\_preload\_libraries, session\_preload\_libraries, and max\_worker\_processes.

## 9.1.3.2 Installing the Extensions

Execute the CREATE EXTENSION statement to install the VCI and pg\_prewarm extensions. Both extensions need to be installed for each database.

- Installing VCI

```
db01=# CREATE EXTENSION vci;
```

- Installing pg\_prewarm

```
db01=# CREATE EXTENSION pg_prewarm;
```

### Note

- Only superusers can install VCI extensions.
- VCI extensions can only be installed in public schema.
- Some operations cannot be performed for VCI extensions. Refer to "[9.2.1 Commands that cannot be Used for VCI](#)" for details.

## 9.1.3.3 Creating a VCI

Execute the CREATE INDEX statement with the "USING vci" clause to create a VCI for the desired columns and the "WITH (stable\_buffer=true)" clause to enable the stable buffer feature.

To use a separate disk for the VCI, specify the TABLESPACE clause.

```
db01=# CREATE INDEX idx_vci ON table01 USING vci (col01, col02) WITH (stable_buffer=true);
```

## Note

- Some table types cannot be specified on the ON clause of CREATE INDEX. Refer to "9.1.4.1 Relation Types" for details.
- Some data types cannot be specified on the column specification of CREATE INDEX. Refer to "9.1.4.2 Data Types" for details.
- Some operations cannot be performed for VCI. Refer to "9.2.1 Commands that cannot be Used for VCI" for details.
- The same column cannot be specified more than once on the column specification of CREATE INDEX.
- VCI cannot be created for table columns that belong to the template database.
- CREATE INDEX creates multiple views named `vci_10digitRelOid_5digitRelAttr_1charRelType` alongside VCI itself. These are called VCI internal relations. Do not update or delete them as they are used for VCI aggregation.
- All data for the specified column will be replaced in columnar format when VCI is created, so executing CREATE INDEX on an existing table with data inserted takes more time compared with a general index (B-tree). Jobs can continue while CREATE INDEX is running.

### 9.1.3.4 Confirming that the VCI has been Created

Execute the SELECT statement to reference the `pg_indexes` catalog, and confirm that the VCI was created for the target columns.

#### Example

```
db01=# SELECT indexdef FROM pg_indexes WHERE indexdef LIKE '%vci%';
          indexdef
-----
CREATE INDEX idx_vci ON table01 USING vci (col01, col02)
(1 row)
```

## 9.1.4 Data that can Use VCI

This section describes on which relation types and for which data types VCIs can be created.

### 9.1.4.1 Relation Types

VCIs cannot be created on some relation types.

The ON clause of CREATE INDEX described in "9.1.3.3 Creating a VCI" cannot specify relations on which VCIs cannot be created.

- Relations on which VCIs can be created
  - Normal tables
  - UNLOGGED TABLEs
- Relations on which VCIs cannot be created
  - Materialized views
  - Temporary tables
  - Views
  - Temporary views
  - Foreign tables

### 9.1.4.2 Data Types

VCIs cannot be created for some data types.

The column specification of CREATE INDEX described in "9.1.3.3 Creating a VCI" cannot specify a column with data type on which VCIs cannot be created.

| Category        | Data type                | Supported by VCI? |
|-----------------|--------------------------|-------------------|
| Numeric         | smallint                 | Y                 |
|                 | integer                  | Y                 |
|                 | bigint                   | Y                 |
|                 | decimal                  | Y                 |
|                 | numeric                  | Y                 |
|                 | real                     | Y                 |
|                 | double precision         | Y                 |
|                 | serial                   | Y                 |
|                 | bigserial                | Y                 |
| Monetary        | money                    | Y                 |
| Character       | varchar( <i>n</i> )      | Y                 |
|                 | char( <i>n</i> )         | Y                 |
|                 | nchar                    | N                 |
|                 | nvarchar( <i>n</i> )     | N                 |
|                 | text                     | Y                 |
| Binary          | bytea                    | Y                 |
| Date/time       | timestamp                | Y                 |
|                 | timestamp with time zone | Y                 |
|                 | date                     | Y                 |
|                 | time                     | Y                 |
|                 | time with time zone      | Y                 |
|                 | interval                 | Y                 |
| Boolean         | boolean                  | Y                 |
| Geometric       | point                    | N                 |
|                 | line                     | N                 |
|                 | lseg                     | N                 |
|                 | box                      | N                 |
|                 | path                     | N                 |
|                 | polygon                  | N                 |
|                 | circle                   | N                 |
| Network address | cidr                     | N                 |
|                 | inet                     | N                 |
|                 | macaddr                  | N                 |
| Bit string      | bit( <i>n</i> )          | Y                 |
|                 | bit varying( <i>n</i> )  | Y                 |
| Text search     | tsvector                 | N                 |
|                 | tsquery                  | N                 |

| Category  | Data type     | Supported by VCI? |
|---|---------------|-------------------|
| UUID  | uuid          | Y                 |
| XML   | xml           | N                 |
| JSON  | json          | N                 |
|   | jbson         | N                 |
| Range   | int4range     | N                 |
|   | int8range     | N                 |
|   | numrange      | N                 |
|   | tsrange       | N                 |
|   | tstzrange     | N                 |
|   | daterange     | N                 |
| Object identifier   | oid           | N                 |
|   | regproc       | N                 |
|   | regprocedure  | N                 |
|   | regoper       | N                 |
|   | regoperator   | N                 |
|   | regclass      | N                 |
|   | regtype       | N                 |
|   | regconfig     | N                 |
|   | regdictionary | N                 |
| pg_lsn type   | pg_lsn        | N                 |
| Array type  | -             | N                 |
| User-defined type<br>(Basic type, enumerated type,<br>composite type, and range type) | -             | N                 |

## 9.2 Operating VCI

---

This section describes how to operate VCI.

### 9.2.1 Commands that cannot be Used for VCI

---

Some operations cannot be performed for VCI extensions and VCI itself.

This section describes SQL commands that cannot be executed for the VCI extensions and VCI itself, and client application commands.

#### SQL commands

- Operations that cannot be performed for the VCI extension

| Command         | Subcommand | Description                             |
|-----------------|------------|---|
| ALTER EXTENSION | UPDATE     | The VCI extension cannot be specified.  |
|                 | SET SCHEMA | This operation is not required for VCI. |
|                 | ADD        |   |
|                 | DROP       |   |

| Command          | Subcommand | Description   |
|------------------|------------|---|
| CREATE EXTENSION | SCHEMA     | The subcommands on the left cannot be performed if the VCI extension is specified.<br><br>This operation is not required for VCI. |
| DROP EXTENSION   | -          | The VCI extension cannot be specified.<br><br>(Restriction in this edition.)  |

- Operations that cannot be performed on relations containing a VCI

| Command               | Subcommand   | Description  |
|-----------------------|--|--|
| ALTER INDEX           | SET  | The subcommands on the left cannot be performed if a VCI is specified.<br><br>If the operation is required, delete the VCI using DROP INDEX, and re-create it using CREATE INDEX after completing the operation.                                 |
|                       | SET TABLESPACE   |  |
|                       | ALL IN TABLESPACE  |  |
| ALTER OPERATOR CLASS  | RENAME TO  | The subcommands on the left cannot be performed if a VCI is specified.<br><br>This operation is not supported in VCI.  |
|                       | OWNER TO   |  |
|                       | SET SCHEMA   |  |
| ALTER OPERATOR FAMILY | ADD  |  |
|                       | DROP   |  |
|                       | RENAME TO  |  |
|                       | OWNER TO   |  |
|                       | SET SCHEMA   |  |
| ALTER TABLE           | ALL IN TABLESPACE <i>name</i> [ OWNED BY <i>roleName</i> ] SET TABLESPACE <i>newTablespace</i>                       | A tablespace that contains a VCI cannot be specified.<br><br>If the operation is required, delete the VCI using DROP INDEX, and re-create it using CREATE INDEX after completing the operation.  |
|                       | DROP [ COLUMN ] [ IF EXISTS ] <i>colName</i> [ RESTRICT   CASCADE ]  | A column that contains a VCI cannot be specified.<br><br>If the operation is required, delete the VCI using DROP INDEX, and re-create it using CREATE INDEX after completing the operation.  |
|                       | ALTER [ COLUMN ] <i>colName</i> [ SET DATA ] TYPE <i>dataType</i> [ COLLATE <i>collation</i> ] [ USING <i>expr</i> ] |  |
|                       | CLUSTER ON <i>indexName</i>  | A VCI cannot be specified.   |
|                       | REPLICA IDENTITY {DEFAULT   USING INDEX <i>indexName</i>   FULL   NOTHING }  | This operation is not supported in VCI.  |
|                       | SET WITH OIDS  | If WITHOUT OIDS is specified for a table that contains a VCI, the SET WITH OIDS clause cannot be used.<br><br>If the operation is required, delete the VCI using DROP INDEX, and re-create it using CREATE INDEX after completing the operation. |
|                       | SET WITHOUT OIDS   | If WITH OIDS is specified for a table that contains a VCI, the SET WITHOUT OIDS clause cannot be used.   |

| Command                | Subcommand                 | Description  |
|------------------------|----------------------------|--|
|                        |                            | If the operation is required, delete the VCI using DROP INDEX, and re-create it using CREATE INDEX after completing the operation.   |
| CLUSTER                | -                          | A table that contains a VCI and VCI cannot be specified.<br><br>If the operation is required, delete the VCI using DROP INDEX, and re-create it using CREATE INDEX after completing the operation. |
| CREATE INDEX           | UNIQUE                     | The subcommands on the left cannot be performed if a VCI is specified.   |
|                        | CONCURRENTLY               |  |
|                        | [ ASC   DESC ]             | This operation is not supported in VCI.  |
|                        | [ NULLS { FIRST   LAST } ] |  |
|                        | WITH                       |  |
|                        | WHERE                      |  |
| CREATE OPERATOR CLASS  | -                          | A VCI cannot be specified.<br><br>This operation is not supported in VCI.  |
| CREATE OPERATOR FAMILY | -                          |  |
| CREATE TABLE           | EXCLUDE                    |  |
| DROP INDEX             | CONCURRENTLY               | The subcommands on the left cannot be performed if a VCI is specified.<br><br>This operation is not supported in VCI.  |
| REINDEX                | -                          | A VCI cannot be specified.<br><br>This command is not required as VCI uses daemon's automatic maintenance to prevent disk space from increasing.   |

### Client application command

- Operations that cannot be performed on relations containing a VCI

| Command   | Description   |
|-----------|---|
| clusterdb | Clustering cannot be performed for tables that contain a VCI. |
| reindexdb | VCIs cannot be specified on the --index option.               |

## 9.2.2 Data Preload Feature

The first aggregation using VCI immediately after an instance is started may take time, because the VCI data has not been loaded to buffer. Therefore, use the preload feature to load the VCI data to buffer in advance when performing VCI aggregation after an instance is started. When using the preload feature, execute the function `pgx_prewarm_vci` to each VCI created with CREATE INDEX.

```
db01=# SELECT pgx_prewarm_vci('idx_vci');
```



See

Refer to "B.4 VCI Data Load Control Function" for information on `pgx_prewarm_vci`.

# Chapter 10 Actions when an Error Occurs

This chapter describes the actions to take when an error occurs in the database or an application, while FUJITSU Enterprise Postgres is operating.

Depending on the type of error, it may be necessary to recover the database cluster. The recovery process recovers the following resources:

- Data storage destination
- Transaction log storage destination (if the transaction log is stored in a separate disk from the data storage destination)
- Backup data storage destination



## Note

Even if a disk is not defective, the same input-output error messages, as those generated when the disk is defective, may be output. The recovery actions differ for these error messages.

Check the status of the disk, and select one of the following actions:

- If the disk is defective

Refer to "[10.1 Recovering from Disk Failure \(Hardware\)](#)", and take actions accordingly.

- If the disk is not defective

Refer to "[10.14 I/O Errors Other than Disk Failure](#)", and take actions accordingly.

A few examples of errors generated even if the disk is not defective include:

- Network error with an external disk
- Errors caused by power failure or mounting issues

## Determining the cause of an error

If an error occurs, refer to the WebAdmin message and the event log, and determine the cause of the error.



## See

Refer to "Configuring Parameters" in the Installation and Setup Guide for Server for information on server logs.

## Approximate recovery time

The formulas for deriving the approximate recovery time of resources in each directory are given below.

- Data storage destination or transaction log storage destination

$$\text{Recovery time} = (\text{usageByTheDataStorageDestination} + \text{usageByTheTransactionLogStorageDestination}) / \text{diskWritePerformance} \times 1.5$$

- *usageByTheDataStorageDestination*: Disk space used by the database cluster
  - *usageByTheTransactionLogStorageDestination*: Disk space used by the transaction log stored outside the database cluster
  - *diskWritePerformance*: Measured maximum data volume (bytes/second) that can be written per second in the system environment where the operation is performed
  - 1.5: Coefficient assuming the time excluding disk write, which is the most time-consuming step
- Backup data storage destination

$$\text{Recovery time} = \text{usageByTheBackupDataStorageDestination} / \text{diskWritePerformance} \times 1.5$$

- *usageByTheBackupDataStorageDestination*: Disk space used by the backup data

- *diskWritePerformance*: Measured maximum data volume (bytes/second) that can be written per second in the system environment where the operation is performed
- 1.5: Coefficient assuming the time excluding disk write, which is the most time-consuming step

## 10.1 Recovering from Disk Failure (Hardware)

---

This section describes how to recover database clusters to a point immediately before failure, if a hardware failure occurs in the data storage disk or the backup data storage disk.

There are two methods of recovery:

- [10.1.1 Using WebAdmin](#)
- [10.1.2 Using Server Command](#)

### Point

Back up the database cluster after recovering it. Backup deletes obsolete archive logs (transaction logs copied to the backup data storage destination), freeing up disk space and reducing the recovery time.

### 10.1.1 Using WebAdmin

---

Recover the database cluster by following the appropriate recovery procedure below for the disk where the failure occurred.

#### Note

Recovery operation cannot be performed on an instance that is part of a streaming replication cluster in standby mode.

If disk failure occurs on a standby instance, it may be necessary to delete and re-create the instance.

Recovery operation can be performed on an instance that is part of a streaming replication cluster in "Master" mode. If a recovery operation is performed on a master instance, it will break the replication cluster and streaming replication will stop between the master instance and all its standby instances. In such an event, the standby instances can be promoted to standalone instances or can be deleted and re-created.

#### **If failure occurred in the data storage disk or the transaction log storage disk**

Follow the procedure below to recover the data storage disk or the transaction log storage disk.

1. Stop applications

Stop applications that are using the database.

2. Stop the instance

Stop the instance. Refer to "[2.1.1 Using WebAdmin](#)" for information on how to stop an instance. WebAdmin automatically stops instances if recovery of the database cluster is performed without stopping the instance.

3. Recover the failed disk

Replace the disk, and then recover the volume configuration information.

4. Create a tablespace directory

If a tablespace was defined after backup, create a directory for it.

5. Recover the keystore, and enable automatic opening of the keystore

Do the following if the data in the database has been encrypted:

- Restore the keystore to its state at the time of the database backup.
- Enable automatic opening of the keystore.

## 6. Recover the database cluster

Log in to WebAdmin, and in the [Instances] tab, click [Solution] for the error message.

The screenshot shows the Fujitsu Enterprise Postgres WebAdmin interface. The main content area displays details for instance 'inst1' (localhost:27500). The 'Backup storage summary' section shows a 'Data storage status' of 'Error' and a 'Backup storage status' of 'Normal'. A diagram illustrates the data flow from 'Data storage' to 'Backup storage'. Below this, a 'Message' section contains two error messages from 2016-03-16 16:17:31: 'Please click the "Solution" button to solve the problem.' and 'Data storage path is broken.' A 'Solution' button is visible at the bottom right of the message area.

## 7. Run recovery

In the [Restore Instance] dialog box, click [Yes].

Instance restore is performed. An instance is automatically started when recovery is successful.

### Note

WebAdmin does not support recovery of hash index. If you are using a hash index, then after recovery, execute the REINDEX command to rebuild it. Use of hash indexes is not recommended.

## 8. Resume applications

Resume applications that are using the database.

### Point

WebAdmin may be unable to detect disk errors, depending on how the error occurred.

If this happens, refer to "10.10.3 Other Errors" to perform recovery.

## If failure occurred on the backup data storage disk

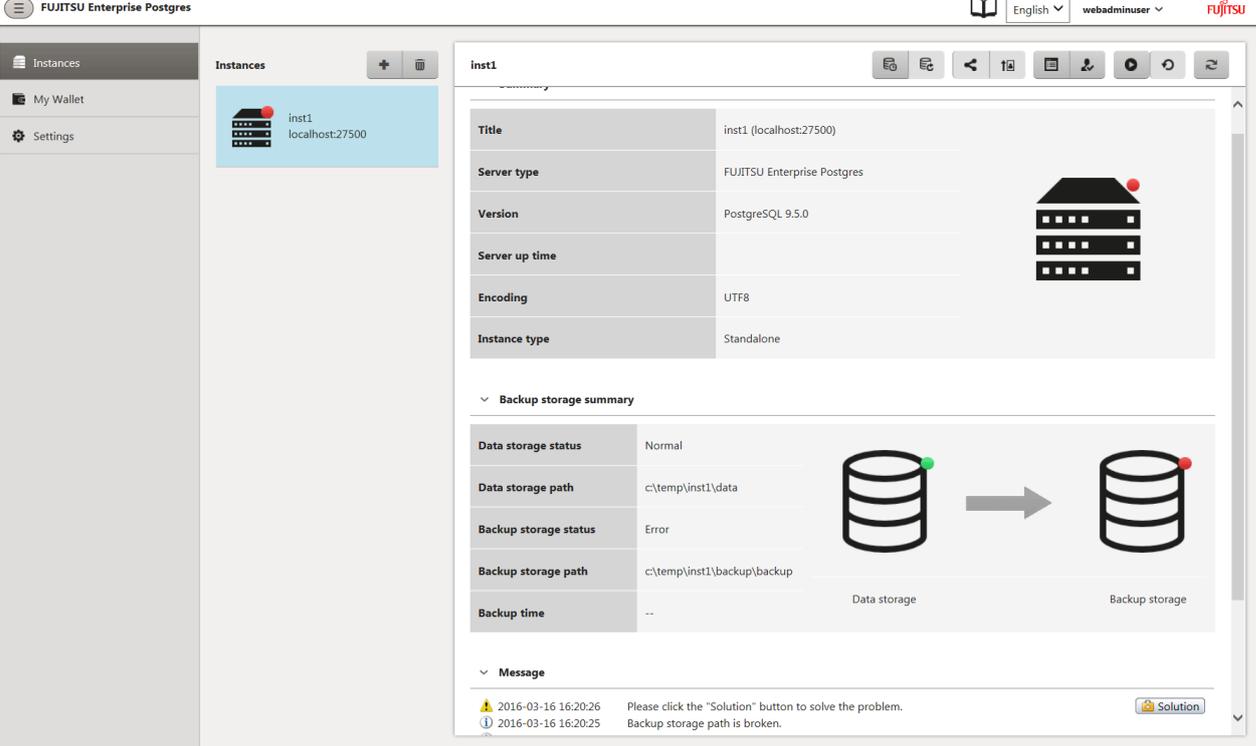
Follow the procedure below to recover the backup data storage disk.

### 1. Recover the failed disk

Replace the disk, and then recover the volume configuration information.

## 2. Recover the backup data

Log in to WebAdmin, and in the [Instance] tab, click [Solution] for the error message.



The screenshot shows the Fujitsu Enterprise Postgres WebAdmin interface. The main content area displays the configuration for instance 'inst1' (localhost:27500). The 'Backup storage summary' section shows a table with the following data:

| Backup storage summary |                             |
|------------------------|-----------------------------|
| Data storage status    | Normal                      |
| Data storage path      | c:\temp\inst1\data          |
| Backup storage status  | Error                       |
| Backup storage path    | c:\temp\inst1\backup\backup |
| Backup time            | --                          |

Below the table, a diagram illustrates the data flow from 'Data storage' (represented by a cylinder with a green dot) to 'Backup storage' (represented by a cylinder with a red dot). A message list at the bottom shows two entries:

- 2016-03-16 16:20:26 Please click the "Solution" button to solve the problem.
- 2016-03-16 16:20:25 Backup storage path is broken.

A 'Solution' button is visible next to the second message.

## 3. Run backup

Perform backup to enable recovery of the backup data. In the [Backup] dialog box, click [Yes]. The backup is performed. An instance is automatically started when backup is performed.

### Point

If you click [Recheck the status], the resources in the data storage destination and the backup data storage destination are reconfirmed. As a result, the following occurs:

- If an error is not detected

The status of the data storage destination and the backup data storage destination returns to normal, and it is possible to perform operations as usual.

- If an error is detected

An error message is displayed in the message list again. Click [Solution], and resolve the problem by following the resolution for the cause of the error displayed in the dialog box.

## 10.1.2 Using Server Command

Recover the database cluster by following the appropriate recovery procedure below for the disk where the failure occurred.

### If failure occurred on the data storage disk or the transaction log storage directory

Follow the procedure below to recover the data storage disk or the transaction log storage directory.

1. Stop applications

Stop applications that are using the database.

## 2. Stop the instance

Stop the instance, refer to "2.1.2 Using Commands" for details.

If the instance fails to stop, refer to "10.11 Actions in Response to Failure to Stop an Instance".

## 3. Recover the failed disk

Replace the disk, and then recover the volume configuration information.

## 4. Create a storage destination directory

- If failure occurred on the data storage disk  
Create a data storage destination directory. If a tablespace was defined, also create a directory for it.
- If failure occurred on the translation log storage disk  
Create a transaction log storage destination directory.

In [Properties] in Windows(R) Explorer, set appropriate permissions so that only the instance administrator can access the storage destination directory. (Refer to [Help and Support] in Windows(R) for information on [Properties].)



Refer to "Preparing Directories to Deploy Resources" under "Setup" in the Installation and Setup Guide for Server for information on how to create a storage directory.

## 5. Recover the keystore, and enable automatic opening of the keystore

When the data in the database has been encrypted, restore the keystore to its state at the time of the database backup. Configure automatic opening of the keystore as necessary.

## 6. Recover the database cluster

Recover the database cluster using the backup data.

Specify the following in the `pgx_rcvall` command:

- Specify the data storage location in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the backup data storage location in the `-B` option.



```
> pgx_rcvall -D D:\database\inst1 -B E:\backup\inst1
```



If recovery fails, remove the cause of the error in accordance with the displayed error message and then re-execute the `pgx_rcvall` command.

If the message "pgx\_rcvall: an error occurred during recovery" is displayed, then the log recorded when recovery was executed is output after this message. The cause of the error is output in around the last fifteen lines of the log, so remove the cause of the error in accordance with the message and then re-execute the `pgx_rcvall` command.

The following message displayed during recovery is output as part of normal operation of `pgx_rcvall` command (therefore the user does not need not be concerned).

```
FATAL: The database system is starting
```

## 7. Start the instance

Refer to "2.1.2 Using Commands" for information on how to start an instance.

## 8. Resume applications

Resume applications that are using the database.

### If failure occurred on the backup data storage disk

The procedure for recovering the backup data storage disk is described below.

There are two methods of taking action:

- Performing recovery while the instance is active
- Stopping the instance before performing recovery

The following table shows the different steps to be performed depending on whether you stop the instance.

| No | Step   | Instance stopped |     |
|----|--|------------------|-----|
|    |  | No               | Yes |
| 1  | Confirm that transaction log mirroring has stopped | Y                | N   |
| 2  | Stop output of archive logs                        | Y                | N   |
| 3  | Stop applications                                  | N                | Y   |
| 4  | Stop the instance                                  | N                | Y   |
| 5  | Recover the failed disk                            | Y                | Y   |
| 6  | Create a backup data storage destination directory | Y                | Y   |
| 7  | Resume output of archive logs                      | Y                | N   |
| 8  | Resume transaction log mirroring                   | Y                | N   |
| 9  | Start the instance                                 | N                | Y   |
| 10 | Run backup   | Y                | Y   |
| 11 | Resume applications                                | N                | Y   |

Y: Required

N: Not required

The procedure is as follows:

If an instance has not been stopped

#### 1. Confirm that transaction log mirroring has stopped

Use the following SQL function to confirm that transaction log mirroring has stopped.

```
postgres=# SELECT pgx_is_wal_multiplexing_paused();
pgx_is_wal_multiplexing_paused
-----
t
(1 row)
```

If transaction log mirroring has not stopped, then stop it using the following SQL function.

```
postgres=# SELECT pgx_pause_wal_multiplexing();
LOG:  multiplexing of transaction log files has been stopped
pgx_pause_wal_multiplexing
-----
(1 row)
```

## 2. Stop output of archive logs

Transaction logs may accumulate during replacement of backup storage disk, and if the data storage disk or the transaction log storage disk becomes full, there is a risk that operations may not be able to continue.

To prevent this, use the following methods to stop output of archive logs.

- Changing archive\_command

Specify a command that will surely complete normally, so that archive logs will be regarded as having been output.

If you specify echo, a message is output to the server log, so it may be used as a reference when you conduct investigations.

- Reload the configuration file

Execute the pg\_ctl reload command or the pg\_reload\_conf SQL function to reload the configuration file.

If you simply want to stop output of errors without the risk that operations will not be able to continue, specify an empty string ("") in archive\_command and reload the configuration file.

## 3. Recover the failed disk

Replace the disk, and then recover the volume configuration information.

## 4. Create a backup data storage destination

Create a backup data storage destination.

In [Properties] in Windows(R) Explorer, set appropriate permissions so that only the instance administrator can access the backup data storage destination directory. (Refer to [Help and Support] in Windows(R) for information on [Properties].)

Refer to "[3.2.2 Using Server Commands](#)" for information on how to create a backup data storage destination.

## 5. Resume output of archive logs

Return the archive\_command setting to its original value, and reload the configuration file.

## 6. Resume transaction log mirroring

Execute the pgx\_resume\_wal\_multiplexing SQL function.

Example

```
SELECT pgx_resume_wal_multiplexing()
```

## 7. Run backup

Use the pgx\_dmpall command to back up the database cluster.

Specify the following value in the pgx\_dmpall command:

- Specify the data storage destination in the -D option. If the -D option is omitted, the value of the PGDATA environment variable is used by default.

Example

```
> pgx_dmpall -D D:\database\inst1
```

If an instance has been stopped

### 1. Stop applications

Stop applications that are using the database.

### 2. Stop the instance

Stop the instance. Refer to "[2.1.2 Using Commands](#)" for details.

If the instance fails to stop, refer to "[10.11 Actions in Response to Failure to Stop an Instance](#)".

### 3. Recover the failed disk

Replace the disk, and then recover the volume configuration information.

#### 4. Create a backup data storage destination

Create a backup data storage destination.

In [Properties] in Windows(R) Explorer, set appropriate permissions so that only the instance administrator can access the backup data storage destination directory. (Refer to [Help and Support] in Windows(R) for information on [Properties].)

Refer to "[3.2.2 Using Server Commands](#)" for details.

#### 5. Start the instance

Start the instance. Refer to "[2.1.2 Using Commands](#)" for information on how to start an instance.

#### 6. Run backup

Use the `pgx_dmpall` command to back up the database cluster.

Specify the following value in the `pgx_dmpall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

Example

```
> pgx_dmpall -D D:\database\inst1
```

#### 7. Resume applications

Resume applications that are using the database.



See

- Refer to "`pgx_rcvall`" and "`pgx_dmpall`" in the Reference for information on the `pgx_rcvall` command and `pgx_dmpall` command.
- Refer to "Write Ahead Log" under "Server Administration" in the PostgreSQL Documentation for information on `archive_command`.
- Refer to "[B.1 WAL Mirroring Control Functions](#)" for information on `pgx_resume_wal_multiplexing`.

## 10.2 Recovering from Data Corruption

---

If data in a disk is logically corrupted and the database does not operate properly, you can recover the database cluster to its state at the time of backup.

There are two methods of recovery:

- [10.2.1 Using WebAdmin](#)
- [10.2.2 Using the `pgx\_rcvall` Command](#)



Note

- Back up the database cluster after recovering it. Backup deletes obsolete archive logs (transaction logs copied to the backup data storage destination), freeing up disk space and reducing the recovery time.
- If you recover data to a point in the past, a new time series (database update history) will start from that recovery point. When recovery is complete, the recovery point is the latest point in the new time series. When you subsequently recover data to the latest state, the database update is re-executed on the new time series.

### 10.2.1 Using WebAdmin

---

If using WebAdmin, recover the data to the point immediately prior to data corruption by using the backup data.

Refer to "[10.1.1 Using WebAdmin](#)" for details.

## 10.2.2 Using the pgx\_rcvall Command

---

Recover the database cluster by specifying in the `pgx_rcvall` command the date and time of the backup you want to read from. Then re-execute the transaction as required to recover the data.

Follow the procedure below to recover the data storage disk.

1. Stop applications

Stop applications that are using the database.

2. Stop the instance

Stop the instance. Refer to ["2.1.2 Using Commands"](#) for information on how to stop an instance.

If the instance fails to stop, refer to ["10.11 Actions in Response to Failure to Stop an Instance"](#).

3. Confirm the backup date and time

Pinpoint a date and time prior to the data corruption based on the content of the job log or event log.

4. Recover the keystore, and enable automatic opening of the keystore

When the data in the database has been encrypted, restore the keystore to its state at the time of the database backup. Configure automatic opening of the keystore as necessary.

5. Recover the database cluster

Use the `pgx_rcvall` command to recover the database cluster.

Specify the following values in the `pg_rcvall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the backup storage directory in the `-B` option.
- Specify the recovery date and time in the `-e` option.

### Example

In the following examples, "May 20, 2015 10:00:00" is specified as the recovery time.

```
> pgx_rcvall -D D:\database\inst1 -B E:\backup\inst1 -e "2015-05-20 10:00:00"
```



If recovery fails, remove the cause of the error in accordance with the displayed error message and then re-execute the `pgx_rcvall` command.

If the message "pgx\_rcvall: an error occurred during recovery" is displayed, then the log recorded when recovery was executed is output after this message. The cause of the error is output in around the last fifteen lines of the log, so remove the cause of the error in accordance with the message and then re-execute the `pgx_rcvall` command.

The following message displayed during recovery is output as part of normal operation of `pgx_rcvall` command (therefore the user does not need not be concerned).

```
FATAL: The database system is starting
```

6. Start the instance

Start the instance. Refer to ["2.1.2 Using Commands"](#) for information on how to start an instance.

If necessary, re-execute transaction processing from the specified recovery time, and then resume database operations.

## Note

The `pgx_rcvall` command cannot accurately recover a hash index. If you are using a hash index, wait for the instance to start and then execute the `REINDEX` command for the appropriate index.

### 7. Resume applications

Resume applications that are using the database.

## See

Refer to "`pgx_rcvall`" in the Reference for information on the `pgx_rcvall` command.

## 10.3 Recovering from an Incorrect User Operation

---

This section describes how to recover database clusters when data has been corrupted due to erroneous user operations.

There are two methods of recovery:

- [10.3.1 Using WebAdmin](#)
- [10.3.2 Using the `pgx\_rcvall` Command](#)

## Note

- Back up the database cluster after recovering it. Backup deletes obsolete archive logs (transaction logs copied to the backup data storage destination), freeing up disk space and reducing the recovery time.
- If you recover data to a point in the past, a new time series (database update history) will start from that recovery point. When recovery is complete, the recovery point is the latest point in the new time series. When you subsequently recover data to the latest state, the database update is re-executed on the new time series.
- An effective restore point is one created on a time series for which you have made a backup. That is, if you recover data to a point in the past, you cannot use any restore points set after that recovery point. Therefore, once you manage to recover your target past data, make a backup.

### 10.3.1 Using WebAdmin

---

You can use WebAdmin to recover data to a backup point.

## Note

Recovery operation cannot be performed on an instance that is part of a streaming replication cluster in standby mode.

If disk failure occurs on a standby instance, it may be necessary to delete and re-create the instance.

Recovery operation can be performed on an instance that is part of a streaming replication cluster in "Master" mode. If a recovery operation is performed on a master instance, it will break the replication cluster and streaming replication will stop between the master instance and all its standby instances. In such an event, the standby instances can be promoted to standalone instances or can be deleted and re-created.

Follow the procedure below to recover the data in the data storage disk.

#### 1. Stop applications

Stop applications that are using the database.

#### 2. Stop the instance

Stop the instance. Refer to "[2.1.1 Using WebAdmin](#)" for information on how to stop an instance.

3. Recover the keystore, and enable automatic opening of the keystore

Do the following if the data in the database has been encrypted:

- Restore the keystore to its state at the time of the database backup.
- Enable automatic opening of the keystore.

4. Recover the database cluster

Log in to WebAdmin, and in the [Instances] tab, select the instance to be recovered and click .

5. Recover to the backup point

In the [Restore Instance] dialog box, click [Yes].

Recovery is performed. An instance is automatically started when recovery is successful.



WebAdmin cannot accurately recover a hash index. If you are using a hash index, then after recovery, execute the REINDEX command for the appropriate index.

6. Resume database operations

If necessary, re-execute transaction processing from the backup point to when an erroneous operation was performed, and then resume database operations.

## 10.3.2 Using the `pgx_rcvall` Command

---

The `pgx_rcvall` command recovers database clusters to the restore point created with the server command. Refer to "Setting a restore point" in "3.2.2 Using Server Commands" for information on how to create a restore point.

Follow the procedure below to recover the data in the data storage disk.

1. Stop applications

Stop applications that are using the database.

2. Stop the instance

Stop the instance. Refer to "2.1.2 Using Commands" for information on how to stop an instance.

If the instance fails to stop, refer to "10.11 Actions in Response to Failure to Stop an Instance".

3. Confirm the restore point

Use a restore point recorded in an arbitrary file, as explained in "3.2.2 Using Server Commands", to determine a restore point prior to the erroneous operation.

4. Recover the keystore, and enable automatic opening of the keystore

When the data in the database has been encrypted, restore the keystore to its state at the time of the database backup. Configure automatic opening of the keystore as necessary.

5. Recover the database cluster

Use the `pgx_rcvall` command to recover the database cluster.

Specify the following values in the `pg_rcvall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the backup data storage destination in the `-B` option.
- The `-n` option recovers the data to the specified restore point.

Example

The following example executes the `pgx_rcvall` command with the restore point "batch\_20150503\_1".

```
> pgx_rcvall -D D:\database\inst1 -B E:\backup\inst1 -n batch_20150503_1
```

### Note

If recovery fails, remove the cause of the error in accordance with the displayed error message and then re-execute the `pgx_rcvall` command.

If the message "pgx\_rcvall: an error occurred during recovery" is displayed, then the log recorded when recovery was executed is output after this message. The cause of the error is output in around the last fifteen lines of the log, so remove the cause of the error in accordance with the message and then re-execute the `pgx_rcvall` command.

The following message displayed during recovery is output as part of normal operation of `pgx_rcvall` (therefore the user does not need not be concerned).

```
FATAL: The database system is starting
```

#### 6. Start the instance

Start the instance.

Refer to "2.1.2 Using Commands" for information on how to start an instance.

### Note

The `pgx_rcvall` command cannot accurately recover a hash index. If you are using a hash index, wait for the instance to start and then execute the `REINDEX` command for the appropriate index.

#### 7. Restart operation of the database

If necessary, re-execute transaction processing from the specified recovery time to the point when an erroneous operation was performed, and then resume database operations.

### See

Refer to "pgx\_rcvall" in the Reference for information on the `pgx_rcvall` command.

## 10.4 Actions in Response to an Application Error

If there is a connection from a client that has been in the waiting state for an extended period, you can minimize performance degradation of the database by closing the problematic connection.

The following methods are available for identifying a connection to be closed:

- `view(pg_stat_activity)` (refer to "10.4.1 When using the view (pg\_stat\_activity)")
- `pgAdmin` (refer to "10.4.2 Using pgAdmin")

Use the system management function (`pg_terminate_backend`) to disconnect connections.

### 10.4.1 When using the view (pg\_stat\_activity)

When using the view (`pg_stat_activity`), follow the procedure below to close a connection.

1. Use `psql` command to connect to the postgres database.

```
> psql postgres
psql (9.5.2)
Type "help" for help.
```

2. Close connections from clients that have been in the waiting state for an extended period.

Use `pg_terminate_backend()` to close connections that have been trying to connect for an extended period.

However, when considering continued compatibility of applications, do not reference or use system catalogs and functions directly in SQL statements. Refer to "Notes on Application Compatibility" in the Application Development Guide for details.

#### Example

The following example closes connections where the client has been in the waiting state for at least 60 minutes.

```
select pid,username,application_name,client_hostname,pg_terminate_backend(pid) from
pg_stat_activity where state='idle in transaction' and current_timestamp > cast(query_start +
interval '60 minutes' as timestamp);
-[ RECORD 1 ]-----+-----
pid                | 4684
username           | fsepuser
application_name   | apl1
client_addr        | 192.11.11.1
pg_terminate_backend | t
```



#### See

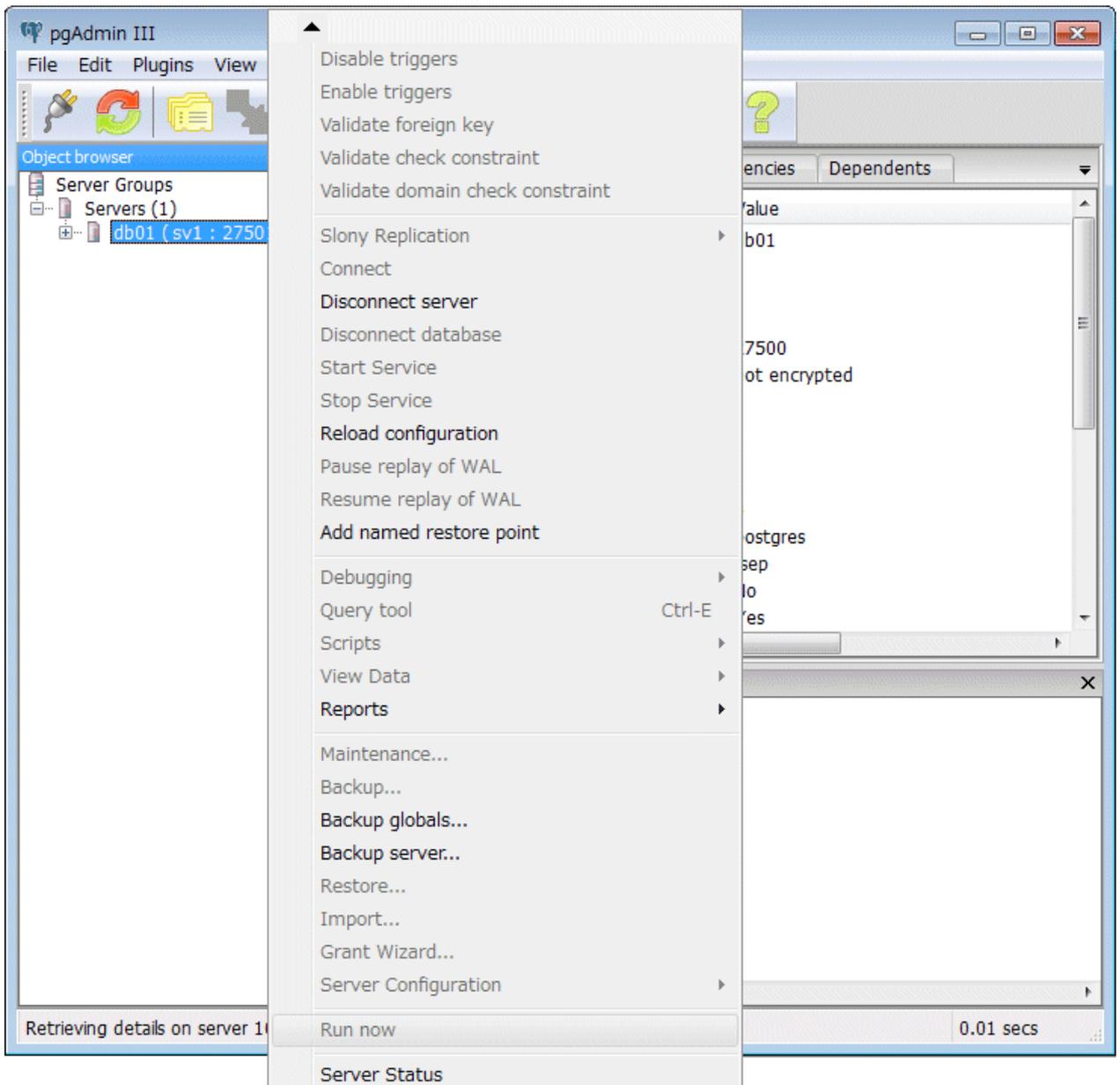
- Refer to "System Administration Functions" under "The SQL Language" in the PostgreSQL Documentation for information on `pg_terminate_backend`.
- Refer to "Notes on Application Compatibility" in the Application Development Guide for information on how to maintain application compatibility.

## 10.4.2 Using pgAdmin

---

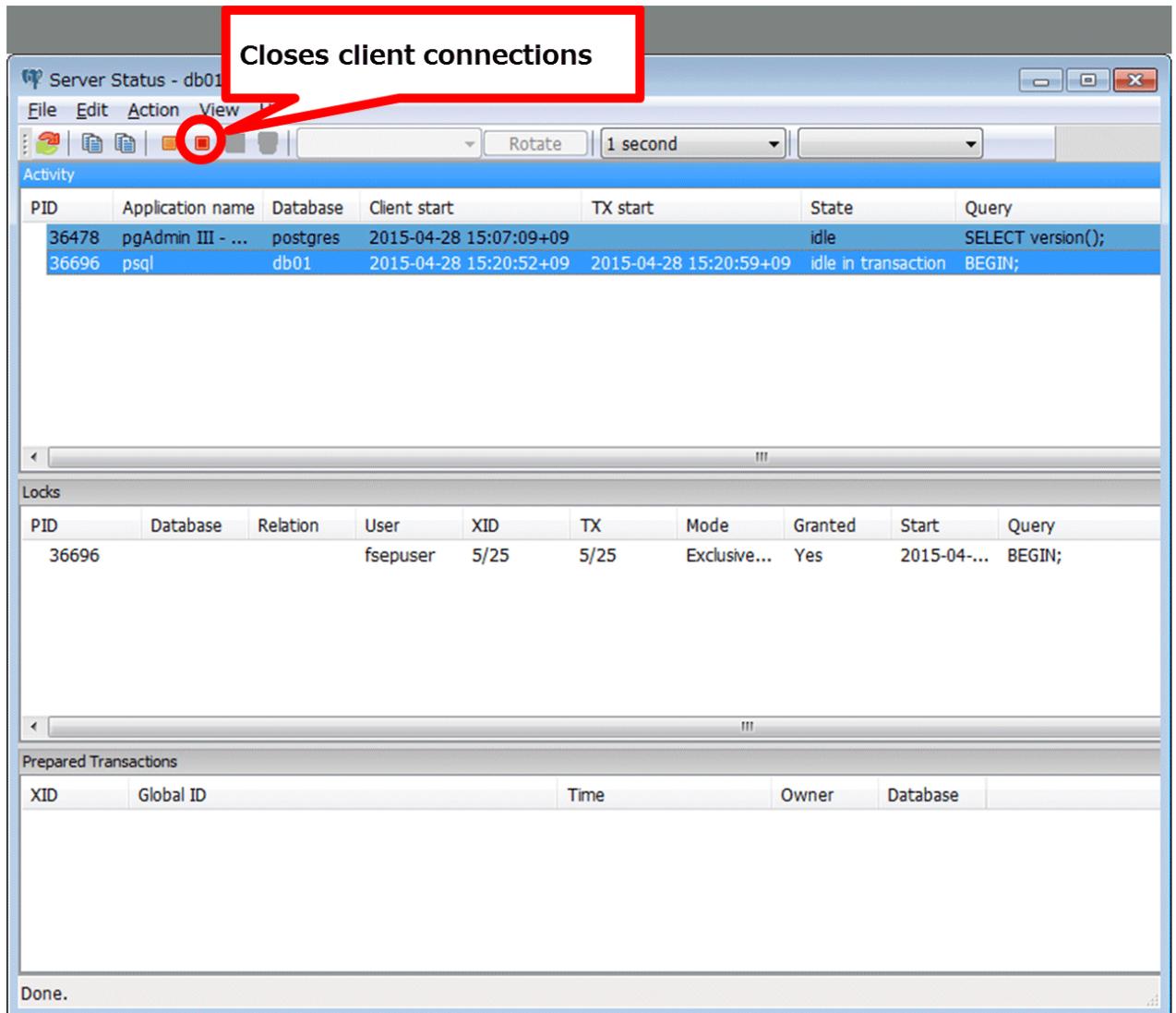
If using pgAdmin, follow the procedure below to close connections.

1. From the [Tools] menu in pgAdmin, click [Server Status].



2. Close client connections that have been in the waiting state for an extended period.

From the transaction start time displayed under [TX Start], select connections that have been in the waiting state for an extended period. Then click the red square button to close the connections.



## 10.5 Actions in Response to an Access Error

If access is denied, grant privileges allowing the instance administrator to operate the following directories, and then re-execute the operation. Also, refer to the event log and the server log, and confirm that the file system has not been mounted as read-only due to a disk error. If the file system has been mounted as read-only, mount it properly and then re-execute operations.

- Data storage destination
- Tablespace storage destination
- Transaction log storage destination
- Backup data storage destination



See

Refer to "Preparing Directories to Deploy Resources" under "Setup" in the Installation and Setup Guide for Server for information on the privileges required for the directory.

## 10.6 Actions in Response to Insufficient Space on the Data Storage Destination

---

If the data storage destination runs out of space, check if the disk contains any unnecessary files and delete them so that operations can continue.

If deleting unnecessary files does not solve the problem, you must migrate data to a disk with larger capacity.

There are two methods of migrating data:

- [10.6.1 Using a Tablespace](#)
- [10.6.2 Replacing the Disk with a Larger Capacity Disk](#)

### 10.6.1 Using a Tablespace

---

FUJITSU Enterprise Postgres enables you to use a tablespace to change the storage destination of database objects, such as tables and indexes, to a different disk.

The procedure is as follows:

1. Create a tablespace

Use the CREATE TABLESPACE command to create a new tablespace in the prepared disk.

2. Modify the tablespace

Use the ALTER TABLE command to modify tables for the newly defined tablespace.



See

Refer to "SQL Commands" under "Reference" in the PostgreSQL Documentation for information on the CREATE TABLESPACE command and ALTER TABLE command.

### 10.6.2 Replacing the Disk with a Larger Capacity Disk

---

Before replacing the disk with a larger capacity disk, migrate resources at the data storage destination using the backup and recovery features.

There are two methods of performing backup and recovery:

- [10.6.2.1 Using WebAdmin](#)
- [10.6.2.2 Using Server Commands](#)

The following sections describe procedures that use each of these methods to replace the disk and migrate resources at the data storage destination.



Note

- Before replacing the disk, stop applications and instances that are using the database.
- It is recommended that you back up the database cluster following recovery. Backup deletes obsolete archive logs (transaction logs copied to the backup data storage destination), freeing up disk space and reducing the recovery time.

#### 10.6.2.1 Using WebAdmin

Follow the procedure below to replace the disk and migrate resources at the data storage destination by using WebAdmin.

1. Back up files

If the disk at the data storage destination contains any required files, back up the files. It is not necessary to back up the data storage destination.

2. Stop applications

Stop applications that are using the database.

3. Back up the database cluster

Back up the latest resources at the data storage destination. Refer to "[3.2.1 Using WebAdmin](#)" for details.

4. Stop the instance

Stop the instance. Refer to "[2.1.1 Using WebAdmin](#)" for information on how to stop an instance.

5. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

6. Recover the database cluster

Log in to WebAdmin, and perform recovery operations. Refer to steps 4 ("Create a tablespace directory ") to 7 ("Run recovery") under "If failure occurred in the data storage disk or the transaction log storage disk" in "[10.1.1 Using WebAdmin](#)" for information on the procedure. An instance is automatically started when recovery is successful.

7. Resume applications

Resume applications that are using the database.

8. Restore the files

Restore the files backed up in step 1.

## 10.6.2.2 Using Server Commands

Follow the procedure below to replace the disk and migrate resources at the data storage destination by using server commands.

1. Back up files

If the disk at the data storage destination contains any required files, back up the files. It is not necessary to back up the data storage destination.

2. Stop applications

Stop applications that are using the database.

3. Back up the database cluster

Back up the latest resources at the data storage destination. Refer to "[3.2.2 Using Server Commands](#)" for details.

4. Stop the instance

After backup is complete, stop the instance. Refer to "[2.1.2 Using Commands](#)" for information on how to stop an instance.

If the instance fails to stop, refer to "[10.11 Actions in Response to Failure to Stop an Instance](#)".

5. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

6. Create a data storage destination

Create a data storage destination. If a tablespace was defined, also create a directory for it.

In [Properties] in Windows(R) Explorer, set appropriate permissions so that only the instance administrator can access the data storage destination directory. (Refer to [Help and Support] in Windows(R) for information on [Properties].)

7. Recover the keystore, and enable automatic opening of the keystore

When the data in the database has been encrypted, restore the keystore to its state at the time of the database backup. Configure automatic opening of the keystore as necessary.

8. Recover the database cluster

Use the `pgx_rcvall` command to recover the database cluster.

- Specify the data storage destination in the -D option. If the -D option is omitted, the value of the PGDATA environment variable is used by default.
- Specify the backup storage directory in the -B option.

#### Example

```
> pgx_rcvall -D D:\database\inst1 -B E:\backup\inst1
```

#### Note

If recovery fails, remove the cause of the error in accordance with the displayed error message and then re-execute the pgx\_rcvall command.

If the message "pgx\_rcvall: an error occurred during recovery" is displayed, then the log recorded when recovery was executed is output after this message. The cause of the error is output in around the last fifteen lines of the log, so remove the cause of the error in accordance with the message and then re-execute the pgx\_rcvall command.

The following message displayed during recovery is output as part of normal operation of pgx\_rcvall (therefore the user does not need not be concerned).

```
FATAL: The database system is starting
```

#### See

Refer to "pgx\_rcvall" in the Reference for information on the pgx\_rcvall command.

#### 9. Start the instance

Start the instance.

Refer to "[2.1.2 Using Commands](#)" for information on how to start an instance.

#### Note

The pgx\_rcvall command cannot accurately recover a hash index. If you are using a hash index, wait for the pgx\_rcvall command to end and then execute the REINDEX command for the appropriate index.

#### 10. Resume applications

Resume applications that are using the database.

#### 11. Restore files

Restore the files backed up in step 1.

## 10.7 Actions in Response to Insufficient Space on the Backup Data Storage Destination

If space runs out on the backup data storage destination, check if the disk contains any unnecessary files and delete them, and then make a backup as required.

If deleting unnecessary files does not solve the problem, take the following action:

- [10.7.1 Temporarily Saving Backup Data](#)
- [10.7.2 Replacing the Disk with a Larger Capacity Disk](#)

## 10.7.1 Temporarily Saving Backup Data

---

This method involves temporarily moving backup data to a different directory, saving it there, and securing disk space on the backup data storage destination so that a backup can be made normally.

Use this method if you need time to prepare a larger capacity disk.

If space runs out on the backup data storage destination, archive logs can no longer be stored in the backup data storage destination. As a result, transaction logs continue to accumulate in the data storage destination or the transaction log storage destination.

If action is not taken soon, the transaction log storage destination will become full, and operations may not be able to continue.

To prevent this, secure space in the backup data storage destination, so that archive logs can be stored.

There are two methods of taking action:

- [10.7.1.1 Using WebAdmin](#)
- [10.7.1.2 Using Server Commands](#)

### 10.7.1.1 Using WebAdmin

Follow the procedure below to recover the backup data storage disk.

#### 1. Temporarily save backup data

Move backup data to a different directory and temporarily save it, and secure space in the backup data storage destination directory.

The reason for saving the backup data is so that the data in the data storage destination can be recovered even if it is corrupted before you perform recovery. If there is no disk at the save destination and you consider that there is no risk of corruption at the data storage destination, delete the backup data.

The following example saves backup data from the backup data storage destination directory (E:\backup\inst1) under F:\mnt\usb\backup.

Example

```
> mkdir F:\mnt\usb\backup
> move E:\backup\inst1\* F:\mnt\usb\backup
```

Note: Place the temporary backup destination directory in a location where it will not impact on operating system resources or FUJITSU Enterprise Postgres resources.

#### 2. Back up the database cluster

Back up the latest resources at the data storage destination. Refer to "[3.2.1 Using WebAdmin](#)" for details.

#### 3. Delete temporarily saved backup data

If backup completes normally, the temporarily saved backup data becomes unnecessary and is deleted.

The following example deletes backup data that was temporarily saved in F:\mnt\usb.

Example

```
> rmdir /S /Q F:\mnt\usb\backup
```

### 10.7.1.2 Using Server Commands

The following describes the procedure for recovering the backup storage disk.

There are two methods of taking action:

- Performing recovery while the instance is active
- Stopping the instance before performing recovery

The following table shows the different steps to be performed depending on whether you stop the instance.

| No | Step                                 | Instance stopped |     |
|----|--------------------------------------|------------------|-----|
|    |                                      | No               | Yes |
| 1  | Stop transaction log mirroring       | Y                | N   |
| 2  | Stop output of archive logs          | Y                | N   |
| 3  | Stop applications                    | N                | Y   |
| 4  | Stop the instance                    | N                | Y   |
| 5  | Temporarily save backup data         | Y                | Y   |
| 6  | Resume output of archive logs        | Y                | N   |
| 7  | Resume transaction log mirroring     | Y                | N   |
| 8  | Start an instance                    | N                | Y   |
| 9  | Run backup                           | Y                | Y   |
| 10 | Resume applications                  | N                | Y   |
| 11 | Delete temporarily saved backup data | Y                | Y   |

Y: Required

N: Not required

The procedure is as follows:

### Performing recovery while the instance is active

#### 1. Stop transaction log mirroring

Stop transaction log mirroring.

```
postgres=# SELECT pgx_pause_wal_multiplexing();
LOG:  multiplexing of transaction log files has been stopped
pgx_pause_wal_multiplexing
-----
(1 row)
```

#### 2. Stop output of archive logs

Transaction logs may accumulate during replacement of backup storage disk, and if the data storage disk or the transaction log storage disk becomes full, there is a risk that operations may not be able to continue.

To prevent this, use the following methods to stop output of archive logs.

- Changing the archive\_command parameter

Specify a command that will surely complete normally, so that archive logs will be regarded as having been output.

If you specify echo, a message is output to the server log, so it may be used as a reference when you conduct investigations.

- Reloading the configuration file

Run the pg\_ctl reload command or the pg\_reload\_conf SQL function.

If you simply want to stop output of errors without the risk that operations will not be able to continue, specify an empty string (") in archive\_command and reload the configuration file.

#### 3. Temporarily save backup data

Move backup data to a different directory and temporarily save it, and secure space in the backup data storage destination directory.

The reason for saving the backup data is so that the data in the data storage destination can be recovered even if it is corrupted before you perform the next step. If there is no disk at the save destination and you consider that there is no risk of corruption at the data storage destination, delete the backup data.

The following example saves backup data from the backup data storage destination directory (E:\backup\inst1) under F:\mnt\usb\backup.

#### Example

```
> mkdir F:\mnt\usb\backup
> move E:\backup\inst1\* F:\mnt\usb\backup
```

Note: Place the temporary backup destination directory in a location where it will not impact on operating system resources or FUJITSU Enterprise Postgres resources.

#### 4. Resume output of archive logs

Return the archive\_command setting to its original value, and reload the configuration file.

#### 5. Resume transaction log mirroring

Execute the pgx\_resume\_wal\_multiplexing SQL function.

#### Example

```
SELECT pgx_resume_wal_multiplexing()
```

#### 6. Run backup

Use the pgx\_dmpall command to back up the database cluster.

Specify the following option in the pgx\_dmpall command:

- Specify the directory of the data storage destination in the -D option. If the -D option is omitted, the value of the PGDATA environment variable is used by default.

#### Example

```
> pgx_dmpall -D D:\database\inst1
```

#### 7. Delete temporarily saved backup data

If backup completes normally, the temporarily saved backup data becomes unnecessary and is deleted.

The following example deletes backup data that was temporarily saved in F:\mnt\usb.

#### Example

```
> rmdir /S /Q F:\mnt\usb\backup
```

## If an instance has been stopped

#### 1. Stop applications

Stop applications that are using the database.

#### 2. Stop the instance

Stop the instance. Refer to ["2.1.2 Using Commands"](#) for details.

If the instance fails to stop, refer to ["10.11 Actions in Response to Failure to Stop an Instance"](#).

#### 3. Temporarily save backup data

Move backup data to a different directory and temporarily save it, and secure space in the backup data storage destination directory.

The reason for saving the backup data is so that the data in the data storage destination can be recovered even if it is corrupted before you perform recovery. If there is no disk at the save destination and you consider that there is no risk of corruption at the data storage destination, delete the backup data.

The following example saves backup data from the backup data storage destination directory (E:\backup\inst1) under F:\mnt\usb\backup.

### Example

```
> mkdir F:\mnt\usb\backup
> move E:\backup\inst1\* F:\mnt\usb\backup
```

Note: Place the temporary backup destination directory in a location where it will not impact on operating system resources or FUJITSU Enterprise Postgres resources.

#### 4. Start the instance

Start the instance. Refer to ["2.1.2 Using Commands"](#) for information on how to start an instance.

#### 5. Run backup

Use the `pgx_dmpall` command to back up the database cluster.

Specify the following value in the `pgx_dmpall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

#### Example

```
> pgx_dmpall -D D:\database\inst1
```

#### 6. Resume applications

Resume applications that are using the database.

#### 7. Delete temporarily saved backup data

If backup completes normally, the temporarily saved backup data becomes unnecessary and is deleted.

The following example deletes backup data that was temporarily saved in `F:\mnt\usb`.

#### Example

```
> rmdir /S /Q F:\mnt\usb\backup
```



### See

- Refer to `"pgx_rcvall"` and `"pgx_dmpall"` in the Reference for information on the `pgx_rcvall` command and `pgx_dmpall` command.
- Refer to `"Write Ahead Log"` under `"Server Administration"` in the PostgreSQL Documentation for information on `archive_command`.
- Refer to `"B.1 WAL Mirroring Control Functions"` for information on the `pgx_is_wal_multiplexing_paused` and `pgx_resume_wal_multiplexing`.

## 10.7.2 Replacing the Disk with a Larger Capacity Disk

This method involves replacing the disk at the backup data storage destination with a larger capacity disk, so that it does not run out of free space again. After replacing the disk, back up data to obtain a proper backup.

There are two methods of performing backup:

- [10.7.2.1 Using WebAdmin](#)
- [10.7.2.2 Using Server Commands](#)



### Note

Before replacing the disk, stop applications that are using the database.

## 10.7.2.1 Using WebAdmin

Follow the procedure below to recover the backup storage disk.

### 1. Back up files

If the disk at the backup data storage destination contains any required files, back up the files. It is not necessary to back up the backup data storage destination.

### 2. Temporarily save backup data

Save the backup data to a different directory.

The reason for saving the backup data is so that the data in the data storage destination can be recovered even if it is corrupted before you perform the next step. If there is no disk at the save destination and you consider that there is no risk of corruption at the data storage destination, delete the backup data.

The following example saves backup data from the backup data storage destination directory (E:\backup\inst1) under F:\mnt\usb\backup.

#### Example

```
> mkdir F:\mnt\usb\backup
> move E:\backup\inst1\* F:\mnt\usb\backup
```

Note: Place the temporary backup destination directory in a location where it will not impact on operating system resources or FUJITSU Enterprise Postgres resources.

### 3. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

### 4. Run backup

Log in to WebAdmin, and perform recovery operations. Refer to steps 2 ("Recover the backup data") and 3 ("Run backup") under "If failure occurred on the backup storage disk" in "10.1.1 Using WebAdmin".

### 5. Restore files

Restore the files backed up in step 1.

### 6. Delete temporarily saved backup data

If backup completes normally, the temporarily saved backup data becomes unnecessary and is deleted.

The following example deletes backup data that was temporarily saved in F:\mnt\usb.

#### Example

```
> rmdir /S /Q F:\mnt\usb\backup
```

## 10.7.2.2 Using Server Commands

The procedure for recovering the backup data storage disk is described below.

There are two methods of taking action:

- Performing recovery while the instance is active
- Stopping the instance before performing recovery

The following table shows the different steps to be performed depending on whether you stop the instance.

| No | Step                         | Instance stopped |     |
|----|------------------------------|------------------|-----|
|    |                              | No               | Yes |
| 1  | Back up files                | Y                | Y   |
| 2  | Temporarily save backup data | Y                | Y   |

| No | Step   | Instance stopped |     |
|----|--|------------------|-----|
|    |  | No               | Yes |
| 3  | Confirm that transaction log mirroring has stopped | Y                | N   |
| 4  | Stop output of archive logs                        | Y                | N   |
| 5  | Stop applications                                  | N                | Y   |
| 6  | Stop the instance                                  | N                | Y   |
| 7  | Replace with a larger capacity disk                | Y                | Y   |
| 8  | Create a backup storage directory                  | Y                | Y   |
| 9  | Resume output of archive logs                      | Y                | N   |
| 10 | Resume transaction log mirroring                   | Y                | N   |
| 11 | Start the instance                                 | N                | Y   |
| 12 | Run backup   | Y                | Y   |
| 13 | Resume applications                                | N                | Y   |
| 14 | Restore files                                      | Y                | Y   |
| 15 | Delete temporarily saved backup data               | Y                | Y   |

Y: Required

N: Not required

The procedure is as follows:

If an instance has not been stopped

1. Back up files

If the disk at the backup data storage destination contains any required files, back up the files. It is not necessary to back up the backup data storage destination.

2. Temporarily save backup data

Save the backup data to a different directory.

The reason for saving the backup data is so that the data in the data storage destination can be recovered even if it is corrupted before you perform the next step. If there is no disk at the save destination and you consider that there is no risk of corruption at the data storage destination, delete the backup data.

The following example saves backup data from the backup data storage destination directory (E:\backup\inst1) under F:\mnt\usb\backup.

Example

```
> mkdir F:\mnt\usb\backup
> move E:\backup\inst1\* F:\mnt\usb\backup
```

3. Confirm that transaction log mirroring has stopped

Use the following SQL function to confirm that transaction log mirroring has stopped.

```
postgres=# SELECT pgx_is_wal_multiplexing_paused();
pgx_is_wal_multiplexing_paused
-----
t
(1 row)
```

If transaction log mirroring has not stopped, then stop it using the following SQL function.

```

postgres=# SELECT pgx_pause_wal_multiplexing();
LOG:  multiplexing of transaction log files has been stopped
pgx_pause_wal_multiplexing
-----
(1 row)

```

#### 4. Stop output of archive logs

Transaction logs may accumulate during replacement of backup storage disk, and if the data storage destination disk or the transaction log storage destination disk becomes full, there is a risk that operations may not be able to continue.

To prevent this, use the following methods to stop output of archive logs.

- Changing the `archive_command` parameter

Specify a command that will surely complete normally, so that archive logs will be regarded as having been output.

If you specify `echo`, a message is output to the server log, so it may be used as a reference when you conduct investigations.

- Reloading the configuration file

Run the `pg_ctl reload` command or the `pg_reload_conf` SQL function.

If you simply want to stop output of errors without the risk that operations will not be able to continue, specify an empty string (`"`) in `archive_command` and reload the configuration file.

#### 5. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

#### 6. Create a backup data storage destination

Create a backup data storage destination.

In [Properties] in Windows(R) Explorer, set appropriate permissions so that only the instance administrator can access the backup data storage destination directory. (Refer to [Help and Support] in Windows(R) for information on [Properties].)

Refer to "[3.2.2 Using Server Commands](#)" for details.

#### 7. Resume output of archive logs

Return the `archive_command` setting to its original value, and reload the configuration file.

#### 8. Resume transaction log mirroring

Execute the `pgx_resume_wal_multiplexing` SQL function.

Example

```
SELECT pgx_resume_wal_multiplexing()
```

#### 9. Run backup

Use the `pgx_dmpall` command to back up the database cluster.

Specify the following value in the `pgx_dmpall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

Example

```
> pgx_dmpall -D D:\database\inst1
```

#### 10. Restore files

Restore the files backed up in step 1.

#### 11. Delete temporarily saved backup data

If backup completes normally, the temporarily saved backup data becomes unnecessary and is deleted.

The following example deletes backup data that was temporarily saved in F:\mnt\usb.

Example

```
> rmdir /S /Q F:\mnt\usb\backup
```

If an instance has been stopped

1. Back up files

If the disk at the backup data storage destination contains any required files, back up the files. It is not necessary to back up the backup data storage destination.

2. Temporarily save backup data

Save the backup data to a different directory.

The reason for saving the backup data is so that the data in the data storage destination can be recovered even if it is corrupted before you perform the next step. If there is no disk at the save destination and you consider that there is no risk of corruption at the data storage destination, delete the backup data.

The following example saves backup data from the backup data storage destination directory (E:\backup\inst1) under F:\mnt\usb\backup.

Example

```
> mkdir F:\mnt\usb\backup  
> move E:\backup\inst1\* F:\mnt\usb\backup
```

Note: Place the temporary backup destination directory in a location where it will not impact on operating system resources or FUJITSU Enterprise Postgres resources.

3. Stop applications

Stop applications that are using the database.

4. Stop the instance

Stop the instance. Refer to "2.1.2 Using Commands" for information on how to stop an instance.

If the instance fails to stop, refer to "10.11 Actions in Response to Failure to Stop an Instance".

5. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

6. Create a backup data storage destination

Create a backup data storage destination.

In [Properties] in Windows(R) Explorer, set appropriate permissions so that only the instance administrator can access the backup data storage destination directory. (Refer to [Help and Support] in Windows(R) for information on [Properties].)

Refer to "3.2.2 Using Server Commands" for details.

7. Start the instance

Start the instance. Refer to "2.1.2 Using Commands" for information on how to start an instance.

8. Run backup

Use the `pgx_dmpall` command to back up the database cluster.

Specify the following value in the `pgx_dmpall` command:

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.

Example

```
> pgx_dmpall -D D:\database\inst1
```

#### 9. Resume applications

Resume applications that are using the database.

#### 10. Restore files

Restore the files backed up in step 1.

#### 11. Delete temporarily saved backup data

If backup completes normally, the temporarily saved backup data becomes unnecessary and is deleted.

The following example deletes backup data that was temporarily saved in F:\mnt\usb.

Example

```
> rmdir /S /Q F:\mnt\usb\backup
```



- Refer to "pgx\_rcvall" and "pgx\_dmpall" in the Reference for information on the pgx\_rcvall command and pgx\_dmpall command.
- Refer to "Write Ahead Log" under "Server Administration" in the PostgreSQL Documentation for information on archive\_command.
- Refer to "[B.1 WAL Mirroring Control Functions](#)" for information on the pgx\_is\_wal\_multiplexing\_paused and pgx\_resume\_wal\_multiplexing.

## 10.8 Actions in Response to Insufficient Space on the Transaction Log Storage Destination

If the transaction log storage destination runs out of space, check if the disk contains any unnecessary files and delete them so that operations can continue.

If deleting unnecessary files does not solve the problem, you must migrate data to a disk with larger capacity.

### 10.8.1 Replacing the Disk with a Larger Capacity Disk

Before replacing the disk with a larger capacity disk, migrate resources at the transaction log storage destination using the backup and recovery features.

There are two methods of performing backup and recovery:

- [10.8.1.1 Using WebAdmin](#)
- [10.8.1.2 Using Server Commands](#)

The following sections describe procedures that use each of these methods to replace the disk and migrate resources at the transaction log storage destination.



- Before replacing the disk, stop applications that are using the database.
- It is recommended that you back up the database cluster following recovery. Backup deletes obsolete archive logs (transaction logs copied to the backup data storage destination), freeing up disk space and reducing the recovery time.

## 10.8.1.1 Using WebAdmin

Follow the procedure below to replace the disk and migrate resources at the transaction log storage destination by using WebAdmin.

1. Back up files

If the disk at the transaction log storage destination contains any required files, back up the files. It is not necessary to back up the transaction log storage destination.

2. Back up the database cluster

Back up the latest data storage destination resources and transaction log storage destination resources (refer to "[3.2.1 Using WebAdmin](#)" for details).

3. Stop applications

Stop applications that are using the database.

4. Stop the instance

Stop the instance. Refer to "[2.1.1 Using WebAdmin](#)" for information on how to stop an instance. WebAdmin automatically stops instances if recovery of the database cluster is performed without stopping the instance.

5. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

6. Create a tablespace directory

If a tablespace was defined after backing up, create a directory for it.

7. Recover the keystore, and enable automatic opening of the keystore

Do the following if the data in the database has been encrypted:

- Restore the keystore to its state at the time of the database backup.
- Enable automatic opening of the keystore.

8. Recover the database cluster

Log in to WebAdmin, and perform recovery operations. Refer to steps 4 ("Create a tablespace directory ") to 7 ("Run Recovery") under "If failure occurred in the data storage disk or the transaction log storage disk " in "[10.1.1 Using WebAdmin](#)" for information on the procedure. An instance is automatically started when recovery is successful.

9. Resume applications

Resume applications that are using the database.

10. Restore files

Restore the files backed up in step 1.

## 10.8.1.2 Using Server Commands

Follow the procedure below to replace the disk and migrate resources at the transaction log storage destination by using server commands.

1. Back up files

If the disk at the transaction log storage destination contains any required files, back up the files. It is not necessary to back up the transaction log storage destination.

2. Back up the database cluster

Use server commands to back up the latest data storage destination resources and transaction log storage destination resources. Refer to "[3.2.2 Using Server Commands](#)" for information on how to perform backup.

3. Stop applications

Stop applications that are using the database.

4. Stop the instance

After backup is complete, stop the instance. Refer to "[2.1.2 Using Commands](#)" for information on how to stop an instance.

If the instance fails to stop, refer to "[10.11 Actions in Response to Failure to Stop an Instance](#)".

5. Replace with a larger capacity disk

Replace the disk. Then, recover the volume configuration information.

6. Create a transaction log storage destination

Create a transaction log storage destination. If a tablespace was defined, also create a directory for it.

In [Properties] in Windows(R) Explorer, set appropriate permissions so that only the instance administrator can access the transaction log destination directory. (Refer to [Help and Support] in Windows(R) for information on [Properties].)

7. Recover the keystore, and enable automatic opening of the keystore

When the data in the database has been encrypted, restore the keystore to its state at the time of the database backup. Configure automatic opening of the keystore as necessary.

8. Recover the database cluster

Use the `pgx_rcvall` command to recover the database cluster.

- Specify the data storage destination in the `-D` option. If the `-D` option is omitted, the value of the `PGDATA` environment variable is used by default.
- Specify the backup storage directory in the `-B` option.

Example

```
> pgx_rcvall -D D:\database\inst1 -B E:\backup\inst1
```

 Note

If recovery fails, remove the cause of the error in accordance with the displayed error message and then re-execute the `pgx_rcvall` command.

If the message "`pgx_rcvall: an error occurred during recovery`" is displayed, then the log recorded when recovery was executed is output after this message. The cause of the error is output in around the last fifteen lines of the log, so remove the cause of the error in accordance with the message and then re-execute the `pgx_rcvall` command.

The following message displayed during recovery is output as part of normal operation of `pgx_rcvall` command (therefore the user does not need not be concerned).

```
FATAL: The database system is starting
```

 See

Refer to "`pgx_rcvall`" in the Reference for information on the `pgx_rcvall` command.

9. Start the instance

Start the instance.

Refer to "[2.1.2 Using Commands](#)" for information on how to start an instance.

 Note

The `pgx_rcvall` command cannot accurately recover a hash index. If you are using a hash index, wait for the instance to start and then execute the `REINDEX` command for the appropriate index.

10. Resume applications

Resume applications that are using the database.

## 11. Restore files

Restore the files backed up in step 1.

## 10.9 Errors in More Than One Storage Disk

---

If an error occurs in the storage destination disks or resources are corrupted, determine the cause of the error from event logs and server logs and remove the cause.

If errors occur in either of the following combinations, you cannot recover the database.

Recreate the instance, and rebuild the runtime environment.

| Data storage disk | Transaction log storage disk | Backup data storage disk |
|-------------------|------------------------------|--------------------------|
| Error             | -                            | Error                    |
| -                 | Error                        | Error                    |



See

.....  
Refer to "Setup" in the Installation and Setup Guide for Server for information on how to create an instance and build the runtime environment.  
.....

## 10.10 Actions in Response to Instance Startup Failure

---

If an instance fails to start, refer to the event log and the server log, and determine the cause of the failure.

If using WebAdmin, remove the cause of the error. Then, click [Solution] and [Recheck the status] and confirm that the instance is in the normal state.

The following sections describe common causes of errors and the actions to take.

### 10.10.1 Errors in the Configuration File

---

If you have directly edited the configuration file using a text editor or changed the settings using WebAdmin, refer to the event log and the server log, confirm that no messages relating to the files below have been output.

- postgresql.conf
- pg\_hba.conf



See

.....  
Refer to the following for information on the parameters in the configuration file:

- "Configuring Parameters" in the Installation and Setup Guide for Server
  - "Appendix A Parameters"
  - "Server Configuration" and "Client Authentication" under "Server Administration" in the PostgreSQL Documentation
- .....

### 10.10.2 Errors Caused by Power Failure or Mounting Issues

---

If mounting is cancelled after restarting the server, for example, because the disk device for each storage destination disk was not turned on, or because automatic mounting has not been set, then starting an instance will fail.

Refer to "[10.14.2 Errors Caused by Power Failure or Mounting Issues](#)", and take actions accordingly.

## 10.10.3 Other Errors

---

This section describes the recovery procedure to be used if you cannot take any action or the instance cannot start even after you have referred to the event log and the server log.

There are two methods of recovery:

- [10.10.3.1 Using WebAdmin](#)
- [10.10.3.2 Using Server Commands](#)

Note that recovery will not be possible if there is an error at the backup data storage destination. If the problem cannot be resolved, contact Fujitsu technical support.

### 10.10.3.1 Using WebAdmin

Follow the procedure below to perform recovery.

1. Delete the data storage destination directory and the transaction log storage destination directory  
Back up the data storage destination directory and the transaction log storage destination directory before deleting them.
2. Reconfirm the status  
Log in to WebAdmin, and in the [Instances] tab, click [Solution] for the error message.  
Click [Recheck the status] to reconfirm the storage destination resources.
3. Run recovery  
Restore the database cluster after WebAdmin detects an error.  
Refer to "[10.2.1 Using WebAdmin](#)" for details.

### 10.10.3.2 Using Server Commands

Follow the procedure below to recover the database.

1. Delete the data storage destination directory and the transaction log storage destination directory  
Save the data storage destination directory and the transaction log storage destination directory, and then delete them.
2. Execute recovery  
Use the `pgx_rcvall` command to recover the database cluster.  
Refer to "[10.2.2 Using the pgx\\_rcvall Command](#)" for details.

## 10.11 Actions in Response to Failure to Stop an Instance

---

If an instance fails to stop, refer to the event log and the server log, and determine the cause of the failure.

If the instance cannot stop despite taking action, perform the following operation to stop the instance.

There are two methods of recovery:

- [10.11.1 Using WebAdmin](#)
- [10.11.2 Using Server Commands](#)

### 10.11.1 Using WebAdmin

---

In the [Instances] tab, click  and select the Fast stop mode or the Immediate stop mode to stop the instance. Forcibly terminate the server process from WebAdmin if the instance cannot be stopped.

Refer to "[2.1.1 Using WebAdmin](#)" for information on the stop modes.

## 10.11.2 Using Server Commands

---

There are three methods:

- Stopping the Instance Using the Fast Mode

If backup is in progress, then terminate it, roll back all executing transactions, forcibly close client connections, and then stop the instance.

- Stopping the Instance Using the Immediate Mode

Forcibly terminate the instance immediately. A crash recovery is run when the instance is restarted.

- Forcibly Stopping the Server Process

Reliably stops the server process when the other methods are unsuccessful.

### 10.11.2.1 Stopping the Instance Using the Fast Mode

Specify "-m fast" in the pg\_ctl command to stop the instance.

If the instance fails to stop when you use this method, stop the instance as described in "[10.11.2.2 Stopping the Instance Using the Immediate Mode](#)" or "[10.11.2.3 Forcibly Stopping the Server Process](#)".

#### Example

```
> pg_ctl stop -D D:\database\inst1 -m fast
```

### 10.11.2.2 Stopping the Instance Using the Immediate Mode

Specify "-m immediate" in the pg\_ctl command to stop the instance.

If the instance fails to stop when you use this method, stop the instance as described in "[10.11.2.3 Forcibly Stopping the Server Process](#)".

#### Example

```
> pg_ctl stop -D D:\database\inst1 -m immediate
```

### 10.11.2.3 Forcibly Stopping the Server Process

If both the Fast mode and the Immediate mode fail to stop the instance, use the kill parameter of the pg\_ctl command to forcibly stop the server process.

The procedure is as follows:

1. Execute the wmic command to identify the process ID of the server process.

```
c:\>wmic
wmic:root\cli>process where "name = \"postgres.exe\"" get CommandLine,Name,ProcessId
CommandLine                                     Name
ProcessId
:
"C:\Program Files\Fujitsu\fsepv<xy>server64\bin\postgres.exe" -D "D:\database\inst1"
postgres.exe 896
:
```

The postgres.exe process ID(896) that indicates the data storage destination directory of the applicable instance in the -D option becomes the server process.

2. Forcibly stop the server process

As instance manager, forcibly stop the server process using the pg\_ctl command.

```
c:\>pg_ctl kill QUIT 896
```

## 10.12 Actions in Response to Failure to Create a Streaming Replication Standby Instance

When creating a streaming replication standby instance using WebAdmin, if the instance creation fails, refer to the event log and the server log, and determine the cause of the failure.

When an error occurs in the creation of the standby instance using WebAdmin, it is unlikely that the partially created standby instance can be resumed to complete the operation.

In such a scenario, fix the cause of the error, delete the partially created standby instance, and then create a new standby instance. This recommendation is based on the following assumptions:

- As the instance is yet to be created completely, there are no applications connecting to the database.
- The standby instance is in error state and is not running.
- There are no backups for the standby instance and as a result, it cannot be recovered.

Refer to "Deleting Instances" in the Installation and Setup Guide for details on how to delete a instance.

## 10.13 Actions in Response to Error in a Distributed Transaction

If a system failure (such as server failure) occurs in an application that uses distributed transactions (such as .NET TransactionScope), then transactions may be changed to the in-doubt state. At that point, resources accessed by the transaction will be locked, and rendered unusable by other transactions.

The following describes how to check for in-doubt transactions, and how to resolve them.

### How to check for in-doubt transactions

The following shows how to check for them:

If the server fails

1. An in-doubt transaction will have occurred if a message similar to the one below is output to the log when the server is restarted.

Example

```
LOG: Restoring prepared transaction 2103.
```

2. Refer to system view `pg_prepared_xacts` to obtain information about the prepared transaction.

If the transaction identifier of the prepared transaction in the list (in the transaction column of `pg_prepared_xacts`) is the same as the identifier of the in-doubt transaction obtained from the log output when the server was restarted, then that row is the information about the in-doubt transaction.

Example

```
postgres=# select * from pg_prepared_xacts;
 transaction | gid          | prepared | owner          | database
-----+-----+-----+-----+-----
 2103 | 374cc221-f6dc-4b73-9d62-d4fec9b430cd | 2015-05-06 16:28:48.471+08 | postgres |
postgres (1 row)
```

Information about the in-doubt transaction is output to the row with the transaction ID 2103 in the transaction column.

If the client fails

If there are no clients connected and there is a prepared transaction in `pg_prepared_xacts`, then you can determine that the transaction is in the in-doubt state.

If at least one client is connected and there is a prepared transaction in `pg_prepared_xacts`, you cannot determine whether there is a transaction in the in-doubt state. In this case, use the following query to determine the in-doubt transaction from the acquired database name, user name, the time PREPARE TRANSACTION was executed, and the information about the table name accessed.

```
select gid,x.database,owner,prepared,l.relation::regclass as relation from pg_prepared_xacts x
left join pg_locks l on l.virtualtransaction = '-1/'||x.transaction and l.locktype='relation';
```

If it still cannot be determined from this information, wait a few moments and then check `pg_prepared_xacts` again.

If there is a transaction that has continued since the last time you checked, then it is likely that it is the one in the in-doubt state.

### Point

As you can see from the explanations in this section, there is no one way to definitively determine in-doubt transactions.

Consider collecting other supplementary information (for example, logging on the client) or performing other operations (for example, allocating database users per job).

## How to resolve in-doubt transactions

From the system view `pg_prepared_xacts` mentioned above, obtain the global transaction identifier (in the `gid` column of `pg_prepared_xacts`) for the in-doubt transaction, and issue either a `ROLLBACK PREPARED` statement or `COMMIT PREPARED` statement to resolve the in-doubt transaction.

### Example

- Rolling back in-doubt transactions

```
postgres=# rollback prepared '374cc221-f6dc-4b73-9d62-d4fec9b430cd';
ROLLBACK PREPARED
```

- Committing in-doubt transactions

```
postgres=# commit prepared '374cc221-f6dc-4b73-9d62-d4fec9b430cd';
COMMIT PREPARED
```

## 10.14 I/O Errors Other than Disk Failure

Even if a disk is not defective, the same input-output error messages, as those generated when the disk is defective, may be output.

A few examples of such errors are given below. The appropriate action for each error is explained respectively.

- [10.14.1 Network Error with an External Disk](#)
- [10.14.2 Errors Caused by Power Failure or Mounting Issues](#)

### 10.14.1 Network Error with an External Disk

This is an error that occurs in the network path to/from an external disk.

Determine the cause of the error by checking the information in the event log and the server log, the disk access LED, network wiring, and network card status. Take appropriate action to remove the cause of the error, for example, replace problematic devices.

### 10.14.2 Errors Caused by Power Failure or Mounting Issues

These are errors that occur when the disk device is not turned on, automatic mounting of the disk was not set, or mounting was accidentally cancelled.

In this case, check the information in the event log and the server log, the disk access LED, and whether the disk is mounted correctly. If problems are detected, take appropriate action.

If mounting has been cancelled, it is possible that mounting was accidentally cancelled, or the existing setting (automatic mounting at the time of starting the operating system) has been changed so that mounting is not performed automatically. In this case, set the mounting to be performed automatically.

# Appendix A Parameters

This appendix describes the parameters to be set in the postgresql.conf file of FUJITSU Enterprise Postgres.

The postgresql.conf file is located in the data storage destination.

- core\_directory (string)

This parameter specifies the directory where the corefile is to be output. If this parameter is omitted, the data storage destination is used by default. This parameter can only be set when specified on starting an instance. It cannot be changed dynamically, while an instance is active.

- core\_contents (string)

This parameter specifies the contents to be included in the corefile.

- full: Outputs all contents of the server process memory to the corefile.
- none: Does not output a corefile.
- minimum: Outputs only non-shared memory server processes to the corefile. This reduces the size of the corefile. However, in some cases, this file may not contain sufficient information for examining the factor that caused the corefile to be output.

If this parameter is omitted, "minimum" is used by default. This parameter can only be set when specified on starting an instance. It cannot be changed dynamically, while an instance is active.

- keystore\_location (string)

This parameter specifies the directory that stores the keystore file. Specify a different location from other database clusters. This parameter can only be set when specified on starting an instance. It cannot be changed dynamically, while an instance is active.

- tablespace\_encryption\_algorithm (string)

This parameter specifies the encryption algorithm for tablespaces that will be created. Valid values are AES128, AES256, and none. If you specify "none", encryption is not performed. The default value is "none". To perform encryption, it is recommended that you specify AES256. Only superusers can change this setting.

- backup\_destination (string)

This parameter specifies the absolute path of the directory where pgx\_dmpall will store the backup data. Specify a different location from other database clusters. This parameter can only be set when specified on starting an instance. It cannot be changed dynamically, while an instance is active.

Place this directory on a different disk from the data directory to be backed up and the tablespace directory. Ensure that users do not store arbitrary files in this directory, because the contents of this directory are managed by the database system.

- search\_path (string)

When using the SUBSTR function compatible with Oracle databases, set "oracle" and "pg\_catalog" in the search\_path parameter. You must specify "oracle" before "pg\_catalog".



## Example

```
search_path = '$user', public, oracle, pg_catalog'
```



## Information

- The search\_path feature specifies the priority of the schema search path. The SUBSTR function in Oracle database is defined in the oracle schema.
- Refer to "Statement Behavior" under "Server Administration" in the PostgreSQL Documentation for information on search\_path.

- track\_waits (string)

This parameter enables collection of statistics for pgx\_stat\_lwlock and pgx\_stat\_latch.

- on: Enables collection of statistics.
- off: Disables collection of statistics.

If this parameter is omitted, "on" is assumed.

Only superusers can change this setting.

- track\_sql (string)

This parameter enables collection of statistics for pgx\_stat\_sql.

- on: Enables collection of statistics.
- off: Disables collection of statistics.

If this parameter is omitted, "on" is assumed.

Only superusers can change this setting.

#### Parameters for parallel scan

- enable\_parallelagg (boolean)

This parameter enables or disables the query planner's use of parallel aggregation plan. If set to "off", parallel aggregation plan will not be used. Normally, use the default value when using the parallel scan feature.

- Valid values: on or off, 1 or 0
- Default value: on

- enable\_parallelscan (boolean)

This parameter enables or disables the query planner's use of parallel scan plan. If set to "off", parallel scan plan will not be used. Normally, use the default value when using the parallel scan feature.

- Valid values: on or off, 1 or 0
- Default value: on

- max\_parallel\_degree (4-byte signed integer)

This parameter specifies the maximum number of parallel processes (background processes) to be used per SQL statement. If set to "0", no parallel processes will be generated, and therefore execution plans will not be able to use parallel scan. When using the parallel scan feature, specify this parameter.

- Minimum value: 0
- Maximum value: 8388607
- Default value: 0

- parallel\_scan\_pages\_threshold (4-byte signed integer)

If the target table size is equal to the specified threshold (number of pages) or more, the query planner considers the parallel scan plan as an option. Normally, use the default value when using the parallel scan feature.

- Minimum value: 1
- Maximum value: 4-byte signed integer
- Default value: 1000

- parallel\_setup\_cost (double precision floating point)

This parameter sets the estimated cost of the planner for starting parallel processes. This value is used to calculate the cost for the parallel scan plan.

- Minimum value: 0
- Maximum value: Maximum value of double precision floating point
- Default value: 1000.0

- parallel\_tuple\_cost (double precision floating point)

This parameter sets the estimated cost of the planner for transferring rows from parallel processes to backend processes. This value is used to calculate the cost for the parallel scan plan.

- Minimum value: 0
- Maximum value: Maximum value of double precision floating point
- Default value: 0.1

#### Parameters for the in-memory feature

- reserve\_buffer\_ratio (numerical value)

This parameter specifies the proportion of shared memory to be used for a stable buffer table.

- Minimum value: 0
- Maximum value: 80

If this parameter is omitted, 0 will be used.

- vci.control\_max\_workers (numerical value)

This parameter specifies the number of background workers that manage VCI. The number of workers for the entire instance is limited by max\_worker\_processes, so add the value specified here to max\_worker\_processes.

- Minimum value: 1
- Maximum value: 8388607

If this parameter is omitted or a value outside this range is specified, 8 will be used.

- vci.enable (string)

This parameter enables or disables VCI.

- on: Enables VCI.
- off: Disables VCI.

If this parameter is omitted, "on" will be used.

- vci.log\_query (string)

This parameter enables or disables log output when VCI is not used due to insufficient memory specified by vci.max\_local\_ros.

- on: Enables log output.
- off: Disables log output.

If this parameter is omitted, "off" will be used.

- vci.maintenance\_work\_mem (numerical value)

This parameter specifies the maximum memory size used for maintenance of VCI (when executing CREATE INDEX, for example).

- Minimum value: 1 MB
- Maximum value: Maximum value that can be expressed as a 4-byte signed integer / 1024

If this parameter is omitted or a value outside this range is specified, 256 MB will be used.

- vci.max\_local\_ros (numerical value)

This parameter specifies the maximum memory size used for VCI scan.

- Minimum value: 64 MB
- Maximum value: Maximum value that can be expressed as a 4-byte signed integer

If this parameter is omitted or a value outside this range is specified, 64 MB will be used.

## Information

The maximum value that can be expressed as a 4-byte signed integer changes according to the operating system. Follow the definition of the operating system in use.

- `vci.max_parallel_degree` (numerical value)

This parameter specifies the maximum number of background workers used for parallel scan. The number of workers for the entire instance is limited by `max_worker_processes`, so add the value specified here to `max_worker_processes`.

A value from -8388607 to 8388607 can be specified.

- Integer (1 or greater): Parallel scan is performed using the specified degree of parallelism.
- 0: Stops the parallel scan process.
- Negative number: The specified value minus the maximum number of CPUs obtained from the environment is used as the degree of parallelism and parallel scan is performed.

If this parameter is omitted or a value outside this range is specified, "0" will be used.

- `vci.shared_work_mem` (numerical value)

This parameter specifies the maximum memory size used for VCI parallel scan.

- Minimum value: 32 MB
- Maximum value: Maximum value that can be expressed as a 4-byte signed integer

If this parameter is omitted or a value outside this range is specified, 1 GB will be used.

- `vci.smc_directory` (string)

This parameter specifies a directory name in which a temporary file is created as the dynamic shared memory during a scan using a VCI.

If this parameter is omitted, a directory (`dataStorageDir\base\pgsql_tmp`) under the data storage directory will be used.

## Note

Note the following when specifying the path:

- Specify `\\` as the path delimiter.
- Enclose the path in double quotes (") if it contains spaces.

## See

Refer to "Server Configuration" under "Server Administration" in the PostgreSQL Documentation for information on other `postgresql.conf` parameters.

## Appendix B System Administration Functions

This appendix describes the system administration functions of FUJITSU Enterprise Postgres.



Refer to "System Administration Functions" under "The SQL Language" in the PostgreSQL Documentation for information on other system administration functions.

### B.1 WAL Mirroring Control Functions

The following table lists the functions that can be used for backup and recovery based on WAL mirroring.

Table B.1 WAL mirroring control functions

| Name  | Return type | Description                                  |
|---|-------------|--|
| <code>pgx_pause_wal_multiplexing()</code>     | void        | Stops WAL multiplexing                       |
| <code>pgx_resume_wal_multiplexing()</code>    | void        | Resumes WAL multiplexing                     |
| <code>pgx_is_wal_multiplexing_paused()</code> | boolean     | Returns true if WAL multiplexing has stopped |

If WAL multiplexing has not been configured, these functions return an error. Setting the `backup_destination` parameter in `postgresql.conf` configures WAL multiplexing.

Only superusers can execute these functions.

### B.2 Transparent Data Encryption Control Functions

The following table lists the functions that can be used for transparent data encryption.

Table B.2 Transparent data encryption control functions

| Name   | Return type | Description                     |
|--|-------------|---------------------------------|
| <code>pgx_open_keystore(<i>passphrase</i>)</code>                                    | void        | Opens the keystore              |
| <code>pgx_set_master_key(<i>passphrase</i>)</code>                                   | void        | Sets the master encryption key  |
| <code>pgx_set_keystore_passphrase(<i>oldPassphrase</i>, <i>newPassphrase</i>)</code> | void        | Changes the keystore passphrase |

The `pgx_open_keystore` function uses the specified passphrase to open the keystore. When the keystore is opened, the master encryption key is loaded into the database server memory. In this way, you can access the encrypted data and create encrypted tablespaces. If the keystore is already open, this function returns an error.

Only superusers can execute this function. Also, this function cannot be executed within a transaction block.

The `pgx_set_master_key` function generates a master encryption key and stores it in the keystore. If the keystore does not exist, this function creates a keystore. If the keystore already exists, this function modifies the master encryption key. If the keystore has not been opened, this function opens it.

The passphrase is a string of 8 to 200 bytes.

Only superusers can execute this function. Also, this function cannot be executed within a transaction block. Processing is not affected by whether the keystore is open.

The `pgx_set_keystore_passphrase` function changes the keystore passphrase. Specify the current passphrase in *oldPassphrase*, and a new passphrase in *newPassphrase*.

The passphrase is a string of 8 to 200 bytes.

Only superusers can execute this function. Also, this function cannot be executed within a transaction block. Processing is not affected by whether the keystore is open.

## B.3 Data Masking Control Functions

---

The table below lists the functions that can be used for data masking.

Table B.3 Data masking control functions

| Name   | Return type | Description  |
|--|-------------|--|
| <a href="#">pgx_alter_confidential_policy</a>  | boolean     | Changes masking policies   |
| <a href="#">pgx_create_confidential_policy</a> | boolean     | Creates masking policies   |
| <a href="#">pgx_drop_confidential_policy</a>   | boolean     | Deletes masking policies   |
| <a href="#">pgx_enable_confidential_policy</a> | boolean     | Enables or disables masking policies   |
| <a href="#">pgx_update_confidential_values</a> | boolean     | Changes replacement characters when full masking is specified for masking type |

### B.3.1 `pgx_alter_confidential_policy`

---

#### Description

Changes masking policies

#### Format

The format varies depending on the content to be changed. The format is shown below.

- Common format

```
common_arg:
[schema_name      := 'schemaName', ]


```

- Add a masking target to a masking policy

```
pgx_alter_confidential_policy(
commonArg,
[action           := 'ADD_COLUMN', ]
column_name      := 'columnName'
[, function_type := 'FULL'] |
[, function_type := 'PARTIAL', partialOpt] |
[, function_type := 'REGEXP', regexpOpt]
)
```

```
partialOpt:
function_parameters := 'maskingFormat'
```

```
regexpOpt:
regexp_pattern      := 'regexpPattern',
regexp_replacement := 'regexpReplacementChar',
[, regexp_flags     := 'regexpFlags']
```

- Delete a masking target from a masking policy

```
pgx_alter_confidential_policy(
  commonArg,
  action          := 'DROP_COLUMN',
  column_name     := 'col umnName'
)
```

- Change the masking condition

```
pgx_alter_confidential_policy(
  commonArg,
  action          := 'MODIFY_EXPRESSION',
  expression      := 'expressi on'
)
```

- Change the content of a masking policy set for a masking target

```
pgx_alter_confidential_policy(
  commonArg,
  action          := 'MODIFY_COLUMN',
  column_name     := 'col umnName'
  [, function_type := 'FULL'] |
  [, function_type := 'PARTIAL', parti al Opt] |
  [, function_type := 'REGEXP', regexpOpt]
)
```

```
parti al Opt:
function_parameters := 'maski ngFormat'
```

```
regexpOpt:
regexp_pattern      := 'regexpPattern',
regexp_replacement := 'regexpRepl acementChar',
[, regexp_flags    := 'regexpFl ags']
```

- Change the masking policy description

```
pgx_alter_confidential_policy(
  commonArg,
  action          := 'SET_POLICY_DESCRIPTION',
  policy_description := 'pol icyDesc'
)
```

- Change the masking target description

```
pgx_alter_confidential_policy(
  commonArg,
  action          := 'SET_COLUMN_DESCRIPTION',
  column_name     := 'col umnName',
  column_description := 'col umnDesc'
)
```

## Argument

The argument varies depending on the content to be changed. Details are as follows.

- Common arguments

| Masking type for which an argument can be specified | Argument    | Data type   | Description  | Default value |
|---|-------------|-------------|--|---------------|
| All   | schema_name | varchar(63) | Schema name of table for which a masking policy is applied | 'public'      |
|   | table_name  | varchar(63) | Name of table for which a masking policy is applied        | Mandatory     |
|   | policy_name | varchar(63) | Masking policy name  | Mandatory     |

- Add a masking target to a masking policy

| Masking type for which an argument can be specified | Argument            | Data type     | Description  | Default value |
|---|---------------------|---------------|--|---------------|
| All   | action              | varchar(63)   | 'ADD_COLUMN'   | 'ADD_COLUMN'  |
|   | column_name         | varchar(63)   | Masking target name  | Mandatory     |
|   | function_type       | varchar(63)   | Masking type<br>- 'FULL': Full masking<br>- 'PARTIAL': Partial masking<br>- 'REGEXP': Regular expression masking | 'FULL'        |
| Partial masking                                     | function_parameters | varchar(1024) | Masking format for partial masking   | Mandatory     |
| Regular expression masking                          | regexp_pattern      | varchar(1024) | Search pattern for regular expression masking  | Mandatory     |
|   | regexp_replacement  | varchar(1024) | Replacement character/string for regular expression masking  | Mandatory     |
|   | regexp_flags        | varchar(20)   | Regular expression flags   | NULL          |

- Delete a masking target from a masking policy

| Masking type for which an argument can be specified | Argument    | Data type   | Description         | Default value |
|---|-------------|-------------|---------------------|---------------|
| All   | action      | varchar(63) | 'DROP_COLUMN'       | Mandatory     |
|   | column_name | varchar(63) | Masking target name | Mandatory     |

- Change the masking condition

| Masking type for which an argument can be specified | Argument   | Data type     | Description                     | Default value |
|---|------------|---------------|---------------------------------|---------------|
| All   | action     | varchar(63)   | 'MODIFY_EXPRESSION'             | Mandatory     |
|   | expression | varchar(1024) | Masking condition to be changed | Mandatory     |

- Change the content of a masking policy set for a masking target

| Masking type for which an argument can be specified | Argument            | Data type     | Description  | Default value |
|---|---------------------|---------------|--|---------------|
| All   | action              | varchar(63)   | 'MODIFY_COLUMN'  | Mandatory     |
|   | column_name         | varchar(63)   | Masking target name  | Mandatory     |
|   | function_type       | varchar(63)   | Masking type<br>- 'FULL': Full masking<br>- 'PARTIAL': Partial masking<br>- 'REGEXP': Regular expression masking | 'FULL'        |
| Partial masking                                     | function_parameters | varchar(1024) | Masking format for partial masking   | Mandatory     |
| Regular expression masking                          | regexp_pattern      | varchar(1024) | Search pattern for regular expression masking  | Mandatory     |
|   | regexp_replacement  | varchar(1024) | Replacement character/string for regular expression masking  | Mandatory     |
|   | regexp_flags        | varchar(20)   | Regular expression flags   | NULL          |

- Change the masking policy description

| Masking type for which an argument can be specified | Argument           | Data type     | Description                | Default value |
|---|--------------------|---------------|----------------------------|---------------|
| All   | action             | varchar(63)   | 'SET_POLICY_DESCRIPTION'   | Mandatory     |
|   | policy_description | varchar(1024) | Masking policy description | Mandatory     |

- Change the masking target description

| Masking type for which an argument can be specified | Argument           | Data type     | Description                | Default value |
|---|--------------------|---------------|----------------------------|---------------|
| All   | action             | varchar(63)   | 'SET_COLUMN_DESCRIPTION'   | Mandatory     |
|   | column_name        | varchar(63)   | Masking target name        | Mandatory     |
|   | column_description | varchar(1024) | Masking target description | Mandatory     |

Details about whether arguments can be omitted are as follows.

| Argument    | Mandatory or optional |                 |                            |             |                   |               |                 |                            |                        |                        |
|-------------|-----------------------|-----------------|----------------------------|-------------|-------------------|---------------|-----------------|----------------------------|------------------------|------------------------|
|             | ADD_COLUMN            |                 |                            | DROP_COLUMN | MODIFY_EXPRESSION | MODIFY_COLUMN |                 |                            | SET_POLICY_DESCRIPTION | SET_COLUMN_DESCRIPTION |
|             | Full masking          | Partial masking | Regular expression masking |             |                   | Full masking  | Partial masking | Regular expression masking |                        |                        |
| schema_name | Y                     | Y               | Y                          | Y           | Y                 | Y             | Y               | Y                          | Y                      | Y                      |
| table_name  | N                     | N               | N                          | N           | N                 | N             | N               | N                          | N                      | N                      |

| Argument            | Mandatory or optional |                 |                            |             |                   |               |                 |                            |                        |                        |
|---------------------|-----------------------|-----------------|----------------------------|-------------|-------------------|---------------|-----------------|----------------------------|------------------------|------------------------|
|                     | ADD_COLUMN            |                 |                            | DROP_COLUMN | MODIFY_EXPRESSION | MODIFY_COLUMN |                 |                            | SET_POLICY_DESCRIPTION | SET_COLUMN_DESCRIPTION |
|                     | Full masking          | Partial masking | Regular expression masking |             |                   | Full masking  | Partial masking | Regular expression masking |                        |                        |
| policy_name         | N                     | N               | N                          | N           | N                 | N             | N               | N                          | N                      | N                      |
| action              | Y                     | Y               | Y                          | N           | N                 | N             | N               | N                          | N                      | N                      |
| column_name         | N                     | N               | N                          | N           | -                 | N             | N               | N                          | -                      | N                      |
| function_type       | Y                     | N               | N                          | -           | -                 | Y             | N               | N                          | -                      | -                      |
| expression          | -                     | -               | -                          | -           | N                 | -             | -               | -                          | -                      | -                      |
| policy_description  | -                     | -               | -                          | -           | -                 | -             | -               | -                          | N                      | -                      |
| column_description  | -                     | -               | -                          | -           | -                 | -             | -               | -                          | -                      | N                      |
| function_parameters | -                     | N               | -                          | -           | -                 | -             | N               | -                          | -                      | -                      |
| regexp_pattern      | -                     | -               | N                          | -           | -                 | -             | -               | N                          | -                      | -                      |
| regexp_replacement  | -                     | -               | N                          | -           | -                 | -             | -               | N                          | -                      | -                      |
| regexp_flags        | -                     | -               | Y                          | -           | -                 | -             | -               | Y                          | -                      | -                      |

Y: Can be omitted; N: Cannot be omitted; -: Ignored when specified

### Return value

| Return value | Description      |
|--------------|------------------|
| TRUE         | Ended normally   |
| FALSE        | Ended abnormally |

### Execution example 1

Adding masking policy p1 to masking target c2

```
postgres=# select pgx_alter_confidential_policy(table_name := 't1', policy_name := 'p1', action :=
'ADD_COLUMN', column_name := 'c2', function_type := 'PARTIAL', function_parameters := 'VVVFVVVFVVVV,
VVV-VVVV-VVVV, *, 4, 11');
pgx_alter_confidential_policy
-----
t
(1 row)
```

### Execution example 2

Deleting masking target c1 from masking policy p1

```
postgres=# select pgx_alter_confidential_policy(table_name := 't1', policy_name := 'p1', action :=
'DROP_COLUMN', column_name := 'c1');
pgx_alter_confidential_policy
-----
t
(1 row)
```

### Execution example 3

Changing the masking condition for masking policy p1

```
postgres=# select pgx_alter_confidential_policy(table_name := 't1', policy_name := 'p1', action :=
'MODIFY_EXPRESSION', expression := 'false');
pgx_alter_confidential_policy
-----
t
(1 row)
```

### Execution example 4

Changing the content of masking policy p1 set for masking target c2

```
postgres=# select pgx_alter_confidential_policy(table_name := 't1', policy_name := 'p1', action :=
'MODIFY_COLUMN', column_name := 'c2', function_type := 'FULL');
pgx_alter_confidential_policy
-----
t
(1 row)
```

### Execution example 5

Changing the description of masking policy p1

```
postgres=# select pgx_alter_confidential_policy(table_name := 't1', policy_name := 'p1', action :=
'SET_POLICY_DESCRIPTION', policy_description := 'this policy is an example. ');
pgx_alter_confidential_policy
-----
t
(1 row)
```

### Execution example 6

Changing the description of masking target c2

```
postgres=# select pgx_alter_confidential_policy(table_name := 't1', policy_name := 'p1', action :=
'SET_COLUMN_DESCRIPTION', column_name := 'c2', column_description := 'c2 column is FULL. ');
pgx_alter_confidential_policy
-----
t
(1 row)
```

### Description

- The arguments for the `pgx_alter_confidential_policy` system management function can be specified in any order.
- The action parameters below can be specified. When action parameters are omitted, `ADD_COLUMN` is applied.

| Parameter                           | Description   |
|-------------------------------------|---|
| <code>ADD_COLUMN</code>             | Adds a masking target to a masking policy.                        |
| <code>DROP_COLUMN</code>            | Deletes a masking target from a masking policy.                   |
| <code>MODIFY_EXPRESSION</code>      | Changes expression.   |
| <code>MODIFY_COLUMN</code>          | Changes the content of a masking policy set for a masking target. |
| <code>SET_POLICY_DESCRIPTION</code> | Changes <code>policy_description</code> .                         |
| <code>SET_COLUMN_DESCRIPTION</code> | Changes <code>column_description</code> .                         |

- The `function_parameters` argument is enabled when the `function_type` is `PARTIAL`. If the `function_type` is other than `PARTIAL`, it will be ignored.

- The arguments below are enabled when the function\_type is REGEXP. If the function\_type is other than REGEXP, these arguments will be ignored.
  - regexp\_pattern
  - regexp\_replacement
  - regexp\_flags



- Refer to "String Constants" in the PostgreSQL Documentation for information on the strings to specify for arguments.
- Refer to "POSIX Regular Expressions" in the PostgreSQL Documentation and check pattern, replacement, and flags for information on the values that can be specified for regexp\_pattern, regexp\_replacement, and regexp\_flags.

## B.3.2 pgx\_create\_confidential\_policy

### Description

Creates masking policies

### Format

The format varies depending on the masking type. The format is shown below.

```
pgx_create_confidential_policy(
[schema_name      := 'schemaName' ,]
table_name       := 'tableName' ,
policy_name      := 'policyName' ,
expression       := 'expression'
[, enable        := 'policyStatus']
[, policy_description := 'policyDesc']
[, column_name    := 'columnName'
  [, function_type := 'FULL'] |
  [, function_type := 'PARTIAL', partialOpt] |
  [, function_type := 'REGEXP', regexpOpt]
[, column_description := 'columnDesc']
])
```

*partialOpt*:  
function\_parameters := 'maskingFormat'

*regexpOpt*:  
regexp\_pattern := 'regexpPattern' ,  
regexp\_replacement := 'regexpReplacementChar' ,  
[, regexp\_flags := 'regexpFlags']

### Argument

Details are as follows.

| Masking type for which an argument can be specified | Argument    | Data type   | Description  | Default value |
|---|-------------|-------------|--|---------------|
| All   | schema_name | varchar(63) | Schema name of table for which the masking policy is created | 'public'      |
|   | table_name  | varchar(63) | Name of table for which the masking policy is created        | Mandatory     |

| Masking type for which an argument can be specified | Argument            | Data type     | Description  | Default value |
|---|---------------------|---------------|--|---------------|
|   | policy_name         | varchar(63)   | Masking policy name  | Mandatory     |
|   | expression          | varchar(1024) | Masking condition  | Mandatory     |
|   | enable              | boolean       | Masking policy status<br>- 't': Enabled<br>- 'f': Disabled   | 't'           |
|   | policy_description  | varchar(1024) | Masking policy description   | NULL          |
|   | column_name         | varchar(63)   | Masking target name  | NULL          |
|   | function_type       | varchar(63)   | Masking type<br>- 'FULL': Full masking<br>- 'PARTIAL': Partial masking<br>- 'REGEXP': Regular expression masking | 'FULL'        |
|   | column_description  | varchar(1024) | Masking target description   | NULL          |
| Partial masking                                     | function_parameters | varchar(1024) | Masking format for partial masking   | Mandatory     |
| Regular expression masking                          | regexp_pattern      | varchar(1024) | Search pattern for regular expression masking  | Mandatory     |
|   | regexp_replacement  | varchar(1024) | Replacement character/string for regular expression masking  | Mandatory     |
|   | regexp_flags        | varchar(20)   | Regular expression flags   | NULL          |

Details about whether arguments can be omitted are as follows.

| Argument            | Mandatory or optional |                 |                            |
|---------------------|-----------------------|-----------------|----------------------------|
|                     | Full masking          | Partial masking | Regular expression masking |
| schema_name         | Y                     | Y               | Y                          |
| table_name          | N                     | N               | N                          |
| policy_name         | N                     | N               | N                          |
| expression          | N                     | N               | N                          |
| enable              | Y                     | Y               | Y                          |
| policy_description  | Y                     | Y               | Y                          |
| column_name         | Y                     | Y               | Y                          |
| function_type       | Y                     | Y               | Y                          |
| column_description  | Y                     | Y               | Y                          |
| function_parameters | -                     | N               | -                          |
| regexp_pattern      | -                     | -               | N                          |
| regexp_replacement  | -                     | -               | N                          |
| regexp_flags        | -                     | -               | Y                          |

Y: Can be omitted; N: Cannot be omitted; -: Ignored when specified

## Return value

| Return value | Description      |
|--------------|------------------|
| TRUE         | Ended normally   |
| FALSE        | Ended abnormally |

## Execution example 1

Creating masking policy p1 that does not contain a masking target

```
postgres=# select pgx_create_confidential_policy(table_name := 't1', policy_name := 'p1',
expression := 'l=1');
pgx_create_confidential_policy
-----
t
(1 row)
```

## Execution example 2

Creating masking policy p1 that contains masking target c1 of which the masking type is full masking

```
postgres=# select pgx_create_confidential_policy(schema_name := 'public', table_name := 't1',
policy_name := 'p1', expression := 'l=1', enable := 't', policy_description := 'this policy is an
example.', column_name := 'c1', function_type := 'FULL', column_description := 'c1 column is FULL.');
```

```
pgx_create_confidential_policy
-----
t
(1 row)
```

## Execution example 3

Creating masking policy p1 that contains masking target c2 of which the masking type is partial masking

```
postgres=# select pgx_create_confidential_policy( table_name := 't1', policy_name := 'p1',
expression := 'l=1', column_name := 'c2', function_type := 'PARTIAL', function_parameters :=
'VVVFVVVFVVVFVVV, VVV-VVVV-VVVV, *, 4, 11');
```

```
pgx_create_confidential_policy
-----
t
(1 row)
```

## Execution example 4

Creating masking policy p1 that contains masking target c3 of which the masking type is regular expression masking

```
postgres=# select pgx_create_confidential_policy( table_name := 't1', policy_name := 'p1',
expression := 'l=1', column_name := 'c3', function_type := 'REGEXP', regexp_pattern := '(.*)(@.*)',
regexp_replacement := 'xxx\2', regexp_flags := 'g');
```

```
pgx_create_confidential_policy
-----
t
(1 row)
```

## Description

- The arguments for the `pgx_create_confidential_policy` system management function can be specified in any order.
- If `column_name` is omitted, only masking policies that do not contain masking target will be created.
- One masking policy can be created for each table. Use the `pgx_alter_confidential_policy` system management function to add a masking target to a masking policy.

- The `function_parameters` argument is enabled when the `function_type` is `PARTIAL`. If the `function_type` is other than `PARTIAL`, it will be ignored.
- The arguments below are enabled when the `function_type` is `REGEXP`. If the `function_type` is other than `REGEXP`, these arguments will be ignored.
  - `regexp_pattern`
  - `regexp_replacement`
  - `regexp_flags`

### Note

If a table for which a masking policy is to be applied is deleted, delete the masking policy as well.

### See

- Refer to "String Constants" in the PostgreSQL Documentation for information on the strings to specify for arguments.
- Refer to "POSIX Regular Expressions" in the PostgreSQL Documentation and check `pattern`, `replacement`, and `flags` for information on the values that can be specified for `regexp_pattern`, `regexp_replacement`, and `regexp_flags`.

## B.3.3 `pgx_drop_confidential_policy`

### Description

Deletes masking policies

### Format

```
pgx_drop_confidential_policy(
[schema_name      := 'schemaName', ]


```

### Argument

Details are as follows.

| Argument                 | Data type                | Description  | Default value |
|--------------------------|--------------------------|--|---------------|
| <code>schema_name</code> | <code>varchar(63)</code> | Schema name of table for which a masking policy is deleted | 'public'      |
| <code>table_name</code>  | <code>varchar(63)</code> | Name of table for which a masking policy is deleted        | Mandatory     |
| <code>policy_name</code> | <code>varchar(63)</code> | Masking policy name  | Mandatory     |

Details about whether arguments can be omitted are as follows.

| Argument                 | Mandatory or optional |
|--------------------------|-----------------------|
| <code>schema_name</code> | Y                     |
| <code>table_name</code>  | N                     |
| <code>policy_name</code> | N                     |

Y: Can be omitted; N: Cannot be omitted

## Return value

| Return value | Description      |
|--------------|------------------|
| TRUE         | Ended normally   |
| FALSE        | Ended abnormally |

## Execution example

Deleting masking policy p1

```
postgres=# select pgx_drop_confidential_policy(table_name := 't1', policy_name := 'p1');
pgx_drop_confidential_policy
-----
t
(1 row)
```

## Description

The arguments for the `pgx_drop_confidential_policy` system management function can be specified in any order.



### Note

If a table for which a masking policy is to be applied is deleted, delete the masking policy as well.



### See

Refer to "String Constants" in the PostgreSQL Documentation for information on the strings to specify for arguments.

## B.3.4 `pgx_enable_confidential_policy`

### Description

Enables or disables masking policies

### Format

```
pgx_enable_confidential_policy(
[schema_name      := 'schemaName', ]
table_name       := 'tableName',
policy_name      := 'policyName',
enable           := 'policyStatus'
)
```

### Argument

Details are as follows.

| Argument                 | Data type                | Description  | Default value |
|--------------------------|--------------------------|--|---------------|
| <code>schema_name</code> | <code>varchar(63)</code> | Schema name of table for which a masking policy is enabled or disabled | 'public'      |
| <code>table_name</code>  | <code>varchar(63)</code> | Name of table for which a masking policy is enabled or disabled        | Mandatory     |
| <code>policy_name</code> | <code>varchar(63)</code> | Masking policy name  | Mandatory     |
| <code>enable</code>      | <code>boolean</code>     | Masking policy status<br>- 't': Enabled                                | Mandatory     |

| Argument | Data type | Description     | Default value |
|----------|-----------|-----------------|---------------|
|          |           | - 'f': Disabled |               |

Details about whether arguments can be omitted are as follows.

| Argument    | Mandatory or optional |
|-------------|-----------------------|
| schema_name | Y                     |
| table_name  | N                     |
| policy_name | N                     |
| enable      | N                     |

Y: Can be omitted; N: Cannot be omitted

### Return value

| Return value | Description      |
|--------------|------------------|
| TRUE         | Ended normally   |
| FALSE        | Ended abnormally |

### Execution example

Enabling masking policy p1

```
postgres=# select pgx_enable_confidential_policy(table_name := 't1', policy_name := 'p1', enable :=
't');
 pgx_enable_confidential_policy
-----
 t
(1 row)
```

### Description

The arguments for the `pgx_enable_confidential_policy` system management function can be specified in any order.



See

Refer to "String Constants" in the PostgreSQL Documentation for information on the strings to specify for arguments.

## B.3.5 `pgx_update_confidential_values`

### Description

Changes replacement characters when full masking is specified for masking type

### Format

```
pgx_update_confidential_values(
[number_value := 'numberValue']
[, char_value := 'charValue']
[, varchar_value := 'varcharValue']
[, date_value := 'dateValue']
[, ts_value := 'tsValue']
)
```

## Argument

Details are as follows.

| Argument      | Data type  | Description                             |
|---------------|------------|---|
| number_value  | integer    | Replacement character in numeric type   |
| char_value    | varchar(1) | Replacement character in char type      |
| varchar_value | varchar(1) | Replacement character in varchar type   |
| date_value    | date       | Replacement character in date type      |
| ts_value      | timestamp  | Replacement character in timestamp type |

## Return value

| Return value | Description      |
|--------------|------------------|
| TRUE         | Ended normally   |
| FALSE        | Ended abnormally |

## Execution example

Using '\*' as a replacement character in char type and varchar type

```
postgres=# select pgx_update_confidential_values(char_value := '*', varchar_value := '*');
pgx_update_confidential_values
-----
t
(1 row)
```

## Description

- The arguments for the pgx\_update\_confidential\_values system management function can be specified in any order.
- Specify one or more arguments for the pgx\_update\_confidential\_values system management function. A replacement character is not changed for an omitted argument.



See

Refer to "String Constants" in the PostgreSQL Documentation for information on the strings to specify for arguments.

## B.4 VCI Data Load Control Function

The table below lists the function that loads VCI data to buffer cache.

Table B.4 VCI data load control function

| Name                                | Return type | Description                         |
|-------------------------------------|-------------|-------------------------------------|
| pgx_prewarm_vci(vci_index regclass) | int8        | Loads the VCI data to buffer cache. |

pgx\_prewarm\_vci loads the specified VCI data to buffer cache and returns the number of blocks of the loaded VCI data.

The aggregation process using VCI may take time immediately after an instance is started, because the VCI data has not been loaded to buffer cache. Therefore, the first aggregation process can be sped up by executing pgx\_prewarm\_vci after an instance is started.

The amount of memory required for preloading is the number of blocks returned by pgx\_prewarm\_vci multiplied by the size of one block.

This function can only be executed if the user has reference privilege to the VCI index and execution privilege to the pg\_prewarm function.

## Appendix C System Views

This appendix describes how to use the system views in FUJITSU Enterprise Postgres.



See

Refer to "System Views" under "Internals" in the PostgreSQL Documentation for information on other system views.

### C.1 pgx\_tablespaces

The `pgx_tablespaces` catalog provides information related to the encryption of tablespaces.

| Name                       | Type              | References                     | Description                     |
|----------------------------|-------------------|--------------------------------|---------------------------------|
| <code>spctablespace</code> | <code>oid</code>  | <code>pg_tablespace.oid</code> | Tablespace OID                  |
| <code>spcencalgo</code>    | <code>text</code> |                                | Tablespace encryption algorithm |

The `spcencalgo` string displays one of the following values:

- none: Tablespace is not encrypted
- AES128: AES with key length of 128 bits
- AES256: AES with key length of 256 bits

### C.2 pgx\_stat\_lwlock

The `pgx_stat_lwlock` view displays statistics related to lightweight locks, with each type of content displayed on a separate line.

Table C.1 `pgx_stat_lwlock` view

| Column                       | Type                                 | Description  |
|------------------------------|--------------------------------------|--|
| <code>lwlock_name</code>     | <code>name</code>                    | Name of the lightweight lock   |
| <code>total_waits</code>     | <code>bigint</code>                  | Number of waits caused by the lightweight lock                       |
| <code>total_wait_time</code> | <code>double precision</code>        | Number of milliseconds spent in waits caused by the lightweight lock |
| <code>stats_reset</code>     | <code>timestamp with timezone</code> | Last time at which this statistics was reset                         |

### C.3 pgx\_stat\_latch

The `pgx_stat_latch` view displays statistics related to latches, with each type of wait information within FUJITSU Enterprise Postgres displayed on a separate line.

Table C.2 `pgx_stat_latch` view

| Column                       | Type                                 | Description   |
|------------------------------|--------------------------------------|---|
| <code>latch_name</code>      | <code>name</code>                    | Name of the latch   |
| <code>total_waits</code>     | <code>bigint</code>                  | Number of waits caused a wait                             |
| <code>total_wait_time</code> | <code>double precision</code>        | Number of milliseconds spent in waits caused by the latch |
| <code>stats_reset</code>     | <code>timestamp with timezone</code> | Last time at which this statistic was reset               |

### C.4 pgx\_stat\_walwriter

The `pgx_stat_walwriter` view display statistics related to WAL writing, in a single line.

Table C.3 pgx\_stat\_walwriter view

| Column           | Type                    | Description  |
|------------------|-------------------------|--|
| dirty_writes     | bigint                  | Number of times old WAL buffers were written to the disk because the WAL buffer was full when WAL records were added |
| writes           | bigint                  | Number of WAL writes   |
| write_blocks     | bigint                  | Number of WAL write blocks   |
| total_write_time | double precision        | Number of milliseconds spent on WAL writing  |
| stats_reset      | timestamp with timezone | Last time at which this statistic was reset  |

## C.5 pgx\_stat\_sql

The pgx\_stat\_sql view displays statistics related to SQL statement executions, with each type of SQL statement displayed on a separate line.

Table C.4 pgx\_stat\_sql view

| Column                   | Type                    | Description  |
|--------------------------|-------------------------|--|
| selects                  | bigint                  | Number of SELECT statements executed                           |
| inserts                  | bigint                  | Number of INSERT statements executed                           |
| deletes                  | bigint                  | Number of DELETE statements executed                           |
| updates                  | bigint                  | Number of UPDATE statements executed                           |
| selects_with_parallelism | bigint                  | Number of times parallel scan was used in SELECT statements    |
| inserts_with_parallelism | bigint                  | Not used   |
| deletes_with_parallelism | bigint                  | Not used   |
| updates_with_parallelism | bigint                  | Not used   |
| copies_with_parallelism  | bigint                  | Not used   |
| declares                 | bigint                  | Number of DECLARE statements executed (number of cursor OPENS) |
| fetches                  | bigint                  | Number of FETCH statements executed                            |
| checkpoints              | bigint                  | Number of CHECKPOINT statements executed                       |
| clusters                 | bigint                  | Number of CLUSTER statements executed                          |
| copies                   | bigint                  | Number of COPY statements executed                             |
| reindexes                | bigint                  | Number of REINDEX statements executed                          |
| truncates                | bigint                  | Number of TRUNCATE statements executed                         |
| locks                    | bigint                  | Number of times a lock occurred                                |
| stats_reset              | timestamp with timezone | Last time at which this statistic was reset                    |



| Name               | Type          | Description                       |
|--------------------|---------------|-----------------------------------|
|                    |               | - 't': Enabled<br>- 'f': Disabled |
| policy_description | varchar(1024) | Masking policy description        |

### Execution example

```
postgres=# select * from pgx_confidential_policies;
 schema_name | table_name | policy_name | expression | enable | policy_description
-----+-----+-----+-----+-----+-----
 public      | t1         | p1          | 1=1        | t      |
(1 row)
```

## D.3 pgx\_confidential\_values

This table provides information on replacement characters when full masking is specified for masking type.

| Name            | Data type  | Description    | Default value         |
|-----------------|------------|----------------|-----------------------|
| number_value    | integer    | Numeric        | 0                     |
| char_value      | varchar(1) | char type      | Spaces                |
| varchar_value   | varchar(1) | varchar type   | Spaces                |
| date_value      | date       | date type      | '1970-01-01'          |
| timestamp_value | timestamp  | timestamp type | '1970-01-01 00:00:00' |

### Execution example

```
postgres=# select * from pgx_confidential_values;
 number_value | char_value | varchar_value | date_value | ts_value
-----+-----+-----+-----+-----
          0 |           |              | 1970-01-01 | 1970-01-01 00:00:00
(1 row)
```

# Appendix E Activating and Stopping the Web Server Feature of WebAdmin

To use WebAdmin for creating and managing a FUJITSU Enterprise Postgres instance on a server where FUJITSU Enterprise Postgres is installed, you must first activate the Web server feature of WebAdmin.

This appendix describes how to activate and stop the Web server feature of WebAdmin.

Note that "<xy>" in paths indicates the product version and level.

## E.1 Activating the Web Server Feature of WebAdmin

Follow the procedure below to activate the Web server feature of WebAdmin:

1. Display the [Services] window
  - Windows Server(R) 2012 or Windows Server(R) 2012 R2:  
In the [Start] screen, select [Administrative Tools], and then click [Services].
  - All other operating systems:  
In the [Start] menu, select [Administrative Tools], and then click [Services].

2. Start a service

Select the displayed name "FUJITSU Enterprise Postgres WebAdmin *version*", and then click [Start Service].

You can also start a service by specifying the service name of the Web server feature of WebAdmin in the net start command or sc start command.

## E.2 Stopping the Web Server Feature of WebAdmin

This section describes how to stop the Web server feature of WebAdmin.

Follow the procedure below to stop the Web server feature of WebAdmin:

1. Display the [Services] window
  - Windows Server(R) 2012 or Windows Server(R) 2012 R2:  
In the [Start] screen, select [Administrative Tools], and then click [Services].
  - All other operating systems:  
In the [Start] menu, select [Administrative Tools], and then click [Services].

2. Stop a service

Select the displayed name "FUJITSU Enterprise Postgres WebAdmin *version*", and then click [Stop Service].

You can also stop a service by specifying the service name of the Web server feature of WebAdmin in the net stop command or sc stop command.

# Appendix F WebAdmin Wallet

This appendix describes how to use the Wallet feature of WebAdmin.

When a remote instance or a standby instance is created, it is necessary to provide user name and password for authentication with the remote machine or the database instance.

The Wallet feature in WebAdmin is a convenient way to create and store these credentials.

Once created, these credentials can be repeatedly used in one or more instances.

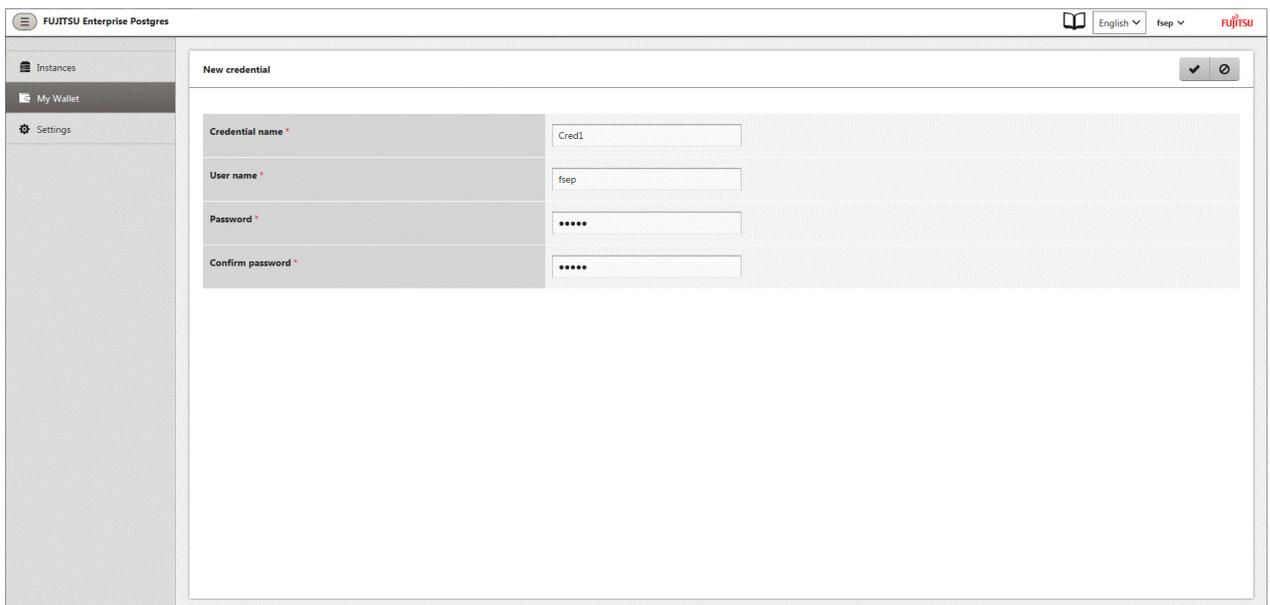
## Note

It is not mandatory to create a credential in the Wallet. It is possible to create a remote instance or a standby instance without creating any credential in the Wallet.

If no credential is created beforehand, a user name and password can be entered in the instance creation page. When creating a "Remote" instance, if operating system credentials are entered without using a credential stored in the Wallet, WebAdmin automatically creates a credential with the given user name and password, and stores it in the user's wallet for future use.

## F.1 Creating a Credential

1. In the [My Wallet] tab, click . The [New credential] page will be displayed.
2. Enter the information for the credentials.



Enter the following items:

- [Credential name]: Name of the credential

The name must meet the conditions below:

- Maximum of 16 characters
- The first character must be an ASCII alphabetic character
- The other characters must be ASCII alphanumeric characters
- [User name]: The operating system user name or database instance user name that will be used later
- [Password]: Password for the user

- [Confirm password]: Reenter the password.

3. Click  to store the credential.

## F.2 Using a Credential

Once a credential is created in the Wallet, it can be used during remote instance creation or standby instance creation.

The following page uses the credential that was created in the previous section.

The screenshot shows the 'Create new instance' form in the Fujitsu Enterprise Postgres interface. The form is for a standalone configuration. It includes the following fields and values:

- Configuration type: Standalone configuration
- Location: Remote
- Instance name: inst2
- Instance port: 27502
- Host name: standbyHost
- Operating system credential: Cred1 (selected)
- User name: webadminuser
- Password: \*\*\*\*\*
- Data storage path: c:\temp\inst2\data
- Backup storage path: c:\temp\inst2\backup
- Transaction log path: c:\temp\inst2\transactionlog
- Encoding: UTF8
- Remote WebAdmin port for standalone: 27515

When "Cred1" is selected in [Operating system credential], the user name and password are automatically populated from the credential.

## Appendix G Collecting Failure Investigation Data

If the cause of an error that occurs while building the environment or during operations is unclear, data must be collected for initial investigation.

This appendix describes how to collect data for initial investigation.

Use FJQSS (Information Collection Tool) to collect data for initial investigation.



See

Refer to the following manual for information on how to use FJQSS:

- Windows Server(R) 2012 and Windows Server(R) 2012 R2

In the [Apps] menu, select [FJQSS (Information Collection Tool)], and then click [FJQSS User's Guide].

- Windows Server(R) 2008 R2 or earlier

In the [Start] menu, select [FJQSS (Information Collection Tool)], and then click [FJQSS User's Guide].



Note

When using FJQSS to collect data for initial investigation, a window will be displayed for you to set the following environment variables:

- PGDATA

Set the data storage destination.

- PGPORT

Set the instance port number. This does not need to be set if the default port number (27500) has not been changed.

- PGUSER

Set the database superuser.

Set the database superuser so that client authentication is possible.

FJQSS establishes a TCP/IP connection with the template1 database and collects data from the database.

In addition, when using database multiplexing, set the following environment variables:

- MCONTROLDIR

Refer to "Mirroring Controller Resources" in the Cluster Operation Guide for information on the Mirroring Controller management directory.

- The instance administrator user must perform FJQSS operations if using database multiplexing mode.

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# FUJITSU Enterprise Postgres 9.5



## Cluster Operation Guide

Linux >

Windows >

# FUJITSU Enterprise Postgres 9.5



## Cluster Operation Guide (*Linux*)

Linux

J2UL-2147-01ENZO(00)  
June 2016

# Preface

---

## Purpose of This Document

This document explains the items required to operate FUJITSU Enterprise Postgres on a cluster system.

## Intended Readers

This document is aimed at people who install and operate FUJITSU Enterprise Postgres on a cluster system. Readers of this document are also assumed to have general knowledge of:

- PostgreSQL
- SQL
- Linux

## Structure of This Document

This document is structured as follows:

### Part 1 Overview of Cluster Systems

#### Chapter 1 Definition of Cluster Operation

Provides an overview of cluster operations and their types.

### Part 2 Database Multiplexing Mode

#### Chapter 2 Overview of Database Multiplexing Mode

Provides an overview of database multiplexing mode.

#### Chapter 3 Setting up Database Multiplexing Mode

Describes how to set up database multiplexing mode.

#### Chapter 4 Operations in Database Multiplexing Mode

Explains periodic database multiplexing mode.

#### Chapter 5 Action Required when an Error Occurs in Database Multiplexing Mode

Explains the action required when an error occurs during a database multiplexing mode.

#### Chapter 6 Managing Mirroring Controller Using WebAdmin

Explains how to setup and manage Mirroring Controller in a streaming replication cluster using WebAdmin.

### Appendix A Parameters

Explains the configuration files and parameters required for database multiplexing mode.

### Appendix B Supplementary Information on Building the Primary Server and Standby Server on the Same Server

Explains supplementary information on building the primary server and standby server on the same server.

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| First edition: June 2016 |
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# Part 1 Overview of Cluster Systems

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This part provides an overview of the cluster systems, and describes the types and operation modes.

|  |                   |
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| <a href="#">Chapter 1 Definition of Cluster Operation.....</a> | <a href="#">2</a> |
|--|-------------------|

# Chapter 1 Definition of Cluster Operation

This chapter explains the features of a cluster system, the types of cluster operations, and the operation mode.

## 1.1 What Is a Cluster System?

A cluster system is a system that joins multiple machines (hereafter, referred to as servers) to achieve high availability and scalability throughout the system.

This allows the creation of systems that simultaneously achieve high availability and scalability.

### High availability

For example, by transferring the role to another server when a server in the cluster system fails, the downtime for the entire system can be made shorter.

This type of operation mode is referred to as a "failover operation".

### Scalability

The load should be distributed, in order to extend the processing capacity across the entire system by dividing multiple application processes amongst multiple servers, regardless of processing content, or to suit the processing content.

## 1.2 Cluster Operation Provided by FUJITSU Enterprise Postgres

In FUJITSU Enterprise Postgres, the following failover operation mode is provided in each system:

- Log shipping mode

### Log shipping mode

This operation mode is based on PostgreSQL streaming replication. Other software such as cluster software is not required.

This mode replicates the database on all servers that comprise the cluster system. It achieves this by sending and reflecting the updated transaction log of the database from the server that receives the update (primary server) to another server (standby server).

In addition, the client driver automatically distinguishes between the primary and standby servers, so applications can be connected transparently regardless of the physical server. Accordingly, a flexible system can easily be built, for example a system that offloads connections to the standby server if the connections only perform referencing.



FUJITSU Enterprise Postgres supports only configurations comprising one standby server per primary server.



- The streaming replication feature is not described in this manual.

Refer to "High Availability, Load Balancing, and Replication" in the PostgreSQL Documentation for information on the streaming replication feature.

- Refer to "[Part 2 Database Multiplexing Mode](#)" for information on the database multiplexing feature.

# Part 2 Database Multiplexing Mode

---

This part describes database multiplexing mode.

|   |                    |
|---|--------------------|
| <a href="#">Chapter 2 Overview of Database Multiplexing Mode.....</a>                             | <a href="#">4</a>  |
| <a href="#">Chapter 3 Setting up Database Multiplexing Mode.....</a>                              | <a href="#">12</a> |
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# Chapter 2 Overview of Database Multiplexing Mode

This chapter provides an overview of database multiplexing mode.

## Point

In this and subsequent chapters, the word "Mirroring Controller" may be used in the process or management directory name or explanation.

## 2.1 What is Database Multiplexing Mode

This operation mode is based on PostgreSQL streaming replication. Other software such as cluster software is not required.

This mode replicates the database on all servers that comprise the cluster system. It achieves this by transferring the updated transaction logs of the database from the server that receives the updates (primary server) to another server (standby server), and then reflecting them on the standby server.

It consists of a feature that detects faults in the elements that are essential for the continuity of the database operation (such as the database process, disk, and network), as well as simplified switchover and standby server disconnection features. The database will be copied in synchronous mode.

### Monitoring using database multiplexing mode

- Operating system or server failures, and no-response state

By generating a heartbeat between Mirroring Controller on each server, operating system or server errors are detected and acknowledged between the relevant servers.

- Database process failures, and no-response state

Mirroring Controller periodically accesses the database processes and checks the status. A process error is detected by monitoring whether an access timeout occurs.

- Disk failure

Mirroring Controller periodically creates files on the data storage destination disk. A disk error is detected when an I/O error occurs.

Failures that can be detected are those that physically affect the entire system, such as disk header or device power failures.

Figure 2.1 Failover from the primary server to the standby server

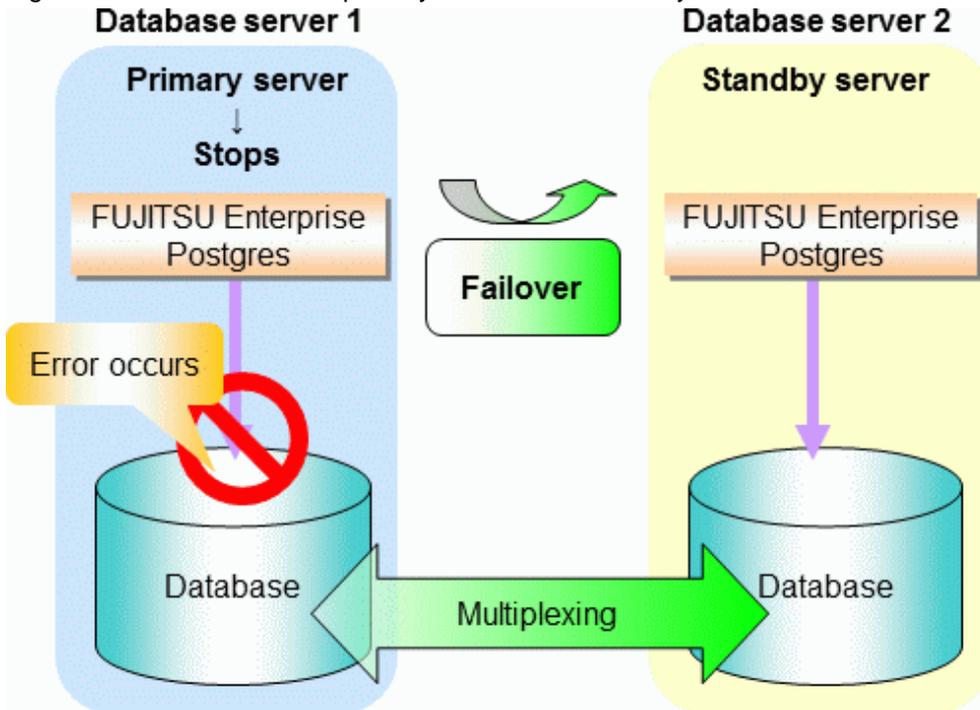
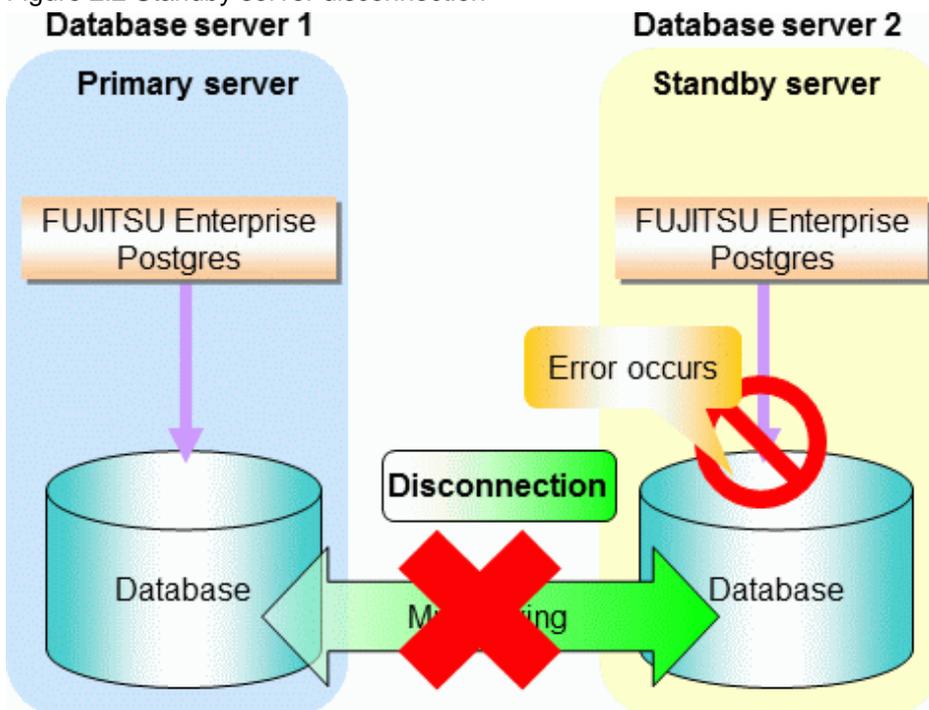


Figure 2.2 Standby server disconnection



When database multiplexing is used to perform monitoring and an error is detected, this option will automatically switch the primary server or disconnect the standby server.

Reference jobs can also be executed on the standby server.

## Note

If the role of primary server was switched to another server and then starts degrading, the original primary server will not become the standby server automatically. Remove the cause of the error, and then change the role of the original primary server to the server currently acting as standby server. Refer to "[5.1 Action Required when Server Degradation Occurs](#)" for details.

## See

- Refer to "[2.2.4 Notes on Executing Reference Jobs on the Standby Server](#)" for information on reference jobs.
- The features that can be used will depend on whether automatic switch/disconnection is used. Refer to "Features that can be Installed" in the Installation and Setup Guide for Server for details.

## Point

If the standby server was disconnected, Mirroring Controller will automatically comment out the `synchronous_standby_names` parameter in the `postgresql.conf` file of the primary server. Accordingly, you can prevent the application processing for the primary server being stopped.

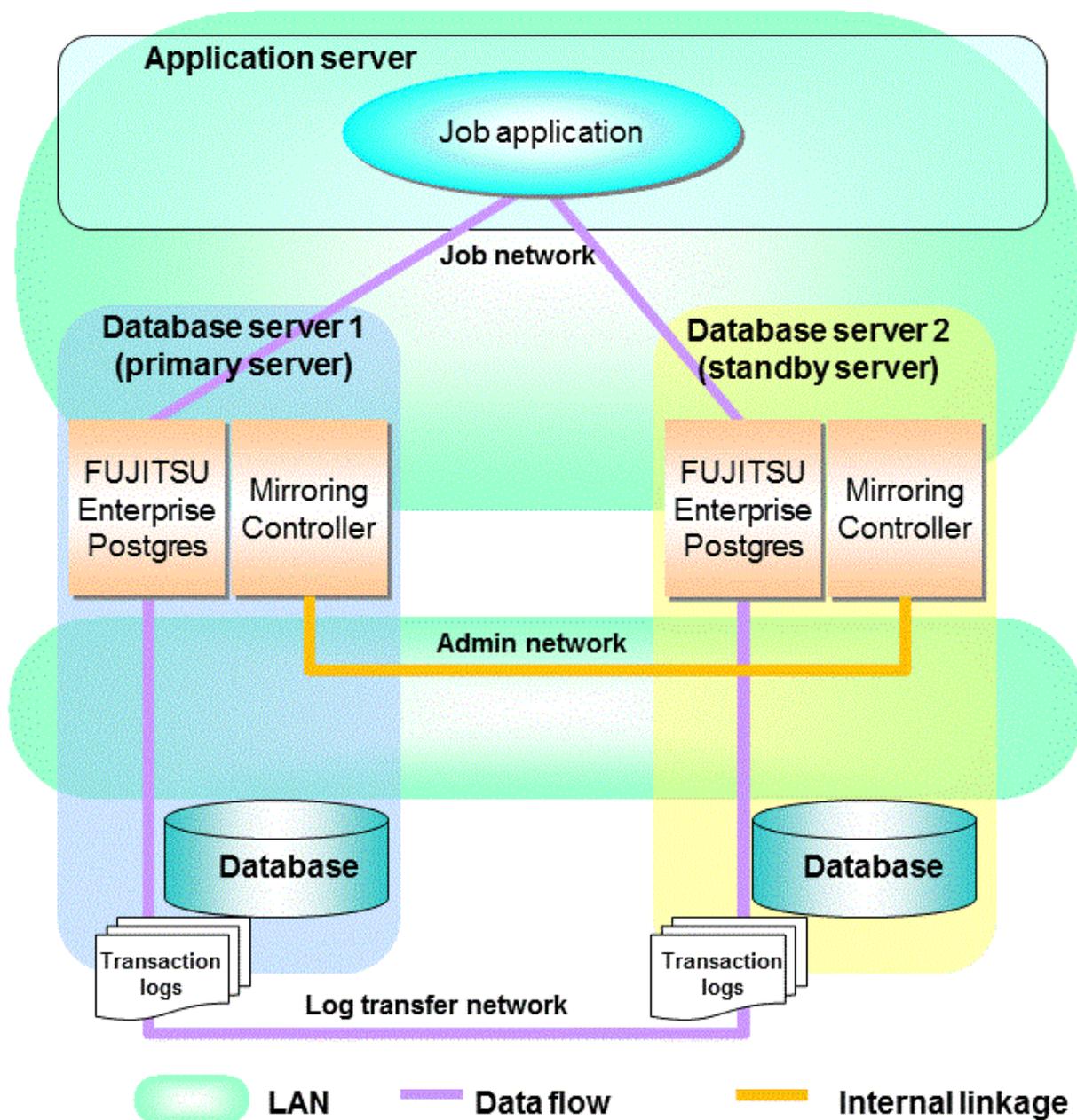
## 2.2 System Configuration for Database Multiplexing Mode

This section explains the products, features, and networks that are part of a database multiplexing system.

The following table shows the network types uses by database multiplexing systems.

| Network type         | Description   |
|----------------------|---|
| Job network          | Network between the application that accesses the database, and the database server.  |
| Admin network        | Network used by the primary server and the standby server to monitor each other using Mirroring Controller, and to control Mirroring Controller of other servers. |
| Log transfer network | Network used to transfer the transaction logs of the database, which is part of database multiplexing.  |

Figure 2.3 System configuration for database multiplexing mode



## 2.2.1 Mirroring Controller Resources

The only Mirroring Controller resource is the Mirroring Controller management directory, which stores the files that define the Mirroring Controller behavior, and the temporary files that are created when Mirroring Controller is active.

### Note

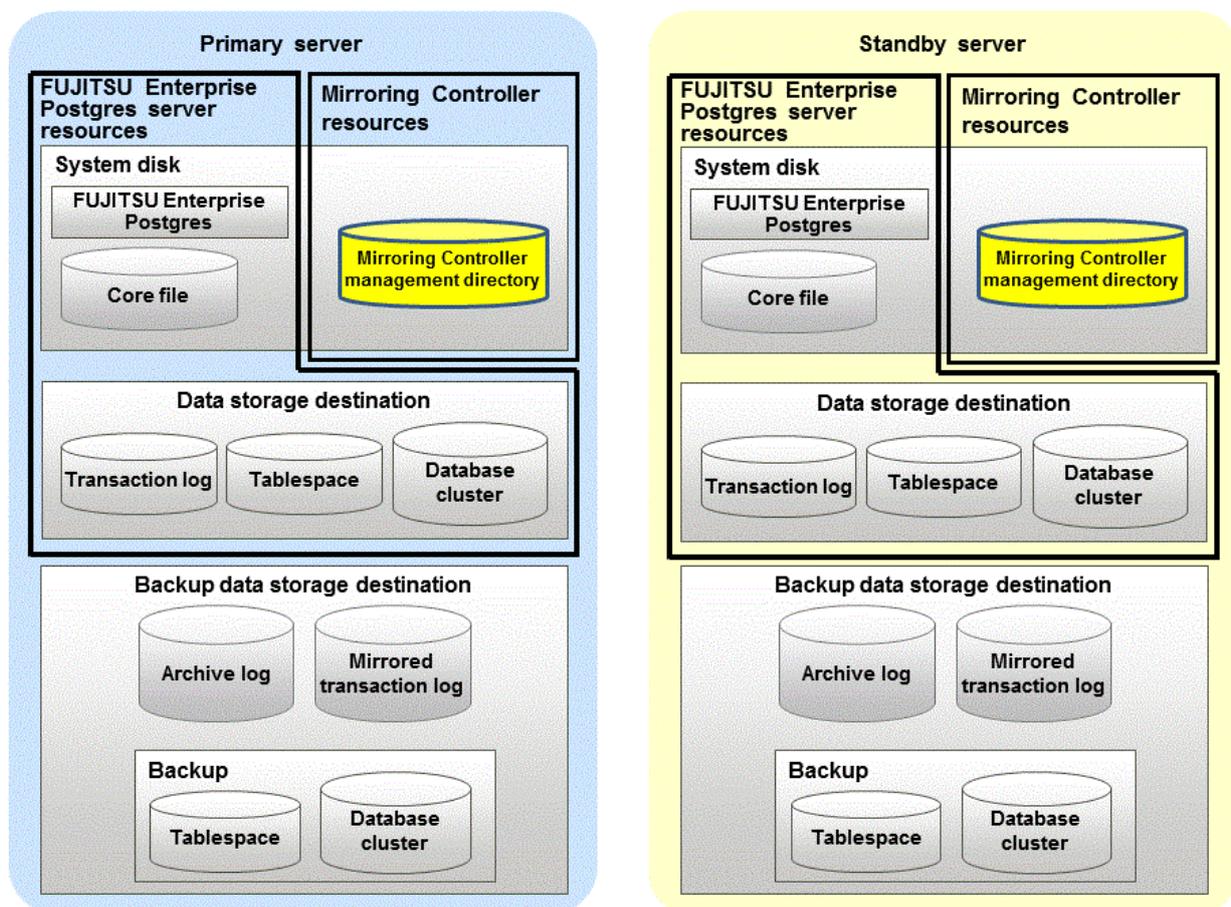
- Do not create the Mirroring Controller management directory in a directory managed by FUJITSU Enterprise Postgres, otherwise it may be deleted by mistake or may cause unexpected problems when FUJITSU Enterprise Postgres recovery is performed (such as old version of files being restored).

Refer to "Preparing Directories for Resource Deployment" in the Installation and Setup Guide for Server for information on the directories managed by FUJITSU Enterprise Postgres.

- The backup methods described in "Backing Up the Database" in the Operation Guide cannot be used to back up the Mirroring Controller resources. Therefore, users must obtain their own backup of Mirroring Controller resources, in addition to FUJITSU Enterprise Postgres server resources.
- If the automatic switch/disconnection is enabled, do not edit synchronous\_standby\_names for the Mirroring Controller monitoring target instance using the methods below. Otherwise, disconnection by the Mirroring Controller may fail, since postgresql.conf settings are overridden by values specified in postgresql.auto.conf and the include\_dir directives.
  - Setting the parameter using the ALTER SYSTEM statement
  - Editing the value specified in postgresql.conf or in a configuration file located in a directory listed in the include\_dir directive

The content on the primary server will be backed up. You cannot tell which server is the primary server to be backed up, because switching and failback may be performed between the servers. It is also impossible to tell which server is to be restored using the backed up data. Accordingly, ensure that you create a backup of each server when it is working as the primary server.

Figure 2.4 Configuration when backing up Mirroring Controller resources



## 2.2.2 Redundancy of the Admin and Log Transfer Networks

The admin network is an important one, because it is used by Mirroring Controller to check the status of each server.

Additionally, the log transfer network is an important one, because it is necessary to ensure data freshness.

Accordingly, configure a failure-resistant network by implementing network redundancy via channel bonding provided by the operating system or network driver vendor.

## 2.2.3 Notes on CPU Architecture and Products

Use the same CPU architecture (endian) for the primary server and the standby server. Additionally, use the same bit architecture (32-bit/64-bit) for the FUJITSU Enterprise Postgres installation.

A server using only PostgreSQL streaming replication cannot be specified as the database multiplexing system log transfer destination.

## 2.2.4 Notes on Executing Reference Jobs on the Standby Server

In database multiplexing mode where automatic switch/disconnection is enabled, switch and disconnection are performed automatically. If a switch occurs when executing a reference job for the standby server, it may affect the performance of that job. The reason is that, on the new primary server (that is, the original standby server), both the main job that was being executed on the original primary server and the reference job that was being executed on the original standby server will be processed. Therefore, before executing a job using this configuration, give careful consideration to the server resource estimates, and the likely impact on performance.

Accordingly, if you are concerned about the impact on performance, pause the reference job on the original standby server, change the original primary server to the new standby server, and then resume the reference job for the new standby server.

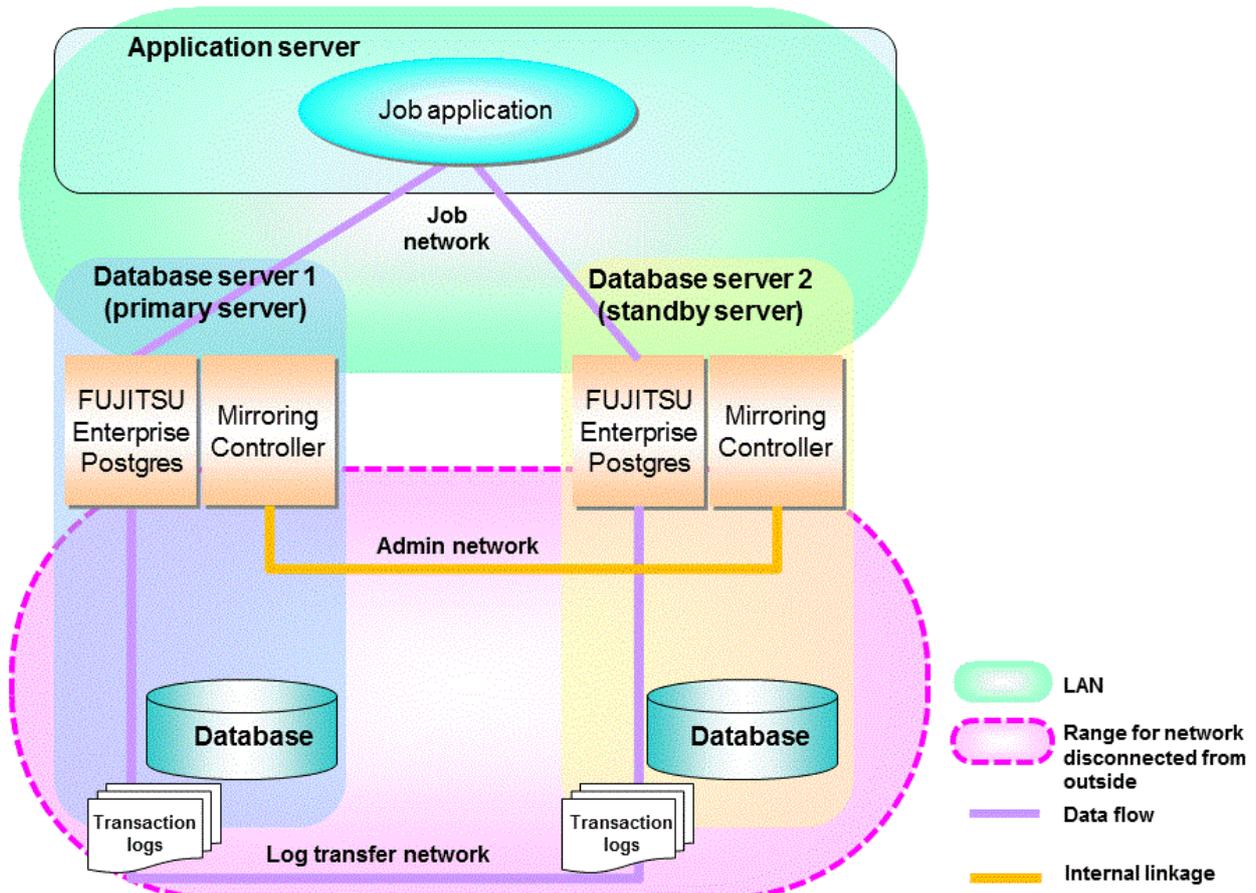
## 2.3 Security in Database Multiplexing

Database multiplexing mode replicates the database on all servers that comprise the cluster system. It achieves this by transferring and reflecting the updated transaction logs of the database from the primary server to the standby server.

To safeguard the database against unauthorized access and protect the confidentiality of data when transferring the transaction logs, carefully consider security and take note of the following:

- Do not use trust authentication when using replication connection.
- Configure the admin network and the log transfer network so that they cannot be connected from the outside, as shown below.

Figure 2.5 Security



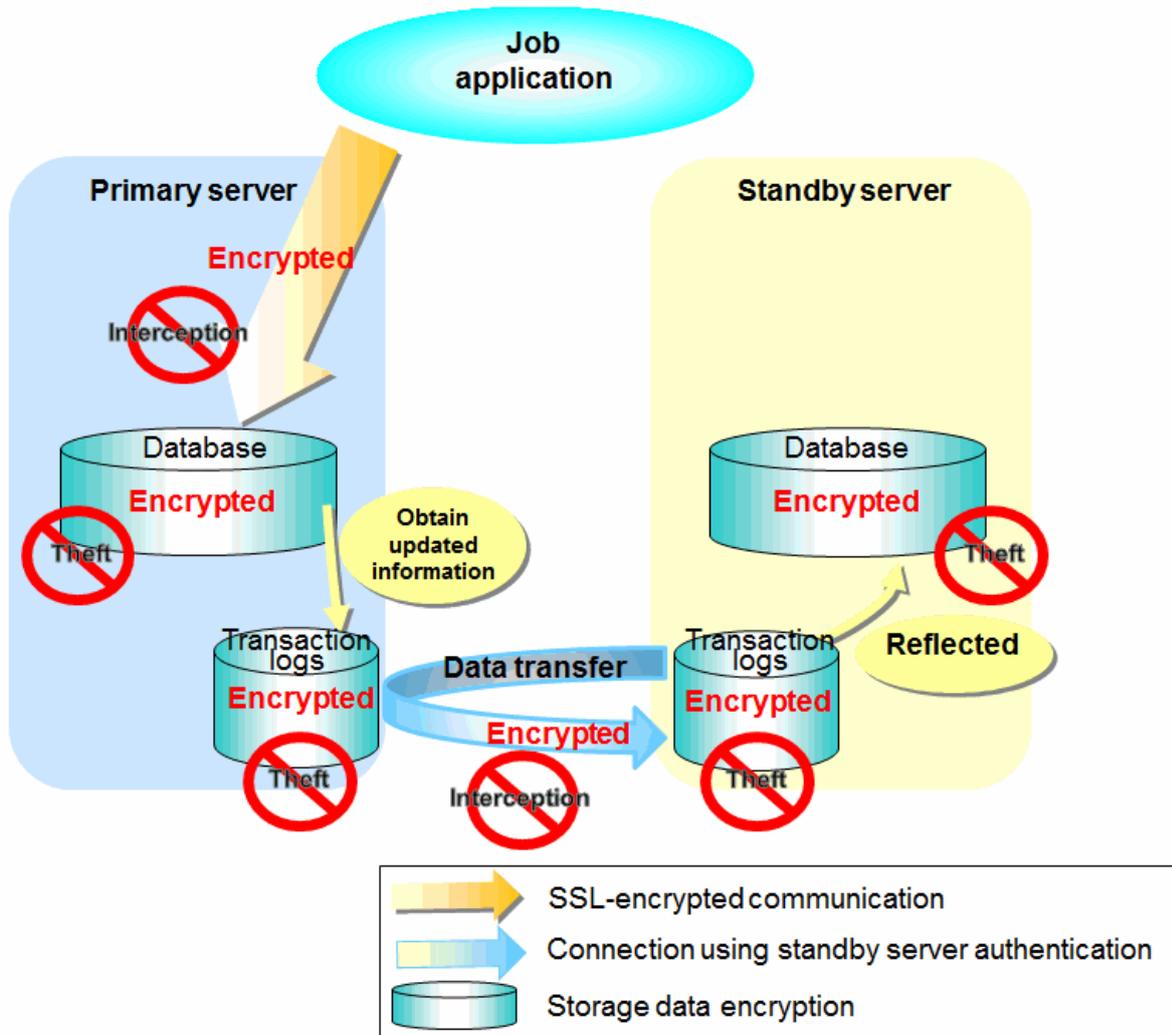
However, it may not always be possible to adopt the configuration mentioned above. For example, you may want to place the servers in a nearby/neighboring office to minimize network delays.

In this case, combine the following features to enhance security:

- Authentication of the standby server
- Encryption of transaction logs transferred to the standby server

When these features are combined, security will be achieved as shown below.

Figure 2.6 Security achieved when standby server authentication is combined with transaction log encryption



 See

Refer to "Performing Database Multiplexing" under "Configuring Secure Communication Using Secure Sockets Layer" in the Operation Guide for information on encrypting SSL communications.

### 2.3.1 Authentication of the Standby Server

You can prevent spoofing connections from an external server purporting to be the standby server by using authentication with a user name and password.

Configure the setting in the primary server `pg_hba.conf` file so that authentication is performed for connections from the standby server in the same way as for connections from the client.



See

.....  
Refer to "Client Authentication" in the PostgreSQL Documentation for information on content that can be configured in `pg_hba.conf`.  
.....

## **2.3.2 Encryption of Transaction Logs Transferred to the Standby Server**

---

In case the authentication of the standby server is breached so that a malicious user purporting to be the standby server can spoof data, the transaction log data can be encrypted to prevent it from being deciphered. The transparent data encryption feature is used to encrypt the data.



See

.....  
Refer to "Protecting Storage Data Using Transparent Data Encryption" in the Operation Guide for details.  
.....

# Chapter 3 Setting up Database Multiplexing Mode

This chapter describes how to set up database multiplexing mode, and how to check it.

## Users who perform setup and operations

Setup and operations of the database multiplexing mode must be performed by the instance administrator user.

The instance administrator user must also be registered as a database superuser.



When executing the `initdb` command, specify the `-U` option, and only perform operations in which the instance administrator user (who is the command execution user) is also a database superuser.

If an operation in which the instance administrator user is not a database superuser is performed, Mirroring Controller will be unable to connect to the instance, and therefore will not be able to perform error monitoring for the database multiplexing mode.

## Matching the system times

Before starting the setup, ensure that the times in both servers match, by using the operating system time synchronization feature, for example.

The tolerated difference is approximately one second.

If the system times are not synchronized (because the tolerated difference is exceeded, for example), problem investigation may be affected.

## Setup

Perform the procedure in the table below to set up database multiplexing mode.

Database multiplexing mode uses the streaming replication feature. If you know how to set up streaming replication, the setup of database multiplexing mode will be easy.

| Step | Task  |   | Refer to   |
|------|---|---|--|
|      | Primary server                                  | Standby server                                  |  |
| 1    | Installation                                    |   | <a href="#">3.1 Installation</a>   |
| 2    | Preparing the backup disk                       |   | <a href="#">3.2 Preparing the Backup Disk</a>  |
| 3    | Setting up database multiplexing mode           |   | <a href="#">3.3.1 Setting up Database Multiplexing Mode on the Primary Server</a>    |
| 4    | Creating, setting, and registering the instance |   | <a href="#">3.3.2 Creating, Setting, and Registering the Primary Server Instance</a> |
| 5    |   | Setting up database multiplexing mode           | <a href="#">3.4.1 Setting up Database Multiplexing Mode on the Standby Server</a>    |
| 6    |   | Creating, setting, and registering the instance | <a href="#">3.4.2 Creating, Setting, and Registering the Standby Server Instance</a> |
| 7    | Confirming the streaming replication status     |   | <a href="#">3.5 Confirming the Streaming Replication Status</a>                      |
| 8    | Creating applications                           |   | <a href="#">3.6 Creating Applications</a>  |
| 9    | Checking the behavior                           |   | <a href="#">3.7 Checking the Behavior</a>  |

Explanations for each step are provided below.

### Information

---

- The setup procedure is also the same when changing the mode on a single server to database multiplexing mode. In this case, omit the installation of FUJITSU Enterprise Postgres and the creation of the instance.

Refer to "[4.7.2 Changing from Single Server Mode to Database Multiplexing Mode](#)" for details.

- The primary and standby server can be pseudo-configured on the same server for system testing, for example. In this case, the setup can be performed using the same procedure, however there will be some supplementary steps.

Before performing the setup, refer to "[Appendix B Supplementary Information on Building the Primary Server and Standby Server on the Same Server](#)".

---

## 3.1 Installation

---

Refer to the manuals of each product, and then install the product.

### See

---

- Refer to the Installation and Setup Guide for Server for details on how to install FUJITSU Enterprise Postgres.
- 

## 3.2 Preparing the Backup Disk

---

In Mirroring Controller, backup allows recovery to be performed even if all server disks are corrupted.

The content on the primary server will be backed up. However, through switching and failback, the standby server may also become the primary server. Accordingly, prepare a backup disk device for the primary and standby servers. Ensure that backup is performed using the backup of the primary server.

## 3.3 Setting up the Primary Server

---

This section explains how to set up the primary server.

### 3.3.1 Setting up Database Multiplexing Mode on the Primary Server

---

This section explains how to set up database multiplexing mode on the primary server.

In database multiplexing, the files that are required for operations are managed in the Mirroring Controller management directory.

There is one Mirroring Controller management directory for each instance.

### Note

---

- Do not place the Mirroring Controller management directory in a directory managed by FUJITSU Enterprise Postgres, otherwise it may be deleted by mistake with the directories managed by FUJITSU Enterprise Postgres, and an old version of files may be restored.
- 

### See

---

- Refer to "Preparing Directories for Resource Deployment" in the Installation and Setup Guide for Server for details on the directories that are managed by FUJITSU Enterprise Postgres.
- Refer to "mc\_ctl" in Reference for information on the command.

- Refer to "[Appendix A Parameters](#)" for details on each parameter to be edited for the setup.

Perform the following procedure:

1. Log in to the primary server.
2. Create the Mirroring Controller management directory that will store the files required by database multiplexing.

Use ASCII characters excluding spaces in the Mirroring Controller management directory.

Additionally, grant "Write" permission to the instance administrator user for the Mirroring Controller management directory.

3. In the network.conf file, define the network configuration that will link between the Mirroring Controller processes.

Create the network.conf file in the Mirroring Controller management directory, based on the sample file. In the network.conf file, set "Read" permission for the instance administrator user only.

If users other than the instance administrator user are granted access, the mc\_ctl command will not work. In this way, users other than the instance administrator user are prevented from operating Mirroring Controller.

Path of the sample file

```
/install/Dir/share/mc_network.conf.sample
```

In the network.conf file, specify the host name (or IP address) and port number of the primary server and standby server, and define the network configuration that will link between the Mirroring Controller processes.

Refer to "[A.3 Network Configuration File](#)" for details.

A definition example is shown below.

In this example, the Mirroring Controller default port number 27540 is specified, and "server1" and "server2" represent any server identifiers.

Example)

```
server1 192.0.2.100 27540
server2 192.0.2.110 27540
```

Ensure that the port numbers for the primary and standby server do not conflict with other software.

Register in /etc/services the port number of the primary server, because programs such as WebAdmin use it to search for available port numbers.

Register any name as the service name.

4. Define the information related to Mirroring Controller monitoring and control in the *serverIdentifier.conf* file.

Create the *serverIdentifier.conf* file in the Mirroring Controller management directory, based on the sample file.

In the *serverIdentifier.conf* file, set "Read" permission for the instance administrator user only. If users other than the instance administrator user are granted access, the mc\_ctl command will not work.

As the file name for the *serverIdentifier.conf* file, use the server identifier name that was specified in the network.conf file in step 3.

Path of the sample file

```
/install/Dir/share/mc_server.conf.sample
```

Set the parameters shown in the table below in the *serverIdentifier.conf* file.

Table 3.1 Parameters

| Parameter   | Content specified                  | Remarks  |
|-------------|------------------------------------|--|
| db_instance | <i>'dataStorageDestinationDir'</i> | Enclose the directory within single quotation marks (').<br>Use ASCII characters excluding spaces to specify this parameter. |

| Parameter            | Content specified                             | Remarks  |
|----------------------|---|--|
| db_instance_password | 'Password of the instance administrator user' | If password authentication is performed, you must specify this parameter in the settings used when Mirroring Controller connects to a database instance. Use ASCII characters excluding spaces to specify this parameter.<br><br>Enclose the name within single quotation marks (').   |
| syslog_ident         | ' <i>programName</i> '                        | Specify the program name to be used to identify the Mirroring Controller messages in the system log.<br><br>Use ASCII characters excluding spaces to specify this parameter.<br><br>Use the same program name as the parameter in the postgresql.conf file ensures that the Mirroring Controller output content can be referenced transparently, so log reference is easy.<br><br>Enclose the name within single quotation marks (').  |
| heartbeat_interval   | 800 (milliseconds)                            | The time until an operation, such as the switch of the primary server, that is performed when there is no response, is calculated according to the following formula:<br><br>$(\text{heartbeat\_timeout (seconds)} + \text{heartbeat\_interval (milliseconds)/1000}) \times (\text{heartbeat\_retry (count)} + 1) = (1+800/1000) \times (2+1) = 5.4 \text{ (seconds)}$<br><br>According to this setting, errors are monitored at 800-millisecond intervals, and if there were three successive occurrences when there was no response for a duration of one second, the operation to switch the primary server, or disconnect the standby server from the primary server, is performed.<br><br>When setting this parameter, there are some considerations to take into account to optimize degradation using abnormality monitoring. Refer to " <a href="#">3.8.4 Tuning for Optimization of Degrading Operation Using Abnormality Monitoring</a> " for details. |
| heartbeat_timeout    | 1 (second)                                    |  |
| heartbeat_retry      | 2 (count)                                     |  |

### 3.3.2 Creating, Setting, and Registering the Primary Server Instance

This section explains how to create, set, and register the primary server instance.



See

- Refer to "Client Authentication" in the PostgreSQL Documentation for information on the pg\_hba.conf file.
- Refer to "[A.1 Parameters Set on the Primary Server](#)" for information on the postgresql.conf file.
- Refer to "mc\_ctl" in Reference for information on the command.

Perform the following procedure:

1. Refer to "Setup" in the Installation and Setup Guide for Server, and then perform the FUJITSU Enterprise Postgres setup and create the FUJITSU Enterprise Postgres instance.

Use ASCII characters excluding spaces in the data storage destination directory.

## Note

If degradation starts occurring due to an error during operations in database multiplexing mode, recovery is required for the standby server. There are some conditions to execute the `pg_rewind` command to recover the standby server. One of the conditions can be satisfied by enabling checksums when executing the `initdb` command. This is not mandatory.

Refer to "5.1.1.1.3 Identify cause of error and perform recovery" for details.

2. Configure the encryption settings for the storage data.

Create the keystore file.

Refer to "Database Multiplexing Mode" in the Operation Guide for details, and then configure the settings.

3. Add the following entry to the `pg_hba.conf` file to authenticate connections from the standby server.

Copy the file to the standby server later.

| # | TYPE | DATABASE    | USER | ADDRESS                     | METHOD                      |
|---|------|-------------|------|-----------------------------|-----------------------------|
|   | host | replication | fsep | <i>standbyServerAddress</i> | <i>authenticationMethod</i> |
|   | host | replication | fsep | <i>primaryServerAddress</i> | <i>authenticationMethod</i> |

For the primary and standby server addresses, specify the IP address that will connect to the log transfer network.

Additionally, all servers can be used as the primary server or the standby server, so add entries for the addresses of all servers that comprise the database multiplexing system.

As the authentication method, set a method other than trust authentication.

If the primary server becomes the standby server, to perform automatic authentication of connections to the primary server, create the `.pgpass` file in the home directory of the instance administrator user, and then specify a password for the replication database.

Accordingly, the OS user account of the instance administrator user and the user registered in the database will be the same, so you can verify that the connection was not made by an unspecified user. Additionally, the password that was set beforehand will be used in the authentication, so that the connection will be automatic.

## Note

If trust authentication is set, all OS users who can log in to the primary server will be able to connect, and if one of these is a malicious user, then that user can corrupt the standby server data, or cause the job system to fail, by sending an erroneous transaction log. Refer to "Authentication Methods" in the PostgreSQL Documentation for details on the authentication methods that can be set.

4. Configure this setting to enable the instance administrator user of the primary server to connect as a database application.

This setting enables the connection to the instance using the user name of the instance administrator user, so that Mirroring Controller can monitor instance errors. Configure this setting to enable the connection to the postgres database.

As the authentication method, set a method other than trust authentication.

- If password authentication is used

In the `db_instance_password` parameter of the `serverIdentifier.conf` file, specify the password for the instance administrator user. This password is used to connect to the database instance. If a password is not specified in the `db_instance_password` parameter, the connection to the database instance from Mirroring Controller will fail, and it will not be possible to perform the process monitoring of the instance.

- If password authentication is not used

There is no need to specify the password in the `db_instance_password` parameter.

Even if the password for the instance administrator user is specified in the `db_instance_password` parameter, it will be ignored.

An example of setting the authentication method is shown below.

| # | TYPE | DATABASE | USER | ADDRESS      | METHOD                      |
|---|------|----------|------|--------------|-----------------------------|
|   | host | postgres | fsep | 127.0.0.1/32 | <i>authenticationMethod</i> |

Refer to the note in step 3 for notes relating to trust authentication.

- To use database multiplexing mode, specify the parameters shown in the table below in the postgresql.conf file.

The postgresql.conf file is copied when the standby server instance is created. Accordingly, set the required parameters in the standby server.

To use database multiplexing mode, specify the parameters shown in the table below in the postgresql.conf file. After editing the postgresql.conf file, restart the instance.

Table 3.2 Parameters

| Parameter                 | Content specified   | Remarks   |
|---------------------------|---|---|
| wal_level                 | Literal "hot_standby"   |   |
| max_wal_senders           | Number of standby servers + 1   | The number of standby servers ( <i>n</i> ) is 1, so 2 must be specified.  |
| synchronous_standby_names | ' <i>standbyServerName</i> '  | Specify the name that will identify the standby server.<br>(Enclose the name within single quotation marks (.))<br><br>Do not change this parameter while Mirroring Controller is running.  |
| hot_standby               | on  | Specify this to execute reference jobs on the standby server.<br>(*1)   |
| wal_keep_segments         | Number of file segments   | If a delay exceeding the value set in this parameter occurs, the WAL segment required later by the primary server may be deleted.<br><br>Additionally, if you stop a standby server (for maintenance, for example), consider the stop time and set a value that will not cause the WAL segment to be deleted.<br><br>Setting this parameter requires consideration regarding stabilization of the database multiplexing mode (refer to "3.8.1 Tuning to Stabilize the Database Multiplexing Mode" for details).<br><br>Refer to "Estimating Transaction Log Space Requirements" in the Installation and Setup Guide for Server for information on estimating the WAL segment. |
| wal_sender_timeout        | Timeout (milliseconds)  | Specify the time period after which it is determined that an error has occurred in the transaction log transfer on the primary server.<br><br>By aligning this value with the value of (heartbeat_interval + heartbeat_timeout/1000) x (heartbeat_retry + 1) of the <i>serverIdentifier.conf</i> file, you can unify the time after which it is determined that an error has occurred.  |
| wal_receiver_timeout      | Timeout (milliseconds)  | Specify the time period after which it is determined that an error has occurred in the transaction log transfer on the standby server.<br><br>By aligning this value with the value of (heartbeat_interval + heartbeat_timeout) x heartbeat_retry of the <i>serverIdentifier.conf</i> file, you can unify the time after which it is determined that an error has occurred.   |
| archive_mode              | on  | Specify the archive log mode.   |
| archive_command           | ' <i>installDir</i> /bin/pgx_xlogcopy.cmd "%p" " <i>backupDataStorageDestin</i> ' | Specify the command and storage destination to save the transaction log.  |

| Parameter          | Content specified   | Remarks  |
|--------------------|---|--|
|                    | <i>ationDirectory/</i><br>archived_xlog/%f"   |  |
| backup_destination | Backup data storage destination directory   | Specify the name of directory where to store the backup data.<br><br>Set the privileges so that only the instance administrator user can access the specified directory.<br><br>Specify the same full path on all servers, so that the backup data of other servers can be used to perform recovery.   |
| max_connections    | The limit value for the number of standby server connections + number of simultaneous executions of mc_ctl status (*2) + 2 + number of simultaneous client connections to the instance + superuser_reserved_connections | The value specified is also used to restrict the number of connections from client applications and the number of connections for the management of instances.<br><br>Refer to "When an Instance was Created with the initdb Command" in the Installation and Setup Guide for Server, and "Connections and Authentication" in the PostgreSQL Documentation, for details. |

\*1: Mandatory to use the Mirroring Controller.

\*2: Number of simultaneous executions of the mc\_ctl command in the status mode.

#### 6. Start the Mirroring Controller process.

##### Enabling automatic switch/disconnection

As the instance administrator user, execute the mc\_ctl command in start mode with the -f option specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the -f option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the mc\_ctl command in enable-failover mode, or restart Mirroring Controller with the -f option specified.

Example)

```
$ mc_ctl start -M /mcdir/inst1 -w -f
```

##### Disabling automatic switch/disconnection

As the instance administrator user, execute the mc\_ctl command in start mode.

Example)

```
$ mc_ctl start -M /mcdir/inst1 -w
```

#### 7. Obtain the backup.

Use the pgx\_dmpall command to collect the backup.

## 3.4 Setting up the Standby Server

This section explains how to set up the standby server.

### 3.4.1 Setting up Database Multiplexing Mode on the Standby Server

This section explains how to set up database multiplexing mode on the standby server.

In database multiplexing, the files that are required for operations are managed in the Mirroring Controller management directory.

There is one Mirroring Controller management directory for each instance.

### Note

- Do not place the Mirroring Controller management directory in a directory managed by FUJITSU Enterprise Postgres, otherwise it may be deleted by mistake with the directories managed by FUJITSU Enterprise Postgres, and an old version of files may be restored.
- When creating a standby server for a large database, stop job system operations, specify a large value for the `wal_keep_segments` parameter, or use replication slots.  
This is because WALs generated after the standby server is built using the `pg_basebackup` command, but before it is started, need to be retained. However, the number of WAL segments that can be retained is constrained by the `wal_keep_segments` parameter. Additionally, setting the `wal_keep_segments` parameter requires consideration regarding stabilization of the database multiplexing mode (refer to "[3.8.1 Tuning to Stabilize the Database Multiplexing Mode](#)" for details).

### See

- Refer to "Preparing Directories for Resource Deployment" in the Installation and Setup Guide for Server for details on the directories that are managed by FUJITSU Enterprise Postgres.
- Refer to "`mc_ctl`" in Reference for information on the command.
- Refer to "[Appendix A Parameters](#)" for details on each parameter to be edited for the setup.
- Refer to "Replication Slots" in the PostgreSQL Documentation for information on replication slots.

Perform the following procedure:

1. Log in to the standby server.
2. Create the Mirroring Controller management directory that will store the files required by database multiplexing.  
Use ASCII characters excluding spaces in the Mirroring Controller management directory.  
Additionally, grant "Write" permission to the instance administrator user for the Mirroring Controller management directory.
3. Copy, and then deploy, the `network.conf` file of the primary server.  
Copy the `network.conf` file that was defined in the primary server setup, and deploy it to the Mirroring Controller management directory of the standby server.  
Set "Read" permission for the instance administrator user only. If users other than the instance administrator user are granted access, the `mc_ctl` command will not work. Accordingly, users other than the instance administrator user are prevented from operating Mirroring Controller.  
Register in `/etc/services` the port number of the standby server that was specified in the `network.conf` file, because programs such as WebAdmin use it to search for available port numbers.  
Register any name as the service name.
4. Copy, and then deploy, the `serverIdentifier.conf` file of the primary server.  
Copy the `serverIdentifier.conf` file that was defined in the primary server setup, and deploy it to the Mirroring Controller management directory of the standby server.  
Set "Read" permission for the instance administrator user only. If users other than the instance administrator user are granted access privileges, the `mc_ctl` command will not work.

## 3.4.2 Creating, Setting, and Registering the Standby Server Instance

---

This section explains how to create, set, and register the standby server instance.



- Refer to "Appendix A Parameters" for details on each parameter.
- Refer to "mc\_ctl" in Reference for information on the command.

Perform the following procedure:

1. Set the kernel parameters.  
Refer to "Configuring Kernel Parameters" in the Installation and Setup Guide for Server for details.
2. Configure the encryption settings for the storage data.  
Deploy a copy of the keystore file of the primary server on the standby server.  
Refer to "Database Multiplexing Mode" in the Operation Guide for details.
3. Execute the pg\_basebackup command to create a copy of the primary server instance on the standby server. A recovery.conf file is also created using the connection information for the primary server specified in each option used with the mc\_ctl command.

Example)

```
$ pg_basebackup -D /database/inst1 --xlog --progress --verbose -R --
dbname='application_name=standbyServerName' -h primaryServerIpAddress -p primaryServerPortNumber
```



If using a method that requires password authentication for connections to the primary server, you will need to ensure that authentication is performed automatically.

If the -R option is specified for the pg\_basebackup command and the password parameter is specified for the --dbname option, the pg\_basebackup command will set the password in recovery.conf file, enabling connections to be performed automatically.

If a password is not set in recovery.conf, it will be necessary to create a .pgpass file in the home directory of the instance administrator user, and specify a password for the replication database.

4. Set the parameters shown in the table below in the postgresql.conf file.

Table 3.3 Parameters

| Parameter                 | Content specified          | Remarks  |
|---------------------------|----------------------------|--|
| synchronous_standby_names | <i>'primaryServerName'</i> | Required after switching the primary server and then changing the original primary server to the new standby server.<br>Enclose the name within single quotation marks (').<br>Do not change this parameter while Mirroring Controller is running. |

5. Start the Mirroring Controller process.

After ensuring that the Mirroring Controller process of the primary server has started, start the Mirroring Controller process.

#### Enabling automatic switch/disconnection

As the instance administrator user, execute the mc\_ctl command in start mode with the -f option specified. This action enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the -f option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the mc\_ctl command in enable-failover mode or restart Mirroring Controller with the -f option specified.

Example)

```
$ mc_ctl start -M /mdir/inst1 -w -f
```

### Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode.

Example)

```
$ mc_ctl start -M /mcdir/inst1 -w
```

6. Check the status of the Mirroring Controller process.

As the instance administrator user, execute the `mc_ctl` command in status mode. Ensure that "mirroring status" is switchable.

Example)

```
$ mc_ctl status -M /mcdir/inst1
```

## 3.5 Confirming the Streaming Replication Status

Before performing the setup of the database multiplexing mode, ensure that the prerequisite streaming replication feature has been set up correctly.

Perform the following procedure:

1. On the primary server, ensure that single-row searches can be performed using the `pg_stat_replication` statistics view.

An example output of the `psql` command is shown below.

Example)

```
postgres=# select * from pg_stat_replication;
-[ RECORD 1 ]-----+-----
pid           | 14336
usesysid     | 10
username     | fsep
application_name | standby
client_addr  | 192.0.2.210
client_hostname |
client_port  | 27500
backend_start | 2015-04-23 20:24:13.761424+09
backend_xmin  |
state        | streaming
sent_location | 0/3000060
write_location | 0/3000060
flush_location | 0/3000060
replay_location | 0/3000060
sync_priority | 1
sync_state   | sync
```

2. Confirm the search results of step 1.

Ensure that the connection established with the intended standby server is in synchronous mode.

Table 3.4 Items to be checked

| Item                          | Required value   |
|-------------------------------|--|
| <code>application_name</code> | Value specified for <code>synchronous_standby_names</code> parameter in the <code>postgresql.conf</code> file of the primary server. |
| <code>client_addr</code>      | IP address of the standby server.  |
| <code>state</code>            | "streaming".   |
| <code>sync_state</code>       | "sync".  |



See

- Refer to "The Statistics Collector" in "Server Administration" in the PostgreSQL Documentation for information on the `pg_stat_replication` statistics view.
- Note that the `pg_stat_replication` statistics view may change in the future.

## 3.6 Creating Applications

This section explains how to create applications using database multiplexing, and points that should be noted when you create the applications.

### 3.6.1 Application Connection Server Settings

If database multiplexing is used and a failover occurs, it will be necessary to switch the application connection server. Accordingly, use the application connection switch feature to create applications.



See

Refer to "Application Connection Switch Feature" in the Application Development Guide for details.

### 3.6.2 Notes on Indexes

Do not use hash indexes.

Even if a hash index is updated, a transaction log will not be output and the hash index will not be reflected on the standby server.

## 3.7 Checking the Behavior

To check if the environment setup was performed correctly, start the application and then check the behavior of the switch and rebuild.

## 3.8 Tuning

This section explains how to tune database multiplexing mode.

### 3.8.1 Tuning to Stabilize the Database Multiplexing Mode

When large amounts of data are updated, the write-to load for the database will become great, and the multiplexing state may become unstable.

Accordingly, by editing the parameters below in the `postgresql.conf` file, a stable multiplexing state can be maintained. Refer to "Estimating Transaction Log Space Requirements" in the Installation and Setup Guide for Server for information on transaction log space requirements.

Table 3.5 Parameters

| Parameter                      | Content  |
|--------------------------------|--|
| <code>wal_keep_segments</code> | Refer to "3.3.2 Creating, Setting, and Registering the Primary Server Instance" for details.   |
| <code>max_wal_size</code>      | <p>The transaction log is written out according to the checkpoint trigger.</p> <p>If a transaction log with the capacity of the value specified in this parameter is generated, the checkpoint will be executed.</p> <p>If a large value is specified in this parameter, the time required for crash recovery will increase.</p> <p>If a small value is specified in this parameter, many checkpoints will be generated, which will affect the performance of the applications that connect to the primary server.</p> |

## 3.8.2 Tuning to Stabilize Queries on the Standby Server

---

Queries made using reference jobs on the standby server may be canceled by jobs executed on the primary server.

To reduce the possibility of a job being canceled, specify as large a value as possible for the `max_standby_archive_delay` parameter in the `postgresql.conf` file.



- Refer to "Handling Query Conflicts" in the PostgreSQL Documentation for details.
  - Refer to "Standby Servers" in the PostgreSQL Documentation for details on the `max_standby_archive_delay` parameter.
- 

## 3.8.3 Tuning to Stabilize Queries on the Standby Server (when Performing Frequent Updates on the Primary Server)

---

If jobs are updated on the primary server regularly and frequently, it will be easy for the query made by the reference job on the standby server to be canceled. In this case, edit one of the `postgresql.conf` file parameters shown in the table below.

| Parameter                             | Description  |
|---------------------------------------|--|
| <code>hot_standby_feedback</code>     | When "on" is set, the deletion (vacuum) of the data area that was deleted or updated on the primary server is suppressed.<br>Accordingly, the query on the standby server will not be canceled. (*1)   |
| <code>vacuum_defer_cleanup_age</code> | The deletion (vacuum) of the data area that was deleted or updated on the primary server is delayed until the specified number of transactions is processed. Accordingly, the probability that the query on the standby server will be canceled decreases. |

\*1: Because the vacuum is delayed, the data storage destination disk space of the primary server comes under pressure. Additionally, if there is conflict between accesses and queries executed on the standby server, transaction logs indicating this conflict will be transferred.  
Accordingly, specify as large a value as possible for the `max_standby_archive_delay` parameter so that access conflicts do not occur.



- Refer to "Standby Servers" in the PostgreSQL Documentation for details on the `hot_standby_feedback` parameter.
  - Refer to "Master Server" in the PostgreSQL Documentation for details on the `vacuum_defer_cleanup_age` parameter.
- 

## 3.8.4 Tuning for Optimization of Degrading Operation Using Abnormality Monitoring

---

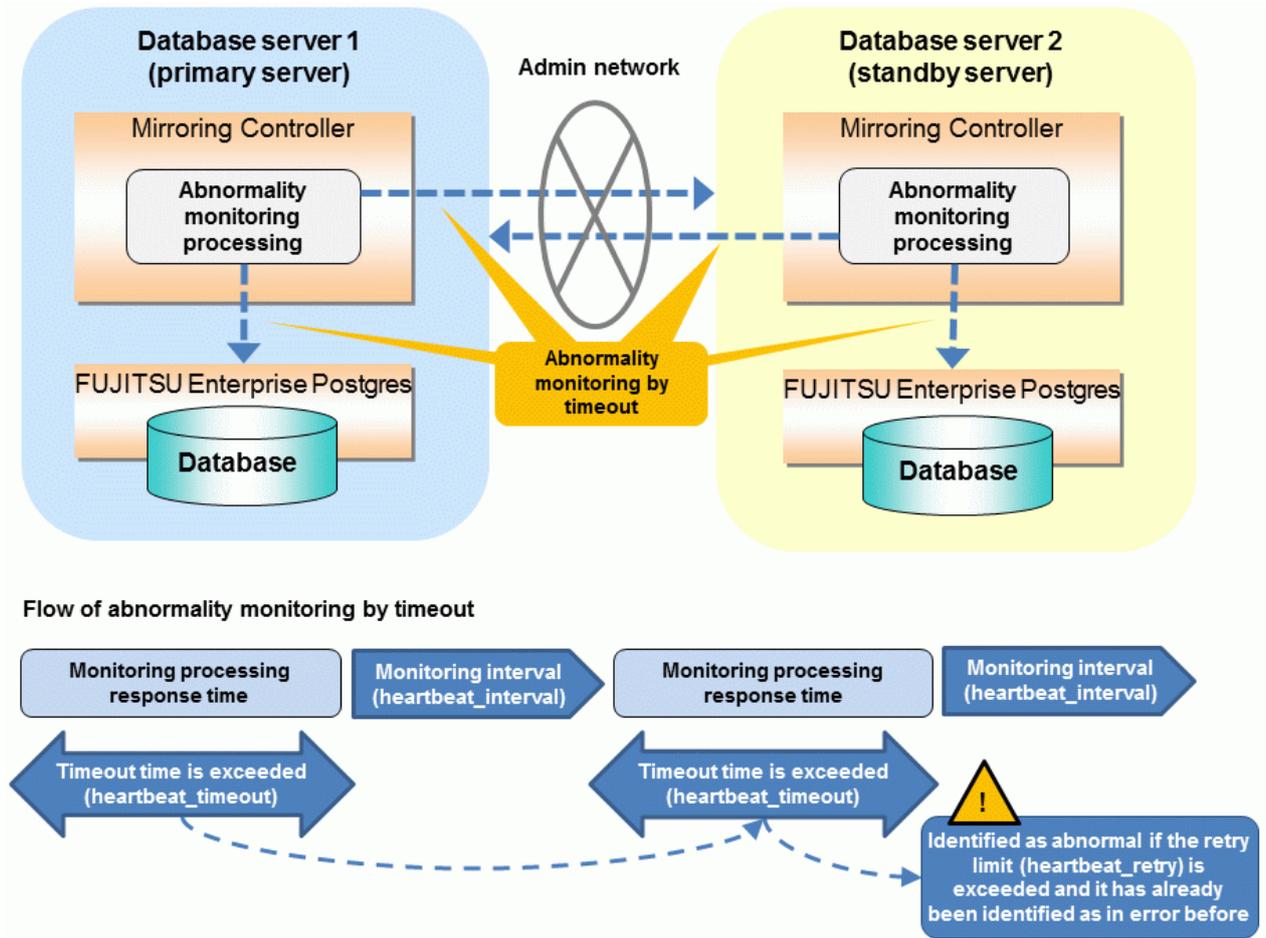
Mirroring Controller uses a monitoring method that outputs an error if the timeout time is exceeded when accessing resources targeted for monitoring. If the timeout time is short, switch/disconnection of the standby server can be performed faster, however, there is greater risk of misdetection, so an appropriate design is required.

You can optimize degrading operation by editing the values for the following parameters in the server definition file in accordance with the system. Refer to "[Appendix A Parameters](#)" for information on how to edit these parameters.

Table 3.6 Parameters

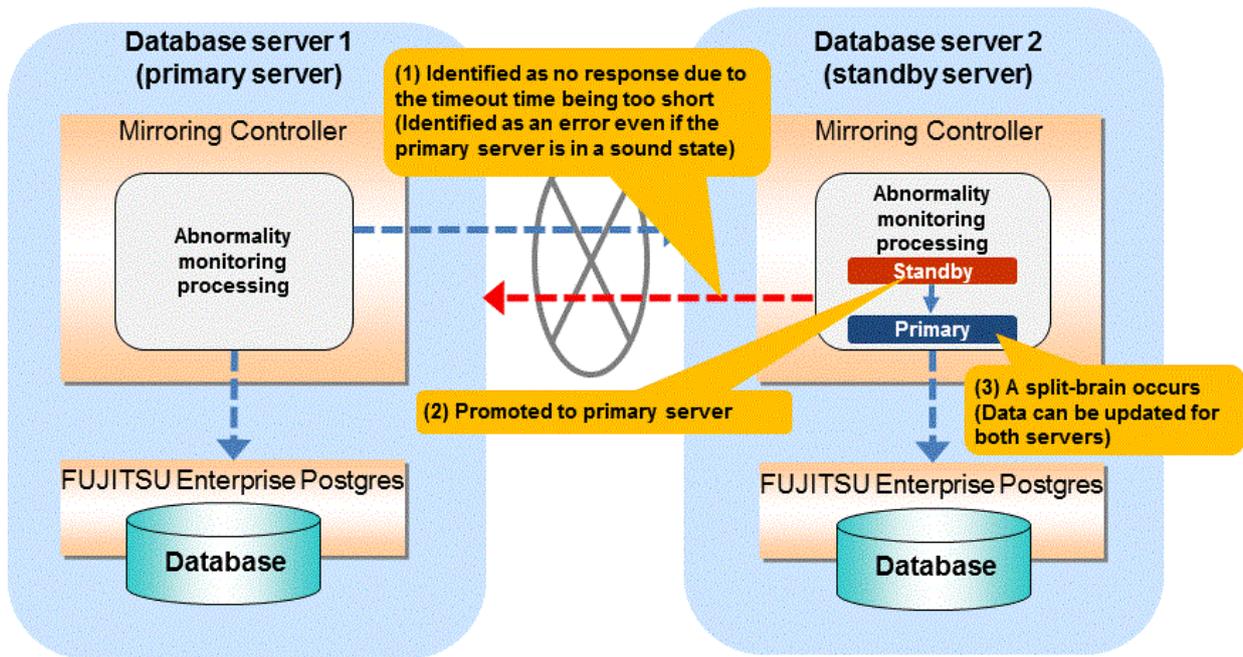
| Parameter  | Description  |
|--|--|
| Abnormality monitoring interval<br>( <code>heartbeat_interval</code> ) | Mirroring Controller is configured so that abnormality monitoring does not place a load on the system. This parameter does not normally need to be set. (The default is 800 milliseconds.) |

| Parameter   | Description   |
|---|---|
| Abnormality monitoring timeout time (heartbeat_timeout) | Set the time during which a load is placed continuously on the server or network performance. For example, it is envisaged that this parameter will be used in situations such as when performing high-load batch jobs or when a large number of online jobs occur continuously and concurrently. |
| Abnormality monitoring retry times (heartbeat_retry)    | This parameter can be set when needing a safety value for situations in which the value specified for heartbeat_timeout is exceeded, for example, when using systems with fluctuating loads, however, this parameter does not normally need to be set. (The default is 2 times.)                  |

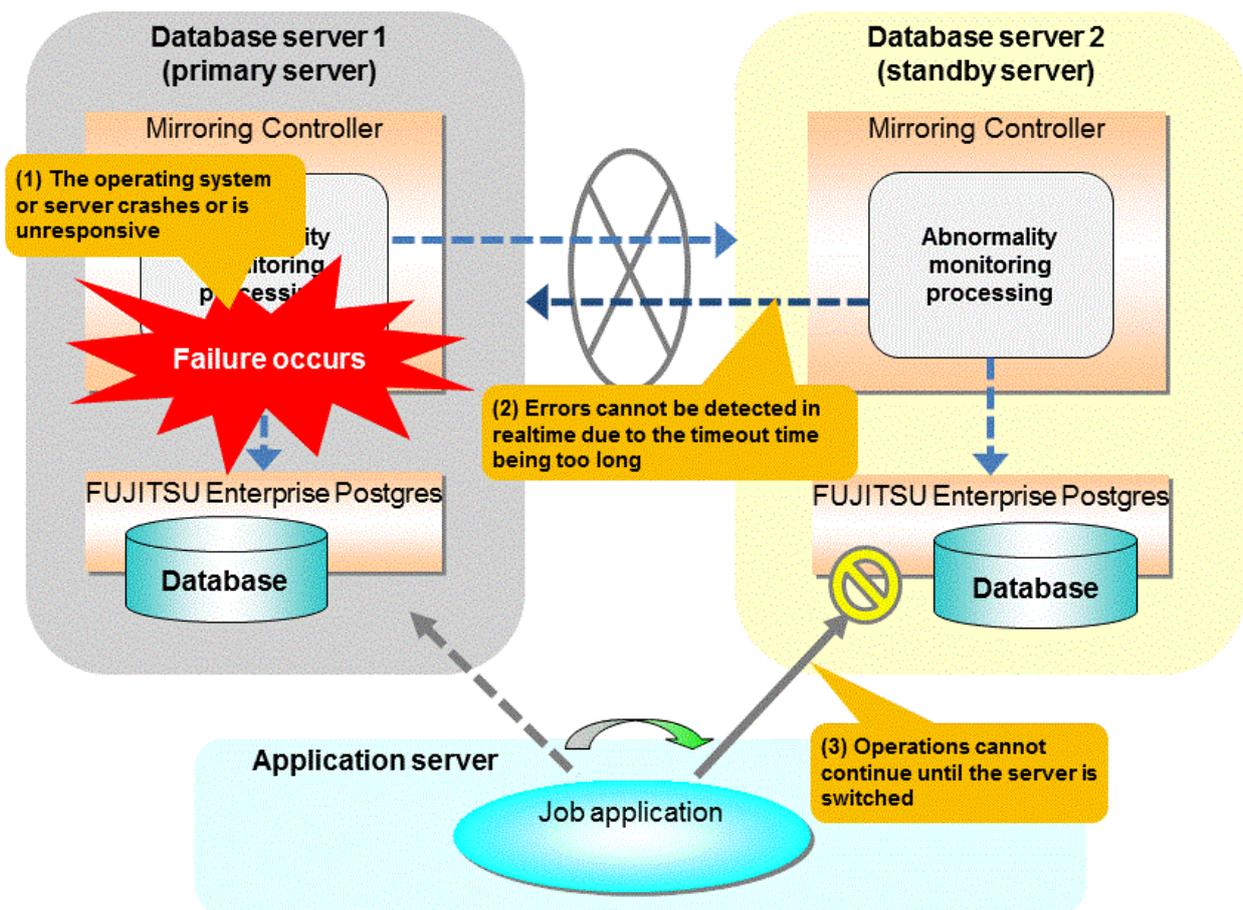


The following type of issue occurs if the tuning related to abnormality monitoring is not performed appropriately.

● If the timeout time is too short



● If the timeout time is too long



## Notes regarding monitoring when the operating system or server crashes or is unresponsive

Monitoring is performed upon the aforementioned timeout when the operating system or server crashes or is unresponsive. Therefore, if tuning has not been performed correctly, there is a risk of a split-brain mistakenly occurring even if the server is in a sound state.

Split-brain is a phenomenon in which both servers temporarily operate as primary servers, causing data updates to be performed on both servers.

### Split-brain detection method

It can be confirmed that split-brain occurs under the following conditions:

1. When the `mc_ctl` command is executed in status mode on both servers, the "host\_role" of both servers is output as "primary".  
And,
2. The following message is output to the system log of one of the servers:

```
promotion processing completed (MCA00062)
```

### How to recover from a split-brain

Use the procedure described below. Note that the new primary server is the server that was confirmed in step 2 of the aforementioned detection method.

1. Stop all applications that are running on the old and new primary servers.
2. Investigate and recover the database.  
Investigate the update results that have not been reflected to the new primary server from the database of the old primary server, and apply to the new primary server as necessary.
3. Stop the old primary server instance and the Mirroring Controller.
4. Resume the applications that were stopped in step 1.
5. Recover the old primary server.  
While referring to "[3.4 Setting up the Standby Server](#)", build (set up) the old primary server as the new standby server, from the new primary server.

### Note

The tuning described above impacts on the time taken from detection of a timeout until switching the primary server. Therefore, modify the values while taking into account the switch/disconnection time, using a design for which misdetection does not occur.

## 3.9 Setting Automatic Start and Stop of Mirroring Controller and Multiplexed Instances

Multiplexed instances and Mirroring Controller can be started and stopped automatically in line with the starting and stopping of the operating system of the database server.

### Note

To guarantee the startup sequence of Mirroring Controller on the primary and standby servers, first confirm that the primary server has started, and then start the standby servers in sequence.

### If using an rc script

Perform the following procedure:

1. Set the OS user account of the instance administrator user

If you logged in using the OS user account of the instance administrator user, set the environment variables required for starting the instance.

This setting is required for executing the "su -" command.

2. Edit the shell script

Copy the sample shell script, and edit the environment variables in the shell script to suit the environment.

Path of the sample shell script

```
/installDir/share/rc_mcoi.sample
```

3. Copy the revised shell script and set access permissions

As the OS superuser, copy the revised shell script to /etc/rc.d/init.d, and then set and register the access rights.

In the following example, the shell script was created as "rc\_mc\_inst1".

Example)

```
# cp rc_mc_inst1 /etc/rc.d/init.d/
# chmod 755 /etc/rc.d/init.d/rc_mc_inst1
```

4. Register and enable automatic start and stop

As the OS superuser, execute the chkconfig command to register and enable the script. To register and enable the script, specify the options shown in the table below.

| Option  | Description   |
|---------|---|
| --add   | Registers the shell script as the startup script.       |
| --level | Sets and enables the startup script for each run level. |

In the following example, the shell script is registered, and then enabled for run levels 3 and 5.

Example)

```
# chkconfig --add rc_mc_inst1
# chkconfig --level 35 rc_mc_inst1 on
```

If using systemd

Perform the following procedure:

1. Create a unit file

Copy the unit file sample stored in the directory below, and revise it to match the target instance.

Path of the sample file

```
/installDir/share/mcoi.service.sample
```

Example)

In the following example, the installation directory is "/opt/fsepv<XY>server64", and the instance name is "inst1".

```
# cp /opt/fsepv<XY>server64/share/mcoi.service.sample /usr/lib/systemd/system/
mcoi_inst1.service
```

Revise the underlined portions of the options below in the unit file.

| Section | Option      | Specified value  | Description   |
|---------|-------------|--|---|
| Unit    | Description | FUJITSU Enterprise Postgres MirroringController <u>instanceName</u>  | Specifies the feature overview.                     |
|         |             |  | Specifies the name of the target instance. (*1)     |
| Service | ExecStart   | /bin/bash -c ' <u>installDir</u> /bin/mc_std start <u>installDir</u> | Command to be executed when the service is started. |

| Section | Option   | Specified value   | Description   |
|---------|----------|---|---|
|         |          | <i>MirroringControllerManagementDir</i><br><i>r' mc_ctlOption</i>   | Specify the option you want to add when the mc_ctl option is executed in the mc_ctl option.<br><br>Note that the content specified in this mc_ctl option is carried over from the mc_std command to the mc_ctl command.   |
|         | ExecStop | /bin/bash -c ' <i>installDir</i> /bin/mc_std<br>stop <i>installDir</i><br><i>MirroringControllerManagementDir</i><br><i>r' mc_ctlOption</i> | Command to be executed when the service is stopped.<br><br>Specify the option you want to add when the mc_ctl command is executed in the mc_ctl option.<br><br>Note that the content specified in this mc_ctl option is carried over from the mc_std command to the mc_ctl command. |
|         | User     | <u>User</u>   | OS user account of the instance administrator user.   |
|         | Group    | <u>Group</u>  | Group to which the instance administrator user belongs.   |

\*1: The instance name should be as nameThatIdentifiesTheInstance.

The naming conventions for identifying the instance are as follows:

- Up to 16 bytes
- The first character must be an ASCII alphabetic character
- The other characters must be ASCII alphanumeric characters

## 2. Enable automatic start and stop

As the OS superuser, use the systemctl command to enable automatic start and stop.

Example)

```
# systemctl enable mcoi_inst1.service
```

## 3.10 Backup Operation

This section explains the backup operation for database multiplexing mode.

### 3.10.1 Backing up Database Multiplexing Mode Information

When changing the Mirroring Controller settings, in addition to backing up the database, back up the configuration file in the Mirroring Controller management directory so that the Mirroring Controller settings are not lost.

### 3.10.2 Database Backup Operation

Using database multiplexing mode is the same as obtaining the backup data on the standby server as a safeguard against a disk failure. Note that all server disks may be corrupted due to some cause.

As a safeguard against this type of case, execute the pgx\_dmpall command on the primary server to create the backup data.

However, it is not definite as to which server runs as the primary server, so ensure that the pgx\_dmpall command is executed periodically on all servers, so that the backup data will be obtained. For example, create a script to obtain the backup data, and set it in the operation management software.

## Point

When the `pgx_dmpall` command is executed on the standby server, it will not match the statuses, however the error message shown below will be output and return the value "1".

If a script that ignores only this type of error is executed on all servers, the backup data of the primary server can be obtained.

Error message

```
ERROR:recovery is in progress (10095)
```

## Note

- Consider the possibility that the server that runs as the primary server may be destroyed alongside the backup data, so it is recommended to promote another server to become the primary server, and then back up the data on the new primary server without waiting for the next scheduled backup.
- Specify the same backup directory name for the primary and standby servers. If different backup directory names are specified, and recovery is performed using the backup data of the other server, the recovery cannot be performed correctly.

## See

- Period backups allow shorter recovery time and reduction in disk usage. Refer to "Backing Up the Database" in the Operation Guide for details on the backup operation.
- Refer to "[Chapter 5 Action Required when an Error Occurs in Database Multiplexing Mode](#)" for details on recovery based on the backup data that was obtained using the `pgx_dmpall` command.

# Chapter 4 Operations in Database Multiplexing Mode

This chapter describes the periodic operations that are performed when running database multiplexing mode.

The periodic operations are the same as the operations on a single server.



See

Refer to "Periodic Operations" in the Operation Guide for information on the periodic operations.

## 4.1 Starting and Stopping Instances

When database multiplexing mode is used, use the `mc_ctl` command to start and stop the instance and Mirroring Controller at the same time.

Do not start or stop the instance by itself.

### Enabling automatic switch/disconnection

Execute the `mc_ctl` command with the `-f` option specified.

If you start Mirroring Controller and the instance without specifying the `-f` option, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

When only the instance is started and stopped, the following will happen:

- When only the instance is started

Features such as automatic switch and automatic disconnection will not work until Mirroring Controller is started.

- When only the instance is stopped

Mirroring Controller determines that an error has occurred in the instance, and performs an unnecessary automatic switch.

Automatic switch may also stop working correctly in some cases.

### Disabling automatic switch/disconnection

When only the instance is started and stopped, the following will happen:

- When only the instance is started

Errors indicated in "2.1 What is Database Multiplexing Mode" will not be detected until Mirroring Controller is started.

- When only the instance is stopped

Mirroring Controller determines that an error has occurred in the instance, and outputs an error to the system log.

## 4.2 Checking the Database Multiplexing Mode Status

Check the multiplexed database status by executing the `mc_ctl` command in status mode.

Additionally, errors can be detected by monitoring the Mirroring Controller messages. If the status or messages are monitored periodically, you can react quickly following an automatic switch failure.

When the `mc_ctl` command is executed, the details of the multiplexing configuration, information about whether switch is possible following the error, and location and details of the error that caused the switch or disconnection are displayed.

After starting database multiplexing mode, execute the `mc_ctl` command in status mode to check the multiplexing status.

An example of the status displayed when the `mc_ctl` command is executed is shown below.

Example)

```
$ mc_ctl status -M /mcdir/inst1
mirroring status
```

```
-----
switchable
server_id host_role      host          host_status  db_proc_status  disk_status
-----
----
nd1       primary      192.0.2.100  normal      normal          normal
nd2       standby     192.0.2.110  normal      normal          normal
```

Additionally, by referencing the `pg_stat_replication` statistics view on the primary server, the data synchronization status can be confirmed. However, when creating the monitoring program, note that the content of `pg_stat_replication` may be changed in the future.

The following example shows that the locations of the transaction log after it is sent and received (`sent_location`, `replay_location`) match, and that they are fully synchronized.

Example)

```
postgres=# select * from pg_stat_replication;
-[ RECORD 1 ]-----+-----
pid          | 14336
usesysid     | 10
username     | fsep
application_name | standby
client_addr  | 192.0.2.210
client_hostname |
client_port  | 27500
backend_start | 2015-04-23 20:24:13.761424+09
backend_xmin  |
state        | streaming
sent_location | 0/3000060
write_location | 0/3000060
flush_location | 0/3000060
replay_location | 0/3000060
sync_priority | 1
sync_state   | sync
```



- Refer to "mc\_ctl" in Reference for information on the command.
- Refer to "Notes on Application Compatibility" in the Application Development Guide for information on retaining application compatibility.
- Refer to "The Statistics Collector" in "Server Administration" in the PostgreSQL Documentation for details on `pg_stat_replication`.

## 4.3 Manually Switching the Primary Server

The primary server cannot be switched automatically in the following case:

- If automatic switch/disconnection is disabled

In this case, to manually switch the primary server, execute the `mc_ctl` command in switch mode on either the primary server or the standby server.

Example)

```
$ mc_ctl switch -M /mdir/inst1
```

## 4.4 Manually Disconnecting the Standby Server

The standby server cannot be disconnected automatically in the following case:

- If automatic switch/disconnection is disabled

In this case, to manually disconnect the standby server, execute the mc\_ctl command in stop mode on the standby server and comment out the synchronous\_standby\_names parameter in the postgresql.conf file on the primary server.

1. Execute the mc\_ctl in stop mode on the standby server.

Example)

```
$ mc_ctl stop -M /mcdir/inst1
```

2. Comment out the synchronous\_standby\_names parameter in the postgresql.conf file on the primary server.
3. Execute the pg\_ctl command in reload mode on the primary server.

Example)

```
$ pg_ctl reload -D /database/inst1
```

## 4.5 Monitoring Mirroring Controller Messages

The messages that are output by Mirroring Controller are output to the system log. If the automatic switch fails, for example, an important message related to the continuation of the operation may be output, so ensure that the system log messages are monitored.



### Point

To monitor message types considered to be important, a setting must be configured in the system log beforehand.

Refer to the operating system manuals, check if the message is of a message type that is monitored to be output to the system log, and configure the setting if required.

### Display format

```
programName[processId]: messageType: messageText (messageNumber)
```

Specify the program name in the syslog\_ident parameter of the serverIdentifier.conf file.

The message types output by Mirroring Controller, their severity, and their corresponding value in the system log are shown in the table below.

Table 4.1 Message type, severity, and corresponding value in the system log

| Message type | Severity    | Meaning   | System log |
|--------------|-------------|---|------------|
| INFO         | Information | Provides information that does not fall under LOG or NOTICE.  | INFO       |
| LOG          |             | Provides information recognized as a particularly important event in tracing the operation history.<br>(Example: Automatic switch is complete)                            |            |
| NOTICE       | Notice      | Outputs information that takes into account the user instructions within the program in response to an executed or automatically executed process.                        | NOTICE     |
| WARNING      | Warning     | Provides a warning, for example it will soon be impossible to maintain the multiplexing state.  | WARNING    |
| ERROR        | Error       | Reports that an error other than FATAL or PANIC has occurred.   | ERROR      |
| FATAL        |             | Reports that an abnormality was detected in one of the multiplexed database systems requiring recovery of this system, and also the content and cause of the abnormality. | CRIT       |

| Message type | Severity | Meaning  | System log |
|--------------|----------|--|------------|
| PANIC        |          | Reports that an abnormality was detected in all multiplexed database systems requiring immediate recovery of this system, and also the content and cause of the abnormality. | ALERT      |

The message severity has the following meanings:

- Information

Informational status. A message that was reported by the system is displayed. No action is required.

- Notice

Informational status, but a message that should be noted is displayed. If necessary, take the actions described in the "Action" section of the message.

- Warning

No error has occurred, but the user is requested to check, and take action. Take the actions described in the "Action" section of the message.

- Error

An error has occurred. Take the actions described in the "Action" section of the message.

## 4.6 Server Maintenance

---

To perform maintenance tasks such as periodic server inspections and the application of updates for software products including the operating system, you must perform a planned stop of the server, and then perform the maintenance.

### 4.6.1 Rolling Updates

---

In database multiplexing mode, rolling updates, that perform the maintenance for the servers that comprise the cluster system, can be performed while jobs continue.

First, perform the maintenance for the standby server, and then switch the standby server to the primary server. Then, perform the maintenance for the original primary server that was switched to the standby server. This enables maintenance to be performed while jobs continue.

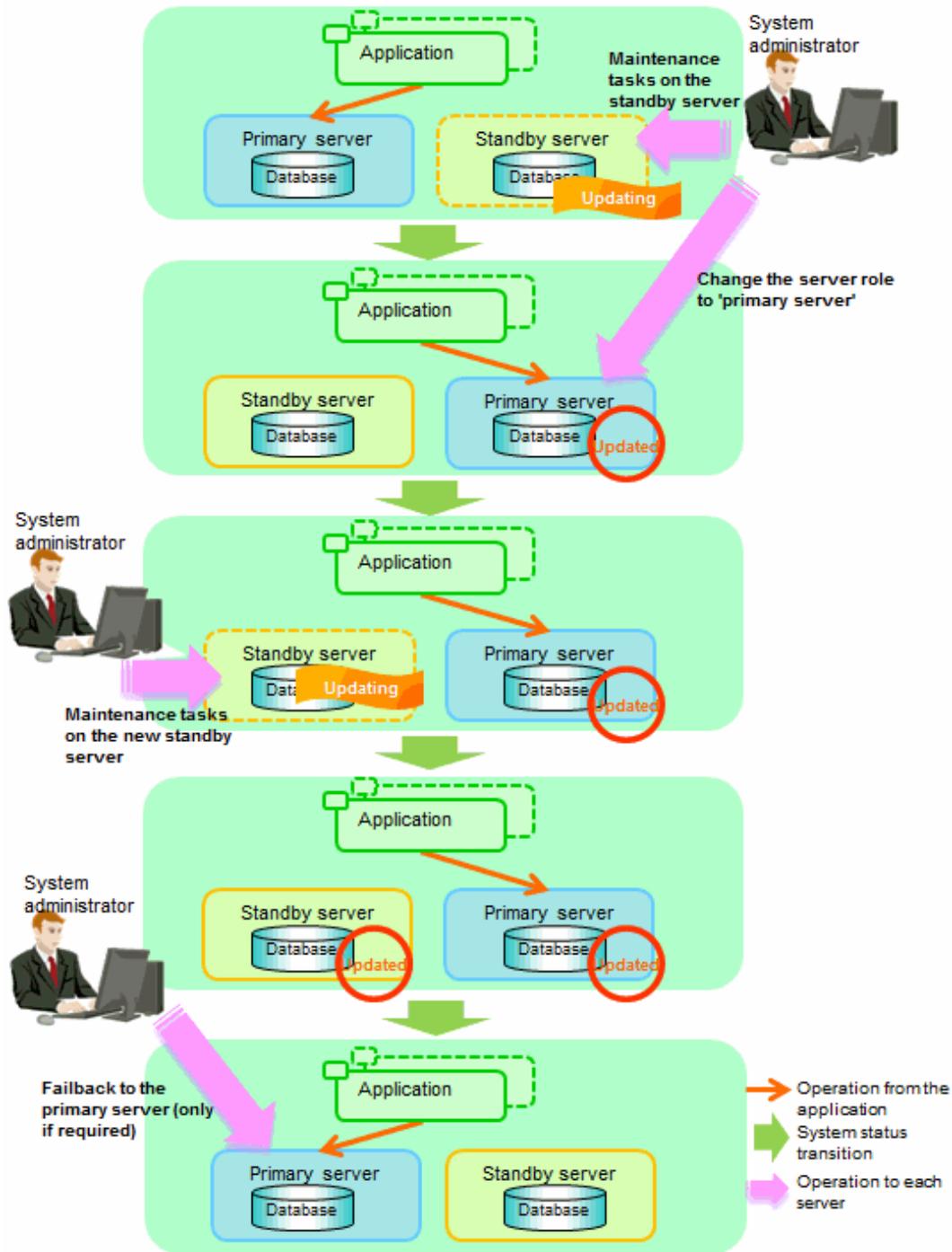


See

.....  
 If the downtime due to the maintenance of the standby server is expected to be long, refer to "Standby server downtime" in "[4.7.1 Changes Required when the Standby Server is Stopped](#)".  
 .....

The flow of a rolling update is shown below.

Figure 4.1 Performing a Rolling Update



Perform the following procedure as shown in the above figure:

### Standby server maintenance tasks

1. To perform the maintenance on the standby server, stop Mirroring Controller.

Example)

```
$ mc_ctl stop -M /mdir/inst1
```

2. Ensure that Mirroring Controller has completely stopped.

If the multiplexed instances and Mirroring Controller have been configured on the standby server to start and stop automatically when the operating system of the database server is started or stopped, cancel the setting to start and stop automatically.



.....  
Refer to "3.9 Setting Automatic Start and Stop of Mirroring Controller and Multiplexed Instances" for information on how to configure the multiplexed instances and Mirroring Controller to start and stop automatically when the operating system of the database server start and stops.  
.....

#### If using an rc script

As the OS superuser, execute the `chkconfig` command to disable automatic start and stop.

In the example below, the shell script for automatic start and stop was created as "rc\_mc\_inst1" and is disabled for run levels 3 and 5.

Example)

```
# chkconfig --level 35 rc_mc_inst1 off
```

#### If using systemd

As the OS superuser, execute the `systemctl` command to disable automatic start and stop.

The example below disables automatic start and stop of "mcoi\_inst1.service".

Example)

```
# systemctl disable mcoi_inst1.service
```

3. Perform maintenance tasks.
4. Create a copy of the primary server instance on the standby server.

Execute the `pg_basebackup` command to create data in the standby server by synchronizing with the primary server.

Example)

```
$ pg_basebackup -D /database/inst1 --xlog --progress --verbose -R --  
dbname='application_name=standbyServerName' -h primaryServerHostName -p primaryServerPortNumber
```



.....  
The procedure for copying the primary server instance to the standby server is the same as the procedure for setting up the standby server.

Refer to "3.4.2 Creating, Setting, and Registering the Standby Server Instance", and then perform the recovery.  
.....

5. Check the settings for automatic start and stop of the multiplexed instances and Mirroring Controller.

If the multiplexed instances and Mirroring Controller were configured in step 2 to not start and stop automatically when the operating system of the database server starts and stops, then change the settings back. This step can be skipped if automatic start and stop are not required.

#### If using an rc script

As the OS superuser, execute the `chkconfig` command to enable the shell script.

In the example below, the shell script for automatic start and stop was created as "rc\_mc\_inst1" and is enabled for run levels 3 and 5.

Example)

```
# chkconfig --level 35 rc_mc_inst1 on
```

## If using systemd

As the OS superuser, execute the systemctl command to enable automatic start and stop.

The example below disables automatic start and stop of "mcoi\_inst1.service".

Example)

```
# systemctl enable mcoi_inst1.service
```

## 6. Start (rebuild) Mirroring Controller on the standby server.

This operation is required when determining the maintenance tasks on the standby server.

### Enabling automatic switch/disconnection

As the instance administrator user, execute the mc\_ctl command in start mode with the -f option specified. This enables automatic switch and disconnection.

If you start Mirroring Controller and the instance without specifying the -f option, automatic switch and disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the mc\_ctl command in enable-failover mode, or restart Mirroring Controller with the -f option specified.

Example)

```
$ mc_ctl start -M /mcdire/inst1 -w -f
```

### Disabling automatic switch/disconnection

As the instance administrator user, execute the mc\_ctl command in start mode.

Example)

```
$ mc_ctl start -M /mcdire/inst1 -w
```

## Switching to the primary server

To perform the maintenance on the primary server, execute the mc\_ctl command in the switch mode on the primary server or the standby server.

Example)

```
$ mc_ctl switch -M /mcdire/inst1
```

When the switch is complete, the synchronous\_standby\_names parameter in the postgresql.conf file of the new primary server will be commented as follows:

Example)

```
#synchronous_standby_names = 'primary'
```

## New standby server maintenance tasks

### 1. Stop the Mirroring Controller.

On the new standby server (the primary server before the switch), execute the mc\_ctl command in stop mode.

Example)

```
$ mc_ctl stop -M /mcdire/inst1
```

### 2. Ensure that Mirroring Controller has completely stopped.

If the multiplexed instances and Mirroring Controller have been configured on the new standby server to start and stop automatically when the operating system of the database server is started or stopped, cancel the setting to start and stop automatically now.



See

Refer to "3.9 Setting Automatic Start and Stop of Mirroring Controller and Multiplexed Instances" for information on how to configure the multiplexed instances and Mirroring Controller to start and stop automatically when the operating system of the database server starts and stops.

#### If using an rc script

As the OS superuser, execute the `chkconfig` command to disable automatic start and stop.

In the example below, the shell script for automatic start and stop was created as "rc\_mc\_inst1" and is disabled for run levels 3 and 5.

Example)

```
# chkconfig --level 35 rc_mc_inst1 off
```

#### If using systemd

As the OS superuser, execute the `systemctl` command to disable automatic start and stop.

The example below disables automatic start and stop of "mcoi\_inst1.service".

Example)

```
# systemctl disable mcoi_inst1.service
```

3. Perform the maintenance on the new standby server that was stopped.

4. Create a copy of the new primary server instance on the new standby server.

Execute the `pg_basebackup` command to create data in the new standby server by synchronizing with the new primary server.

Example)

```
$ pg_basebackup -D /database/inst1 --xlog --progress --verbose -R --  
dbname='application_name=standbyServerName' -h primaryServerHostName -p primaryServerPortNumber
```



See

The procedure for copying the primary server instance to the standby server is the same as the procedure for setting up the standby server.

Refer to "3.4.2 Creating, Setting, and Registering the Standby Server Instance", and then perform the recovery.

5. Check the settings for automatic start and stop of the multiplexed instances and Mirroring Controller.

If the multiplexed instances and Mirroring Controller were configured in step 2 to not start and stop automatically when the operating system of the database server starts and stops, then change the settings back. This step can be skipped if automatic start and stop are not required.

#### If using an rc script

As the OS superuser, execute the `chkconfig` command to enable the shell script.

In the example below, the shell script for automatic start and stop was created as "rc\_mc\_inst1" and is enabled for run levels 3 and 5.

Example)

```
# chkconfig --level 35 rc_mc_inst1 on
```

#### If using systemd

As the OS superuser, execute the `systemctl` command to enable automatic start and stop.

The example below disables automatic start and stop of "mcoi\_inst1.service".

Example)

```
# systemctl enable mcoi_inst1.service
```

6. After the maintenance is complete, edit the following parameters in the postgresql.conf file of the standby server as required.

Copying an instance results in the value of the synchronous\_standby\_names parameter becoming the specified value on the primary server. Therefore, correct it to the specified value on the standby server. If the parameter was commented out, then you must uncomment it.

7. On the standby server, start (rebuild) Mirroring Controller.

#### Enabling automatic switch/disconnection

As the instance administrator user, execute the mc\_ctl command in start mode with the -w and -f options specified. This enables automatic switch and disconnection.

If you start Mirroring Controller and the instance without specifying the -f option, automatic switch and disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the mc\_ctl command in enable-failover mode, or restart Mirroring Controller with the -f option specified.

Example)

```
$ mc_ctl start -M /mdir/inst1 -w -f
```

#### Disabling automatic switch/disconnection

As the instance administrator user, execute the mc\_ctl command in start mode with the -w option specified.

Example)

```
$ mc_ctl start -M /mdir/inst1 -w
```

## Failback of the Primary Server

Revert the primary server and standby server to the original server configuration. Do this to execute the main job on the previous primary server. Refer to "5.1.1.3 Failback of the Primary Server" for details.



Obtain a backup as soon as this task is complete.

## 4.6.2 Stopping for Maintenance

Perform this procedure to stop all servers for periodic inspections, for example. On the server on which Mirroring Controller is running, execute the mc\_ctl command in stop mode to stop the instance and Mirroring Controller.

Example)

```
$ mc_ctl stop -M /mdir/inst1 -a
```

## 4.7 Changes in Operation

The following changes in operation may be required:

- Changes required when the standby server is stopped
- Changing from single server mode to database multiplexing mode
- Changing from database multiplexing mode to single server mode

## 4.7.1 Changes Required when the Standby Server is Stopped

---

### Operation when the standby server is stopped

Before performing maintenance for the primary server instance when the standby server has been stopped, comment out the `synchronous_standby_names` parameter in the `postgresql.conf` file of the primary server, and then execute the `pg_ctl` command in reload mode.

If this operation is not performed, operations performed on the primary server for the instance will remain in a wait state.



.....  
Refer to "pg\_ctl" in Reference for information on the command.  
.....

### Standby server downtime

If you specified the `synchronous_standby_names` parameter of the `postgresql.conf` file and then the standby server instance is stopped, consider the points below.

- The `wal_sender_timeout` parameter in the `postgresql.conf` file

If the standby server is stopped after the timeout set in this parameter was exceeded, an error stating that the transaction log could not be received may be output to the standby server system log, and all transaction logs that should be transferred to the standby server may be lost.

- The `wal_keep_segments` parameter in the `postgresql.conf` file

If a transaction log that exceeds the value set in this parameter was generated while the standby server was stopped, the transaction log may be deleted.

Additionally, setting this parameter requires consideration regarding stabilization of the database multiplexing mode. Refer to "[3.8.1 Tuning to Stabilize the Database Multiplexing Mode](#)" for details.



.....  
The standby server must be rebuilt in both cases above.

Take the action advised in the recovery operation that starts from "[5.1.1.1.3 Identify cause of error and perform recovery](#)" through to "[5.1.1.2 Rebuild the Standby Server](#)".  
.....

## 4.7.2 Changing from Single Server Mode to Database Multiplexing Mode

---

The procedure for switching single server mode to database multiplexing mode for the purposes of high reliability and load distribution of the system is explained below.

This procedure is equivalent to the setup procedure explained in "[Chapter 3 Setting up Database Multiplexing Mode](#)".



### If the data storage destination directory name is not comprised of ASCII characters excluding spaces

Stop the application job and then migrate to a directory with a name that uses only ASCII characters excluding spaces:

1. Stop the database instance on the primary server.
  2. Change the name of the data storage destination directory to one that uses only ASCII characters excluding spaces.
- .....



See

When encrypting the storage data, refer to "Database Multiplexing Mode" in the Operation Guide, and then perform the setup for encryption on the primary and standby servers.

1. Install on the standby server

Install FUJITSU Enterprise Postgres on the server to be started as the standby server.

Refer to "Installation" in the Installation and Setup Guide for Server for information on how to install FUJITSU Enterprise Postgres.

Use ASCII characters excluding spaces in the data storage destination directory.

2. Stop the application jobs

Stop the application jobs to be connected to the primary server.

3. Change the primary server settings

To allow connections from the server to be started as the standby server, configure the settings in step 2 and thereafter of "[3.3.2 Creating, Setting, and Registering the Primary Server Instance](#)" on the primary server.

4. Set up database multiplexing mode on the standby server

Refer to "[3.4.1 Setting up Database Multiplexing Mode on the Standby Server](#)" for details.

5. Create the standby server instance and start it

Refer to "[3.4.2 Creating, Setting, and Registering the Standby Server Instance](#)" for details.

After the above steps are completed, refer to the remaining explanations in "[Chapter 3 Setting up Database Multiplexing Mode](#)" and ensure that the required settings and operations are completed.

### 4.7.3 Changing from Database Multiplexing Mode to Single Server Mode

The procedure for stopping database multiplexing mode and changing to single server mode is explained below.

1. Determine the server for which the instance is to be stopped, and switch this server

Determine the server that is to be excluded as the database multiplexing mode target, and for which the instance is to be stopped.

If the server for which the instance is to be stopped is the primary server, execute the `mc_ctl` command in the switch mode to switch the standby server to the primary server.

The standby server after the switch is complete will be the server for which the instance is to be stopped.

If the server for which the instance is to be stopped is the standby server, there is no need to perform the switch operation.

Example)

```
$ mc_ctl switch -M /mcdir/inst1
```

2. Stop Mirroring Controller and the instance, and delete the file resources

On the server that was determined in step 1, execute the `mc_ctl` command in stop mode to stop Mirroring Controller and the instance.

Example)

```
$ mc_ctl stop -M /mcdir/inst1
```

Then, delete the following file resources:

- Data storage destination directory
- Mirroring Controller management directory

Example)

```
$ rm -rf /database/inst1
$ rm -rf /mdir/inst1
```



See

Refer to "Security-Related Notes" in the Operation Guide for details on deleting the data securely.

### 3. Stop Mirroring Controller and the instance on the primary server

Execute the mc\_ctl command in stop mode on the primary server.

Example)

```
$ mc_ctl stop -M /mdir/inst1
```

### 4. Delete the database multiplexing mode settings that were configured for the primary server instance.

Take the appropriate action for each parameter and resource by editing postgresql.conf as shown below. Also, delete recovery.conf or change its name to recovery.done for example.

| File            | Parameter                 | Action   |
|-----------------|---------------------------|--|
| postgresql.conf | wal_level                 | Delete the "hot_standby" value that was specified.                         |
|                 | max_wal_senders           | Revert the value to the one set before database multiplexing mode was set. |
|                 | synchronous_standby_names | Delete.  |
|                 | wal_sender_timeout        |  |
|                 | wal_receiver_timeout      |  |
|                 | listen_addresses          | Revert the value to the one set before database multiplexing mode was set. |
|                 | max_connections           |  |
|                 | synchronous_standby_names | Delete.  |
| hot_standby     |                           |  |

- Mirroring Controller management directory

Additionally, if the backup operation was performed, delete the following resources:

- Mirroring Controller management directory backup data obtained in database multiplexing mode
- Instance backup data obtained in database multiplexing mode

After these actions are performed, ensure that the backup data is collected when starting the single operation.



See

- Refer to "Security-Related Notes" in the Operation Guide for details on deleting the data securely.
- Refer to "3.10 Backup Operation" for details on the backup operation.
- Refer to "Appendix A Parameters" for details on the postgresql.conf file parameters.

# Chapter 5 Action Required when an Error Occurs in Database Multiplexing Mode

This chapter describes the action required if an error occurs in database multiplexing mode.

In database multiplexing mode, when an error is detected, the switch or disconnection of the standby server is performed automatically, so that only the primary server starts degrading. In this case, the recovery tasks will be required for the standby server on which the switch or disconnection was performed.

Other possible cases are as follows:

- When automatic switch fails
- When automatic disconnection fails
- When all servers or instances were stopped

## 5.1 Action Required when Server Degradation Occurs

If the server has started degrading, the recovery tasks will vary depending on whether the cause was the switch (failover or switchover), or the disconnection.

Execute the `mc_ctl` command in status mode, or refer to the system log, and check if the cause of the server degradation was the switch or the disconnection.

In the example below, the `mc_ctl` command is executed in status mode.

If a switch has occurred, "switched" (the switch is complete and the server is in a degrading state) is displayed for "mirroring status".

Example)

```
$ mc_ctl status -M /mdir/inst1
mirroring status
-----
switched
:
```

If a disconnection has occurred, "not-switchable" (disconnection was performed so the server cannot be switched) is displayed for "mirroring status".

Example)

```
$ mc_ctl status -M /mdir/inst1
mirroring status
-----
not-switchable
:
```



If Mirroring Controller detects any errors on the server on which operations are continuing during recovery to database multiplexing mode from a degrading operation state, perform the procedure in "5.1.3 Addressing Errors During Degrading Operation", and then recover to database multiplexing mode.

### 5.1.1 Operations when the Server has Started Degrading after a Switch has Occurred

This section explains the operations when the server has started degrading after a switch has occurred.

## Note

---

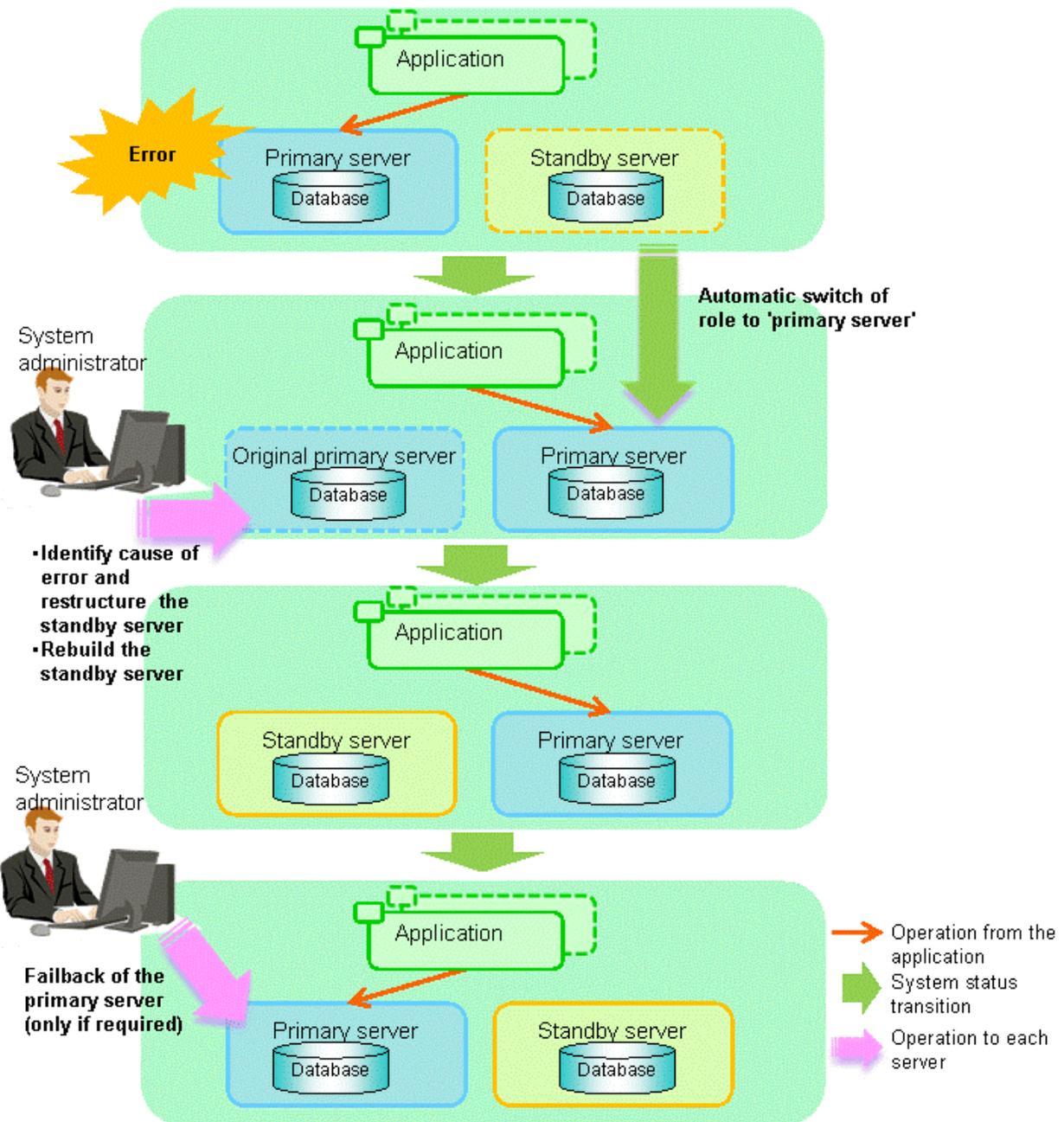
- After a switch has occurred as a result of an abnormality on the primary server, the database will not have a multiplexed configuration until the standby server is rebuilt. Remove the cause of the error as quickly as possible, and then rebuild the standby server.
  - If the reference job was executed on the standby server, and the servers are switched because an error occurred on the primary server, the load is concentrated on the new primary server. Accordingly, pause the reference job on the original standby server, rebuild the original primary server as the new standby server, and then resume the reference job for the new standby server.
  - If the instance on the new primary server is stopped before the original primary server where the error occurred is rebuilt as the new standby server, a split brain occurs at startup from the instance on the original primary server. Therefore, start the instance on the new primary server before rebuilding the standby server.
- 

If the switch occurred and the server has started degrading, perform the following operations to recover the standby server and revert it to its original state:

- [Identify Cause of Error and Restore the Standby Server](#)
- [Rebuild the Standby Server](#)
- [Failback of the Primary Server](#) (only if required)

The flow of these operations is shown in the figure below.

Figure 5.1 Flow of operations



### 5.1.1.1 Identify Cause of Error and Restore the Standby Server

Perform the recovery according to the following procedure:

1. [Stop Mirroring Controller](#)
2. [Recovery of the Mirroring Controller management directory](#)
3. [Identify cause of error and perform recovery](#)

#### 5.1.1.1.1 Stop Mirroring Controller

Execute the `mc_ctl` command in stop mode for the original primary server on which the error occurred.

Example)

```
$ mc_ctl stop -M /mdir/inst1
```

This also stops the instance that is required to perform the recovery.

### Note

If the instance does not stop, refer to "Actions in Response to Failure to Stop an Instance" in the Operation Guide, and then stop the instance.

Then, specify the `-e` option in the above command to forcibly stop Mirroring Controller.

## 5.1.1.1.2 Recovery of the Mirroring Controller management directory

Copy the files in the Mirroring Controller management directory from the backup data, and then perform the recovery.

## 5.1.1.1.3 Identify cause of error and perform recovery

Refer to the system log of the primary server and the standby server to identify the cause of the error, and then perform recovery.

The following commands can be used to recover a standby server:

### - `pg_basebackup`

Creates a copy of all resources of the primary server instance. This command is used for example when creating the first instance on the standby server.

### - `pg_rewind`

Creates a copy of only the updated files on the new primary server. For this reason, if this command is used to incorporate a new standby server, recovery time can be shortened. To use this command to build the original primary server as a new standby server, at least one of the following must be true:

- a. The original primary server was stopped normally.
- b. Checksums were enabled when an instance was created.
- c. The `wal_log_hints` parameter of `postgresql.conf` was enabled when an instance was started.

Additionally, `full_page_writes` must be enabled, which is its default value.

If it is required to start the original primary server again to then stop it normally, both servers will temporarily operate as primary servers. If data is updated on the original primary server, data corruption will occur, so take measures such as changing settings in `pg_hba.conf` to disallow client connections.

### See

Refer to "pg\_rewind" under "Reference" in the PostgreSQL Documentation for information on the `pg_rewind` command.

The example below executes the `pg_rewind` command to perform recovery by synchronizing data on the original primary server with the new primary server.

1. Use the `pg_ctl` command to start the original primary server instance.

Example)

```
$ pg_ctl start -w -D /database/inst1
```

2. Use the `pg_ctl` command to stop the original primary server instance.

Example)

```
$ pg_ctl stop -D /database/inst1
```

3. Create a copy of the new primary server instance in the original primary server (new standby server).

Execute the `pg_rewind` command to synchronize the new standby server data with the new primary server.

Example)

```
$ pg_rewind -D /database/inst1 --source-server='user=userName host=newPrimaryServerHostName  
port=newPrimaryServerPortNumber'
```

### 5.1.1.2 Rebuild the Standby Server

The starting of the recovered original primary server as the standby server is referred to as the "standby server rebuild".

On the original primary server, start Mirroring Controller and the instance.

#### Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-f` option specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example)

```
$ mc_ctl start -M /mdir/inst1 -w -f
```

#### Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode.

Example)

```
$ mc_ctl start -M /mdir/inst1 -w
```

### 5.1.1.3 Failback of the Primary Server

To revert the primary server and standby server to the original server configuration after rebuilding the standby server, perform failback for the primary server.

Do this to execute the main job on the previous primary server.

Perform the following procedure:

1. Failback of the primary server

Execute the `mc_ctl` command in switch mode on the primary server or the standby server.

Example)

```
$ mc_ctl switch -M /mdir/inst1
```

After executing the `mc_ctl` command in switch mode, the status will be as follows:

Example)

```
$ mc_ctl status -M /mdir/inst1  
mirroring status  
-----  
switched  
server_id host_role host host_status db_proc_status disk_status  
-----  
nd1 primary 192.0.2.100 normal abnormal(postmaster) normal  
nd2 none(inactivated primary) 192.0.2.110 normal abnormal(postmaster) normal
```

## 2. Stop the original primary server

On the original primary server, execute the `mc_ctl` command in stop mode to stop Mirroring Controller and the instance.

Example)

```
$ mc_ctl stop -M /mcdir/inst1
```

## 3. Create a copy of the new primary server instance in the original primary server (new standby server)

Execute the `pg_basebackup` command to create data in the new standby server by synchronizing with the new primary server.

Example)

```
$ pg_basebackup -D /database/inst1 --xlog --progress --verbose -R --  
dbname='application_name=standbyServerName' -h primaryServerHostName -p primaryServerPortNumber
```



The procedure for copying the new primary server instance to the new standby server is the same as the procedure for setting up the new standby server.

Refer to "3.4.2 Creating, Setting, and Registering the Standby Server Instance", and then perform the recovery.

## 4. Rebuild the standby server

On the standby server, start Mirroring Controller and the instance.

### Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-w` and `-f` options specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example)

```
$ mc_ctl start -M /mcdir/inst1 -w -f
```

### Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-w` option specified.

Example)

```
$ mc_ctl start -M /mcdir/inst1 -w
```

## 5.1.2 Operations when the Server has Started Degrading after a Disconnection has Occurred

This section explains the operations when the server has started degrading after a disconnection has occurred.



After a disconnection has occurred as a result of an abnormality on the standby server, the database will not have a multiplexed configuration until the standby server is rebuilt. Remove the cause of the error as quickly as possible, and then rebuild the standby server.

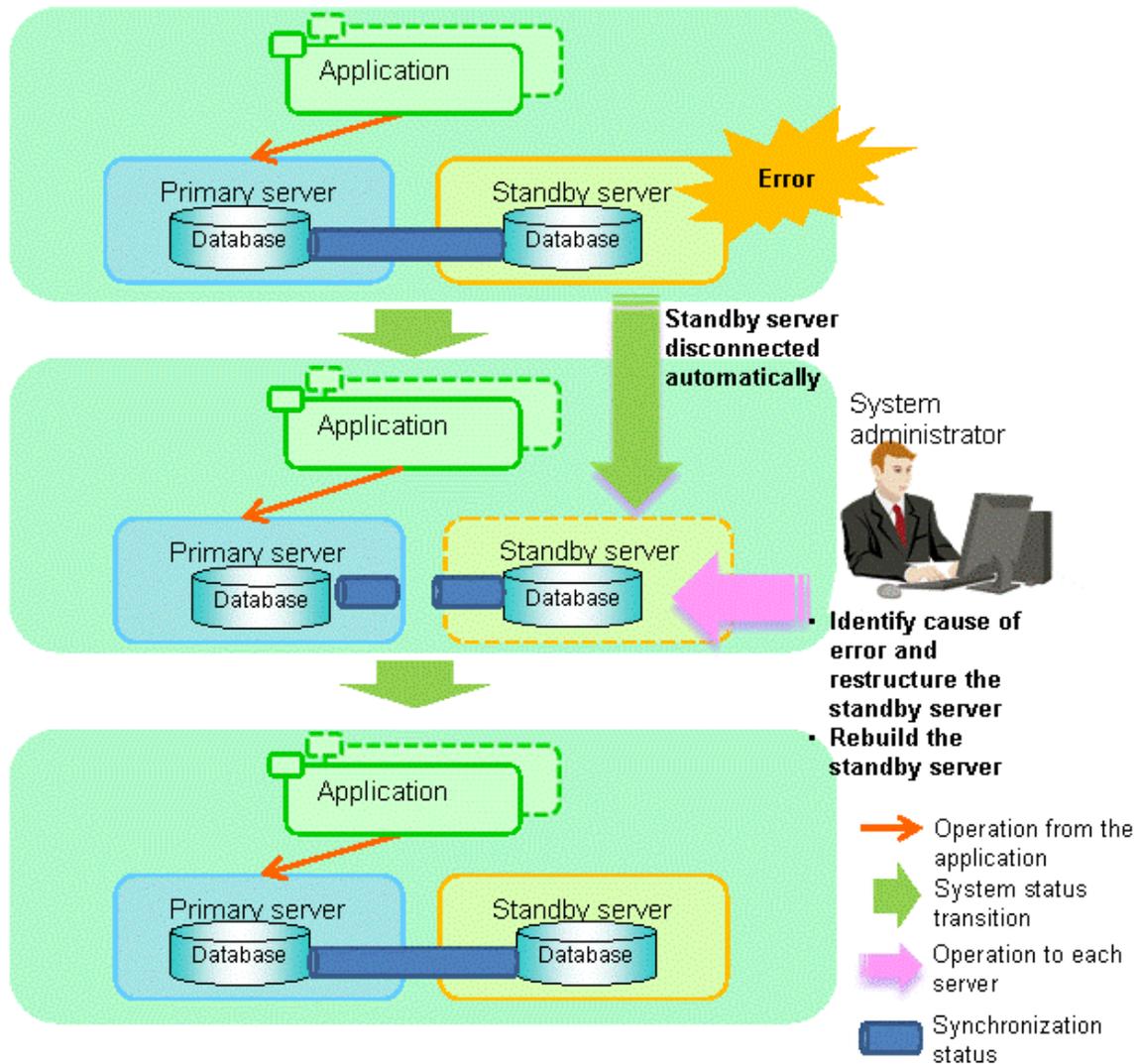
If the disconnection occurred and the server has started degrading, perform the following operations to recover the standby server and revert it to its original state:

- [Identify Cause of Error and Restore the Standby Server](#)

- [Rebuild the Standby Server](#)

The flow of these operations is shown in the figure below.

Figure 5.2 Flow of operations



### 5.1.2.1 Identify Cause of Error and Restore the Standby Server

Perform the recovery according to the following procedure:

1. [Stop Mirroring Controller](#)
2. [Recovery of the Mirroring Controller management directory](#)
3. [Identify cause of error and perform recovery](#)

#### 5.1.2.1.1 Stop Mirroring Controller

Execute the `mc_ctl` command in stop mode for the standby server on which the error occurred.

Example)

```
$ mc_ctl stop -M /mdir/inst1
```

This also stops the instance that is required to perform the recovery.

## Note

If the instance does not stop, refer to "Actions in Response to Failure to Stop an Instance" in the Operation Guide, and then stop the instance.

Then, specify the `-e` option in the above command to forcibly stop Mirroring Controller.

### 5.1.2.1.2 Recovery of the Mirroring Controller management directory

Copy the files in the Mirroring Controller management directory from the backup data, and then perform the recovery.

### 5.1.2.1.3 Identify cause of error and perform recovery

Refer to the system logs of the primary server and the standby server to identify the cause of the error, and then perform recovery.

Execute the `pg_basebackup` command to perform recovery by synchronizing data in the primary server with the standby server.

Example)

```
$ pg_basebackup -D /database/inst1 --xlog --progress --verbose -R --  
dbname='application_name=standbyServerName' -h primaryServerHostName -p primaryServerPortNumber
```

## See

This recovery procedure is the same as the procedure for setting up the standby server.

Refer to "3.4.2 Creating, Setting, and Registering the Standby Server Instance", and then perform the recovery.

### 5.1.2.2 Rebuild the Standby Server

Start the Mirroring Controller and the instance of the standby server, and rebuild the standby server.

#### Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-f` option specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example)

```
$ mc_ctl start -M /mcdir/inst1 -w -f
```

#### Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode.

Example)

```
$ mc_ctl start -M /mcdir/inst1 -w
```

## 5.1.3 Addressing Errors During Degrading Operation

This section explains how to address errors that may occur on the server on which operation is continuing during degrading operation triggered by a switch or disconnection.

### If needing to recover from backup data

If it is necessary to recover the database using backup data due to data becoming corrupted from disk failure or user operation error, refer to the following for information on recovery to database multiplexing mode:

- [Action Required when All Servers or Instances Stopped](#)
- [Recovering from an Incorrect User Operation](#)

### If a temporary error occurs

If a temporary error occurs, such as due to a high load on the server or insufficient system resources, remove the cause of the error and restart Mirroring Controller, and then refer to the following for details on recovery to database multiplexing mode:

- [Operations when the Server has Started Degrading after a Switch has Occurred](#)
- [Operations when the Server has Started Degrading after a Disconnection has Occurred](#)

## 5.2 Action Required when Automatic Switch Fails

---

If the system behavior is unstable, for example there are insufficient temporary system resources, the Mirroring Controller automatic switch may fail.

Perform the switch manually using one of the following methods:

- Execute the mc\_ctl command in switch mode

Execute the mc\_ctl command in switch mode on the primary server or the standby server.

Example )

```
$ mc_ctl switch -M /mcdire/inst1
```



### Note

If the server fails during execution of the mc\_ctl command, automatic switch, or automatic disconnection, or if communication between the primary server and the standby server is lost, a message indicating that the mc\_ctl command is being executed may be output even though the command is not running elsewhere, and the command may end abnormally.

In this case, switch the server in accordance with the "Execute the mc\_ctl command in stop mode" procedure below.

- Execute the mc\_ctl command in stop mode

Execute the mc\_ctl command in stop mode on the server on which the error occurred.

Example )

```
$ mc_ctl stop -M /mcdire/inst1
```

If the instance does not stop, refer to "Actions in Response to Failure to Stop an Instance" in the Operation Guide, and then stop the instance.

Then, specify the -e option in the mc\_ctl command to forcibly stop Mirroring Controller.

Example )

```
$ mc_ctl stop -M /mcdire/inst1 -e
```



### See

#### Recovery to database multiplexing mode

Refer to "[5.1.1.2 Rebuild the Standby Server](#)" and "[5.1.1.3 Failback of the Primary Server](#)" for information on recovery to database multiplexing mode.

## 5.3 Action Required when Automatic Disconnection Fails

---

If the system behavior is unstable, for example there are insufficient system resources such as available memory or free disk space, automatic disconnection using Mirroring Controller may not be possible.

In this case, perform the following procedure to disconnect the primary server manually.

1. On the standby server, execute the `mc_ctl` command in stop mode with the `-e` option specified.

Example)

```
$ mc_ctl stop -M /mcdir/inst1 -e
```

2. On the primary server, comment out the `synchronous_standby_names` parameter in the `postgresql.conf` file.

Example)

```
:  
# synchronous_standby_names = 'standby1 '
```

3. Execute the `pg_ctl` command in reload mode on the primary server.

Example)

```
$ pg_ctl reload -D /database/inst1
```



Refer to "pg\_ctl" in Reference for information on the command.



### Recovery to database multiplexing mode

Refer to "5.1.2.2 Rebuild the Standby Server" for information on recovery to database multiplexing mode.

## 5.4 Action Required when All Servers or Instances Stopped

---

This section explains what happens when all servers or instances on the server have stopped, so jobs cannot continue.

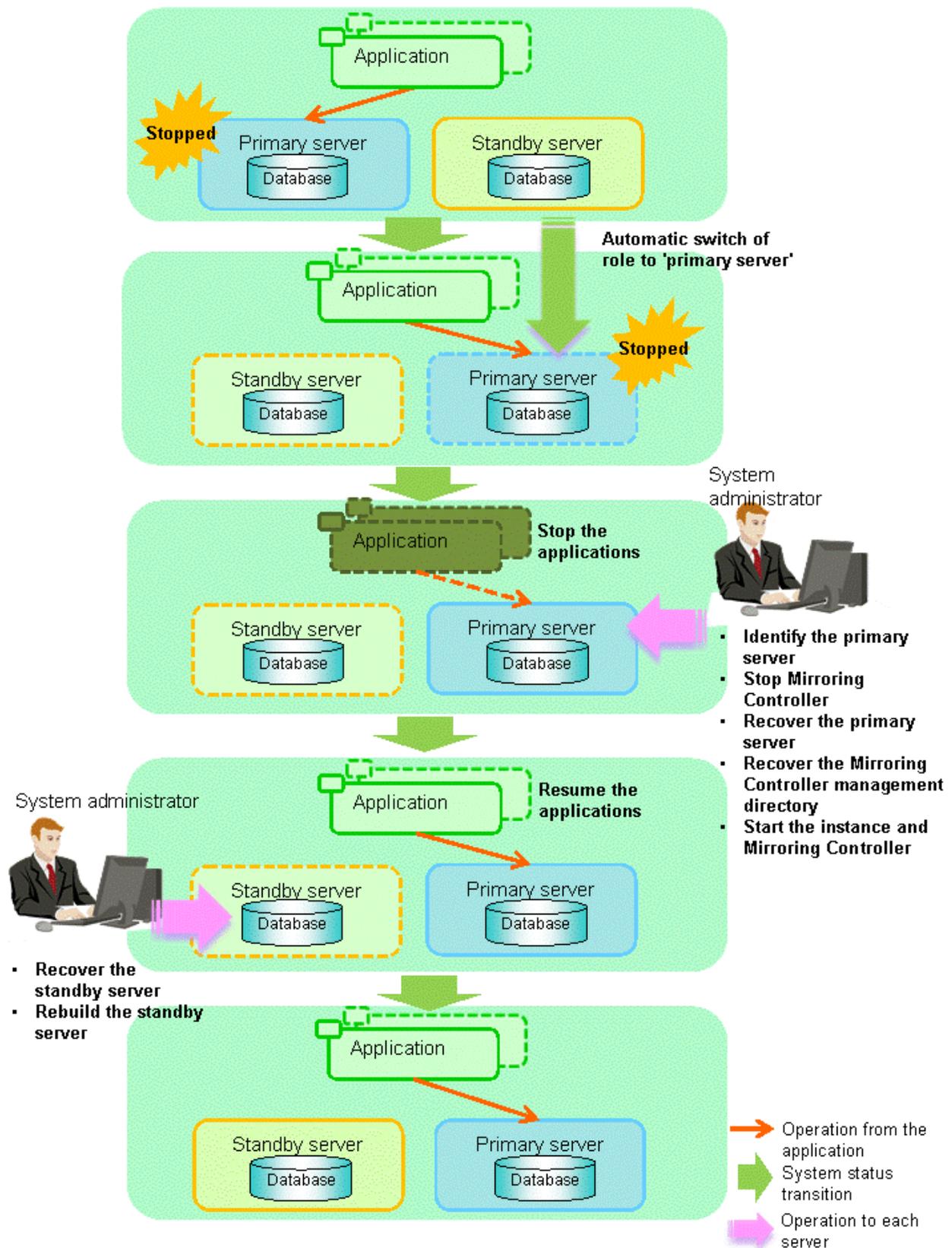


### Recovery to database multiplexing mode

Refer to "5.1.1.2 Rebuild the Standby Server" and "5.1.1.3 Failback of the Primary Server" for information on recovery to database multiplexing mode.

The flow of these recovery operations is shown in the figure below.

Figure 5.3 Flow of operations



Perform the following procedure:

1. Stop the applications  
Stop the applications from running.

## 2. Identify the primary server

Use one of the following methods to identify the primary server that was running before the servers or instances stopped:

- Refer to the system log on each server and identify the server where the following message was output.

Message:

```
MirroringControllerOpen[30017]: LOG: promotion processing completed (MCA00062)
```

- On each server, execute the `mc_ctl` command in status mode to search the servers for which "none(inactivated primary)" is displayed.

## 3. Stop Mirroring Controller on the primary server

Execute the `mc_ctl` command in stop mode on the primary server.

Example)

```
$ mc_ctl stop -M /mdir/inst1
```



### Forcibly stopping Mirroring Controller

If Mirroring Controller does not stop, specify the `-e` option in the stop mode of the `mc_ctl` command and then execute the command.

Example)

```
$ mc_ctl stop -M /mdir/inst1 -e
```

## 4. Recover the primary server

First, refer to "Actions when an Error Occurs" in the Operation Guide, and then identify the cause of the error and perform recovery.

Next, recover the primary server using the recovery method that uses the `pgx_rcvall` command based on the backup data.

If the backup operation was performed using the `pgx_dmpall` command based on the instructions in "[3.10.2 Database Backup Operation](#)", perform the following procedure for the recovery:

- Perform the following operations on both the primary server and the standby server, and check the server containing the backup data and the archive log that show the latest date.
  - Execute the `pgx_rcvall` command with the `-l` option specified and identify the backup data that shows the latest date.
  - Identify the archive log that shows the latest date, as shown below.

Example)

```
$ ls -ltr backupDataStorageDir/*_xlog
```

- If the latest backup data exists on the standby server, copy (\*1) the backup data and overwrite (\*2) it to each backup storage destination directory on the primary server.
- If the latest archive log exists on the standby server, copy (\*1) the archive log and overwrite (\*2) it to the backup storage destination directory on the primary server.
- Execute the `pgx_rcvall` command on the primary server, specifying the backup storage destination directory you used in step 3.



\*1: The backup data may contain a symbolic link, so copy the backup data so that the symbolic link is not converted to an ordinary file (with the `tar` command, for example).

\*2: If you can save a copy of the backup storage destination directory, do so without overwriting it.



Refer to "Actions when an Error Occurs" in the Operation Guide for information on the `pgx_rcvall` command.

5. Recover the Mirroring Controller management directory

Copy the files in the Mirroring Controller management directory from the backup data, and then perform the recovery.

6. Start the primary server instance and Mirroring Controller

Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-f` option specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example)

```
$ mc_ctl start -M /mcdire/inst1 -w -f
```

Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode.

Example)

```
$ mc_ctl start -M /mcdire/inst1 -w
```

7. Resume applications

Resume the applications.

8. Stop Mirroring Controller on the standby server

Execute the `mc_ctl` command in stop mode on the standby server.

Example)

```
$ mc_ctl stop -M /mcdire/inst1
```

9. Recover the standby server

Refer to "[3.4.2 Creating, Setting, and Registering the Standby Server Instance](#)", and then recover (set up) the standby server from the primary server.

10. Rebuild the standby server

On the standby server, start Mirroring Controller and the instance.

Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-f` option specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example)

```
$ mc_ctl start -M /mcdire/inst1 -w -f
```

### Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode.

Example)

```
$ mc_ctl start -M /mcdir/inst1 -w
```

## 5.5 Recovering from an Incorrect User Operation

This section describes how to recover an instance when data has been corrupted due to incorrect user operation.

For example, when data has been corrupted due to incorrect user operation, such as data being unintentionally changed or deleted by an application or command, it is necessary to restore the original data on the primary server and resynchronize with the standby server.

Use the following procedure to perform recovery.

1. Identify the primary server

Execute the `mc_ctl` command in status mode on each server, and search for a server for which "primary" or "none(inactivated primary)" is displayed.

2. Stop the applications and commands that caused the incorrect operation to occur

Stop applications and commands that are running on the primary server. This will minimize the impact caused by the incorrect data.

Also, if any applications used for reference by the standby server are running, stop them too.

3. Stop the instance and Mirroring Controller

Stop the instance and Mirroring Controller on both the primary server and standby server.

Example)

```
$ mc_ctl stop -a -M /mcdir/inst1
```

4. Recover the database on the primary server

Recover the database using the recovery method in which the `pgx_rcvall` command uses the backup data to recover the database to a restore point prior to the time when the incorrect operation was performed.



See

Refer to "Recovering from an Incorrect User Operation" in the Operation Guide for information on using the `pgx_rcvall` command to recover the database to a restore point, and then perform only the database recovery procedure while the instance is in a stop state.

5. Start the instance and Mirroring Controller

Start the instance and Mirroring Controller on the primary server.

### Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-f` option specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example)

```
$ mc_ctl start -M /mcdir/inst1 -w -f
```

### Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode.

Example)

```
$ mc_ctl start -M /mcdir/inst1 -w
```

6. Build the new standby server

Refer to "[3.4 Setting up the Standby Server](#)" for information on building (setting up) a standby server from the primary server.

# Chapter 6 Managing Mirroring Controller Using WebAdmin

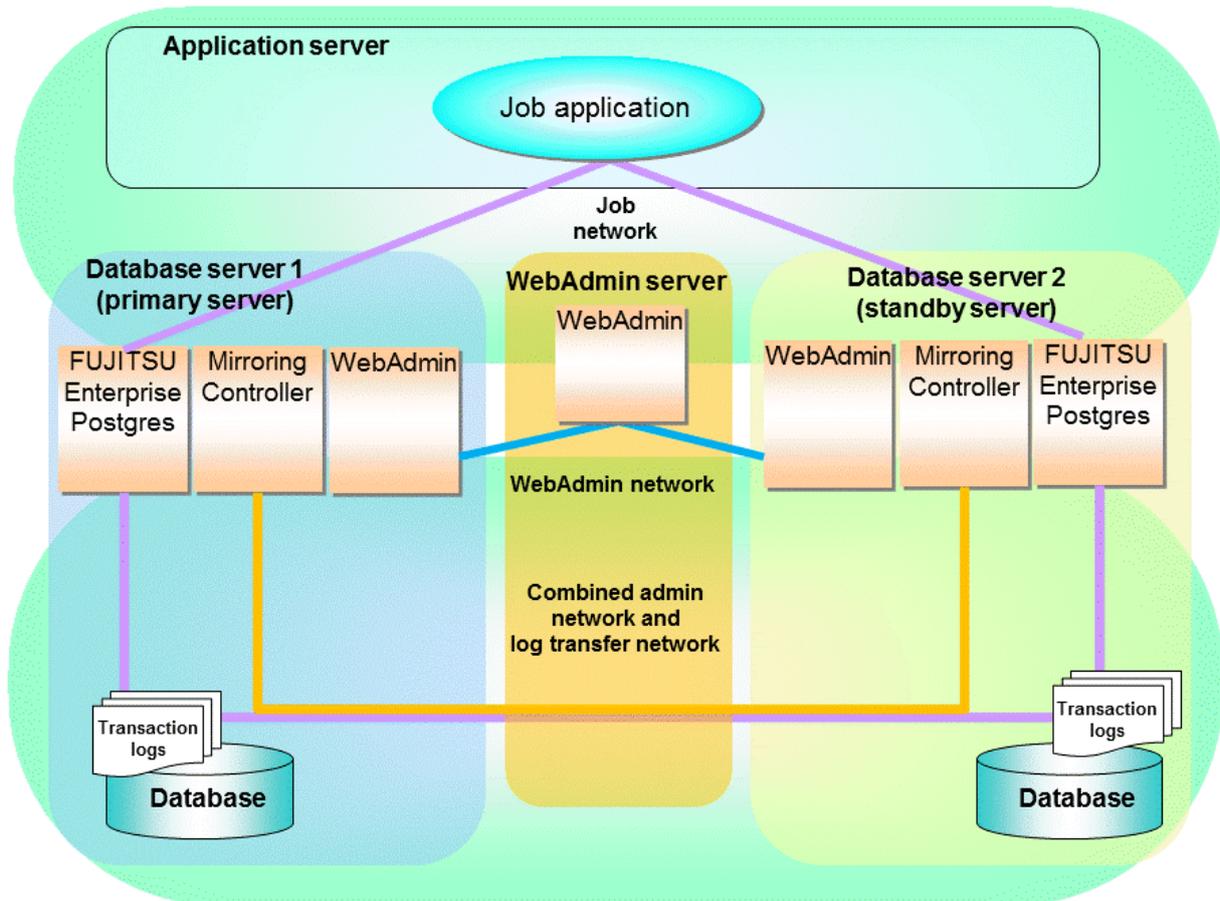
This chapter describes how to set up and manage Mirroring Controller in a streaming replication cluster using WebAdmin.

Mirroring Controller can be used to monitor a streaming replication cluster and perform automatic switching or disconnect synchronous replication when there is an error.

WebAdmin can be used to set up Mirroring Controller in an existing replication cluster having master and synchronous standby instances.

The configuration of the database multiplexing system built using WebAdmin is shown below:

Figure 6.1 Configuration of database multiplexing operation system using WebAdmin



## Point

- If Mirroring Controller is set up to the replication cluster using WebAdmin, the network with the host name (or IP address) specified in [Host name] will be used as the admin network and the log transfer network.
- To use a network other than the job network as the log transfer network, before building the replication cluster specify a host name other than the job network one in [Host name].

## 6.1 Mirroring Controller Setup

Perform the following procedure to setup Mirroring Controller in a streaming replication cluster. The option for this setup is accessible only in synchronous standby instance.

1. In the [Instances] tab, select the synchronous standby instance on which Mirroring Controller needs to be set up.
2. Click .

3. Enter the information for the Mirroring Controller to be setup.

In the example below, Mirroring Controller is being setup for the replication cluster having master instance "inst1" and standby instance "inst1s".

The screenshot shows the 'Mirroring Controller setup' page in the Fujitsu Enterprise Postgres web interface. The page is divided into two main sections: 'Mirroring Controller setup for master instance' and 'Mirroring Controller setup for standby instance'. Each section contains a table of configuration parameters.

**Mirroring Controller setup for master instance**

|   |                             |
|---|-----------------------------|
| Instance name                               | inst1                       |
| Instance port                               | 27500                       |
| Instance host                               | localhost                   |
| Mirroring Controller port *                 | 27505                       |
| Mirroring Controller management directory * | /home/fsep/test/mkdir/inst1 |
| Heartbeat interval (in milliseconds) *      | 800                         |
| Heartbeat timeout (in seconds) *            | 1                           |
| Heartbeat retry *                           | 2                           |

**Mirroring Controller setup for standby instance**

|   |                              |
|---|------------------------------|
| Instance name                               | inst1s                       |
| Instance port                               | 27502                        |
| Instance host                               | fepwa-ae1                    |
| Mirroring Controller port *                 | 27505                        |
| Mirroring Controller management directory * | /home/fsep/test/mkdir/inst1s |
| Heartbeat interval (in milliseconds) *      | 800                          |
| Heartbeat timeout (in seconds) *            | 1                            |
| Heartbeat retry *                           | 2                            |

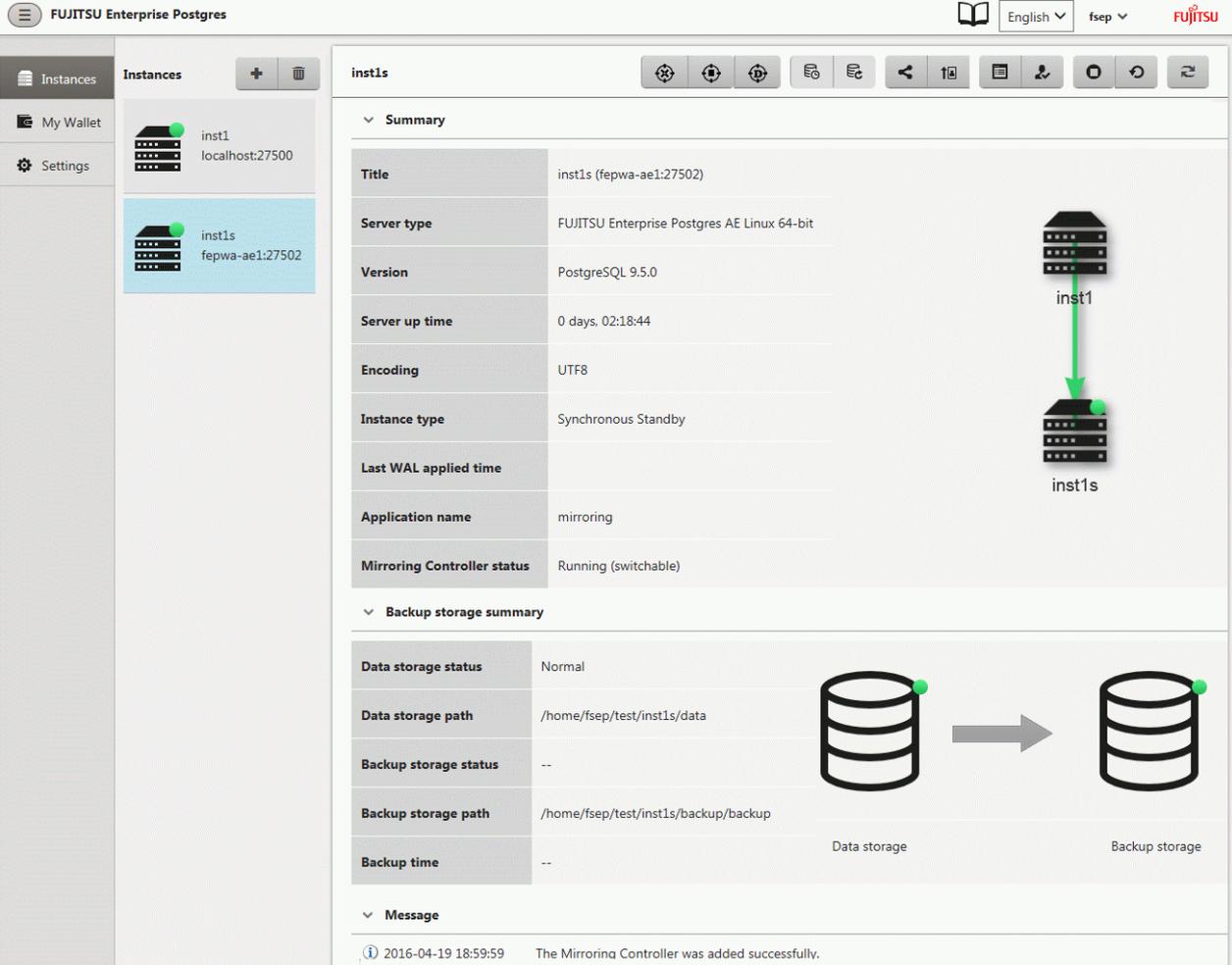
The instance name, host address and port of the master and standby instances are displayed for easy reference.

Enter the following items on master instance and on standby instance fields for Mirroring Controller setup, as shown in the above screenshot:

- [Enable automatic switch over]: Toggles the automatic switch/disconnection functionality. Select "Yes". The default is "No".
- [Mirroring Controller port]: Port number of Mirroring Controller.
- [Mirroring Controller management directory]: Directory where the Mirroring Controller configuration files will be stored.
- [Heartbeat interval (in milliseconds)]: Number of milliseconds between two consecutive heartbeat checks. The default is "800".
- [Heartbeat timeout (in seconds)]: Number of seconds for the heartbeat timeout. The default is "1".
- [Heartbeat retry]: Number of retries for heartbeat monitoring, before failover occurs. The default is "2".

4. Click  to setup Mirroring Controller.
5. Upon successful completion, Mirroring Controller will be started on master and standby instances.

In the [Instances] tab, select "inst1s". The following page will be displayed, with the Mirroring Controller status:



The screenshot displays the Fujitsu Enterprise Postgres WebAdmin interface. The left sidebar shows the 'Instances' tab with two instances: 'inst1' (localhost:27500) and 'inst1s' (fepwa-ae1:27502). The main content area shows the configuration for 'inst1s'.

**Summary**

|                             |   |
|-----------------------------|---|
| Title                       | inst1s (fepwa-ae1:27502)                    |
| Server type                 | FUJITSU Enterprise Postgres AE Linux 64-bit |
| Version                     | PostgreSQL 9.5.0                            |
| Server up time              | 0 days, 02:18:44                            |
| Encoding                    | UTF8  |
| Instance type               | Synchronous Standby                         |
| Last WAL applied time       |   |
| Application name            | mirroring                                   |
| Mirroring Controller status | Running (switchable)                        |

**Backup storage summary**

|                       |                                      |
|-----------------------|--------------------------------------|
| Data storage status   | Normal                               |
| Data storage path     | /home/fsep/test/inst1s/data          |
| Backup storage status | --                                   |
| Backup storage path   | /home/fsep/test/inst1s/backup/backup |
| Backup time           | --                                   |

The interface also includes a diagram showing data storage and backup storage, and a message section with the following entry:

**Message**

2016-04-19 18:59:59 The Mirroring Controller was added successfully.

## 6.2 Stopping Mirroring Controller

Mirroring Controller can be stopped either in master instance or in standby instance using WebAdmin.

Perform the following procedure to stop Mirroring Controller.

1. In the [Instances] tab, select the instance where to stop Mirroring Controller.
2. Click .
3. In the confirmation dialog box, click [Yes].

Mirroring Controller will be stopped on the selected instance. The Mirroring Controller status will be updated, and a confirmation message entry will be displayed in the [Message] section.

## 6.3 Starting Mirroring Controller

Mirroring Controller can be started either in master instance or in standby instance using WebAdmin.

Perform the following procedure to start Mirroring Controller.

1. In the [Instances] tab, select the instance where to start Mirroring Controller.

2. Click .
3. In the confirmation dialog box, select the desired failover mode.



4. In the confirmation dialog box, click [Yes].

Mirroring Controller will be started on the selected instance. The Mirroring Controller status will be updated, and a confirmation message entry will be displayed in the [Message] section.

## 6.4 Disabling Failover Mode

---

Disabling failover mode in Mirroring Controller disables automatic switch/disconnection between master and standby instances.

Perform the following procedure to disable failover mode.

1. In the [Instances] tab, select the instance.
2. Click .
3. In the confirmation dialog box, click [Yes].

Failover mode will be disabled in Mirroring Controller. The Mirroring Controller status will be updated and a confirmation message entry will be displayed in the [Message] section.

## 6.5 Enabling Failover Mode

---

Enabling failover mode in Mirroring Controller enables automatic switch/disconnection between master and standby instances.

Perform the following procedure to enable failover.

1. In the [Instances] tab, select the instance.
2. Click .
3. In the confirmation dialog box, click [Yes].

Failover mode will be enabled in Mirroring Controller. The Mirroring Controller status will be updated and a confirmation message entry will be displayed in the [Message] section.

## 6.6 Deleting Mirroring Controller Setup

---

Deleting Mirroring Controller setup removes its setup from master and standby instances.

1. In the [Instances] tab, select the instance.
2. Click .
3. In the confirmation dialog box, click [Yes].

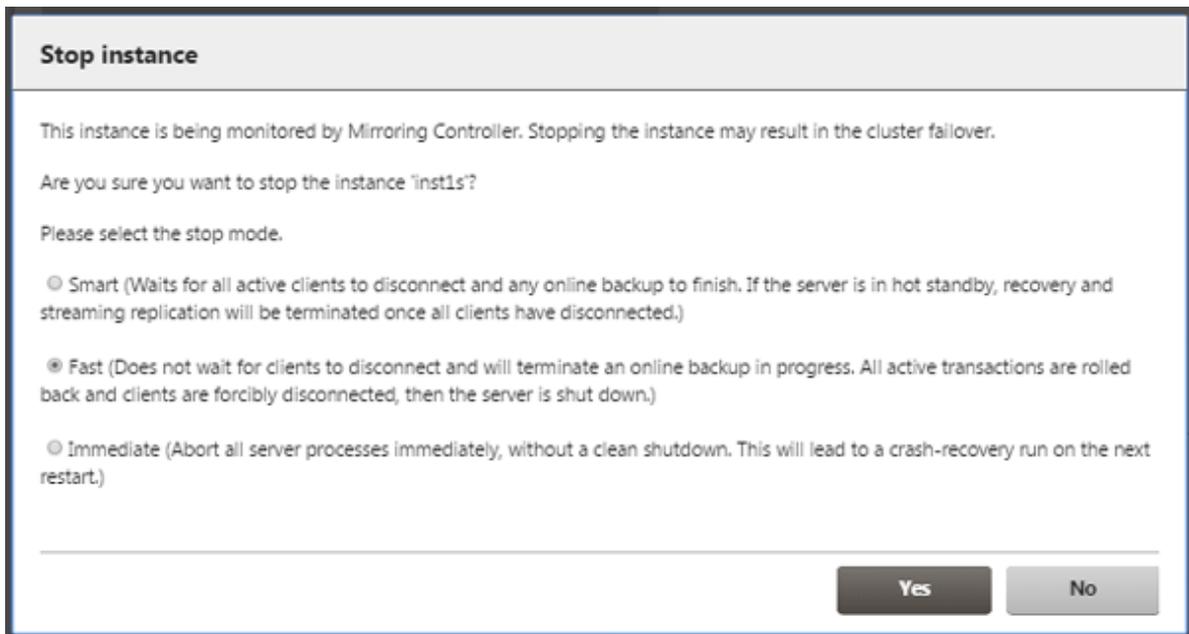
Mirroring Controller setup will be removed from the cluster. The cluster status will be updated and a confirmation message entry will be displayed in the [Message] section.

## 6.7 Status Update after Failover

When Mirroring Controller performs a failover, standby instance will be promoted to standalone instance. The Mirroring Controller setup will be removed from both standby and master instances.

The following scenario describes one of the ways in which failover can be triggered, and the results achieved by the use of Mirroring Controller in WebAdmin.

1. In the [Instances] tab, select the master instance "inst1".
2. Click .
3. In the confirmation dialog box, the warning "This instance is being monitored by Mirroring Controller. Stopping the instance may result in the cluster failover." is displayed.



4. Choose the stop mode and click [Yes].

In the server, the following takes place:

- a. The master instance is stopped.
  - b. Failover is triggered in Mirroring Controller.
  - c. The Mirroring Controller setup is removed from both master and standby instances
  - d. Standby instance is promoted to standalone.
5. When the instance is refreshed in WebAdmin, the latest status of the instances will be displayed.

## 6.8 Action Required when an Error Occurs in the Combined Admin Network and Log Transfer Network

---

Communication errors may temporarily occur in the network used as the admin network and log transfer network due to reasons such as high load on the server or insufficient system resources. Because of this, there is a risk of causing a split-brain situation by mistake even though the server has no issues.

Split brain refers to a situation where data update is performed on both servers because they both work as a primary server temporarily.

### How to detect split brain using WebAdmin

If the conditions below are met, split brain may occur. Refer to "[Split-brain detection method](#)" and "[How to recover from a split-brain](#)" in "[3.8.4 Tuning for Optimization of Degrading Operation Using Abnormality Monitoring](#)" and take the actions described.

1. A standby instance is selected in the [Instances] tab, and
2. "Standalone" is displayed in [Instance type], and
3. A primary instance is selected in the [Instances] tab, and
4. "Standalone" is displayed in "Standalone".



The admin network is important because Mirroring Controllers use it to confirm the status of each server.

The log transfer network is also important to maintain the data freshness.

Therefore, use network configurations resistant to faults for these networks by using the network redundancy channel bonding feature provided by the operating system or network driver vendor.

---

# Appendix A Parameters

This appendix describes the configuration files and parameters required by the database multiplexing mode.



See

Refer to "Server Configuration" in the PostgreSQL Documentation for information on the postgresql.conf file.

## A.1 Parameters Set on the Primary Server

The content for the parameters set in the postgresql.conf file of the primary server is shown in the table below.

Table A.1 postgresql.conf file

| Parameter                 | Value set                     | Explanation   |
|---------------------------|-------------------------------|---|
| wal_level                 | Literal "hot_standby"         | Specify the output level for the transaction log.<br>Specify "hot_standby".   |
| max_wal_senders           | Number of standby servers + 1 | Specify the number of standby servers + 1.<br>In FUJITSU Enterprise Postgres, 1:1 standby is used, so specify 2.  |
| synchronous_standby_names | ' <i>standbyServerName</i> '  | Use single quotation marks (') to enclose the name that will identify the standby server. Any name can be specified.<br>Do not change this parameter while Mirroring Controller is running.   |
| hot_standby               | on                            | Specify whether queries can be run on the standby server.<br>Specify this to execute reference jobs on the standby server. (*1)   |
| wal_keep_segments         | Number of file segments       | If a delay exceeding the value set in this parameter occurs, the WAL segment required later by the primary server may be deleted.<br>Additionally, if you stop a standby server (for maintenance, for example), consider the stop time and set a value that will not cause the WAL segment to be deleted.<br>Setting this parameter requires consideration regarding stabilization of the database multiplexing mode (refer to " <a href="#">3.8.1 Tuning to Stabilize the Database Multiplexing Mode</a> " for details).<br>Refer to "Estimating Transaction Log Space Requirements" in the Installation and Setup Guide for Server for information on estimating the WAL segment. |
| wal_sender_timeout        | Timeout (milliseconds)        | Specify the time period after which it is determined that the receiver process (walreceiver) of the transaction log is in an abnormal state on the primary server.<br>The specified value must be larger than the value set for the wal_receiver_status_interval parameter set in the postgresql.conf file of the standby server.<br>By aligning this value with the value of (heartbeat_interval + heartbeat_timeout/1000) x (heartbeat_retry + 1) of the <i>serverIdentifier.conf</i> file, you can unify the time after which it is determined that an error has occurred.   |

| Parameter            | Value set   | Explanation  |
|----------------------|---|--|
| wal_receiver_timeout | Timeout (milliseconds)  | Specify the time period after which it is determined that an error has occurred in the transaction log transfer on the standby server.<br><br>By aligning this value with the value of (heartbeat_interval + heartbeat_timeout) x heartbeat_retry of the <i>serverIdentifier.conf</i> file, you can unify the time after which it is determined that an error has occurred.  |
| archive_mode         | on  | Specify the archive log mode.  |
| archive_command      | <i>'installDir/bin/pgx_xlogcopy.cmd "%p" "backupDataStorageDestinationDirectory/archived_xlog/%f"'</i>  | Specify the command and storage destination to save the transaction log.   |
| backup_destination   | Backup data storage destination directory   | Specify the name of directory where to store the backup data.<br><br>Set the permissions so that only the instance administrator user can access the specified directory.<br><br>Specify the same full path on all servers, so that the backup data of other servers can be used to perform recovery.  |
| listen_addresses     | Primary server IP address, host name, or "*"  | Specify the IP address or host name of the primary server. Specify the IP address or corresponding host name that will be used to connect to the log transfer network.<br><br>The content specified is also used to allow connections from client applications.<br><br>To receive the connection and the transaction log from any client or standby server, specify "*".<br><br>Refer to "Connections and Authentication" in the PostgreSQL Documentation for details. |
| max_connections      | The limit value for the number of standby server connections + number of simultaneous executions of mc_ctl status (*2) + 2 + number of simultaneous client connections to the instance + superuser_reserved_connections value | The value specified is also used to restrict the number of connections from client applications and the number of connections for the management of instances.<br><br>Refer to "When an Instance was Created with the initdb Command" in the Installation and Setup Guide for Server, and "Connections and Authentication" in the PostgreSQL Documentation, for details.   |

\*1: Mandatory to use the Mirroring Controller.

\*2: Number of simultaneous executions of the mc\_ctl command in the status mode.

## A.2 Parameters Set on the Standby Server

This section explains the content of the file and parameters set on the standby server. After editing postgresql.conf file, start the instance.

The content for the parameters specified in postgresql.conf file is shown in the table below.

Table A.2 postgresql.conf file

| Parameter                 | Value set                  | Explanation  |
|---------------------------|----------------------------|--|
| synchronous_standby_names | <i>'primaryServerName'</i> | Use single quotation marks (') to enclose the name that will identify the primary server. Any name can be specified. |

| Parameter          | Value set  | Explanation   |
|--------------------|--|---|
|                    |  | This name will be required to rebuild the original primary server as the new standby server after the primary server was switched.<br><br>Do not change this parameter while Mirroring Controller is running.   |
| backup_destination | Backup data storage destination directory  | Specify the name of the backup data storage directory.<br><br>Set the permissions so that only the instance administrator user can access the specified directory.<br><br>Specify the same full path on all servers so that the backup data of other servers can be used to perform recovery. |
| archive_command    | 'installDir/bin/pgx_xlogcopy.cmd "%p" " <i>backupDataStorageDestinationDirectory/archived_xlog/%f</i> "' | Specify the command and storage destination to save the transaction log.  |

## A.3 Network Configuration File

Define the network configuration that will link the Mirroring Controller processes in the network configuration file (network.conf file).

Define the same content on the primary server and standby server.

Table A.3 network.conf file

| Format specified   | Explanation  |
|--|--|
| <i>serverIdentifier hostName portNumber</i><br><i>Or</i><br><i>serverIdentifier ipAddress portNumber</i> | Specify any identifier (*1) for the server, a host name (or IP address), and port number (*2), using a space as the separator.<br><br>Specify the IP address or corresponding host name (*3) that will be used to connect to the admin network.<br><br>Define the same content on the primary server and standby server.<br><br>Example)<br><br>The literal <i>&lt;space&gt;</i> represents a space.<br><br>[For IPv4]<br><br>server1 <i>&lt;space&gt;</i> 192.0.2.100 <i>&lt;space&gt;</i> 27540<br><br>server2 <i>&lt;space&gt;</i> 192.0.2.110 <i>&lt;space&gt;</i> 27540<br><br>[For IPv6]<br><br>server1 2001:258:8404:1217:250:56ff:fea7:559f 27000<br>server2 2001:258:8404:1217:250:56ff:fea7:55a0 27100 |

\*1: The maximum length of the server identifier is 64 bytes. Use ASCII characters excluding spaces to specify this parameter.

\*2: The port number must be 0 to 65535. Ensure that the port number does not conflict with other software. Do not specify an ephemeral port that may temporarily be assigned by another program. Note that the value specified in this parameter must also be set in the /etc/services file.

\*3: Use ASCII characters excluding spaces to specify the host name.

## A.4 Server Configuration File

Define the information related to Mirroring Controller monitoring and control in the serverIdentifier.conf file. The maximum length of the server identifier is 64 bytes. Use ASCII characters excluding spaces to specify this parameter.

If the primary server and standby server environments are different, define content that is different, according to the environment.

Table A.4 serverIdentifier.conf file

| Parameter            | Value set   | Explanation  |
|----------------------|---|--|
| db_instance          | <i>'dataStorageDestinationDir'</i><br>[Example]<br>db_instance = '/database1/inst1'   | Specify using single quotation marks (') to enclose the data storage destination directory used to identify the monitoring target instance.<br><br>Use ASCII characters excluding spaces to specify this parameter.  |
| db_instance_password | <i>'passwordOfInstanceAdminUser'</i>  | Specify the password used when Mirroring Controller connects to a database instance.<br><br>Use ASCII characters excluding spaces to specify this parameter.<br><br>If password authentication is performed, you must specify this parameter in the settings used when Mirroring Controller connects to a database instance.<br><br>If you specify this parameter when password authentication is not performed, the parameter will be ignored.<br><br>Enclose the name within single quotation marks ('). |
| remote_call_timeout  | Admin communication timeout   | Specify the timeout value (milliseconds) of the Mirroring Controller agent process for communication between servers.<br><br>Specify a value between 0 and 2147483647.<br><br>The value 0 indicates that there is no timeout limit.<br><br>The default is 70000 milliseconds (70 seconds).   |
| core_file_path       | <i>CoreFileOutputDir</i>  | Specify the directory to which the core file is to be output.<br><br>Use ASCII characters excluding spaces to specify this parameter.<br><br>If this parameter is omitted, it will be assumed that the Mirroring Controller management directory was specified.  |
| syslog_facility      | Specify LOCAL0, LOCAL1, LOCAL2, LOCAL3, LOCAL4, LOCAL5, LOCAL6, or LOCAL7.  | When the import of logs to the syslog is enabled, the value of this parameter will be used for "facility" of the syslog.<br><br>The default is "LOCAL0".   |
| syslog_ident (*1)    | <i>'programName'</i>  | Specify using single quotation marks (') to enclose the program name used to identify the Mirroring Controller message in the system log.<br><br>Use ASCII characters excluding spaces to specify this parameter.<br><br>The default is 'MirroringControllerOpen'.   |
| heartbeat_interval   | Interval time for operating system/ server and process heartbeat monitoring, and disk abnormality monitoring (milliseconds) | Servers will contact each other and perform abnormality monitoring at the specified interval.<br><br>Specify a value between 1 and 2147483647.   |

| Parameter         | Value set   | Explanation  |
|-------------------|---|--|
|                   |   | The default is 800 milliseconds.   |
| heartbeat_timeout | Timeout for operating system/server and process heartbeat monitoring, and disk abnormality monitoring (seconds)                   | <p>If there is no response for at least the number of seconds specified, it will be assumed that an error has occurred that requires the primary server to be switched, or the standby server to be disconnected.</p> <p>Specify a value between 1 and 2147483647.</p> <p>The default is 1 second.</p>   |
| heartbeat_retry   | Number of retries for operating system/server and process heartbeat monitoring, and disk abnormality monitoring (number of times) | <p>Specify the number of retries when an error has been detected that requires the primary server to be switched, or the standby server to be disconnected.</p> <p>If an error is detected in succession more than the specified number of times, switch or disconnection will be performed.</p> <p>Specify a value between 0 and 2147483647.</p> <p>The default is 2 times.</p> |

\*1: By specifying the syslog\_ident parameter of the postgresql.conf file, the Mirroring Controller output content can be referenced transparently, so log reference is easy.

## Appendix B Supplementary Information on Building the Primary Server and Standby Server on the Same Server

The primary server and standby server can be pseudo-configured on the same server for system testing, for example. Out of consideration for performance and reliability, do not use this type of configuration for any other purposes. For this reason, do not use this type of configuration in a production environment.

Note that the setup and operations is the same as if the primary and standby servers are built on different servers.

This appendix provides supplementary information explaining how to configure the primary server and standby server on the same server.

### B.1 Backup Data Storage Destination Directory

It is not a problem if the same backup data storage destination directory is used on the primary server and standby server.

### B.2 How to Execute the mc\_ctl Command

When executing the mc\_ctl command, specify the server identifier in the --local-server option in order to identify the operation destination server.

Below is an example of starting Mirroring Controller of the server "server1" defined in the network.conf file. For mc\_ctl command operations using another mode, also specify the --local-server option.

Define two server identifiers for the same IP address with different port numbers in the network.conf file.

Example)

```
server1 192.0.2.100 27540
server2 192.0.2.100 27541
```

Ensure that the port numbers of both primary server and standby server do not conflict with any other software.

#### Enabling automatic swith/disconnection

Start Mirroring Controller of the server "server1":

Example)

```
$ mc_ctl start -M /mcdire/inst1 -w -f --local-server server1
```

Stop Mirroring Controller of the server "server1":

Example)

```
$ mc_ctl stop -M /mcdire/inst1 --local-server server1
```

#### Disabling automatic swith/disconnection

Start Mirroring Controller of the server "server1":

Example)

```
$ mc_ctl start -M /mcdire/inst1 -w --local-server server1
```

Stop Mirroring Controller of the server "server1":

Example)

```
$ mc_ctl stop -M /mcdire/inst1 --local-server server1
```

 Note

If using an rc script

Append the `--local-server` option to the `mc_ctl` command call defined in the automatic start shell script.

If using `systemd`

Add the `--local-server` option to the `mc_ctl` option specification for `ExecStart` and `ExecStop` of the unit file for `systemd`.

Refer to "[3.9 Setting Automatic Start and Stop of Mirroring Controller and Multiplexed Instances](#)" for details.

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# FUJITSU Enterprise Postgres 9.5



## Cluster Operation Guide *(Windows)*

Windows

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# Preface

---

## Purpose of This Document

This document explains the items required to operate FUJITSU Enterprise Postgres on a cluster system.

## Intended Readers

This document is aimed at people who install and operate FUJITSU Enterprise Postgres on a cluster system. Readers of this document are also assumed to have general knowledge of:

- PostgreSQL
- SQL
- Windows

## Structure of This Document

This document is structured as follows:

### Part 1 Overview of Cluster Systems

#### Chapter 1 Definition of Cluster Operation

Provides an overview of cluster operations and their types.

### Part 2 Database Multiplexing Mode

#### Chapter 2 Overview of Database Multiplexing Mode

Provides an overview of database multiplexing mode.

#### Chapter 3 Setting up Database Multiplexing Mode

Describes how to set up database multiplexing mode.

#### Chapter 4 Operations in Database Multiplexing Mode

Explains periodic database multiplexing mode.

#### Chapter 5 Action Required when an Error Occurs in Database Multiplexing Mode

Explains the action required when an error occurs during a database multiplexing mode.

#### Chapter 6 Managing Mirroring Controller Using WebAdmin

Explains how to setup and manage Mirroring Controller in a streaming replication cluster using WebAdmin.

### Appendix A Parameters

Explains the configuration files and parameters required for database multiplexing mode.

### Appendix B Supplementary Information on Building the Primary Server and Standby Server on the Same Server

Explains supplementary information on building the primary server and standby server on the same server.

### Appendix C Supplementary Procedure on Configuring for Operation in Database Multiplexing Mode

Explains the configuration procedure for operation in database multiplexing mode.

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# Part 1 Overview of Cluster Systems

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This part provides an overview of the cluster systems, and describes the types and operation modes.

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# Chapter 1 Definition of Cluster Operation

This chapter explains the features of a cluster system, the types of cluster operations, and the operation mode.

## 1.1 What Is a Cluster System?

A cluster system is a system that joins multiple machines (hereafter, referred to as servers) to achieve high availability and scalability throughout the system.

This allows the creation of systems that simultaneously achieve high availability and scalability.

### High availability

For example, by transferring the role to another server when a server in the cluster system fails, the downtime for the entire system can be made shorter.

This type of operation mode is referred to as a "failover operation".

### Scalability

The load should be distributed, in order to extend the processing capacity across the entire system by dividing multiple application processes amongst multiple servers, regardless of processing content, or to suit the processing content.

## 1.2 Cluster Operation Provided by FUJITSU Enterprise Postgres

In FUJITSU Enterprise Postgres, the following failover operation mode is provided in each system:

- Log shipping mode

### Log shipping mode

This operation mode is based on PostgreSQL streaming replication. Other software such as cluster software is not required.

This mode replicates the database on all servers that comprise the cluster system. It achieves this by sending and reflecting the updated transaction log of the database from the server that receives the update (primary server) to another server (standby server).

In addition, the client driver automatically distinguishes between the primary and standby servers, so applications can be connected transparently regardless of the physical server. Accordingly, a flexible system can easily be built, for example a system that offloads connections to the standby server if the connections only perform referencing.



FUJITSU Enterprise Postgres supports only configurations comprising one standby server per primary server.



- The streaming replication feature is not described in this manual.

Refer to "High Availability, Load Balancing, and Replication" in the PostgreSQL Documentation for information on the streaming replication feature.

- Refer to "[Part 2 Database Multiplexing Mode](#)" for information on the database multiplexing feature.

# Part 2 Database Multiplexing Mode

---

This part describes database multiplexing mode.

|   |                    |
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# Chapter 2 Overview of Database Multiplexing Mode

This chapter provides an overview of database multiplexing mode.

## Point

In this and subsequent chapters, the word "Mirroring Controller" may be used in the process or management directory name or explanation.

## 2.1 What is Database Multiplexing Mode

This operation mode is based on PostgreSQL streaming replication. Other software such as cluster software is not required.

This mode replicates the database on all servers that comprise the cluster system. It achieves this by transferring the updated transaction logs of the database from the server that receives the updates (primary server) to another server (standby server), and then reflecting them on the standby server.

It consists of a feature that detects faults in the elements that are essential for the continuity of the database operation (such as the database process, disk, and network), as well as simplified switchover and standby server disconnection features. The database will be copied in synchronous mode.

### Monitoring using database multiplexing mode

- Operating system or server failures, and no-response state

By generating a heartbeat between Mirroring Controller on each server, operating system or server errors are detected and acknowledged between the relevant servers.

- Database process failures, and no-response state

Mirroring Controller periodically accesses the database processes and checks the status. A process error is detected by monitoring whether an access timeout occurs.

- Disk failure

Mirroring Controller periodically creates files on the data storage destination disk. A disk error is detected when an I/O error occurs.

Failures that can be detected are those that physically affect the entire system, such as disk header or device power failures.

Figure 2.1 Failover from the primary server to the standby server

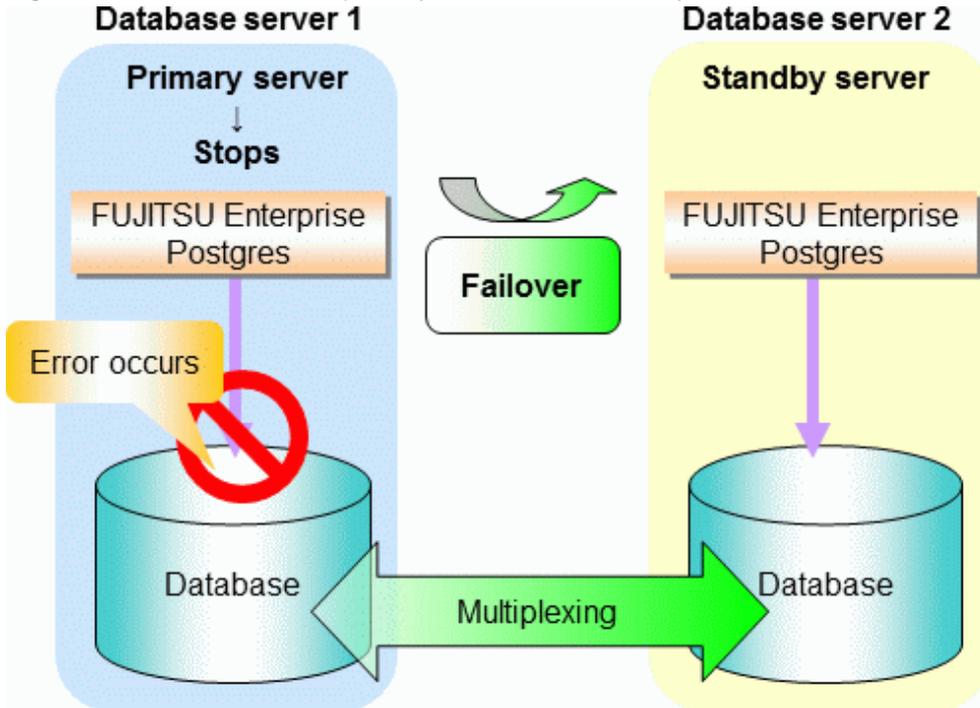
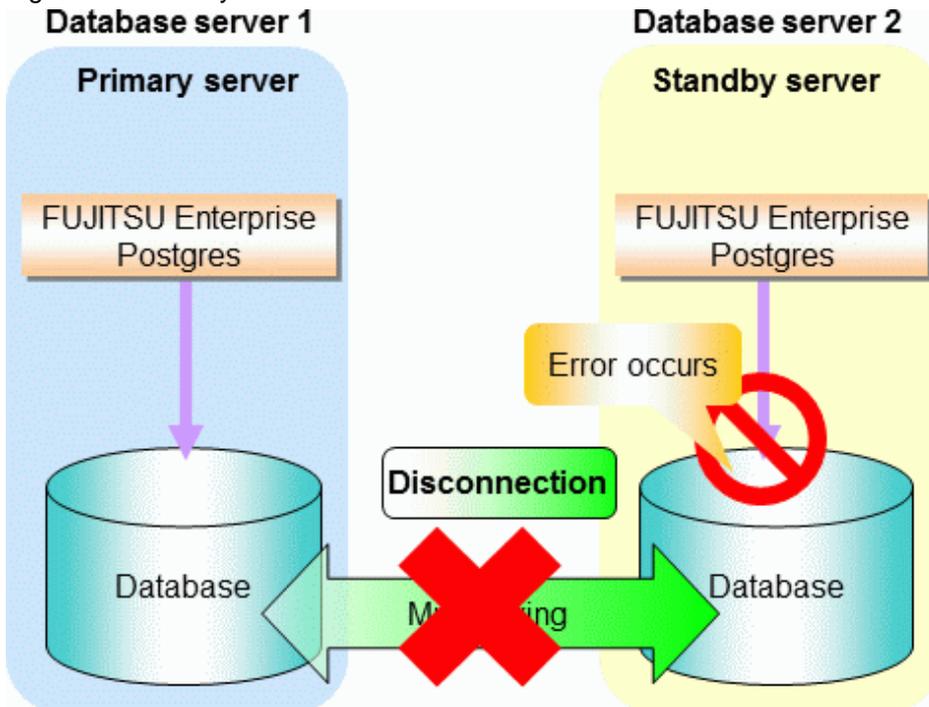


Figure 2.2 Standby server disconnection



When database multiplexing is used to perform monitoring and an error is detected, this option will automatically switch the primary server or disconnect the standby server.

Reference jobs can also be executed on the standby server.

## Note

If the role of primary server was switched to another server and then starts degrading, the original primary server will not become the standby server automatically. Remove the cause of the error, and then change the role of the original primary server to the server currently acting as standby server. Refer to "[5.1 Action Required when Server Degradation Occurs](#)" for details.

## See

- Refer to "[2.2.4 Notes on Executing Reference Jobs on the Standby Server](#)" for information on reference jobs.
- The features that can be used will depend on whether automatic switch/disconnection is used. Refer to "Features that can be Installed" in the Installation and Setup Guide for Server for details.

## Point

If the standby server was disconnected, Mirroring Controller will automatically comment out the `synchronous_standby_names` parameter in the `postgresql.conf` file of the primary server. Accordingly, you can prevent the application processing for the primary server being stopped.

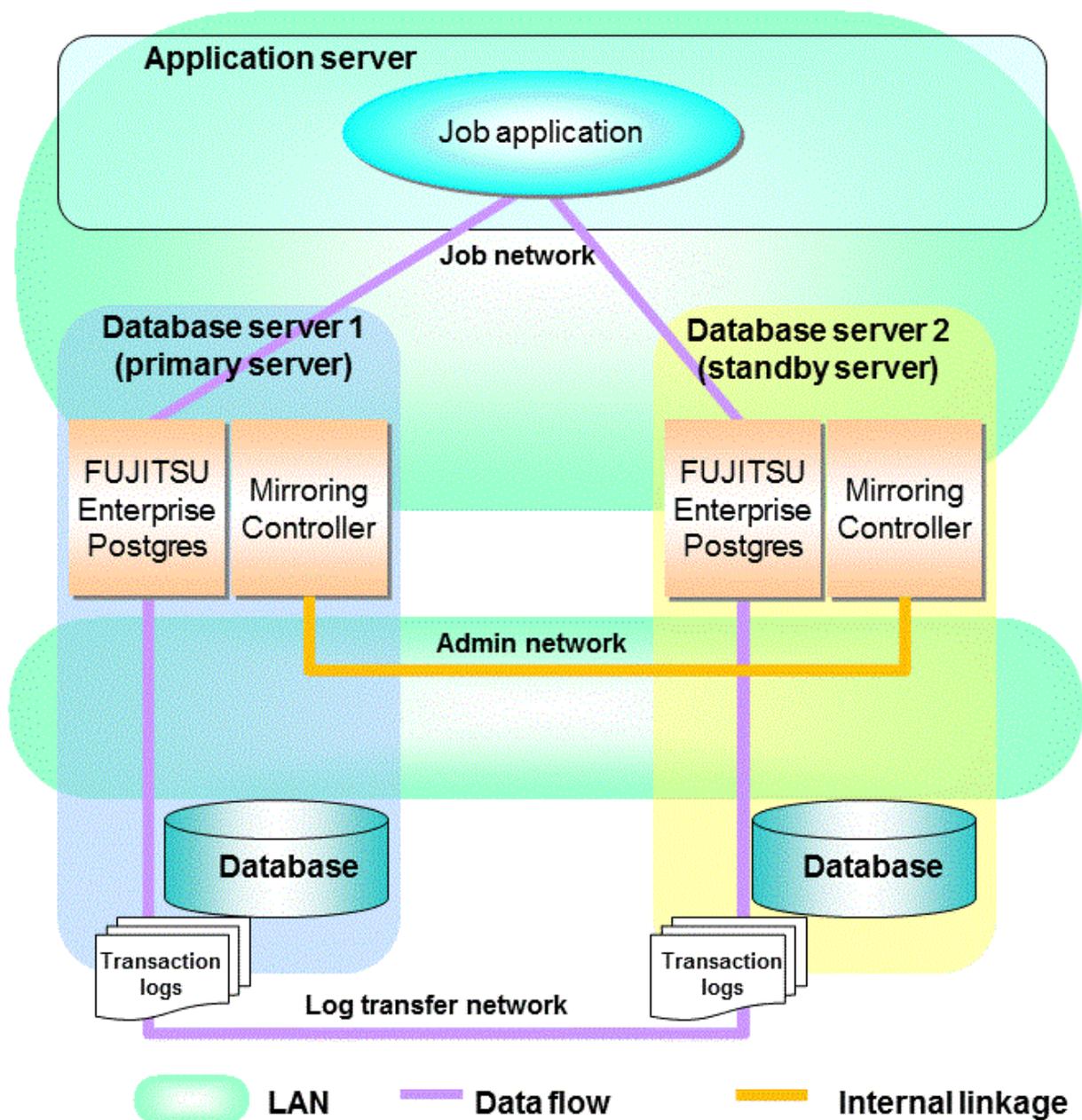
## 2.2 System Configuration for Database Multiplexing Mode

This section explains the products, features, and networks that are part of a database multiplexing system.

The following table shows the network types uses by database multiplexing systems.

| Network type         | Description   |
|----------------------|---|
| Job network          | Network between the application that accesses the database, and the database server.  |
| Admin network        | Network used by the primary server and the standby server to monitor each other using Mirroring Controller, and to control Mirroring Controller of other servers. |
| Log transfer network | Network used to transfer the transaction logs of the database, which is part of database multiplexing.  |

Figure 2.3 System configuration for database multiplexing mode



## 2.2.1 Mirroring Controller Resources

The only Mirroring Controller resource is the Mirroring Controller management directory, which stores the files that define the Mirroring Controller behavior, and the temporary files that are created when Mirroring Controller is active.

### Note

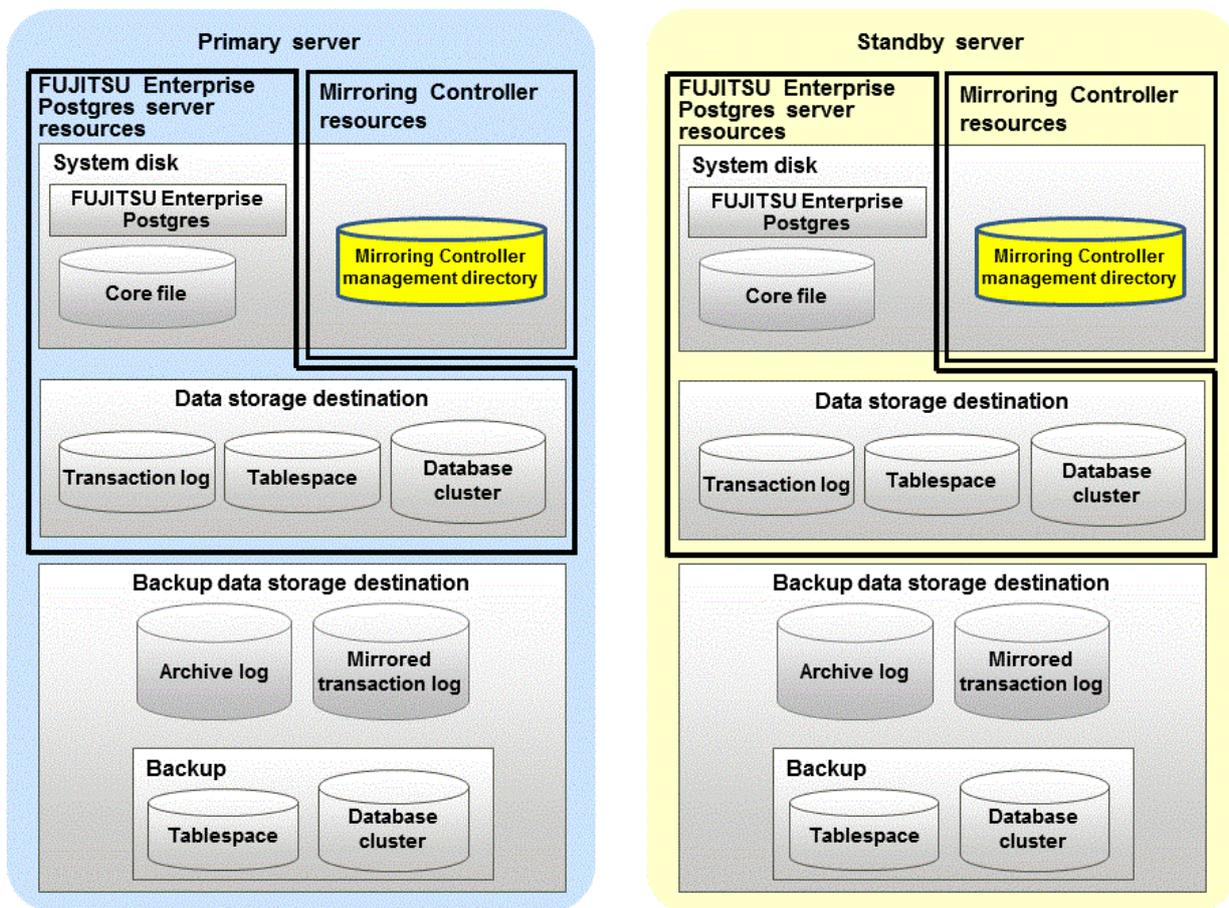
- Do not create the Mirroring Controller management directory in a directory managed by FUJITSU Enterprise Postgres, otherwise it may be deleted by mistake or may cause unexpected problems when FUJITSU Enterprise Postgres recovery is performed (such as old version of files being restored).

Refer to "Preparing Directories for Resource Deployment" in the Installation and Setup Guide for Server for information on the directories managed by FUJITSU Enterprise Postgres.

- The backup methods described in "Backing Up the Database" in the Operation Guide cannot be used to back up the Mirroring Controller resources. Therefore, users must obtain their own backup of Mirroring Controller resources, in addition to FUJITSU Enterprise Postgres server resources.
- If the automatic switch/disconnection is enabled, do not edit synchronous\_standby\_names for the Mirroring Controller monitoring target instance using the methods below. Otherwise, disconnection by the Mirroring Controller may fail, since postgresql.conf settings are overridden by values specified in postgresql.auto.conf and the include\_dir directives.
  - Setting the parameter using the ALTER SYSTEM statement
  - Editing the value specified in postgresql.conf or in a configuration file located in a directory listed in the include\_dir directive

The content on the primary server will be backed up. You cannot tell which server is the primary server to be backed up, because switching and failback may be performed between the servers. It is also impossible to tell which server is to be restored using the backed up data. Accordingly, ensure that you create a backup of each server when it is working as the primary server.

Figure 2.4 Configuration when backing up Mirroring Controller resources



## 2.2.2 Redundancy of the Admin and Log Transfer Networks

The admin network is an important one, because it is used by Mirroring Controller to check the status of each server.

Additionally, the log transfer network is an important one, because it is necessary to ensure data freshness.

Accordingly, configure a failure-resistant network by implementing network redundancy via the NIC teaming feature provided by the operating system or network driver vendor.

### Information

NIC teaming feature

In Windows Server(R) 2012 or later, the NIC teaming feature is provided by the operating system by default, and in Windows Server(R) 2008 R2 or earlier, it is provided by the network driver vendor.

---

## 2.2.3 Notes on CPU Architecture and Products

---

Use the same CPU architecture (endian) for the primary server and the standby server. Additionally, use the same bit architecture (32-bit/64-bit) for the FUJITSU Enterprise Postgres installation.

A server using only PostgreSQL streaming replication cannot be specified as the database multiplexing system log transfer destination.

## 2.2.4 Notes on Executing Reference Jobs on the Standby Server

---

In database multiplexing mode where automatic switch/disconnection is enabled, switch and disconnection are performed automatically. If a switch occurs when executing a reference job for the standby server, it may affect the performance of that job. The reason is that, on the new primary server (that is, the original standby server), both the main job that was being executed on the original primary server and the reference job that was being executed on the original standby server will be processed. Therefore, before executing a job using this configuration, give careful consideration to the server resource estimates, and the likely impact on performance.

Accordingly, if you are concerned about the impact on performance, pause the reference job on the original standby server, change the original primary server to the new standby server, and then resume the reference job for the new standby server.

## 2.3 Security in Database Multiplexing

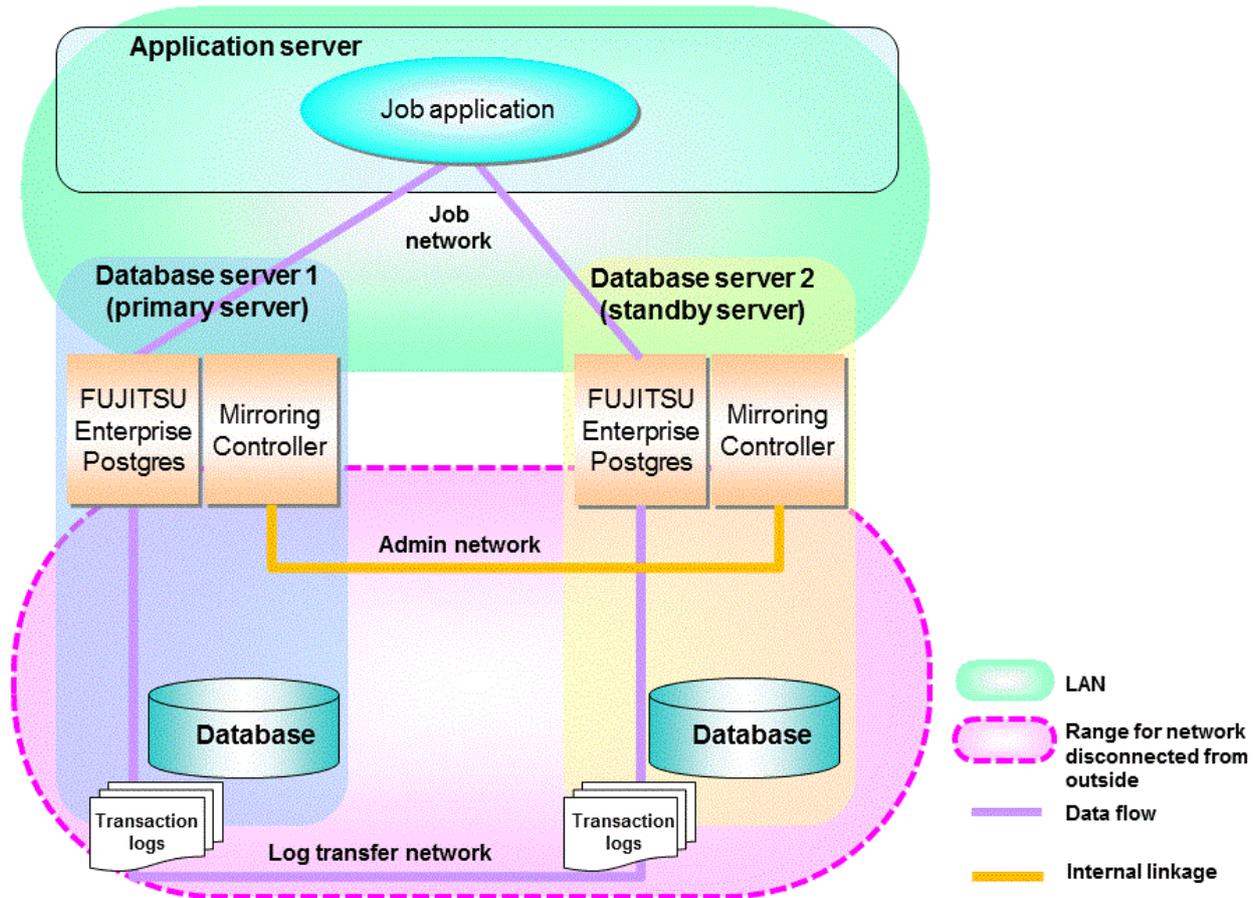
---

Database multiplexing mode replicates the database on all servers that comprise the cluster system. It achieves this by transferring and reflecting the updated transaction logs of the database from the primary server to the standby server.

To safeguard the database against unauthorized access and protect the confidentiality of data when transferring the transaction logs, carefully consider security and take note of the following:

- Do not use trust authentication when using replication connection.
- Configure the admin network and the log transfer network so that they cannot be connected from the outside, as shown below.

Figure 2.5 Security



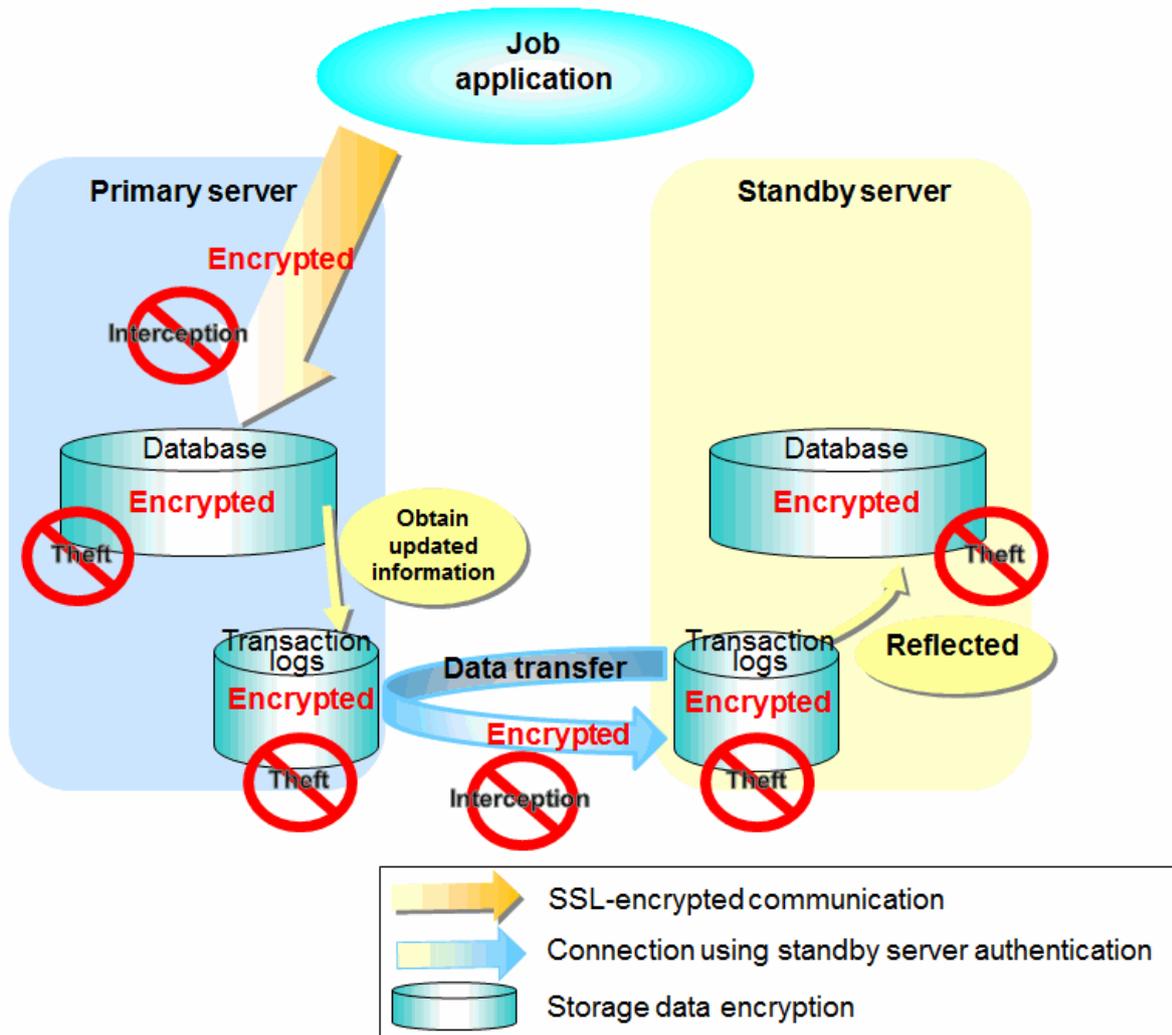
However, it may not always be possible to adopt the configuration mentioned above. For example, you may want to place the servers in a nearby/neighboring office to minimize network delays.

In this case, combine the following features to enhance security:

- [Authentication of the standby server](#)
- [Encryption of transaction logs transferred to the standby server](#)

When these features are combined, security will be achieved as shown below.

Figure 2.6 Security achieved when standby server authentication is combined with transaction log encryption



 See

Refer to "Performing Database Multiplexing" under "Configuring Secure Communication Using Secure Sockets Layer" in the Operation Guide for information on encrypting SSL communications.

### 2.3.1 Authentication of the Standby Server

You can prevent spoofing connections from an external server purporting to be the standby server by using authentication with a user name and password.

Configure the setting in the primary server `pg_hba.conf` file so that authentication is performed for connections from the standby server in the same way as for connections from the client.

 See

Refer to "Client Authentication" in the PostgreSQL Documentation for information on content that can be configured in `pg_hba.conf`.

## 2.3.2 Encryption of Transaction Logs Transferred to the Standby Server

---

In case the authentication of the standby server is breached so that a malicious user purporting to be the standby server can spoof data, the transaction log data can be encrypted to prevent it from being deciphered. The transparent data encryption feature is used to encrypt the data.



See

.....  
Refer to "Protecting Storage Data Using Transparent Data Encryption" in the Operation Guide for details.  
.....

# Chapter 3 Setting up Database Multiplexing Mode

This chapter describes how to set up database multiplexing mode, and how to check it.

## Users who perform setup and operations

Setup and operations of the database multiplexing mode must be performed by the instance administrator user with administrator privileges (operating system user ID belonging to the Administrators group).

- The instance administrator user must be assigned privileges to log on as a service.
- The instance administrator user must also be registered as the database superuser.



When executing the `initdb` command, specify the `-U` option, and only perform operations in which the instance administrator user (who is the command execution user) is also a database superuser.

If an operation in which the instance administrator user is not a database superuser is performed, Mirroring Controller will be unable to connect to the instance, and therefore will not be able to perform error monitoring for the database multiplexing mode.

## Matching the system times

Before starting the setup, ensure that the times in both servers match, by using the operating system time synchronization feature, for example.

The tolerated difference is approximately one second.

If the system times are not synchronized (because the tolerated difference is exceeded, for example), problem investigation may be affected.

## Setup

Perform the procedure in the table below to set up database multiplexing mode.

Database multiplexing mode uses the streaming replication feature. If you know how to set up streaming replication, the setup of database multiplexing mode will be easy.

| Step | Task  |   | Refer to   |
|------|---|---|--|
|      | Primary server                                  | Standby server                                  |  |
| 1    | Installation                                    |   | <a href="#">3.1 Installation</a>   |
| 2    | Preparing for setup                             |   | <a href="#">3.2 Preparing for Setup</a>  |
| 3    | Setting up database multiplexing mode           |   | <a href="#">3.3.1 Setting up Database Multiplexing Mode on the Primary Server</a>    |
| 4    | Creating, setting, and registering the instance |   | <a href="#">3.3.2 Creating, Setting, and Registering the Primary Server Instance</a> |
| 5    |   | Setting up database multiplexing mode           | <a href="#">3.4.1 Setting up Database Multiplexing Mode on the Standby Server</a>    |
| 6    |   | Creating, setting, and registering the instance | <a href="#">3.4.2 Creating, Setting, and Registering the Standby Server Instance</a> |
| 7    | Confirming the streaming replication status     |   | <a href="#">3.5 Confirming the Streaming Replication Status</a>                      |
| 8    | Creating applications                           |   | <a href="#">3.6 Creating Applications</a>  |

| Step | Task                  |                | Refer to                                  |
|------|-----------------------|----------------|---|
|      | Primary server        | Standby server |   |
| 9    | Checking the behavior |                | <a href="#">3.7 Checking the Behavior</a> |

Explanations for each step are provided below.

### Information

- The setup procedure is also the same when changing the mode on a single server to database multiplexing mode. In this case, omit the installation of FUJITSU Enterprise Postgres and the creation of the instance.

Refer to "[4.7.2 Changing from Single Server Mode to Database Multiplexing Mode](#)" for details.

- The primary and standby server can be pseudo-configured on the same server for system testing, for example. In this case, the setup can be performed using the same procedure, however there will be some supplementary steps.

Before performing the setup, refer to "[Appendix B Supplementary Information on Building the Primary Server and Standby Server on the Same Server](#)".

## 3.1 Installation

Refer to the manuals of each product, and then install the product.

### See

- Refer to the Installation and Setup Guide for Server for details on how to install FUJITSU Enterprise Postgres.

## 3.2 Preparing for Setup

This section describes the preparation required before setting up Mirroring Controller.

### 3.2.1 Preparing the Backup Disk

In Mirroring Controller, by performing a backup, recovery is possible even if all server disks are corrupted.

The content on the primary server should be backed up. However, through switching and failback, the standby server may also become the primary server. Accordingly, prepare each of the backup disk devices for the primary and standby servers. Perform backup on the primary server used at the time of the backup.

### 3.2.2 Preparatory Tasks for the Output of Error Logs to the Event Log

This section explains the preparatory tasks required to output error logs to the event log.

#### Note

If you do not register an event source name, the message content output to the event log may be incomplete.

#### Setting each server

You should register this default event source name beforehand because the default event source name "MirroringControllerOpen" may be output to the event log when Mirroring Controller commands are used.

Example)

The following is an example in which the DLL of a 64-bit product is registered under the default event source name.

```
> regsvr32 "c:\Program Files\Fujitsu\fssepv<xy>server64\lib\mcevent.dll"
```

## Setting each instance

You can output messages to any event source named by the user, so that messages output to the event log can be identified by each instance.

Example)

The following is an example in which the DLL of a 64-bit product is registered under the event source name "Mirroring Controller inst1".

```
> regsvr32 /n /i:"Mirroring Controller inst1" "c:\Program Files\Fujitsu\fssepv<xy>server64\lib\mcevent.dll"
```

The parameter must be edited for each instance. Refer to "[A.4 Server Configuration File](#)" to set the event\_source parameter.

## If installing multiple versions

If FUJITSU Enterprise Postgres is already installed on the same machine, search for the key below in a registry editor, and make a note of the path of the registered DLL. Afterwards, register a new DLL using the default event source name.

Use the DLL path that you made a note of in the above step when re-registering the default event source name during an uninstall.

```
MirroringControllerOpen
```

## 3.2.3 Security Policy Settings

Security settings that allow logon as a service are required in Mirroring Controller for the operating system user account of the instance administrator user in order to start and stop Mirroring Controller and an instance using a Windows service.

If the security settings have not been configured, refer to "[C.1 Security Policy Settings](#)" for information on configuring the settings.

## 3.3 Setting up the Primary Server

This section explains how to set up the primary server.

### 3.3.1 Setting up Database Multiplexing Mode on the Primary Server

This section explains how to set up database multiplexing mode on the primary server.

In database multiplexing, the files that are required for operations are managed in the Mirroring Controller management directory.

There is one Mirroring Controller management directory for each instance.



- Do not place the Mirroring Controller management directory in a directory managed by FUJITSU Enterprise Postgres, otherwise it may be deleted by mistake with the directories managed by FUJITSU Enterprise Postgres, and an old version of files may be restored.



- Refer to "Preparing Directories for Resource Deployment" in the Installation and Setup Guide for Server for details on the directories that are managed by FUJITSU Enterprise Postgres.
- Refer to "mc\_ctl" in Reference for information on the command.
- Refer to "[Appendix A Parameters](#)" for details on each parameter to be edited for the setup.

Perform the following procedure:

1. Log in to the primary server.

2. Create the Mirroring Controller management directory that will store the files required by database multiplexing.

Use ASCII characters in the Mirroring Controller management directory.

Additionally, grant "Write" permission to the instance administrator user for the Mirroring Controller management directory.

3. In the network.conf file, define the network configuration that will link between the Mirroring Controller processes.

Create the network.conf file in the Mirroring Controller management directory, based on the sample file.

Path of the sample file

```
install\Dir\share\mc_network.conf.sample
```

In the network.conf file, specify the host name (or IP address) and port number of the primary server and standby server, and define the network configuration that will link between the Mirroring Controller processes.

Refer to "[A.3 Network Configuration File](#)" for details.

A definition example is shown below.

In this example, the Mirroring Controller default port number 27540 is specified, and "server1" and "server2" represent any server identifiers.

Example)

```
server1 192.0.2.100 27540
server2 192.0.2.110 27540
```

Ensure that the port numbers for the primary and standby server do not conflict with other software.

Register the port number of the primary server in the services file, because there are programs, such as WebAdmin, that search an available port number using the services file.

Register any name as the service name.

4. Change the access permissions for the network.conf file.

In the network.conf file, set "Read" permission for the instance administrator user only.

If users other than the instance administrator user are granted access permissions, the mc\_ctl command will not work. Accordingly, users other than the instance administrator user are prevented from operating Mirroring Controller.

Example)

The following is an execution example, in which the instance administrator user is granted full access permissions as the owner when the operating system user name of the instance administrator user is "fsepuser". The following procedure applies when the user is logged in to the Windows server as "fsepuser":

```
> takeown /f network.conf
> icacls network.conf /reset
> icacls network.conf /inheritance:r
> icacls network.conf /grant fsepuser:F
```

5. Define the information related to Mirroring Controller monitoring and control in the *serverIdentifier.conf* file.

Create the *serverIdentifier.conf* file in the Mirroring Controller management directory, based on the sample file.

As the file name for the *serverIdentifier.conf* file, use the server identifier name that was specified in the network.conf file in step 3.

Path of the sample file

```
install\Dir\share\mc_server.conf.sample
```

Set the parameters shown in the table below in the *serverIdentifier.conf* file.

Table 3.1 Parameters

| Parameter                | Content specified  | Remarks  |
|--------------------------|--|--|
| db_instance              | 'dataStorageDestinationDir'                                | Use ASCII characters, and specify "\\" as the path delimiter.  |
| db_instance_service_name | 'registeredServiceNameOfFujitsuEnterprisePostgresInstance' | Specify the registered service name of the FUJITSU Enterprise Postgres instance in the Windows service.<br><br>Use ASCII characters to specify this parameter.   |
| db_instance_password     | 'passwordOfInstanceAdminUser'                              | If password authentication is performed, specify this parameter in the settings used when Mirroring Controller connects to a database instance.<br><br>Use ASCII characters to specify this parameter.   |
| mc_service_name          | 'registeredServiceNameOfMirroringController'               | Specify the Mirroring Controller service name registered in the Windows service. Use ASCII characters excluding forward slash (/) and backslash (\) to specify this parameter.<br><br>The service name is up to 124 bytes.   |
| event_source             | 'eventSourceName'  | Specify the event source name to be used to identify the Mirroring Controller message in the event log. Use ASCII characters to specify this parameter.<br><br>The maximum length of the event source name is 255 bytes.<br><br>By using a similar event source name as the postgresql.conf file parameter, the Mirroring Controller output content can be referenced transparently, so log reference is easy.   |
| heartbeat_interval       | 800 (milliseconds)   | The time until an operation, such as the switch of the primary server, that is performed when there is no response, is calculated according to the following formula:<br><br>(heartbeat_timeout (seconds) + heartbeat_interval (milliseconds)/1000) x (heartbeat_retry (count) + 1) = (1+800/1000) x (2+1) = 5.4 (seconds)<br><br>According to this setting, errors are monitored at 800-millisecond intervals, and if there were three successive occurrences when there was no response for a duration of one second, the operation to switch the primary server, or disconnect the standby server from the primary server, is performed.<br><br>When setting this parameter, there are some considerations to take into account to optimize degradation using abnormality monitoring. Refer to <a href="#">"3.8.4 Tuning for Optimization of Degrading Operation Using Abnormality Monitoring"</a> for details. |
| heartbeat_timeout        | 1 (second)   |  |
| heartbeat_retry          | 2 (count)  |  |

6. Change the access permissions for the *serverIdentifier.conf* file.

In the *serverIdentifier.conf* file, set "Read" permission for the instance administrator user only. If users other than the instance administrator user are granted access permissions, the mc\_ctl command will not work.

Example)

The following is an execution example, in which the instance administrator user is granted full access permissions when the operating system user name of the instance administrator user is "fsepuser". The following procedure applies when the user is logged in to the Windows server as "fsepuser":

```
> takeown /f serverIdentifier.conf
> icacls serverIdentifier.conf /reset
> icacls serverIdentifier.conf /inheritance:r
> icacls serverIdentifier.conf /grant fsepuser:F
```

7. Configure the Windows firewall.

If the Windows firewall feature is to be enabled, you should enable the port number of Mirroring Controller that you specified in the network definition file in step 3. Refer to "[C.2 Windows Firewall Settings](#)" for details.

8. Register Mirroring Controller to the Windows service.

Execute the mc\_ctl command in the register mode.

For the -P option of the mc\_ctl command, specify the password of the operating system user who executes the command.

Example)

```
> mc_ctl register -M D:\mcdire\inst1 -w -f -P *****
```

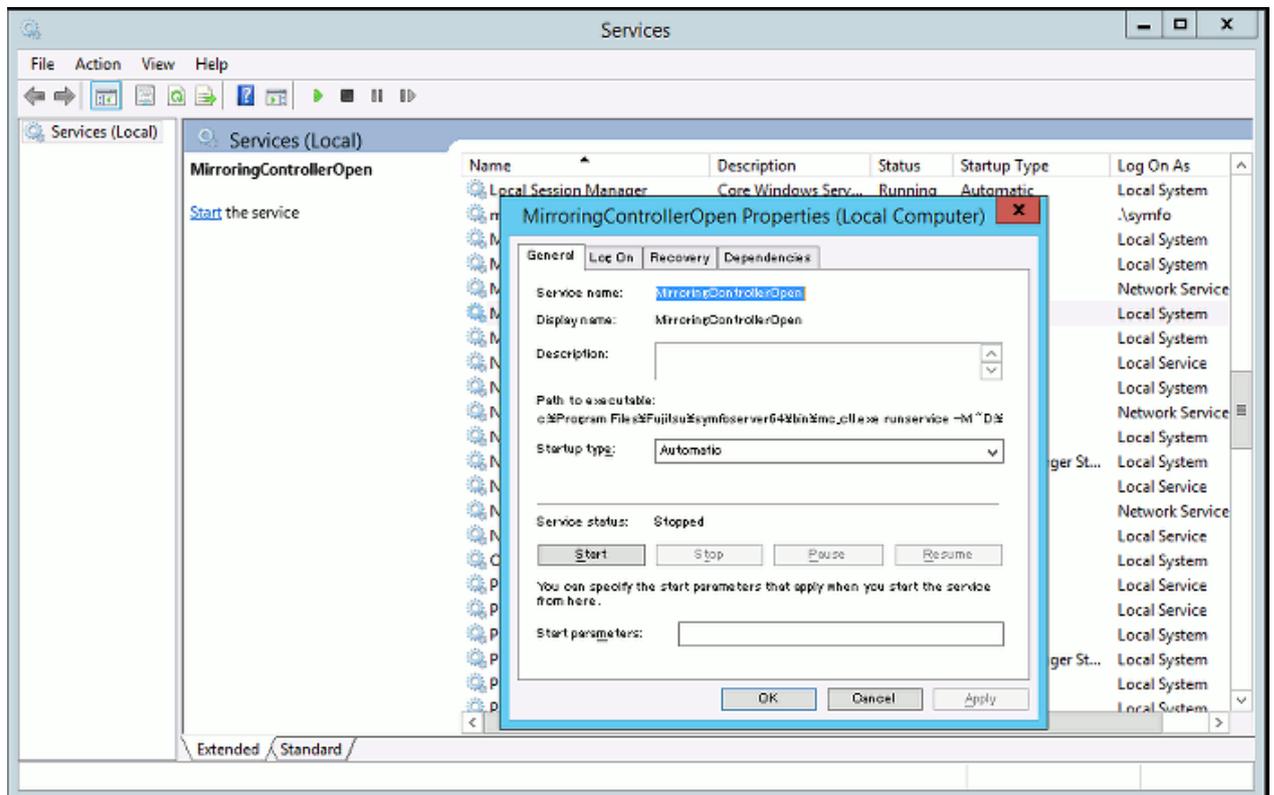
### Note

When specifying the password in the -P option of the mc\_ctl command, for security reasons, you should be careful not to allow other users to access it.

### Information

You can use the mc\_ctl command with the -S option to specify automatic start and stop of Mirroring Controller. Refer to "[3.9 Setting Automatic Start and Stop of Mirroring Controller and Multiplexed Instances](#)" for details.

Using the service name specified in the mc\_service\_name parameter of the server definition file in step 5, Mirroring Controller is registered to the Windows service as shown below.



You can execute the sc qc command to check the registration status.

## 3.3.2 Creating, Setting, and Registering the Primary Server Instance

This section explains how to create, set, and register the primary server instance.

### Note

- Mirroring Controller supports instances that are registered in the Windows service.

### See

- Refer to "Client Authentication" in the PostgreSQL Documentation for information on the `pg_hba.conf` file.
- Refer to "A.1 Parameters Set on the Primary Server" for information on the `postgresql.conf` file.
- Refer to "mc\_ctl" in Reference for information on the command.

Perform the following procedure:

1. Refer to "Setup" in the Installation and Setup Guide for Server, and then perform the FUJITSU Enterprise Postgres setup and create the FUJITSU Enterprise Postgres instance.
  - Use ASCII characters in the data storage destination directory.
  - When registering an instance to the Windows service, perform the settings required to enable Mirroring Controller to start and stop the instance. Execute the `pg_ctl` command with the following specified for the register mode:
    - For the service name of the `-N` option, specify the name set for the `db_instance_service_name` parameter in the server definition file
    - Specify "demand" for the `-S` option, so that the service does not start automatically on startup of the system
    - Specify the `-w` option, so that the system waits for the start or stop process to complete

### Note

Do not configure the Windows service of a multiplexed instance to perform automatic start, as it is started by Mirroring Controller.

### Note

If degradation starts occurring due to an error during operations in database multiplexing mode, recovery is required for the standby server. There are some conditions to execute the `pg_rewind` command to recover the standby server. One of the conditions can be satisfied by enabling checksums when executing the `initdb` command. This is not mandatory.

Refer to "5.1.1.1.3 Identify cause of error and perform recovery" for details.

2. Configure the encryption settings for the storage data.

Create the keystore file.

Refer to "Database Multiplexing Mode" in the Operation Guide for details, and then configure the settings.

3. Add the following entry to the `pg_hba.conf` file to authenticate connections from the standby server.

Copy the file to the standby server later.

| # | TYPE | DATABASE    | USER | ADDRESS                     | METHOD                      |
|---|------|-------------|------|-----------------------------|-----------------------------|
|   | host | replication | fsep | <i>standbyServerAddress</i> | <i>authenticationMethod</i> |
|   | host | replication | fsep | <i>primaryServerAddress</i> | <i>authenticationMethod</i> |

For the primary and standby server addresses, specify the IP address that will connect to the log transfer network.

Additionally, all servers can be used as the primary server or the standby server, so add entries for the addresses of all servers that comprise the database multiplexing system.

As the authentication method, set a method other than trust authentication.

If the primary server becomes the standby server, to perform automatic authentication of connections to the primary server, create a password file (%APPDATA%postgresql\pgpass.conf), and then specify a password for the replication database. Accordingly, the instance administrator operating system user and the user registered in the database will be the same, so you can verify that the connection was not made by an unknown user. Additionally, the password that was set beforehand will be used in the authentication, so that the connection will be automatic.

### Note

If trust authentication is set, all OS users who can log in to the primary server will be able to connect, and if one of these is a malicious user, then that user can corrupt the standby server data, or cause the job system to fail, by sending an erroneous transaction log. Refer to "Authentication Methods" in the PostgreSQL Documentation for details on the authentication methods that can be set.

#### 4. Configure this setting to enable the instance administrator user of the primary server to connect as a database application.

This setting enables the connection to the instance using the user name of the instance administrator user, so that Mirroring Controller can monitor instance errors. Configure this setting to enable the connection to the postgres database.

As the authentication method, set a method other than trust authentication.

- If password authentication is used

In the db\_instance\_password parameter of the *serverIdentifier.conf* file, specify the password for the instance administrator user. This password is used to connect to the database instance. If a password is not specified in the db\_instance\_password parameter, the connection to the database instance from Mirroring Controller will fail, and it will not be possible to perform the process monitoring of the instance.

- If password authentication is not used

There is no need to specify the password in the db\_instance\_password parameter.

Even if the password for the instance administrator user is specified in the db\_instance\_password parameter, it will be ignored.

An example of setting the authentication method is shown below.

| # | TYPE | DATABASE | USER | ADDRESS      | METHOD                      |
|---|------|----------|------|--------------|-----------------------------|
|   | host | postgres | fsep | 127.0.0.1/32 | <i>authenticationMethod</i> |

Refer to the note in step 3 for notes relating to trust authentication.

#### 5. To use database multiplexing mode, specify the parameters shown in the table below in the postgresql.conf file.

The postgresql.conf file is copied when the standby server instance is created. Accordingly, set the required parameters in the standby server.

To use database multiplexing mode, specify the parameters shown in the table below in the postgresql.conf file. After editing the postgresql.conf file, restart the instance.

Table 3.2 Parameters

| Parameter                 | Content specified             | Remarks   |
|---------------------------|-------------------------------|---|
| wal_level                 | Literal "hot_standby"         |   |
| max_wal_senders           | Number of standby servers + 1 | The number of standby servers ( <i>n</i> ) is 1, so 2 must be specified.  |
| synchronous_standby_names | ' <i>standbyServerName</i> '  | Specify the name that will identify the standby server.<br>Enclose the name within single quotation marks (').<br>Do not change this parameter while Mirroring Controller is running. |

| Parameter          | Content specified   | Remarks  |
|--------------------|---|--|
| hot_standby        | on  | Specify this to execute reference jobs on the standby server. (*1)   |
| wal_keep_segments  | Number of file segments   | <p>If a delay exceeding the value set in this parameter occurs, the WAL segment required later by the primary server may be deleted.</p> <p>Additionally, if you stop a standby server (for maintenance, for example), consider the stop time and set a value that will not cause the WAL segment to be deleted.</p> <p>Setting this parameter requires consideration regarding stabilization of the database multiplexing mode (refer to <a href="#">"3.8.1 Tuning to Stabilize the Database Multiplexing Mode"</a> for details).</p> <p>Refer to "Estimating Transaction Log Space Requirements" in the Installation and Setup Guide for Server for information on estimating the WAL segment.</p> |
| wal_sender_timeout | Timeout (milliseconds)  | <p>Specify the time period after which it is determined that an error has occurred in the transaction log transfer on the primary server.</p> <p>By aligning this value with the value of (heartbeat_interval + heartbeat_timeout/1000) x (heartbeat_retry + 1) of the <i>serverIdentifier.conf</i> file, you can unify the time after which it is determined that an error has occurred.</p>  |
| archive_mode       | on  | Specify the archive log mode.  |
| archive_command    | 'cmd /c ""installDir\bin\pgx_xlogcopy.cmd" "%p" "backupDataStorageDestinationDir\archived_xlog\%f""'  | Specify the command and storage destination to save the transaction log.   |
| backup_destination | Backup data storage destination directory   | <p>Specify the name of directory where to store the backup data.</p> <p>Set the privileges so that only the instance administrator user can access the specified directory.</p> <p>Specify the same full path on all servers, so that the backup data of other servers can be used to perform recovery.</p>  |
| max_connections    | The limit value for the number of standby server connections + number of simultaneous executions of mc_ctl status (*2) + 2 + number of simultaneous client connections to the instance + superuser_reserved_connections | <p>The value specified is also used to restrict the number of connections from client applications and the number of connections for the management of instances.</p> <p>Refer to "When an Instance was Created with the initdb Command" in the Installation and Setup Guide for Server, and "Connections and Authentication" in the PostgreSQL Documentation, for details.</p>  |

\*1: Mandatory to use the Mirroring Controller.

\*2: Number of simultaneous executions of the mc\_ctl command in the status mode.

6. Start the Mirroring Controller process.

#### Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-f` option specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example )

```
> mc_ctl start -M D:\mcdire\inst1 -w -f
```

#### Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode.

Example )

```
> mc_ctl start -M D:\mcdire\inst1 -w
```

7. Obtain the backup.

Use the `pgx_dmpall` command to collect the backup.

## 3.4 Setting up the Standby Server

---

This section explains how to set up the standby server.

### 3.4.1 Setting up Database Multiplexing Mode on the Standby Server

---

This section explains how to set up database multiplexing mode on the standby server.

In database multiplexing, the files that are required for operations are managed in the Mirroring Controller management directory.

There is one Mirroring Controller management directory for each instance.

#### Note

- Do not place the Mirroring Controller management directory in a directory managed by FUJITSU Enterprise Postgres, otherwise it may be deleted by mistake with the directories managed by FUJITSU Enterprise Postgres, and an old version of files may be restored.
- When creating a standby server for a large database, stop job system operations, specify a large value for the `wal_keep_segments` parameter, or use replication slots.  
This is because WALs generated after the standby server is built using the `pg_basebackup` command, but before it is started, need to be retained. However, the number of WAL segments that can be retained is constrained by the `wal_keep_segments` parameter. Additionally, setting the `wal_keep_segments` parameter requires consideration regarding stabilization of the database multiplexing mode (refer to "[3.8.1 Tuning to Stabilize the Database Multiplexing Mode](#)" for details).

#### See

- Refer to "Preparing Directories for Resource Deployment" in the Installation and Setup Guide for Server for details on the directories that are managed by FUJITSU Enterprise Postgres.
- Refer to "`mc_ctl`" in Reference for information on the command.
- Refer to "[Appendix A Parameters](#)" for details on each parameter to be edited for the setup.
- Refer to "Replication Slots" in the PostgreSQL Documentation for information on replication slots.

Perform the following procedure:

1. Log in to the standby server.
2. Create the Mirroring Controller management directory that will store the files required by database multiplexing.  
Use ASCII characters in the Mirroring Controller management directory.  
Additionally, grant "Write" permission to the instance administrator user for the Mirroring Controller management directory.
3. Copy, and then deploy, the network.conf file of the primary server.  
Copy the network.conf file that was defined in the primary server setup, and deploy it to the Mirroring Controller management directory of the standby server.  
Register the port number of the standby server that was specified in the network.conf file in the services file, because there are programs, such as WebAdmin, that search an available port number using the services file.  
Register any name as the service name.
4. Change the access permissions for the network.conf file.  
Set "Read" permission for the instance administrator user only. If users other than the instance administrator user are granted access permissions, the mc\_ctl command will not work. Accordingly, users other than the instance administrator user are prevented from operating Mirroring Controller.

Example)

The following is an execution example, in which the instance administrator user is granted full access permissions as the owner when the operating system user name of the instance administrator user is "fsepuser". The following procedure applies when the user is logged in to the Windows server as "fsepuser".

```
> takeown /f network.conf
> icacls network.conf /reset
> icacls network.conf /inheritance:r
> icacls network.conf /grant fsepuser:F
```

5. Copy, and then deploy, the *serverIdentifier.conf* file of the primary server.  
Copy the *serverIdentifier.conf* file that was defined in the primary server setup, and deploy it to the Mirroring Controller management directory of the standby server.



## Note

If the primary server and standby server are to be built within the same server, change the following parameters in the *serverIdentifier.conf* file, ensuring that the names are not duplicated with those on the primary server:

- db\_instance\_service\_name (registered service name of the FUJITSU Enterprise Postgres instance)
- mc\_service\_name (registered service name of Mirroring Controller)
- event\_source (event source name)

6. Change the access permissions for the *serverIdentifier.conf* file.  
Set "Read" permission for the instance administrator user only. If users other than the instance administrator user are granted access permissions, the mc\_ctl command will not work.

Example)

The following is an execution example, in which the instance administrator user is granted full access permissions as the owner when the operating system user name of the instance administrator user is "fsepuser". The following procedure applies when the user is logged in to the Windows server as "fsepuser":

```
> takeown /f serverIdentifier.conf
> icacls serverIdentifier.conf /reset
```

```
> icacls server\identifier.conf /inheritance:r
> icacls server\identifier.conf /grant fsepuser:F
```

7. Configure the Windows firewall.

If the Windows firewall feature is to be enabled, you should enable the port number of Mirroring Controller that you specified in the network definition file in step 3. Refer to "[C.2 Windows Firewall Settings](#)" for details.

8. Register Mirroring Controller to the Windows service.

Execute the mc\_ctl command in the register mode.

For the -P option of the mc\_ctl command, specify the password of the operating system user who executes the command.

Example)

```
> mc_ctl register -M D:\mcdire\inst1 -w -f -P *****
```

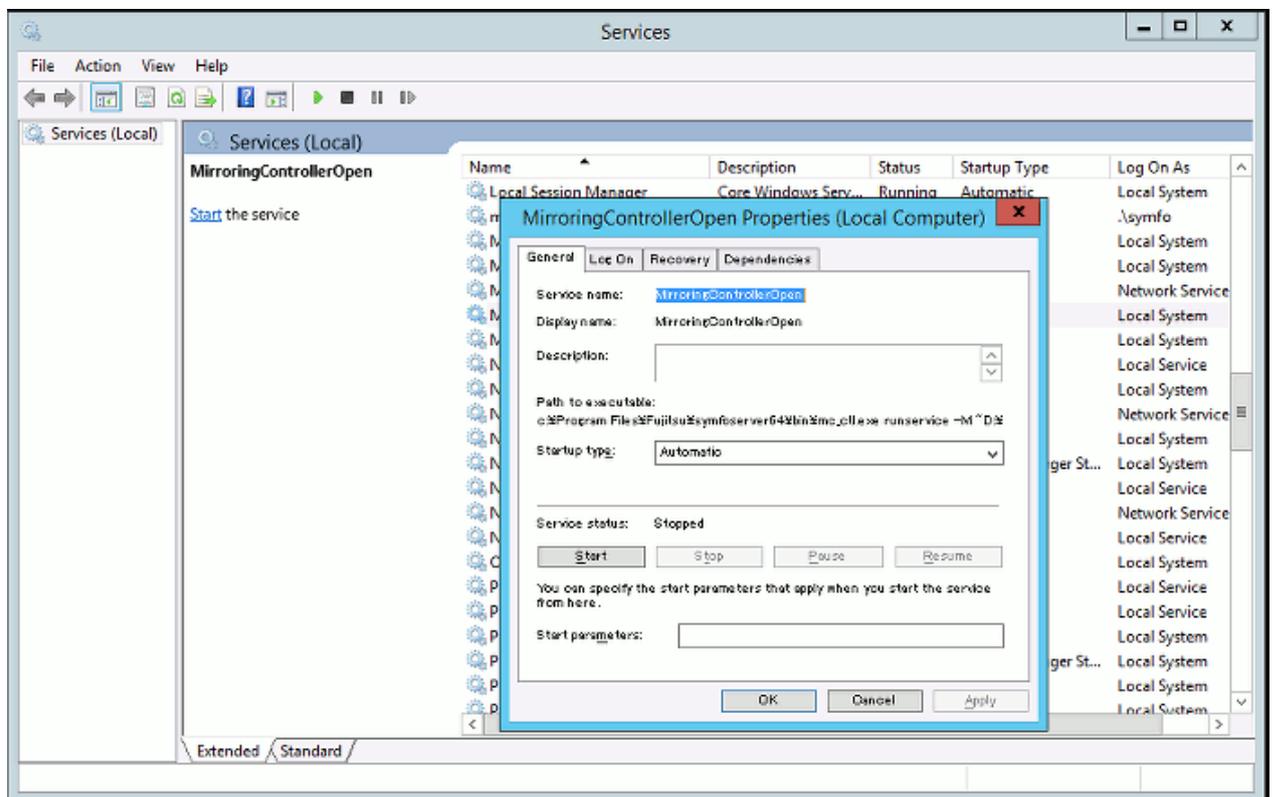
 **Note**

When specifying the password in the -P option of the mc\_ctl command, for security reasons, you should be careful not to allow other users to access it.

 **Information**

You can use the mc\_ctl command with the -S option to specify automatic start and stop of Mirroring Controller. Refer to "[3.9 Setting Automatic Start and Stop of Mirroring Controller and Multiplexed Instances](#)" for details.

Using the service name specified in the mc\_service\_name parameter of the server definition file in step 5, Mirroring Controller is registered to the Windows service as shown below.



You can execute the sc qc command to check the registration status.

## 3.4.2 Creating, Setting, and Registering the Standby Server Instance

This section explains how to create, set, and register the standby server instance.

### Note

Mirroring Controller supports instances that are registered in the Windows service.

### See

- Refer to "Appendix A Parameters" for details on each parameter.
- Refer to "mc\_ctl" in Reference for information on the command.

Perform the following procedure:

1. Prepare for setup.

Refer to "Preparations for Setup" in the Installation and Setup Guide for Server for information on the preparatory tasks to be performed before creating an instance on the standby server.

### Note

If the primary server and standby server are to be built within the same server, perform preparation to ensure that the event source names of FUJITSU Enterprise Postgres are not duplicated with that of the primary server.

2. Configure the encryption settings for the storage data.

Deploy a copy of the keystore file of the primary server on the standby server.

Refer to "Database Multiplexing Mode" in the Operation Guide for details.

3. Execute the pg\_basebackup command to create a copy of the primary server instance on the standby server.

Example)

```
> pg_basebackup -D D:\mcd\inst1 --xlog --progress --verbose -R --
dbname='application_name=standbyServerName' -h primaryServerIpAddress -p primaryServerPortNumber
```

### Note

If using a method that requires password authentication for connections to the primary server, you will need to ensure that authentication is performed automatically.

If the -R option is specified for the pg\_basebackup command and the password parameter is specified for the --dbname option, the pg\_basebackup command will set the password in recovery.conf file, enabling connections to be performed automatically.

If a password is not set in recovery.conf, it will be necessary to create a password file (%APPDATA%\postgresql\pgpass.conf), and then specify a password for the replication database.

4. Set the parameters shown in the table below in the postgresql.conf file.

Table 3.3 Parameters

| Parameter                 | Content specified   | Remarks   |
|---------------------------|---------------------|---|
| synchronous_standby_names | 'primaryServerName' | Required after switching the primary server and then changing the original primary server to the new standby server.<br>Enclose the name within single quotation marks ('). |

| Parameter            | Content specified      | Remarks   |
|----------------------|------------------------|---|
|                      |                        | Do not change this parameter while Mirroring Controller is running.   |
| wal_receiver_timeout | Timeout (milliseconds) | Specify the time period after which it is determined that an error has occurred in the transaction log transfer on the standby server.<br><br>By aligning this value with the value of (heartbeat_interval + heartbeat_timeout) x heartbeat_retry of the <i>serverIdentifier.conf</i> file, you can unify the time after which it is determined that an error has occurred. |

5. Register an instance to the Windows service.

Refer to "Creating an Instance" in the Installation and Setup Guide for Server for information on how to register an instance to the Windows service. Note that you should execute the `pg_ctl` command with the following specified for the register mode to enable Mirroring Controller to start and stop an instance:

- For the service name of the `-N` option, specify the name set for the `db_instance_service_name` parameter in the server definition file
- Specify "demand" for the `-S` option, so that the service does not start automatically on startup of the system
- Specify the `-w` option, so that the system waits for the start or stop process to complete

 Note

- Do not configure the Windows service of a multiplexed instance to perform automatic start, as it is started by Mirroring Controller.
- If the primary server and standby server are to be built within the same server, ensure that the registered service name of the FUJITSU Enterprise Postgres instance is not duplicated with that of the primary server.

6. Start the Mirroring Controller process.

After ensuring that the Mirroring Controller process of the primary server has started, start the Mirroring Controller process.

Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-f` option specified. This action enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode or restart Mirroring Controller with the `-f` option specified.

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w -f
```

Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode.

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w
```

7. Check the status of the Mirroring Controller process.

As the instance administrator user, execute the `mc_ctl` command in status mode. Ensure that "mirroring status" is switchable.

Example)

```
> mc_ctl status -M D:\mcdir\inst1
```

### 3.5 Confirming the Streaming Replication Status

Before performing the setup of the database multiplexing mode, ensure that the prerequisite streaming replication feature has been set up correctly.

Perform the following procedure:

1. On the primary server, ensure that single-row searches can be performed using the `pg_stat_replication` statistics view.

An example output of the `psql` command is shown below.

Example)

```
postgres=# select * from pg_stat_replication;
-[ RECORD 1 ]-----+-----
pid           | 14336
usesysid     | 10
username     | fsep
application_name | standby
client_addr  | 192.0.2.210
client_hostname |
client_port  | 27500
backend_start | 2015-04-23 20:24:13.761424+09
backend_xmin  |
state        | streaming
sent_location | 0/3000060
write_location | 0/3000060
flush_location | 0/3000060
replay_location | 0/3000060
sync_priority | 1
sync_state   | sync
```

2. Confirm the search results of step 1.

Ensure that the connection established with the intended standby server is in synchronous mode.

Table 3.4 Items to be checked

| Item             | Required value   |
|------------------|--|
| application_name | Value specified for <code>synchronous_standby_names</code> parameter in the <code>postgresql.conf</code> file of the primary server. |
| client_addr      | IP address of the standby server.  |
| state            | "streaming".   |
| sync_state       | "sync".  |



- Refer to "The Statistics Collector" in "Server Administration" in the PostgreSQL Documentation for information on the `pg_stat_replication` statistics view.
- Note that the `pg_stat_replication` statistics view may change in the future.

### 3.6 Creating Applications

This section explains how to create applications using database multiplexing, and points that should be noted when you create the applications.

### 3.6.1 Application Connection Server Settings

---

If database multiplexing is used and a failover occurs, it will be necessary to switch the application connection server. Accordingly, use the application connection switch feature to create applications.



.....  
Refer to "Application Connection Switch Feature" in the Application Development Guide for details.  
.....

### 3.6.2 Notes on Indexes

---

Do not use hash indexes.

Even if a hash index is updated, a transaction log will not be output and the hash index will not be reflected on the standby server.

## 3.7 Checking the Behavior

---

To check if the environment setup was performed correctly, start the application and then check the behavior of the switch and rebuild.

## 3.8 Tuning

---

This section explains how to tune database multiplexing mode.

### 3.8.1 Tuning to Stabilize the Database Multiplexing Mode

---

When large amounts of data are updated, the write-to load for the database will become great, and the multiplexing state may become unstable.

Accordingly, by editing the parameters below in the postgresql.conf file, a stable multiplexing state can be maintained. Refer to "Estimating Transaction Log Space Requirements" in the Installation and Setup Guide for Server for information on transaction log space requirements.

Table 3.5 Parameters

| Parameter         | Content   |
|-------------------|---|
| wal_keep_segments | Refer to " <a href="#">3.3.2 Creating, Setting, and Registering the Primary Server Instance</a> " for details.  |
| max_wal_size      | The transaction log is written out according to the checkpoint trigger.<br><br>If a transaction log with the capacity of the value specified in this parameter is generated, the checkpoint will be executed.<br><br>If a large value is specified in this parameter, the time required for crash recovery will increase.<br><br>If a small value is specified in this parameter, many checkpoints will be generated, which will affect the performance of the applications that connect to the primary server. |

### 3.8.2 Tuning to Stabilize Queries on the Standby Server

---

Queries made using reference jobs on the standby server may be canceled by jobs executed on the primary server.

To reduce the possibility of a job being canceled, specify as large a value as possible for the max\_standby\_archive\_delay parameter in the postgresql.conf file.



- .....
- Refer to "Handling Query Conflicts" in the PostgreSQL Documentation for details.
  - Refer to "Standby Servers" in the PostgreSQL Documentation for details on the max\_standby\_archive\_delay parameter.
- .....

### 3.8.3 Tuning to Stabilize Queries on the Standby Server (when Performing Frequent Updates on the Primary Server)

If jobs are updated on the primary server regularly and frequently, it will be easy for the query made by the reference job on the standby server to be canceled. In this case, edit one of the postgresql.conf file parameters shown in the table below.

| Parameter                | Description  |
|--------------------------|--|
| hot_standby_feedback     | When "on" is set, the deletion (vacuum) of the data area that was deleted or updated on the primary server is suppressed.<br>Accordingly, the query on the standby server will not be canceled. (*1)   |
| vacuum_defer_cleanup_age | The deletion (vacuum) of the data area that was deleted or updated on the primary server is delayed until the specified number of transactions is processed. Accordingly, the probability that the query on the standby server will be canceled decreases. |

\*1: Because the vacuum is delayed, the data storage destination disk space of the primary server comes under pressure. Additionally, if there is conflict between accesses and queries executed on the standby server, transaction logs indicating this conflict will be transferred. Accordingly, specify as large a value as possible for the max\_standby\_archive\_delay parameter so that access conflicts do not occur.



See

- Refer to "Standby Servers" in the PostgreSQL Documentation for details on the hot\_standby\_feedback parameter.
- Refer to "Master Server" in the PostgreSQL Documentation for details on the vacuum\_defer\_cleanup\_age parameter.

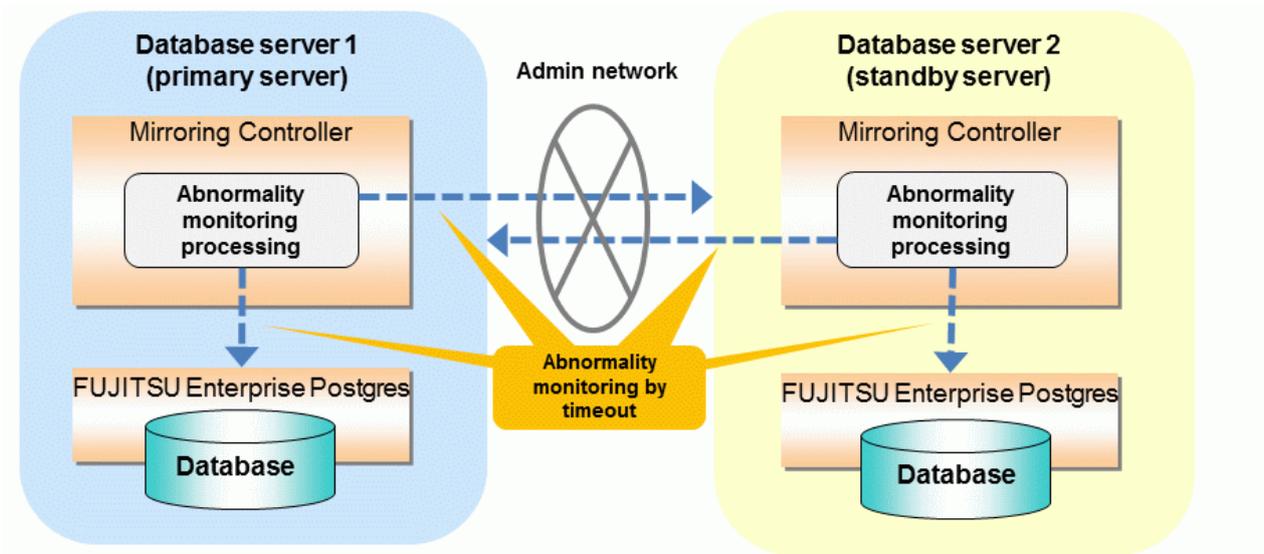
### 3.8.4 Tuning for Optimization of Degrading Operation Using Abnormality Monitoring

Mirroring Controller uses a monitoring method that outputs an error if the timeout time is exceeded when accessing resources targeted for monitoring. If the timeout time is short, switch/disconnection of the standby server can be performed faster, however, there is greater risk of misdetection, so an appropriate design is required.

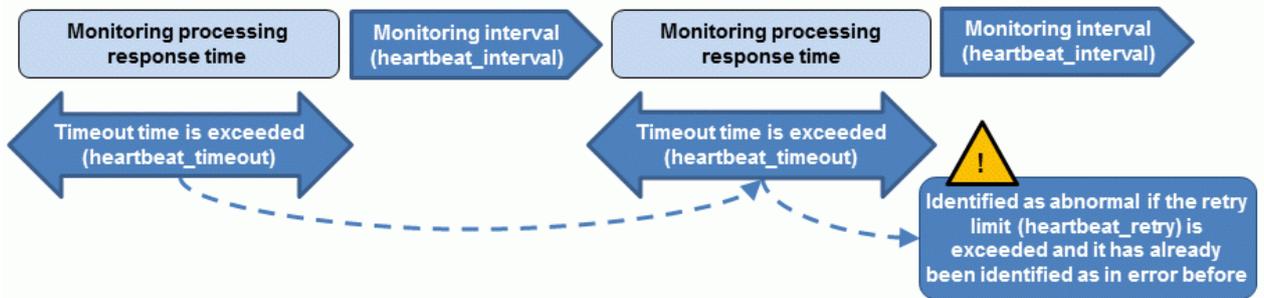
You can optimize degrading operation by editing the values for the following parameters in the server definition file in accordance with the system. Refer to "[Appendix A Parameters](#)" for information on how to edit these parameters.

Table 3.6 Parameters

| Parameter  | Description   |
|--|---|
| Abnormality monitoring interval<br>(heartbeat_interval)    | Mirroring Controller is configured so that abnormality monitoring does not place a load on the system. This parameter does not normally need to be set. (The default is 800 milliseconds.)  |
| Abnormality monitoring timeout time<br>(heartbeat_timeout) | Set the time during which a load is placed continuously on the server or network performance. For example, it is envisaged that this parameter will be used in situations such as when performing high-load batch jobs or when a large number of online jobs occur continuously and concurrently. |
| Abnormality monitoring retry times<br>(heartbeat_retry)    | This parameter can be set when needing a safety value for situations in which the value specified for heartbeat_timeout is exceeded, for example, when using systems with fluctuating loads, however, this parameter does not normally need to be set. (The default is 2 times.)                  |

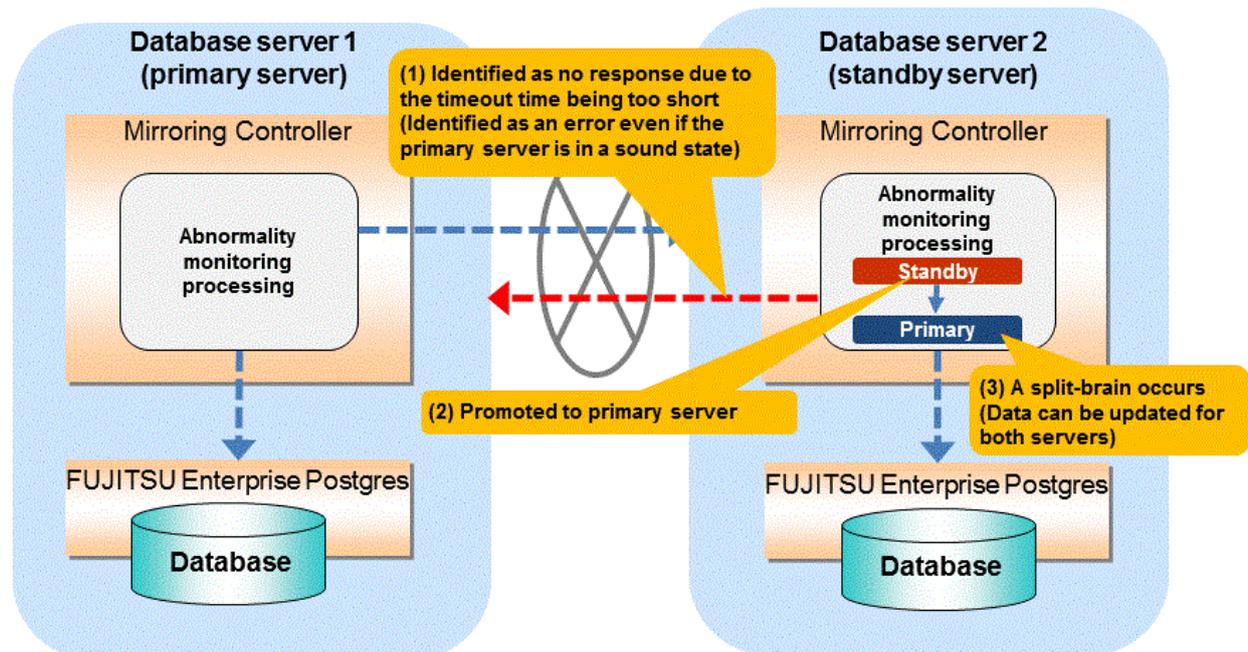


Flow of abnormality monitoring by timeout

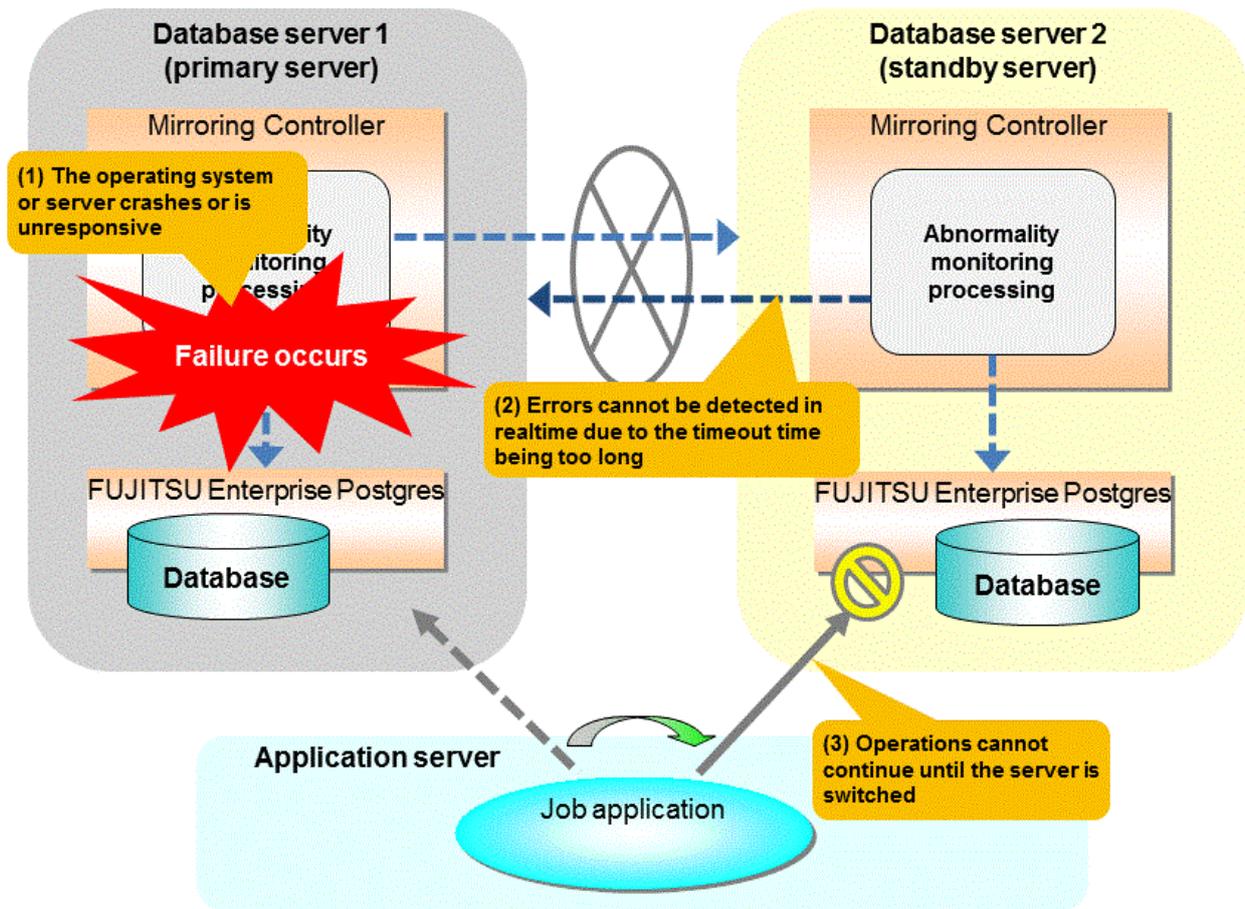


The following type of issue occurs if the tuning related to abnormality monitoring is not performed appropriately.

● If the timeout time is too short



● If the timeout time is too long



**Notes regarding monitoring when the operating system or server crashes or is unresponsive**

Monitoring is performed upon the aforementioned timeout when the operating system or server crashes or is unresponsive. Therefore, if tuning has not been performed correctly, there is a risk of a split-brain mistakenly occurring even if the server is in a sound state.

Split-brain is a phenomenon in which both servers temporarily operate as primary servers, causing data updates to be performed on both servers.

**Split-brain detection method**

It can be confirmed that split-brain occurs under the following conditions:

1. When the mc\_ctl command is executed in status mode on both servers, the "host\_role" of both servers is output as "primary".  
And,
2. The following message is output to the event log of one of the servers:

```
promotion processing completed (MCA00062)
```

**How to recover from a split-brain**

Use the procedure described below. Note that the new primary server is the server that was confirmed in step 2 of the aforementioned detection method.

1. Stop all applications that are running on the old and new primary servers.
2. Investigate and recover the database.  
Investigate the update results that have not been reflected to the new primary server from the database of the old primary server, and apply to the new primary server as necessary.
3. Stop the old primary server instance and the Mirroring Controller.

4. Resume the applications that were stopped in step 1.
5. Recover the old primary server.  
While referring to "[3.4 Setting up the Standby Server](#)", build (set up) the old primary server as the new standby server, from the new primary server.

### Note

The tuning described above impacts on the time taken from detection of a timeout until switching the primary server. Therefore, modify the values while taking into account the switch/disconnection time, using a design for which misdetection does not occur.

## 3.9 Setting Automatic Start and Stop of Mirroring Controller and Multiplexed Instances

Multiplexed instances and Mirroring Controller can be started and stopped automatically in line with the starting and stopping of the operating system of the database server.

However, to stop the operating system on the primary server, it is necessary to stop the operating system on the standby server so that no unnecessary automatic switching or errors occur.

### Note

To guarantee the startup sequence of Mirroring Controller on the primary and standby servers, first confirm that the primary server has started, and then start the standby servers in sequence.

You can configure the Windows service to perform automatic start and stop of Mirroring Controller.

#### Setting automatic start and stop of a multiplexed instance

No settings are required for Mirroring Controller to start and stop an instance.

### Note

Do not configure the Windows service of a multiplexed instance to perform automatic start.

#### Configuring automatic start and stop for database multiplexing mode

##### Configuring during setup

When registering Mirroring Controller to the Windows service in "[3.3.1 Setting up Database Multiplexing Mode on the Primary Server](#)" and "[3.4.1 Setting up Database Multiplexing Mode on the Standby Server](#)", specify "auto" for the -S option of the register mode used with the mc\_ctl command.

Example)

```
> mc_ctl register -M D:\mcdire\inst1 -w -f -P ***** -S auto
```

##### Changing the configuration after setup

Use the sc config command to change the configuration of the Windows service of Mirroring Controller.

Example)

The following is an example using the registered service name "Mirroring\_Controller\_inst1".

```
> sc config "Mirroring_Controller_inst1" start= auto
```



See

Refer to documentation such as Windows Help and Support for the sc command for information on how to configure the service.



Information

You can check the registration status in the Windows service window or by using the sc qc command.

## 3.10 Backup Operation

This section explains the backup operation for database multiplexing mode.

### 3.10.1 Backing up Database Multiplexing Mode Information

When changing the Mirroring Controller settings, in addition to backing up the database, back up the configuration file in the Mirroring Controller management directory so that the Mirroring Controller settings are not lost.

### 3.10.2 Database Backup Operation

Using database multiplexing mode is the same as obtaining the backup data on the standby server as a safeguard against a disk failure. Note that all server disks may be corrupted due to some cause.

As a safeguard against this type of case, execute the `pgx_dmpall` command on the primary server to create the backup data.

However, it is not definite as to which server runs as the primary server, so ensure that the `pgx_dmpall` command is executed periodically on all servers, so that the backup data will be obtained. For example, create a script to obtain the backup data, and set it in the operation management software.



Point

When the `pgx_dmpall` command is executed on the standby server, it will not match the statuses, however the error message shown below will be output and return the value "1".

If a script that ignores only this type of error is executed on all servers, the backup data of the primary server can be obtained.

Error message

```
ERROR:recovery is in progress (10095)
```



Note

- Consider the possibility that the server that runs as the primary server may be destroyed alongside the backup data, so it is recommended to promote another server to become the primary server, and then back up the data on the new primary server without waiting for the next scheduled backup.
- Specify the same backup directory name for the primary and standby servers. If different backup directory names are specified, and recovery is performed using the backup data of the other server, the recovery cannot be performed correctly.



See

- Period backups allow shorter recovery time and reduction in disk usage. Refer to "Backing Up the Database" in the Operation Guide for details on the backup operation.

- Refer to "[Chapter 5 Action Required when an Error Occurs in Database Multiplexing Mode](#)" for details on recovery based on the backup data that was obtained using the `pgx_dmpall` command.



# Chapter 4 Operations in Database Multiplexing Mode

This chapter describes the periodic operations that are performed when running database multiplexing mode.

The periodic operations are the same as the operations on a single server.



Refer to "Periodic Operations" in the Operation Guide for information on the periodic operations.

## 4.1 Starting and Stopping Instances

When database multiplexing mode is used, use the `mc_ctl` command or Windows service to start and stop the instance and Mirroring Controller at the same time.

Do not start or stop the instance by itself.

### 4.1.1 Starting Mirroring Controller

Mirroring Controller can be started using one of the following:

- Using the `mc_ctl` command
- Starting a service on system startup



Mirroring Controller must be started by a user with administrator privileges (user ID belonging to the Administrators group).

Using the `mc_ctl` command

While Mirroring Controller is in a stopped state, execute the `mc_ctl` command from the command prompt to start the instance and Mirroring Controller.

Enabling automatic switch/disconnection

Execute the `mc_ctl` command in start mode with the `-f` option specified.

If you start Mirroring Controller without specifying the `-f` option, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example )

```
> mc_ctl start -M D:\mdir\inst1 -w -f
```

Disabling automatic switch/disconnection

Execute the `mc_ctl` command in start mode.

Example )

```
> mc_ctl start -M D:\mdir\inst1 -w
```



To start the Mirroring Controller process only, execute the `mc_ctl` command in start mode with the `--mc-only` option specified.



## See

Refer to the Command Reference for information on how to specify the mc\_ctl command.

### Starting a service on system startup

Specify automatic start when registering Mirroring Controller to the Windows service during setup of database multiplexing mode. Accordingly, the Mirroring Controller service will start on startup of the operating system.



## See

Refer to "3.9 Setting Automatic Start and Stop of Mirroring Controller and Multiplexed Instances" for details.



## Note

When only the instance is started without starting Mirroring Controller, the impact will be as follows:

- Enabling automatic switch/disconnection  
Features such as automatic switch and automatic disconnection will not work until Mirroring Controller is started.
- Disabling automatic switch/disconnection  
Errors indicated in "2.1 What is Database Multiplexing Mode" will not be detected until Mirroring Controller is started.

## 4.1.2 Stopping Mirroring Controller

---

Mirroring Controller can be stopped using one of the following ways:

- Using the mc\_ctl command
- Stopping the service



## Note

Mirroring Controller must be stopped by a user with administrator privileges (user ID belonging to the Administrators group).

### Using the mc\_ctl command

While Mirroring Controller is running, execute the mc\_ctl command from the command prompt in stop mode to stop Mirroring Controller.

Example )

```
> mc_ctl stop -M D:\mdir\inst1
```



## Point

To stop the Mirroring Controller process only, execute the mc\_ctl command in stop mode with the --mc-only option specified.



## See

Refer to the Command Reference for information on how to specify the mc\_ctl command.

## Stopping the service

Select [Administrativehpq Tools], then [Services] to open the [Services] window, and then select the Mirroring Controller service and click the [Stop] menu.

### Note

- Before shutting down the operating system on the primary server, you must stop the Mirroring Controller, or shut down the operating system on the standby server.
- If you stop the Mirroring Controller by stopping the service, you must firstly exit all applications or programs that are using the instance that is to be stopped.
- When only the instance is stopped without stopping Mirroring Controller, the impact will be as follows:
  - Enabling automatic switch/disconnection  
Mirroring Controller determines that an error has occurred in the instance, and performs an unnecessary automatic switch. Automatic switch may also stop working correctly in some cases.
  - Disabling automatic switch/disconnection  
Mirroring Controller determines that an error has occurred in the instance, and outputs an error to the event log.

## 4.2 Checking the Database Multiplexing Mode Status

Check the multiplexed database status by executing the `mc_ctl` command in status mode.

Additionally, errors can be detected by monitoring the Mirroring Controller messages. If the status or messages are monitored periodically, you can react quickly following an automatic switch failure.

When the `mc_ctl` command is executed, the details of the multiplexing configuration, information about whether switch is possible following the error, and location and details of the error that caused the switch or disconnection are displayed.

After starting database multiplexing mode, execute the `mc_ctl` command in status mode to check the multiplexing status.

An example of the status displayed when the `mc_ctl` command is executed is shown below.

Example)

```
> mc_ctl status -M D:\mcdire\inst1

mirroring status
-----
switchable
server_id  host_role      host              host_status  db_proc_status  disk_status
-----
nd1        primary       192.0.2.100      normal       normal          normal
nd2        standby       192.0.2.110      normal       normal          normal
```

Additionally, by referencing the `pg_stat_replication` statistics view on the primary server, the data synchronization status can be confirmed. However, when creating the monitoring program, note that the content of `pg_stat_replication` may be changed in the future.

The following example shows that the locations of the transaction log after it is sent and received (`sent_location`, `replay_location`) match, and that they are fully synchronized.

Example)

```
postgres=# select * from pg_stat_replication;
-[ RECORD 1 ]-----+-----
pid           | 14336
usesysid     | 10
username     | fsep
application_name | standby
```

|                 |  |                               |
|-----------------|--|-------------------------------|
| client_addr     |  | 192.0.2.210                   |
| client_hostname |  |                               |
| client_port     |  | 27500                         |
| backend_start   |  | 2015-04-23 20:24:13.761424+09 |
| backend_xmin    |  |                               |
| state           |  | streaming                     |
| sent_location   |  | 0/3000060                     |
| write_location  |  | 0/3000060                     |
| flush_location  |  | 0/3000060                     |
| replay_location |  | 0/3000060                     |
| sync_priority   |  | 1                             |
| sync_state      |  | sync                          |



See

- Refer to "mc\_ctl" in Reference for information on the command.
- Refer to "Notes on Application Compatibility" in the Application Development Guide for information on retaining application compatibility.
- Refer to "The Statistics Collector" in "Server Administration" in the PostgreSQL Documentation for details on pg\_stat\_replication.

## 4.3 Manually Switching the Primary Server

The primary server cannot be switched automatically in the following case:

- If automatic switch/disconnection is disabled

In this case, to manually switch the primary server, execute the mc\_ctl command in switch mode on either the primary server or the standby server.

Example)

```
> mc_ctl switch -M D:\mcdire\inst1
```

## 4.4 Manually Disconnecting the Standby Server

The standby server cannot be disconnected automatically in the following case:

- If automatic switch/disconnection is disabled

In this case, to manually disconnect the standby server, execute the mc\_ctl command in stop mode on the standby server and comment out the synchronous\_standby\_names parameter in the postgresql.conf file on the primary server.

1. Execute the mc\_ctl in stop mode on the standby server.

Example)

```
> mc_ctl stop -M D:\mcdire\inst1
```

2. Comment out the synchronous\_standby\_names parameter in the postgresql.conf file on the primary server.
3. Execute the pg\_ctl command in reload mode on the primary server.

Example)

```
> pg_ctl reload -D D:\database\inst1
```

## 4.5 Monitoring Mirroring Controller Messages

The messages that are output by Mirroring Controller are output to the event log. If the automatic switch fails, for example, an important message related to the continuation of the operation may be output, so ensure that the event log messages are monitored.

### Point

To monitor message types considered to be important, a setting must be configured in the event log beforehand.

Refer to the operating system manual, check if the monitoring target message type message is output to the event log, and configure the setting if required.

### Display format

```
eventSourceName[processId]: messageType: messageContent (messageNumber)
```

Specify the event source name in the event\_source parameter of the serverIdentifier.conf file.

The message types output by Mirroring Controller, their severity, and their corresponding value in the event log are shown in the table below.

Table 4.1 Message type, severity, and corresponding value in the event log

| Message type | Severity    | Meaning  | Event log   |
|--------------|-------------|--|-------------|
| INFO         | Information | Provides information that does not fall under LOG or NOTICE.   | INFORMATION |
| LOG          |             | Provides information recognized as a particularly important event in tracing the operation history.<br>(Example: Automatic switch is complete)                               |             |
| NOTICE       | Notice      | Outputs information that takes into account the user instructions within the program in response to an executed or automatically executed process.                           |             |
| WARNING      | Warning     | Provides a warning, for example it will soon be impossible to maintain multiplexing capabilities.  | WARNING     |
| ERROR        | Error       | Reports that an error other than FATAL or PANIC has occurred.  | ERROR       |
| FATAL        |             | Reports that an abnormality was detected in one of the multiplexed database systems requiring recovery of this system, and also the content and cause of the abnormality.    |             |
| PANIC        |             | Reports that an abnormality was detected in all multiplexed database systems requiring immediate recovery of this system, and also the content and cause of the abnormality. |             |

The message severity has the following meanings:

- Information

Informational status. A message that was reported by the system is displayed. No action is required.

- Notice

Informational status, but a message that should be noted is displayed. If necessary, take the actions described in the "Action" section of the message.

- Warning

No error has occurred, but the user is requested to check, and take action. Take the actions described in the "Action" section of the message.

- Error

An error has occurred. Take the actions described in the "Action" section of the message.

## 4.6 Server Maintenance

---

To perform maintenance tasks such as periodic server inspections and the application of updates for software products including the operating system, you must perform a planned stop of the server, and then perform the maintenance.

### 4.6.1 Rolling Updates

---

In database multiplexing mode, rolling updates, that perform the maintenance for the servers that comprise the cluster system, can be performed while jobs continue.

First, perform the maintenance for the standby server, and then switch the standby server to the primary server. Then, perform the maintenance for the original primary server that was switched to the standby server. This enables maintenance to be performed while jobs continue.

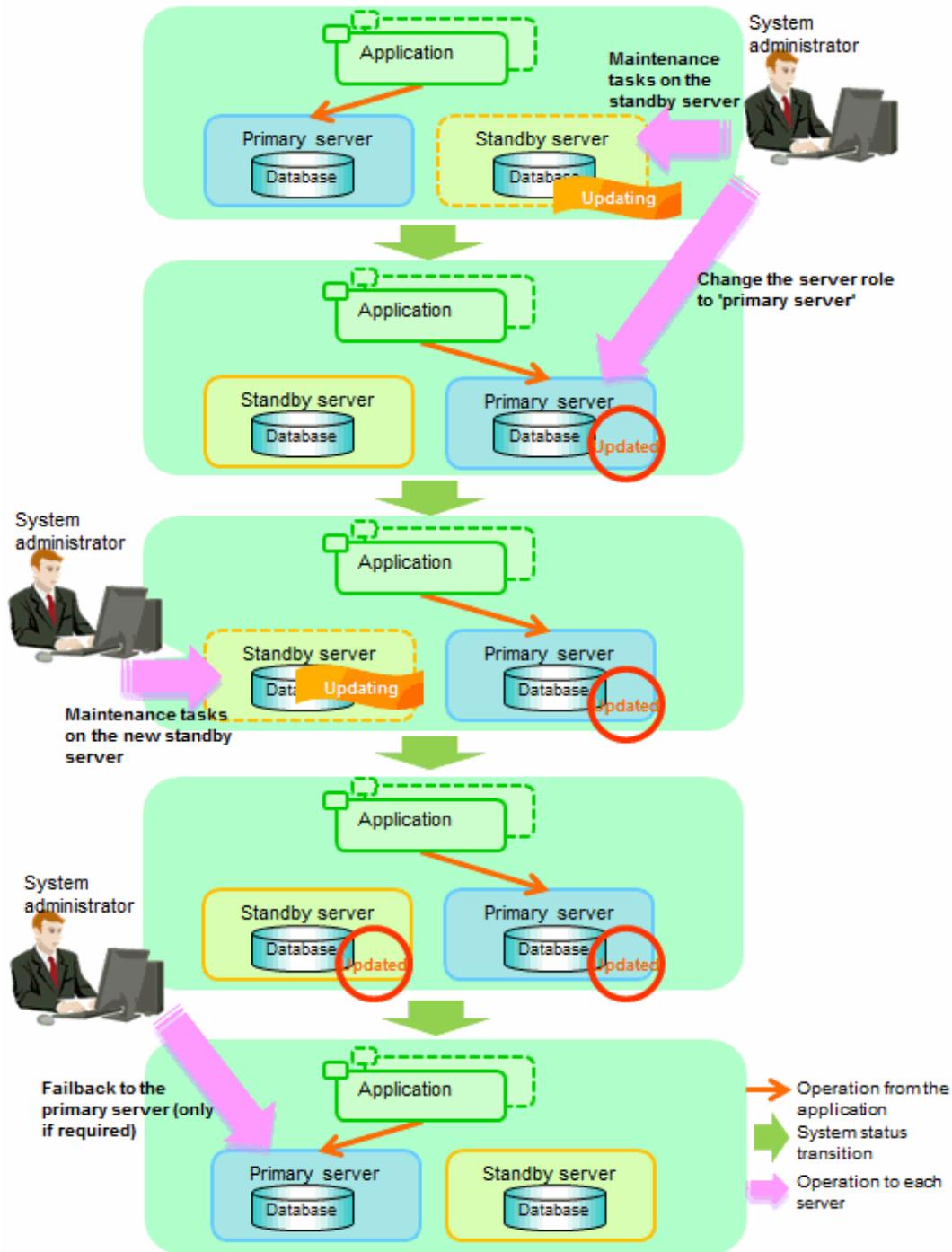


See

.....  
If the downtime due to the maintenance of the standby server is expected to be long, refer to "Standby server downtime" in "[4.7.1 Changes Required when the Standby Server is Stopped](#)".  
.....

The flow of a rolling update is shown below.

Figure 4.1 Performing a Rolling Update



Perform the following procedure as shown in the above figure:

### Standby server maintenance tasks

1. To perform the maintenance on the standby server, stop Mirroring Controller.

Example)

```
> mc_ctl stop -M D:\mcdire\inst1
```

2. Ensure that Mirroring Controller has completely stopped.

If the multiplexed instances and Mirroring Controller have been configured on the standby server to start and stop automatically when the operating system of the database server is started or stopped, cancel the setting to start and stop automatically.

### See

Refer to "3.9 Setting Automatic Start and Stop of Mirroring Controller and Multiplexed Instances" for information on how to configure the multiplexed instances and Mirroring Controller to start and stop automatically when the operating system of the database server start and stops.

This task should be performed by the instance administrator user with administrator privileges.

Use the `sc config` command to disable automatic start of multiplexed instances and Mirroring Controller from the Windows service.

Example)

The following is an example using the registered service name "Mirroring\_Controller\_inst1".

```
> sc config "Mirroring_Controller_inst1" start= demand
```

### Information

You can use the `sc qc` command to check the registration status.

Refer to documentation such as Windows Help and Support for the `sc` command for information on registry content.

3. Perform maintenance tasks.
4. Create a copy of the primary server instance on the standby server.

Execute the `pg_basebackup` command to create data in the standby server by synchronizing with the primary server.

Example)

```
> pg_basebackup -D D:\mcd\inst1 --xlog --progress --verbose -R --  
dbname='application_name=standbyServerName' -h primaryServerHostName -p primaryServerPortNumber
```

### See

The procedure for copying the primary server instance to the standby server is the same as the procedure for setting up the standby server.

Refer to "3.4.2 Creating, Setting, and Registering the Standby Server Instance", and then perform the recovery.

5. Check the settings for automatic start and stop of the multiplexed instances and Mirroring Controller.

If the multiplexed instances and Mirroring Controller were configured in step 2 to not start and stop automatically when the operating system of the database server starts and stops, then change the settings back. This step can be skipped if automatic start and stop are not required.

This task should be performed by an instance administrator user with administrator privileges.

Use the `sc config` command to enable automatic start of multiplexed instances and Mirroring Controller from the Windows service.

Example)

The following is an example using the registered service name "Mirroring\_Controller\_inst1".

```
> sc config "Mirroring_Controller_inst1" start= auto
```

## Information

You can use the `sc qc` command to check the registration status.

Refer to documentation such as Windows Help and Support for the `sc` command for information on registry content.

### 6. Start (rebuild) Mirroring Controller on the standby server.

This operation is required when determining the maintenance tasks on the standby server.

#### Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-f` option specified. This enables automatic switch and disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch and disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w -f
```

#### Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode.

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w
```

## Switching to the primary server

To perform the maintenance on the primary server, execute the `mc_ctl` command in the switch mode on the primary server or the standby server.

Example)

```
> mc_ctl switch -M D:\mcdire\inst1
```

When the switch is complete, the `synchronous_standby_names` parameter in the `postgresql.conf` file of the new primary server will be commented as follows:

Example)

```
#synchronous_standby_names = 'primary'
```

## New standby server maintenance tasks

### 1. Stop the Mirroring Controller.

On the new standby server (the primary server before the switch), execute the `mc_ctl` command in stop mode.

Example)

```
> mc_ctl stop -M D:\mcdire\inst1
```

### 2. Ensure that Mirroring Controller has completely stopped.

If the multiplexed instances and Mirroring Controller have been configured on the new standby server to start and stop automatically when the operating system of the database server is started or stopped, cancel the setting to start and stop automatically now.

## See

Refer to "[3.9 Setting Automatic Start and Stop of Mirroring Controller and Multiplexed Instances](#)" for information on how to configure the multiplexed instances and Mirroring Controller to start and stop automatically when the operating system of the database server starts and stops.

This task should be performed by an instance administrator user with administrator privileges.

Use the `sc config` command to disable automatic start of multiplexed instances and Mirroring Controller from the Windows service.

Example)

The following is an example using the registered service name "Mirroring\_Controller\_inst1".

```
> sc config "Mirroring_Controller_inst1" start= demand
```

## Information

You can use the `sc qc` command to check the registration status.

Refer to documentation such as Windows Help and Support for the `sc` command information on registry content.

3. Perform the maintenance on the new standby server that was stopped.
4. Create a copy of the new primary server instance on the new standby server.

Execute the `pg_basebackup` command to create data in the new standby server by synchronizing with the new primary server.

Example)

```
> pg_basebackup -D D:\mcdir\inst1 --xlog --progress --verbose -R --  
dbname='application_name=standbyServerName' -h primaryServerHostName -p primaryServerPortNumber
```

## See

The procedure for copying the primary server instance to the standby server is the same as the procedure for setting up the standby server.

Refer to "[3.4.2 Creating, Setting, and Registering the Standby Server Instance](#)", and then perform the recovery.

5. Check the settings for automatic start and stop of the multiplexed instances and Mirroring Controller.

If the multiplexed instances and Mirroring Controller were configured in step 2 to not start and stop automatically when the operating system of the database server starts and stops, then change the settings back. This step can be skipped if automatic start and stop are not required.

This task should be performed by an instance administrator user with administrator privileges.

Use the `sc config` command to enable automatic start of multiplexed instances and Mirroring Controller from the Windows service.

Example)

The following is an example using the registered service name "Mirroring\_Controller\_inst1".

```
> sc config "Mirroring_Controller_inst1" start= auto
```

## Information

You can use the `sc qc` command to check the registration status.

Refer to the document such as Windows Help and Support for the `sc` command for information on registry content.

6. After the maintenance is complete, edit the following parameters in the postgresql.conf file of the standby server as required.

Copying an instance results in the value of the synchronous\_standby\_names parameter becoming the specified value on the primary server. Therefore, correct it to the specified value on the standby server. If the parameter was commented out, then you must uncomment it.

7. On the standby server, start (rebuild) Mirroring Controller.

#### Enabling automatic switch/disconnection

As the instance administrator user, execute the mc\_ctl command in start mode with the -w and -f options specified. This enables automatic switch and disconnection.

If you start Mirroring Controller and the instance without specifying the -f option, automatic switch and disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the mc\_ctl command in enable-failover mode, or restart Mirroring Controller with the -f option specified.

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w -f
```

#### Disabling automatic switch/disconnection

As the instance administrator user, execute the mc\_ctl command in start mode with the -w option specified.

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w
```

## Failback of the Primary Server

Revert the primary server and standby server to the original server configuration. Do this to execute the main job on the previous primary server. Refer to "5.1.1.3 Failback of the Primary Server" for details.



Obtain a backup as soon as this task is complete.

## 4.6.2 Stopping for Maintenance

Perform this procedure to stop all servers for periodic inspections, for example. On the server on which Mirroring Controller is running, execute the mc\_ctl command in stop mode to stop the instance and Mirroring Controller.

Example)

```
> mc_ctl stop -M D:\mcdire\inst1 -a
```

## 4.7 Changes in Operation

The following changes in operation may be required:

- Changes required when the standby server is stopped
- Changing from single server mode to database multiplexing mode
- Changing from database multiplexing mode to single server mode

### 4.7.1 Changes Required when the Standby Server is Stopped

## Operation when the standby server is stopped

Before performing maintenance for the primary server instance when the standby server has been stopped, comment out the `synchronous_standby_names` parameter in the `postgresql.conf` file of the primary server, and then execute the `pg_ctl` command in reload mode.

If this operation is not performed, operations performed on the primary server for the instance will remain in a wait state.



Refer to "pg\_ctl" in Reference for information on the command.

## Standby server downtime

If you specified the `synchronous_standby_names` parameter of the `postgresql.conf` file and then the standby server instance is stopped, consider the points below.

- The `wal_sender_timeout` parameter in the `postgresql.conf` file

If the standby server is stopped after the timeout time set in this parameter was exceeded, an error stating that the transaction log could not be received may be output to the standby server event log, and all transaction logs that should be transferred to the standby server may be lost.

- The `wal_keep_segments` parameter in the `postgresql.conf` file

If a transaction log that exceeds the value set in this parameter was generated while the standby server was stopped, the transaction log may be deleted.

Additionally, setting this parameter requires consideration regarding stabilization of the database multiplexing mode. Refer to "[3.8.1 Tuning to Stabilize the Database Multiplexing Mode](#)" for details.



The standby server must be rebuilt in both cases above.

Take the action advised in the recovery operation that starts from "[5.1.1.1.3 Identify cause of error and perform recovery](#)" through to "[5.1.1.2 Rebuild the Standby Server](#)".

## 4.7.2 Changing from Single Server Mode to Database Multiplexing Mode

The procedure for switching single server mode to database multiplexing mode for the purposes of high reliability and load distribution of the system is explained below.

This procedure is equivalent to the setup procedure explained in "[Chapter 3 Setting up Database Multiplexing Mode](#)".



### If the data storage destination directory name is not comprised of ASCII characters

Stop the application job and then perform the following procedure to migrate to a directory with a name that uses only ASCII characters:

1. Stop the database instance on the primary server.
2. Change the name of the data storage destination directory to one that uses only ASCII characters.  
For example, do not perform operations that will cause the symbolic link contained in the data storage destination directory to become lost, such as moving data to another drive.



See

When encrypting the storage data, refer to "Database Multiplexing Mode" in the Operation Guide, and then perform the setup for encryption on the primary and standby servers.

1. Install on the standby server

Install FUJITSU Enterprise Postgres on the server to be started as the standby server.

Refer to "Installation" in the Installation and Setup Guide for Server for information on how to install FUJITSU Enterprise Postgres.

Use ASCII characters in the data storage destination directory.

2. Stop the application jobs

Stop the application jobs to be connected to the primary server.

3. Change the primary server settings

To allow connections from the server to be started as the standby server, configure the settings in step 2 and thereafter of "[3.3.2 Creating, Setting, and Registering the Primary Server Instance](#)" on the primary server.

4. Set up database multiplexing mode on the standby server

Refer to "[3.4.1 Setting up Database Multiplexing Mode on the Standby Server](#)" for details.

5. Create the standby server instance and start it

Refer to "[3.4.2 Creating, Setting, and Registering the Standby Server Instance](#)" for details.

After the above steps are completed, refer to the remaining explanations in "[Chapter 3 Setting up Database Multiplexing Mode](#)" and ensure that the required settings and operations are completed.

## 4.7.3 Changing from Database Multiplexing Mode to Single Server Mode

The procedure for stopping database multiplexing mode and changing to single server mode is explained below.

1. Determine the server for which the instance is to be stopped, and switch this server

Determine the server that is to be excluded as the database multiplexing mode target, and for which the instance is to be stopped.

If the server for which the instance is to be stopped is the primary server, execute the mc\_ctl command in the switch mode to switch the standby server to the primary server.

The standby server after the switch is complete will be the server for which the instance is to be stopped.

If the server for which the instance is to be stopped is the standby server, there is no need to perform the switch operation.

Example)

```
> mc_ctl switch -M D:\mcdire\inst1
```

2. Stop Mirroring Controller and the instance.

On the server that was determined in step 1, execute the mc\_ctl command in the stop mode to stop Mirroring Controller and the instance.

Example)

```
> mc_ctl stop -M D:\mcdire\inst1
```

3. Unregister Mirroring Controller from the Windows service.

Execute the mc\_ctl command in unregister mode to unregister Mirroring Controller from the Windows service.

Example)

```
> mc_ctl unregister -M D:\mcdire\inst1
```

4. Delete registries related to the event log

If error logs are output to the event log in "3.2.2 Preparatory Tasks for the Output of Error Logs to the Event Log", delete the registered event source name for each instance.

Example)

```
> regsvr32 /u /i:"Mirroring Controller inst1" "c:\Program Files\Fujitsu\fssepv<xy>server64\lib\mcevent.dll"
```

5. Delete the file resources

Delete the following file resources:

- Data storage destination directory
- Mirroring Controller management directory

Example)

```
> rmdir /S /Q D:\database\inst1
> rmdir /S /Q D:\mcdir\inst1
```



Refer "Security-Related Notes" in the Operation Guide for information on deleting the data securely.

6. Stop Mirroring Controller and the instance on the primary server

Execute the mc\_ctl command in stop mode on the primary server.

Example)

```
> mc_ctl stop -M D:\mcdir\inst1
```

7. Unregister Mirroring Controller from the Windows service on the primary server

Execute the mc\_ctl command in unregister mode to unregister Mirroring Controller from the Windows service.

Example)

```
> mc_ctl unregister -M D:\mcdir\inst1
```

8. Delete registries related to the event log on the primary server

If error logs are output to the event log in "3.2.2 Preparatory Tasks for the Output of Error Logs to the Event Log", delete the registered event source name for each instance.

Example)

```
> regsvr32 /u /i:"Mirroring Controller inst1" "c:\Program Files\Fujitsu\fssepv<xy>server64\lib\mcevent.dll"
```

9. Delete the database multiplexing mode settings that were configured for the primary server instance.

Take the appropriate action for each parameter and resource by editing postgresql.conf as shown below. Also, delete recovery.conf or change its name to recovery.done for example.

| File            | Parameter                 | Action   |
|-----------------|---------------------------|--|
| postgresql.conf | wal_level                 | Delete the "hot_standby" value that was specified.                         |
|                 | max_wal_senders           | Revert the value to the one set before database multiplexing mode was set. |
|                 | synchronous_standby_names | Delete.  |

| File | Parameter                 | Action   |
|------|---------------------------|--|
|      | wal_sender_timeout        |  |
|      | listen_addresses          | Revert the value to the one set before database multiplexing mode was set. |
|      | max_connections           |  |
|      | synchronous_standby_names | Delete.  |
|      | hot_standby               |  |

- Mirroring Controller management directory

Additionally, if the backup operation was performed, delete the following resources:

- Mirroring Controller management directory backup data obtained in database multiplexing mode
- Instance backup data obtained in database multiplexing mode

After these actions are performed, ensure that the backup data is collected when starting the single operation.



- Refer to "Security-Related Notes" in the Operation Guide for details on deleting the data securely.
- Refer to "3.10 Backup Operation" for details on the backup operation.
- Refer to "Appendix A Parameters" for details on the postgresql.conf file parameters.

## 4.7.4 Uninstalling in Database Multiplexing Mode

This section explains how to uninstall FUJITSU Enterprise Postgres on a server using database multiplexing mode.

You must delete the Mirroring Controller settings from both the primary server and standby server before uninstalling FUJITSU Enterprise Postgres.

1. Stop the multiplexed instances and Mirroring Controller

Refer to "4.1 Starting and Stopping Instances" for information on how to stop the instance.

2. Unregister Mirroring Controller from the Windows service

Execute the mc\_ctl command in unregister mode to unregister Mirroring Controller from the Windows service.

Example)

```
> mc_ctl unregister -M D:\mcdire\inst1
```

3. Delete registries related to the event log

If messages are output to the event log, DLLs are registered in accordance with "3.2.2 Preparatory Tasks for the Output of Error Logs to the Event Log". Delete these registries so that no unnecessary issues occur.

Example)

The following is an example in which the DLL of a 64-bit product that is registered under the default event source name is deleted.

```
> regsvr32 /u "c:\Program Files\Fujitsu\fsepv<xy>server64\lib\mcevent.dll"
```

- Delete the registered DLL for each instance

DLL registration is performed so that messages output to the event log are identified by each instance, and are output to any event source named by the user.

Accordingly, it is necessary to delete the DLL registry for each instance. Delete the DLL registry for each event source name.

Example)

The following is an example in which the DLL of a 64-bit product that is registered under the event source name "Mirroring Controller inst1" is deleted.

```
> regsvr32 /u /i:"Mirroring Controller inst1" "c:\Program Files\Fujitsu\fsepv<XY>server64\lib\ncevent.dll"
```

- If installing multiple versions

If the database multiplexing system you set up using the FUJITSU Enterprise Postgres package has been set to output error logs to the event log, use the DLL path name that you took note of previously as explained in "[3.2.2 Preparatory Tasks for the Output of Error Logs to the Event Log](#)" to reregister the default event source name.



## Note

Ensure that you delete the DLLs before the uninstallation. If you perform the uninstallation without doing so, you may not be able to delete the DLLs at a later time.

## 4. Uninstall FUJITSU Enterprise Postgres

Refer to "Uninstallation" in the Installation and Setup Guide for Server for information on how to uninstall FUJITSU Enterprise Postgres.

# Chapter 5 Action Required when an Error Occurs in Database Multiplexing Mode

This chapter describes the action required if an error occurs in database multiplexing mode.

In database multiplexing mode, when an error is detected, the switch or disconnection of the standby server is performed automatically, so that only the primary server starts degrading. In this case, the recovery tasks will be required for the standby server on which the switch or disconnection was performed.

Other possible cases are as follows:

- When automatic switch fails
- When automatic disconnection fails
- When all servers or instances were stopped

## 5.1 Action Required when Server Degradation Occurs

If the server has started degrading, the recovery tasks will vary depending on whether the cause was the switch (failover or switchover), or the disconnection.

Execute the `mc_ctl` command in status mode, or refer to the event log, and check if the cause of the server to start degrading was the switch or the disconnection.

In the example below, the `mc_ctl` command is executed in status mode.

If a switch has occurred, "switched" (the switch is complete and the server is in a degrading state) is displayed for "mirroring status".

Example)

```
> mc_ctl status -M D:\mcdire\inst1
mirroring status
-----
switched
:
```

If a disconnection has occurred, "not-switchable" (disconnection was performed so the server cannot be switched) is displayed for "mirroring status".

Example)

```
> mc_ctl status -M D:\mcdire\inst1
mirroring status
-----
not-switchable
:
```



If Mirroring Controller detects any errors on the server on which operations are continuing during recovery to database multiplexing mode from a degrading operation state, perform the procedure in "5.1.3 Addressing Errors During Degrading Operation", and then recover to database multiplexing mode.

### 5.1.1 Operations when the Server has Started Degrading after a Switch has Occurred

This section explains the operations when the server has started degrading after a switch has occurred.

## Note

---

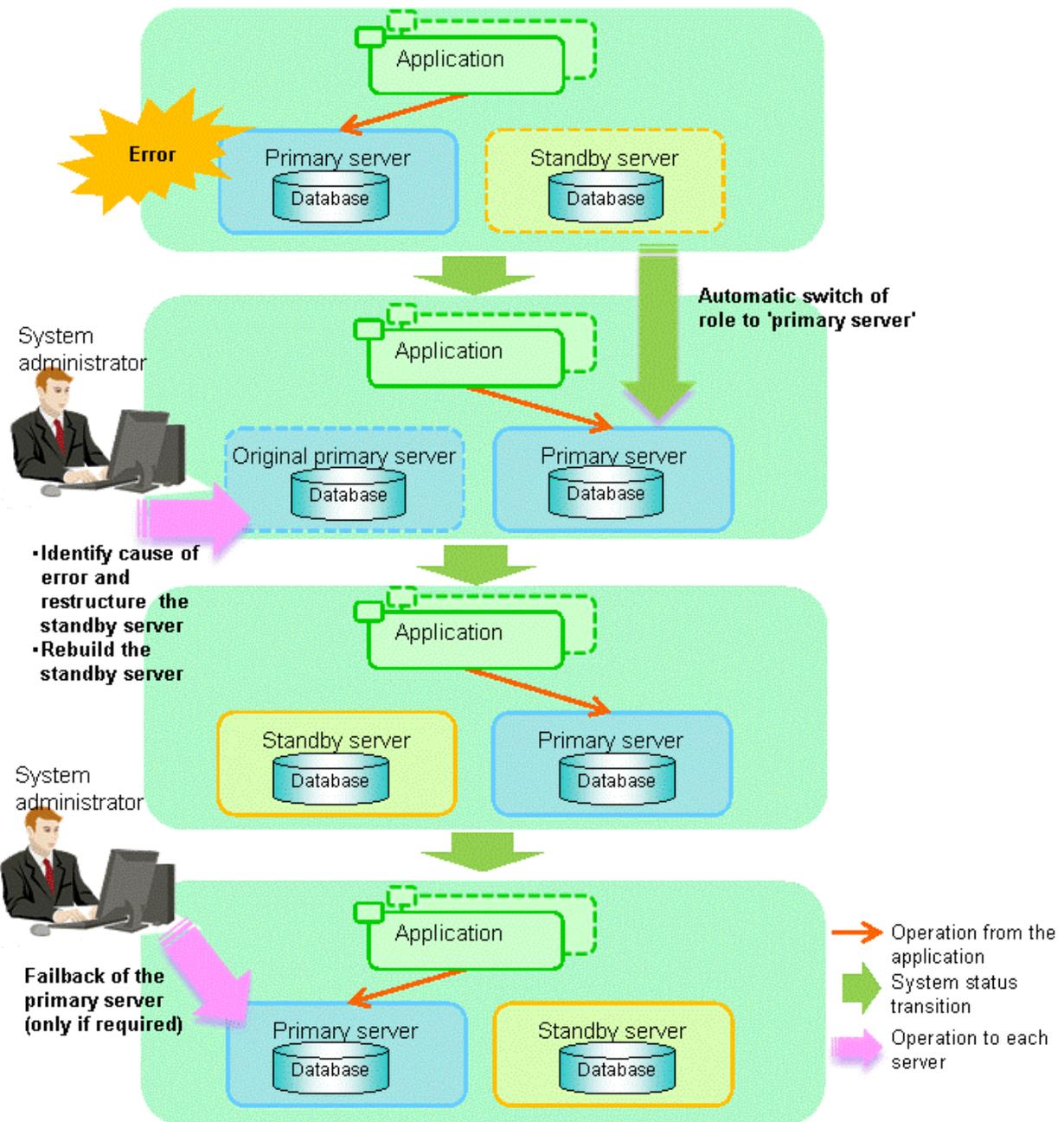
- After a switch has occurred as a result of an abnormality on the primary server, the database will not have a multiplexed configuration until the standby server is rebuilt. Remove the cause of the error as quickly as possible, and then rebuild the standby server.
  - If the reference job was executed on the standby server, and the servers are switched because an error occurred on the primary server, the load is concentrated on the new primary server. Accordingly, pause the reference job on the original standby server, rebuild the original primary server as the new standby server, and then resume the reference job for the new standby server.
  - If the instance on the new primary server is stopped before the original primary server where the error occurred is rebuilt as the new standby server, a split brain occurs at startup from the instance on the original primary server. Therefore, start the instance on the new primary server before rebuilding the standby server.
- 

If the switch occurred and the server has started degrading, perform the following operations to recover the standby server and revert it to its original state:

- [Identify Cause of Error and Restore the Standby Server](#)
- [Rebuild the Standby Server](#)
- [Failback of the Primary Server](#) (only if required)

The flow of these operations is shown in the figure below.

Figure 5.1 Flow of operations



### 5.1.1.1 Identify Cause of Error and Restore the Standby Server

Perform the recovery according to the following procedure:

1. [Stop Mirroring Controller](#)
2. [Recovery of the Mirroring Controller management directory](#)
3. [Identify cause of error and perform recovery](#)

#### 5.1.1.1.1 Stop Mirroring Controller

Execute the `mc_ctl` command in stop mode for the original primary server on which the error occurred.

Example)

```
> mc_ctl stop -M D:\mcdire\inst1
```

This also stops the instance that is required to perform the recovery.



If the instance does not stop, refer to "Actions in Response to Failure to Stop an Instance" in the Operation Guide, and then stop the instance.

Then, specify the `-e` option in the above command to forcibly stop Mirroring Controller.

### 5.1.1.1.2 Recovery of the Mirroring Controller management directory

Copy the files in the Mirroring Controller management directory from the backup data, and then perform the recovery.

### 5.1.1.1.3 Identify cause of error and perform recovery

Refer to the event log of the primary server and the standby server to identify the cause of the error, and then perform recovery.

The following commands can be used to recover a standby server:

- `pg_basebackup`

Creates a copy of all resources of the primary server instance. This command is used for example when creating the first instance on the standby server.

- `pg_rewind`

Creates a copy of only the updated files on the new primary server. For this reason, if this command is used to incorporate a new standby server, recovery time can be shortened. To use this command to build the original primary server as a new standby server, at least one of the following must be met:

- a. Checksums were enabled when an instance was created and the original primary server was stopped normally, or
- b. The original primary server was stopped normally and the `wal_log_hints` parameter of `postgresql.conf` was enabled when an instance was started.

Additionally, `full_page_writes` must be enabled, which is its default value.

If it is required to start the original primary server again to then stop it normally, both servers will temporarily operate as primary servers. If data is updated on the original primary server, data corruption will occur, so take measures such as changing settings in `pg_hba.conf` to disallow client connections.



Refer to "pg\_rewind" under "Reference" in the PostgreSQL Documentation for information on the `pg_rewind` command.

The example below executes the `pg_rewind` command to perform recovery by synchronizing data on the original primary server with the new primary server.

1. Use the `pg_ctl` command to start the original primary server instance.

Example)

```
> pg_ctl start -w -D D:\mcdire\inst1
```

2. Use the `pg_ctl` command to stop the original primary server instance.

Example)

```
> pg_ctl stop -D D:\mcdire\inst1
```

3. Create a copy of the new primary server instance in the original primary server (new standby server).

Execute the `pg_rewind` command to synchronize the new standby server data with the new primary server.

Example)

```
> pg_rewind -D db1 --source-server='user=userName host=newPrimaryServerHostName
port=newPrimaryServerPortNumber'
```

### 5.1.1.2 Rebuild the Standby Server

The starting of the recovered original primary server as the standby server is referred to as the "standby server rebuild".

On the original primary server, start Mirroring Controller and the instance.

#### Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-f` option specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w -f
```

#### Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode.

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w
```

### 5.1.1.3 Failback of the Primary Server

To revert the primary server and standby server to the original server configuration after rebuilding the standby server, perform failback for the primary server.

Do this to execute the main job on the previous primary server.

Perform the following procedure:

1. Failback of the primary server

Execute the `mc_ctl` command in switch mode on the primary server or the standby server.

Example)

```
> mc_ctl switch -M D:\mcdire\inst1
```

After executing the `mc_ctl` command in switch mode, the status will be as follows:

Example)

```
> mc_ctl status -M D:\mcdire\inst1
mirroring status
-----
switched
server_id  host_role                host          host_status  db_proc_status  disk_status
-----
nd1        primary                  192.0.2.100  normal      abnormal(postmaster) normal
nd2        none(inactivated primary) 192.0.2.110  normal      abnormal(postmaster) normal
```

## 2. Stop the original primary server

On the original primary server, execute the `mc_ctl` command in stop mode to stop Mirroring Controller and the instance.

Example)

```
> mc_ctl stop -M D:\mcdire\inst1
```

## 3. Create a copy of the new primary server instance in the original primary server (new standby server)

Execute the `pg_basebackup` command to create data in the new standby server by synchronizing with the new primary server.

Example)

```
> pg_basebackup -D D:\mcdire\inst1 --xlog --progress --verbose -R --  
dbname='application_name=standbyServerName' -h primaryServerHostName -p primaryServerPortNumber
```



The procedure for copying the new primary server instance to the new standby server is the same as the procedure for setting up the new standby server.

Refer to "3.4.2 Creating, Setting, and Registering the Standby Server Instance", and then perform the recovery.

## 4. Rebuild the standby server

On the standby server, start Mirroring Controller and the instance.

### Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-w` and `-f` options specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w -f
```

### Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-w` option specified.

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w
```

## 5.1.2 Operations when the Server has Started Degrading after a Disconnection has Occurred

This section explains the operations when the server has started degrading after a disconnection has occurred.



After a disconnection has occurred as a result of an abnormality on the standby server, the database will not have a multiplexed configuration until the standby server is rebuilt. Remove the cause of the error as quickly as possible, and then rebuild the standby server.

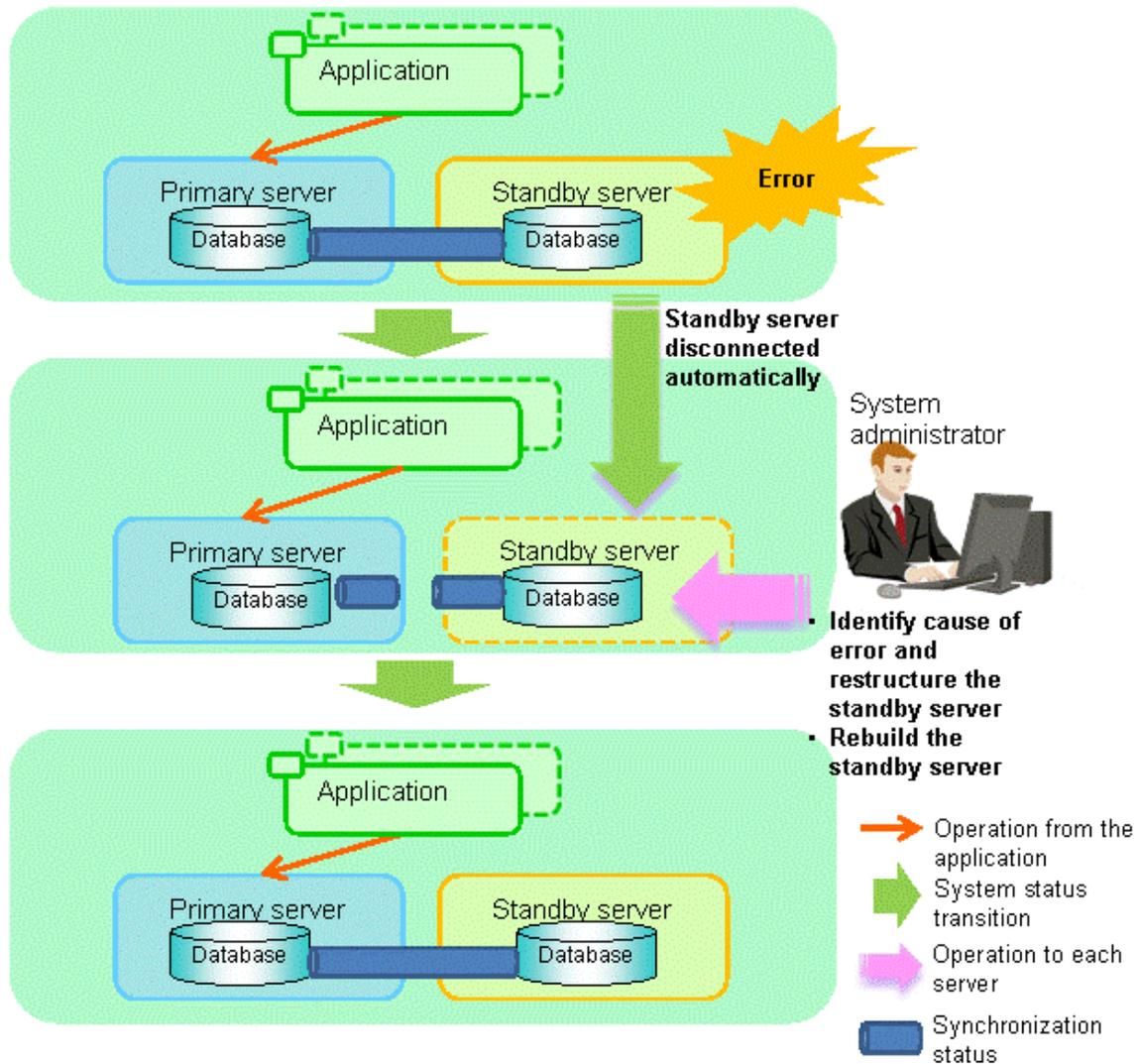
If the disconnection occurred and the server has started degrading, perform the following operations to recover the standby server and revert it to its original state:

- [Identify Cause of Error and Restore the Standby Server](#)

- [Rebuild the Standby Server](#)

The flow of these operations is shown in the figure below.

Figure 5.2 Flow of operations



### 5.1.2.1 Identify Cause of Error and Restore the Standby Server

Perform the recovery according to the following procedure:

1. [Stop Mirroring Controller](#)
2. [Recovery of the Mirroring Controller management directory](#)
3. [Identify cause of error and perform recovery](#)

#### 5.1.2.1.1 Stop Mirroring Controller

Execute the `mc_ctl` command in stop mode for the standby server on which the error occurred.

Example)

```
> mc_ctl stop -M D:\mcdire\inst1
```

This also stops the instance that is required to perform the recovery.

## Note

If the instance does not stop, refer to "Actions in Response to Failure to Stop an Instance" in the Operation Guide, and then stop the instance.

Then, specify the `-e` option in the above command to forcibly stop Mirroring Controller.

### 5.1.2.1.2 Recovery of the Mirroring Controller management directory

Copy the files in the Mirroring Controller management directory from the backup data, and then perform the recovery.

### 5.1.2.1.3 Identify cause of error and perform recovery

Refer to the event log of the primary server and the standby server to identify the cause of the error, and then perform recovery.

Execute the `pg_basebackup` command to perform recovery by synchronizing data in the primary server with the standby server.

Example)

```
> pg_basebackup -D D:\mcdir\inst1 --xlog --progress --verbose -R --  
dbname='application_name=standbyServerName' -h primaryServerHostName -p primaryServerPortNumber
```

## See

This recovery procedure is the same as the procedure for setting up the standby server.

Refer to "3.4.2 Creating, Setting, and Registering the Standby Server Instance", and then perform the recovery.

### 5.1.2.2 Rebuild the Standby Server

Start the Mirroring Controller and the instance of the standby server, and rebuild the standby server.

#### Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-f` option specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example)

```
> mc_ctl start -M D:\mcdir\inst1 -w -f
```

#### Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode.

Example)

```
> mc_ctl start -M D:\mcdir\inst1 -w
```

## 5.1.3 Addressing Errors During Degrading Operation

This section explains how to address errors that may occur on the server on which operation is continuing during degrading operation triggered by a switch or disconnection.

### If needing to recover from backup data

If it is necessary to recover the database using backup data due to data becoming corrupted from disk failure or user operation error, refer to the following for information on recovery to database multiplexing mode:

- [Action Required when All Servers or Instances Stopped](#)
- [Recovering from an Incorrect User Operation](#)

### If a temporary error occurs

If a temporary error occurs, such as due to a high load on the server or insufficient system resources, remove the cause of the error and restart Mirroring Controller, and then refer to the following for details on recovery to database multiplexing mode:

- [Operations when the Server has Started Degrading after a Switch has Occurred](#)
- [Operations when the Server has Started Degrading after a Disconnection has Occurred](#)



See

Refer to "4.1.1 Starting Mirroring Controller" and "4.1.2 Stopping Mirroring Controller" for information on restarting Mirroring Controller.

## 5.2 Action Required when Automatic Switch Fails

If the system behavior is unstable, for example there are insufficient temporary system resources, the Mirroring Controller automatic switch may fail.

Perform the switch manually using one of the following methods:

- Execute the mc\_ctl command in switch mode

Execute the mc\_ctl command in switch mode on the primary server or the standby server.

Example )

```
> mc_ctl switch -M D:\mcdire\inst1
```



Note

If the server fails during execution of the mc\_ctl command, automatic switch, or automatic disconnection, or if communication between the primary server and the standby server is lost, a message indicating that the mc\_ctl command is being executed may be output even though the command is not running elsewhere, and the command may end abnormally.

In this case, switch the server in accordance with the "Execute the mc\_ctl command in stop mode" procedure below.

- Execute the mc\_ctl command in stop mode

Execute the mc\_ctl command in stop mode on the server on which the error occurred.

Example )

```
> mc_ctl stop -M D:\mcdire\inst1
```

If the instance does not stop, refer to "Actions in Response to Failure to Stop an Instance" in the Operation Guide, and then stop the instance.

Then, specify the -e option in the mc\_ctl command to forcibly stop Mirroring Controller.

Example )

```
> mc_ctl stop -M D:\mcdire\inst1 -e
```



See

**Recovery to database multiplexing mode**

Refer to "5.1.1.2 Rebuild the Standby Server" and "5.1.1.3 Failback of the Primary Server" for information on recovery to database multiplexing mode.

---

## 5.3 Action Required when Automatic Disconnection Fails

If the system behavior is unstable, for example there are insufficient system resources such as available memory or free disk space, automatic disconnection using Mirroring Controller may not be possible.

In this case, perform the following procedure to disconnect the primary server manually.

1. On the standby server, execute the mc\_ctl command in stop mode with the -e option specified.

Example)

```
> mc_ctl stop -M D:\mcdire\inst1 -e
```

2. On the primary server, comment out the synchronous\_standby\_names parameter in the postgresql.conf file.

Example)

```
:  
# synchronous_standby_names = 'standby1 '
```

3. Execute the pg\_ctl command in reload mode on the primary server.

Example)

```
> pg_ctl reload -D D:\database\inst1
```

 See

Refer to "pg\_ctl" in Reference for information on the command.

 See

### Recovery to database multiplexing mode

Refer to "5.1.2.2 Rebuild the Standby Server" for information on recovery to database multiplexing mode.

---

## 5.4 Action Required when All Servers or Instances Stopped

This section explains what happens when all servers or instances on the server have stopped, so jobs cannot continue.

 See

### Recovery to database multiplexing mode

Refer to "5.1.1.2 Rebuild the Standby Server" and "5.1.1.3 Failback of the Primary Server" for information on recovery to database multiplexing mode.

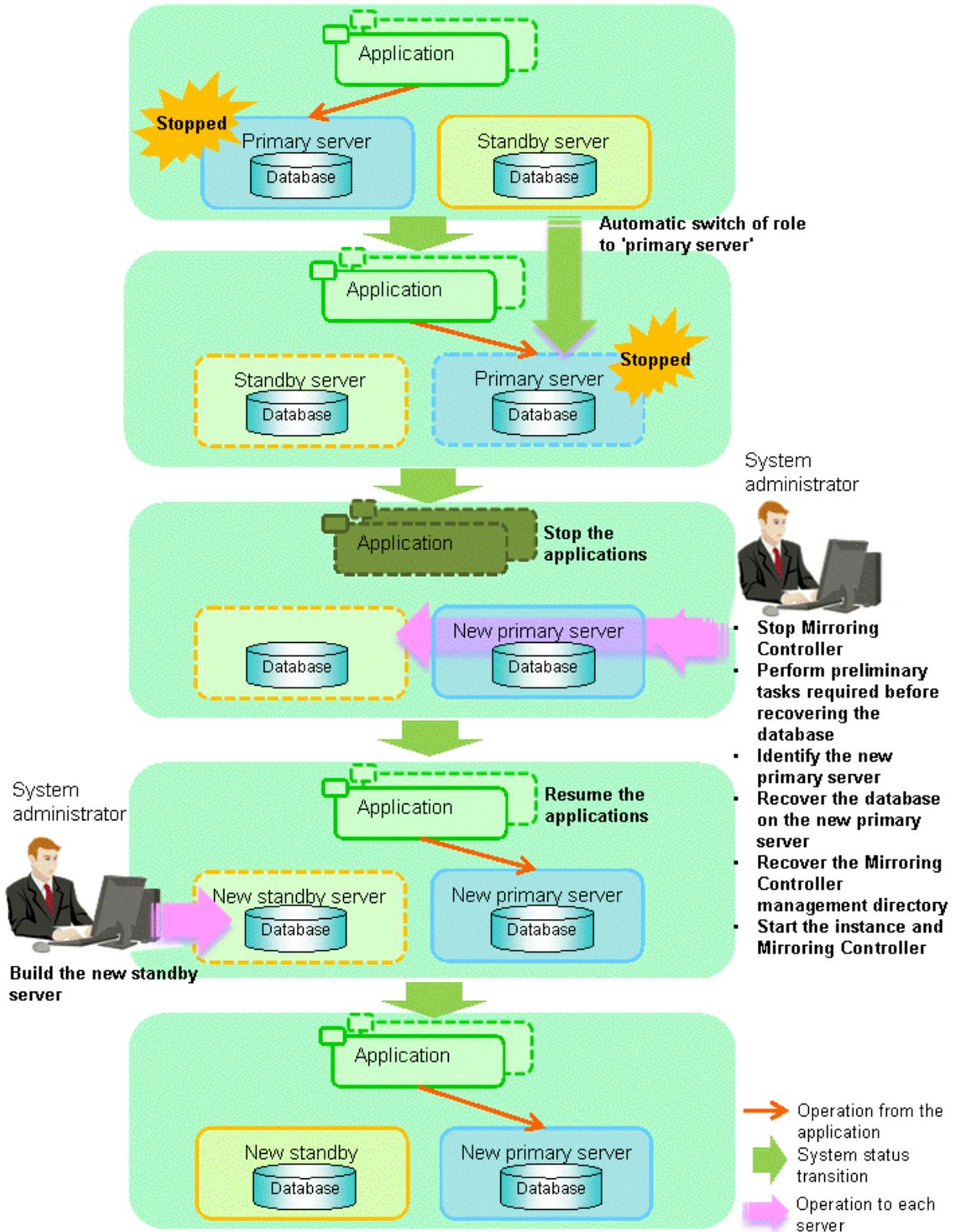
### Overview of recovery operations

After recovering the database to the state immediately prior to the failure on a specific server comprising the database multiplexing system, restore the system.

In other words, after specifying the server on which the database is to be recovered and then recovering it as the new primary server, configure all other servers as new standby servers.

The flow of these recovery operations is shown in the figure below.

Figure 5.3 Flow of recovery operations



Perform the following procedure.

### 1. Stop applications

Stop running applications.

### 2. Stop Mirroring Controller

Execute the mc\_ctl command in stop mode on all servers that comprise the database multiplexing system.

Example)

```
> mc_ctl stop -M D:\mcdire\inst1
```



#### Forcibly stop Mirroring Controller

If Mirroring Controller does not stop, execute the mc\_ctl command in stop mode with the -e option specified.

Example)

```
> mc_ctl stop -M D:\mcdire\inst1 -e
```

### 3. Perform prerequisite tasks before recovering the database

First, refer to "Actions when an Error Occurs" in the Operation Guide, and then identify the cause of the error and perform recovery of the disk on which the failure occurred, etc.

### 4. Identify the new primary server

Perform the following operations on all servers comprising the database multiplexing system, and check the server containing the backup data that shows the latest date. This server will become the new primary server, on which the database is to be recovered.

Example)

In the example below, the pgx\_rcvall command is executed with the -l option specified and the backup data that shows the latest date is identified.

```
> pgx_rcvall -l -D D:\database\inst1
Date                Status          Dir
2013-07-01 13:30:40 COMPLETE       E:\backup\inst1\2013-07-01_13-30-40
```

### 5. Recover the database on the new primary server

Recover the database using the recovery method that uses the pgx\_rcvall command based on the backup data.

- a. Perform the following operations on all servers comprising the database multiplexing system, and check the server containing the archive log and mirrored transaction log that show the latest date.

Example)

In the example below, the archive log and mirrored transaction log that show the latest date are identified.

```
> dir /OD <backupDataStorageDir>\*_xlog
```

- b. If the server containing the latest archive log and mirrored transaction log is different to the new primary server identified in step 4, all files and directories under the directory shown below are copied and written to the backup storage destination directory on the new primary server.

Deployment destination directory of the archive log and mirrored transaction log

```
<backupDataStorageDir>\*_xlog
```

- c. Execute the `pgx_rcvall` command on the new primary server, specifying the backup storage destination directory you used in step b.

Example)

In the example below, the `pgx_rcvall` command is executed with the `-B` option specified.

```
> pgx_rcvall -B E:\backup\inst1 -D D:\database\inst1
```



See

Refer to "Actions when an Error Occurs" in the Operation Guide for information on the `pgx_rcvall` command.

6. Recover the Mirroring Controller management directory

Copy the files in the Mirroring Controller management directory from the backup data on the new primary server, and then perform the recovery.

7. Start the instance and Mirroring Controller

Start the instance and Mirroring Controller on the new primary server.

#### Enabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode with the `-f` option specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the `-f` option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the `mc_ctl` command in enable-failover mode, or restart Mirroring Controller with the `-f` option specified.

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w -f
```

#### Disabling automatic switch/disconnection

As the instance administrator user, execute the `mc_ctl` command in start mode.

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w
```

8. Resume applications

Resume execution of applications.

9. Build the new standby server

Refer to "3.4 Setting up the Standby Server" for information on building (setting up) a standby server from the primary server.



Point

It is not necessary to repeat steps that have already been performed, such as registering to Windows services.

## 5.5 Recovering from an Incorrect User Operation

This section describes how to recover an instance when data has been corrupted due to incorrect user operation.

For example, when data has been corrupted due to incorrect user operation, such as data being unintentionally changed or deleted by an application or command, it is necessary to restore the original data on the primary server and resynchronize with the standby server.

Use the following procedure to perform recovery.

1. Identify the primary server

Execute the mc\_ctl command in status mode on each server, and search for a server for which "primary" or "none(inactivated primary)" is displayed.

2. Stop the applications and commands that caused the incorrect operation to occur

Stop applications and commands that are running on the primary server. This will minimize the impact caused by the incorrect data.

Also, if any applications used for reference by the standby server are running, stop them too.

3. Stop the instance and Mirroring Controller

Stop the instance and Mirroring Controller on both the primary server and standby server.

Example )

```
$ mc_ctl stop -a -M D:\mcdire\inst1
```

4. Recover the database on the primary server

Recover the database using the recovery method in which the pgx\_rcvall command uses the backup data to recover the database to a restore point prior to the time when the incorrect operation was performed.



See

Refer to "Recovering from an Incorrect User Operation" in the Operation Guide for information on using the pgx\_rcvall command to recover the database to a restore point, and then perform only the database recovery procedure while the instance is in a stop state.

5. Start the instance and Mirroring Controller

Start the instance and Mirroring Controller on the primary server.

Enabling automatic switch/disconnection

As the instance administrator user, execute the mc\_ctl command in start mode with the -f option specified. This enables automatic switch/disconnection.

If you start Mirroring Controller and the instance without specifying the -f option, automatic switch/disconnection will not be enabled. To enable both, start Mirroring Controller and then execute the mc\_ctl command in enable-failover mode, or restart Mirroring Controller with the -f option specified.

Example )

```
> mc_ctl start -M D:\mcdire\inst1 -w -f
```

Disabling automatic switch/disconnection

As the instance administrator user, execute the mc\_ctl command in start mode.

Example )

```
> mc_ctl start -M D:\mcdire\inst1 -w
```

6. Build the new standby server

Refer to "3.4 Setting up the Standby Server" for information on building (setting up) a standby server from the primary server.



Point

It is not necessary to repeat steps that have already been performed, such as registering to Windows services.

# Chapter 6 Managing Mirroring Controller Using WebAdmin

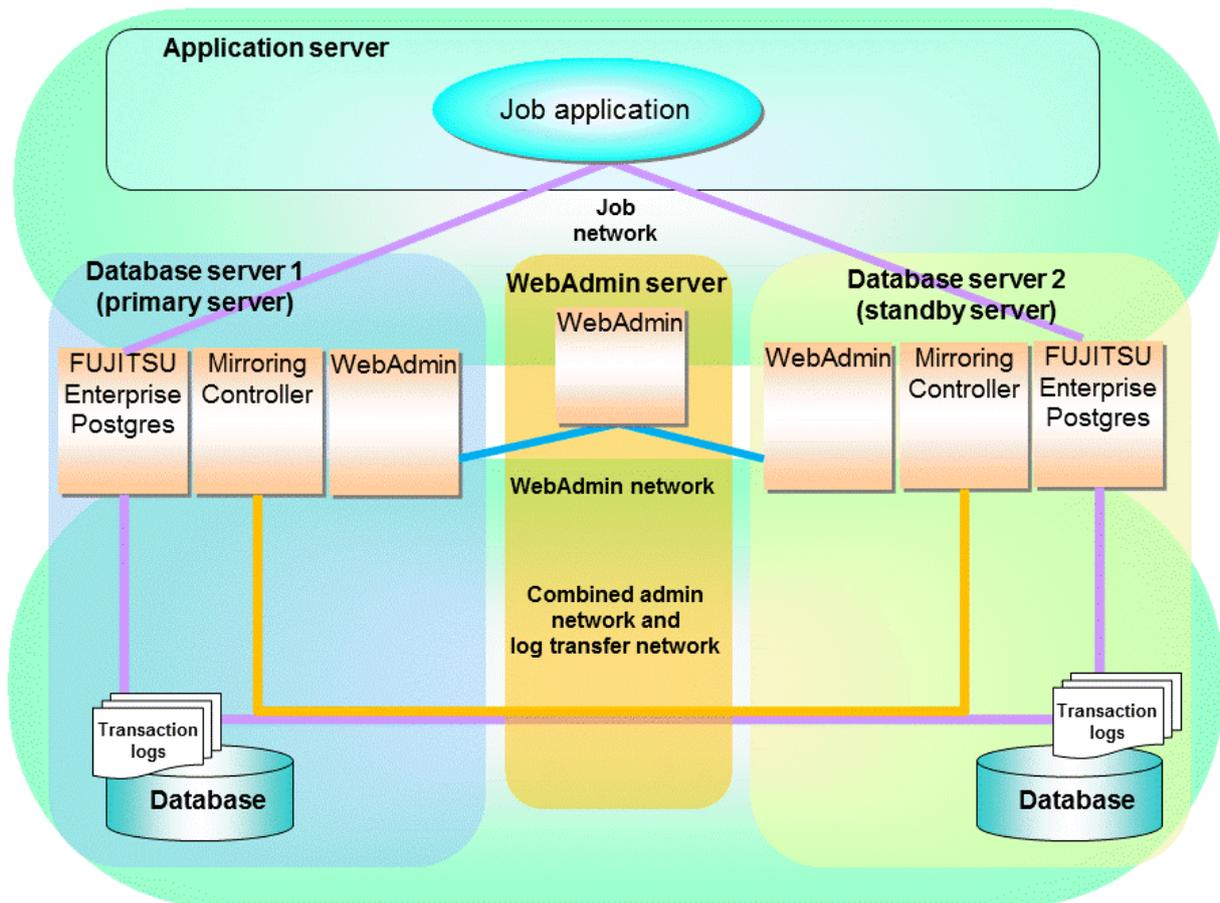
This chapter describes how to set up and manage Mirroring Controller in a streaming replication cluster using WebAdmin.

Mirroring Controller can be used to monitor a streaming replication cluster and perform automatic switching or disconnect synchronous replication when there is an error.

WebAdmin can be used to set up Mirroring Controller in an existing replication cluster having master and synchronous standby instances.

The configuration of the database multiplexing system built using WebAdmin is shown below:

Figure 6.1 Configuration of database multiplexing operation system using WebAdmin



## Point

- If Mirroring Controller is set up to the replication cluster using WebAdmin, the network with the host name (or IP address) specified in [Host name] will be used as the admin network and the log transfer network.
- To use a network other than the job network as the log transfer network, before building the replication cluster specify a host name other than the job network one in [Host name].

## 6.1 Mirroring Controller Setup

Perform the following procedure to setup Mirroring Controller in a streaming replication cluster. The option for this setup is accessible only in synchronous standby instance.

1. In the [Instances] tab, select the synchronous standby instance on which Mirroring Controller needs to be set up.
2. Click .

3. Enter the information for the Mirroring Controller to be setup.

In the example below, Mirroring Controller is being setup for the replication cluster having master instance "inst1" and standby instance "inst1s".

The screenshot displays the 'Mirroring Controller setup' page in the Fujitsu Enterprise Postgres administration console. The page is divided into two main sections: 'Mirroring Controller setup for master instance' and 'Mirroring Controller setup for standby instance'. Each section contains a table of configuration parameters. The 'Enable automatic switch over' option is set to 'Yes'. The master instance (inst1) is configured with port 27500 and localhost, while the standby instance (inst1s) is configured with port 27502 and FASTDEVVMS. Both instances share the same Mirroring Controller port (27505) and management directory (c:\temp\mcdir\inst1/inst1s). Heartbeat settings are consistent for both instances: 800ms interval, 1s timeout, and 2 retries.

| Mirroring Controller setup for master instance |                     |
|--|---------------------|
| Instance name                                  | inst1               |
| Instance port                                  | 27500               |
| Instance host                                  | localhost           |
| Mirroring Controller port *                    | 27505               |
| Mirroring Controller management directory *    | c:\temp\mcdir\inst1 |
| Heartbeat interval (in milliseconds) *         | 800                 |
| Heartbeat timeout (in seconds) *               | 1                   |
| Heartbeat retry *                              | 2                   |

| Mirroring Controller setup for standby instance |                      |
|---|----------------------|
| Instance name                                   | inst1s               |
| Instance port                                   | 27502                |
| Instance host                                   | FASTDEVVMS           |
| Mirroring Controller port *                     | 27505                |
| Mirroring Controller management directory *     | c:\temp\mcdir\inst1s |
| Heartbeat interval (in milliseconds) *          | 800                  |
| Heartbeat timeout (in seconds) *                | 1                    |
| Heartbeat retry *                               | 2                    |

The instance name, host address and port of the master and standby instances are displayed for easy reference.

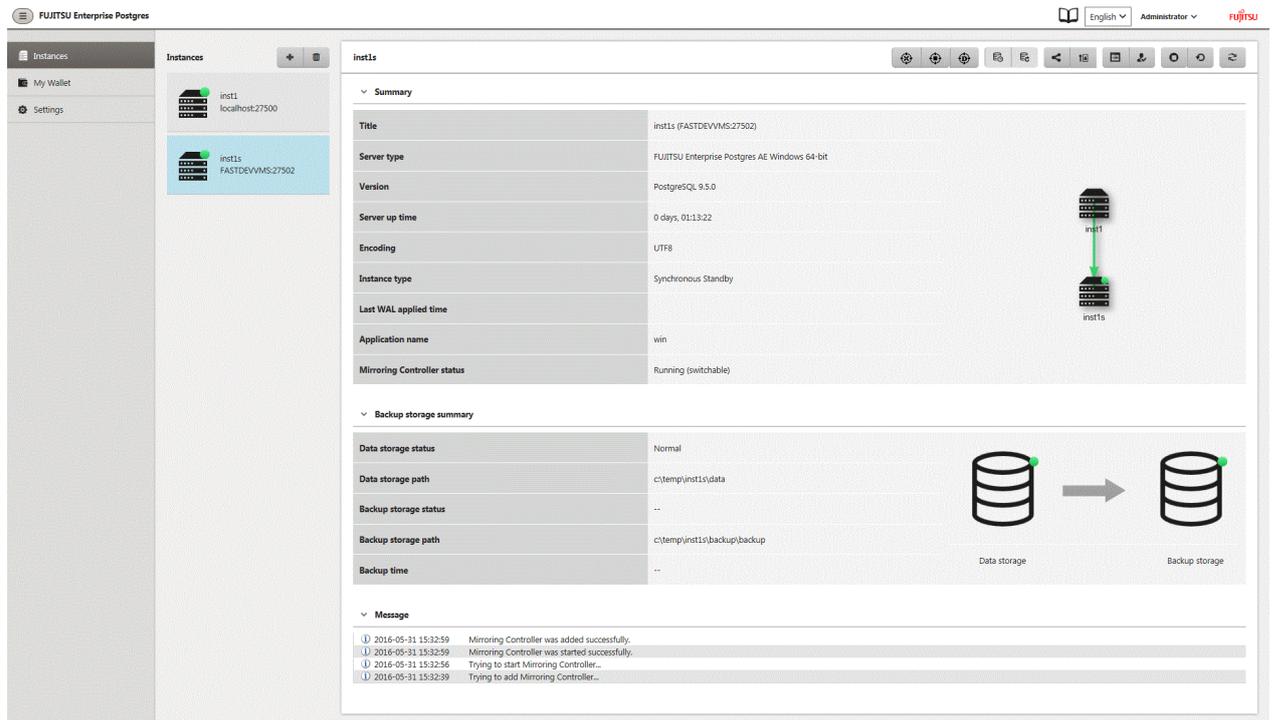
Enter the following items on master instance and on standby instance fields for Mirroring Controller setup, as shown in the above screenshot:

- [Enable automatic switch over]: Toggles the automatic switch/disconnection functionality. Select "Yes". The default is "No".
- [Mirroring Controller port]: Port number of Mirroring Controller.
- [Mirroring Controller management directory]: Directory where the Mirroring Controller configuration files will be stored.
- [Heartbeat interval (in milliseconds)]: Number of milliseconds between two consecutive heartbeat checks. The default is "800".
- [Heartbeat timeout (in seconds)]: Number of seconds for the heartbeat timeout. The default is "1".
- [Heartbeat retry]: Number of retries for heartbeat monitoring, before failover occurs. The default is "2".

4. Click  to setup Mirroring Controller.

5. Upon successful completion, Mirroring Controller will be started on master and standby instances.

In the [Instances] tab, select "inst1s". The following page will be displayed, with the Mirroring Controller status:



## 6.2 Stopping Mirroring Controller

Mirroring Controller can be stopped either in master instance or in standby instance using WebAdmin.

Perform the following procedure to stop Mirroring Controller.

1. In the [Instances] tab, select the instance where to stop Mirroring Controller.
2. Click .
3. In the confirmation dialog box, click [Yes].

Mirroring Controller will be stopped on the selected instance. The Mirroring Controller status will be updated, and a confirmation message entry will be displayed in the [Message] section.

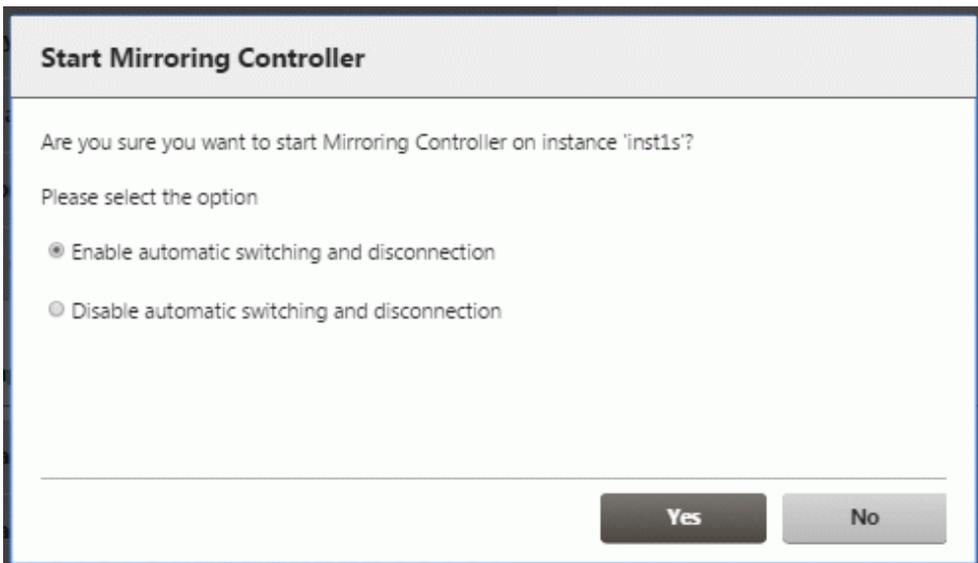
## 6.3 Starting Mirroring Controller

Mirroring Controller can be started either in master instance or in standby instance using WebAdmin.

Perform the following procedure to start Mirroring Controller.

1. In the [Instances] tab, select the instance where to start Mirroring Controller.
2. Click .

3. In the confirmation dialog box, select the desired failover mode.



4. In the confirmation dialog box, click [Yes].

Mirroring Controller will be started on the selected instance. The Mirroring Controller status will be updated, and a confirmation message entry will be displayed in the [Message] section.

## 6.4 Disabling Failover Mode

---

Disabling failover mode in Mirroring Controller disables automatic switch/disconnection between master and standby instances.

Perform the following procedure to disable failover mode.

1. In the [Instances] tab, select the instance.
2. Click .
3. In the confirmation dialog box, click [Yes].

Failover mode will be disabled in Mirroring Controller. The Mirroring Controller status will be updated and a confirmation message entry will be displayed in the [Message] section.

## 6.5 Enabling Failover Mode

---

Enabling failover mode in Mirroring Controller enables automatic switch/disconnection between master and standby instances.

Perform the following procedure to enable failover.

1. In the [Instances] tab, select the instance.
2. Click .
3. In the confirmation dialog box, click [Yes].

Failover mode will be enabled in Mirroring Controller. The Mirroring Controller status will be updated and a confirmation message entry will be displayed in the [Message] section.

## 6.6 Deleting Mirroring Controller Setup

---

Deleting Mirroring Controller setup removes its setup from master and standby instances.

1. In the [Instances] tab, select the instance.

2. Click .
3. In the confirmation dialog box, click [Yes].

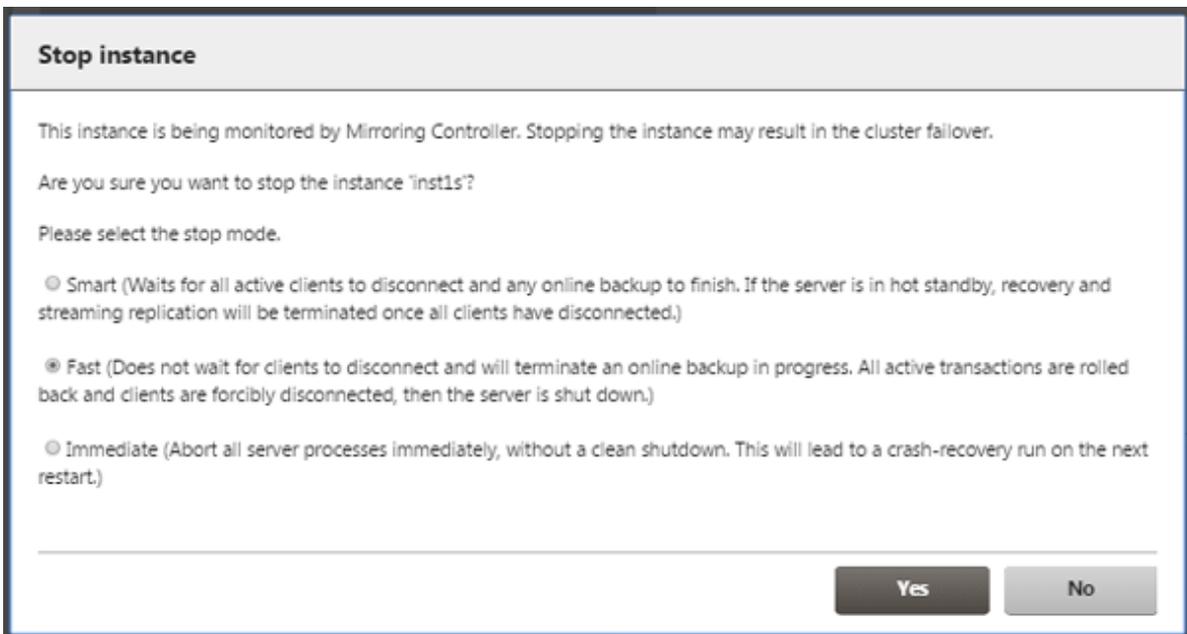
Mirroring Controller setup will be removed from the cluster. The cluster status will be updated and a confirmation message entry will be displayed in the [Message] section.

## 6.7 Status Update after Failover

When Mirroring Controller performs a failover, standby instance will be promoted to standalone instance. The Mirroring Controller setup will be removed from both standby and master instances.

The following scenario describes one of the ways in which failover can be triggered, and the results achieved by the use of Mirroring Controller in WebAdmin.

1. In the [Instances] tab, select the master instance "inst1".
2. Click .
3. In the confirmation dialog box, the warning "This instance is being monitored by Mirroring Controller. Stopping the instance may result in the cluster failover." is displayed.



4. Choose the stop mode and click [Yes].  
In the server, the following takes place:
  - a. The master instance is stopped.
  - b. Failover is triggered in Mirroring Controller.
  - c. The Mirroring Controller setup is removed from both master and standby instances
  - d. Standby instance is promoted to standalone.
5. When the instance is refreshed in WebAdmin, the latest status of the instances will be displayed.

## 6.8 Action Required when an Error Occurs in the Combined Admin Network and Log Transfer Network

---

Communication errors may temporarily occur in the network used as the admin network and log transfer network due to reasons such as high load on the server or insufficient system resources. Because of this, there is a risk of causing a split-brain situation by mistake even though the server has no issues.

Split brain refers to a situation where data update is performed on both servers because they both work as a primary server temporarily.

### How to detect split brain using WebAdmin

If the conditions below are met, split brain may occur. Refer to "[Split-brain detection method](#)" and "[How to recover from a split-brain](#)" in "[3.8.4 Tuning for Optimization of Degrading Operation Using Abnormality Monitoring](#)" and take the actions described.

1. A standby instance is selected in the [Instances] tab, and
2. "Standalone" is displayed in [Instance type], and
3. A primary instance is selected in the [Instances] tab, and
4. "Standalone" is displayed in "Standalone".



The admin network is important because Mirroring Controllers use it to confirm the status of each server.

The log transfer network is also important to maintain the data freshness.

Therefore, use network configurations resistant to faults for these networks by using the network redundancy channel bonding feature provided by the operating system or network driver vendor.

---

# Appendix A Parameters

This appendix describes the configuration files and parameters required by the database multiplexing mode.



See

Refer to "Server Configuration" in the PostgreSQL Documentation for information on the postgresql.conf file.

## A.1 Parameters Set on the Primary Server

The content for the parameters set in the postgresql.conf file of the primary server is shown in the table below.

Table A.1 postgresql.conf file

| Parameter                 | Value set                     | Explanation   |
|---------------------------|-------------------------------|---|
| wal_level                 | Literal "hot_standby"         | Specify the output level for the transaction log.<br>Specify "hot_standby".   |
| max_wal_senders           | Number of standby servers + 1 | Specify the number of standby servers + 1.<br>In FUJITSU Enterprise Postgres, 1:1 standby is used, so specify 2.  |
| synchronous_standby_names | ' <i>standbyServerName</i> '  | Use single quotation marks (') to enclose the name that will identify the standby server. Any name can be specified.<br>Do not change this parameter while Mirroring Controller is running.   |
| hot_standby               | on                            | Specify whether queries can be run on the standby server.<br>Specify this to execute reference jobs on the standby server. (*1)   |
| wal_keep_segments         | Number of file segments       | If a delay exceeding the value set in this parameter occurs, the WAL segment required later by the primary server may be deleted.<br>Additionally, if you stop a standby server (for maintenance, for example), consider the stop time and set a value that will not cause the WAL segment to be deleted.<br>Setting this parameter requires consideration regarding stabilization of the database multiplexing mode (refer to " <a href="#">3.8.1 Tuning to Stabilize the Database Multiplexing Mode</a> " for details).<br>Refer to "Estimating Transaction Log Space Requirements" in the Installation and Setup Guide for Server for information on estimating the WAL segment. |
| wal_sender_timeout        | Timeout (milliseconds)        | Specify the time period after which it is determined that the receiver process (walreceiver) of the transaction log is in an abnormal state on the primary server.<br>The specified value must be larger than the value set for the wal_receiver_status_interval parameter set in the postgresql.conf file of the standby server.<br>By aligning this value with the value of $(\text{heartbeat\_interval} + \text{heartbeat\_timeout}/1000) \times (\text{heartbeat\_retry} + 1)$ of the <i>serverIdentifier.conf</i> file, you  |

| Parameter          | Value set   | Explanation  |
|--------------------|---|--|
|                    |   | can unify the time after which it is determined that an error has occurred.  |
| archive_mode       | on  | Specify the archive log mode.  |
| archive_command    | 'cmd /c ""installDir\bin\<br>\pgx_xlogcopy.cmd" "%p"<br>"backupDataStorageDestinationDir<br>\archived_xlog\%f"'   | Specify the command and storage destination to save the transaction log.   |
| backup_destination | Backup data storage destination directory   | Specify the name of directory where to store the backup data.<br><br>Set the permissions so that only the instance administrator user can access the specified directory.<br><br>Specify the same full path on all servers, so that the backup data of other servers can be used to perform recovery.  |
| listen_addresses   | Primary server IP address, host name, or "*"  | Specify the IP address or host name of the primary server. Specify the IP address or corresponding host name that will be used to connect to the log transfer network.<br><br>The content specified is also used to allow connections from client applications.<br><br>To receive the connection and the transaction log from any client or standby server, specify "*".<br><br>Refer to "Connections and Authentication" in the PostgreSQL Documentation for details. |
| max_connections    | The limit value for the number of standby server connections + number of simultaneous executions of mc_ctl status (*2) + 2 + number of simultaneous client connections to the instance + superuser_reserved_connections value | The value specified is also used to restrict the number of connections from client applications and the number of connections for the management of instances.<br><br>Refer to "When an Instance was Created with the initdb Command" in the Installation and Setup Guide for Server, and "Connections and Authentication" in the PostgreSQL Documentation, for details.   |

\*1: Mandatory to use the Mirroring Controller.

\*2: Number of simultaneous executions of the mc\_ctl command in the status mode.

## A.2 Parameters Set on the Standby Server

This section explains the content of the file and parameters set on the standby server. After editing postgresql.conf file, start the instance.

The content for the parameters specified in postgresql.conf file is shown in the table below.

Table A.2 postgresql.conf file

| Parameter                 | Value set           | Explanation   |
|---------------------------|---------------------|---|
| synchronous_standby_names | 'primaryServerName' | Use single quotation marks (') to enclose the name that will identify the primary server. Any name can be specified.<br><br>This name will be required to rebuild the original primary server as the new standby server after the primary server was switched.<br><br>Do not change this parameter while Mirroring Controller is running. |

| Parameter            | Value set   | Explanation   |
|----------------------|---|---|
| backup_destination   | Backup data storage destination directory   | Specify the name of the backup data storage directory.<br><br>Set the permissions so that only the instance administrator user can access the specified directory.<br><br>Specify the same full path on all servers so that the backup data of other servers can be used to perform recovery.   |
| archive_command      | 'cmd /c ""installDir\bin\<br>\pgx_xlogcopy.cmd" "%p"<br>"backupDataStorageDestinationD<br>ir\archived_xlog\%f"' | Specify the command and storage destination to save the transaction log.  |
| wal_receiver_timeout | Timeout (milliseconds)  | Specify the time period after which it is determined that an error has occurred in the transaction log transfer on the standby server.<br><br>By aligning this value with the value of (heartbeat_interval + heartbeat_timeout) x heartbeat_retry of the <i>serverIdentifier.conf</i> file, you can unify the time after which it is determined that an error has occurred. |

## A.3 Network Configuration File

Define the network configuration that will link the Mirroring Controller processes in the network configuration file (network.conf file).

Define the same content on the primary server and standby server.

Table A.3 network.conf file

| Format specified   | Explanation  |
|--|--|
| <i>serverIdentifier hostName portNumber</i><br><i>Or</i><br><i>serverIdentifier ipAddress portNumber</i> | Specify any identifier (*1) for the server, a host name (or IP address), and port number (*2), using a space as the separator.<br><br>Specify the IP address or corresponding host name (*3) that will be used to connect to the admin network.<br><br>Define the same content on the primary server and standby server.<br><br>Example)<br><br>The literal <i>&lt;space&gt;</i> represents a space.<br><br>[For IPv4]<br><br>server1 <i>&lt;space&gt;</i> 192.0.2.100 <i>&lt;space&gt;</i> 27540<br><br>server2 <i>&lt;space&gt;</i> 192.0.2.110 <i>&lt;space&gt;</i> 27540<br><br>[For IPv6]<br><br>server1 2001:258:8404:1217:250:56ff:fea7:559f 27000<br><br>server2 2001:258:8404:1217:250:56ff:fea7:55a0 27100 |

\*1: The maximum length of the server identifier is 64 bytes. Use ASCII characters excluding spaces to specify this parameter.

\*2: The port number must be 0 to 65535. Ensure that the port number does not conflict with other software. Do not specify an ephemeral port that may temporarily be assigned by another program. Note that the value specified in this parameter must also be set in the services file.

\*3: Use ASCII characters excluding spaces to specify the host name.

## A.4 Server Configuration File

Define the information related to Mirroring Controller monitoring and control in the serverIdentifier.conf file. The maximum length of the server identifier is 64 bytes. Use ASCII characters excluding spaces to specify this parameter.

If the primary server and standby server environments are different, define content that is different, according to the environment.

Table A.4 serverIdentifier.conf file

| Parameter                | Value set   | Explanation   |
|--------------------------|---|---|
| db_instance              | <i>'dataStorageDestinationDir'</i><br>[Example]<br>db_instance = 'D:\\database1\\inst1' | Use halfwidth single quotation marks (') to enclose the data storage destination directory that will identify the monitoring target instance.<br><br>Use ASCII characters, and specify "\\" as the path delimiter.  |
| db_instance_service_name | <i>'registeredServiceNameOfFujitsuEnterprisePostgresInstance'</i>                       | Specify the registered service name of the FUJITSU Enterprise Postgres instance in the Windows service.<br><br>Use ASCII characters to specify this parameter.  |
| db_instance_password     | <i>'passwordOfInstanceAdminUser'</i>  | Specify the password used when Mirroring Controller connects to a database instance. Use ASCII characters to specify this parameter.<br><br>If password authentication is performed, you must specify this parameter in the settings used when Mirroring Controller connects to a database instance.<br><br>If you specify this parameter when password authentication is not performed, the parameter will be ignored. |
| remote_call_timeout      | Admin communication timeout   | Specify the timeout value (milliseconds) of the Mirroring Controller agent process for communication between servers.<br><br>Specify a value between 0 and 2147483647.<br><br>The value 0 indicates that there is no timeout limit.<br><br>The default is 70000 milliseconds (70 seconds).  |
| core_file_path           | <i>coreFileOutputDir</i>  | Specify the directory to which the core file is to be output. Use ASCII characters, and specify "\\" as the path delimiter.<br><br>If this parameter is omitted, it will be assumed that the Mirroring Controller management directory was specified.   |
| mc_service_name          | <i>'registeredServiceNameOfMirroringController'</i>                                     | Specify the Mirroring Controller service name registered in the Windows service. Use ASCII characters excluding forward slash (/) and backslash (\) to specify this parameter.<br><br>The maximum length of the service name is 124 bytes.<br><br>The default is 'MirroringControllerOpen'.   |
| event_source(*1)         | <i>'eventSourceName'</i>  | Specify the event source name to be used to identify the Mirroring Controller message in the event log. Use ASCII characters to specify this parameter.<br><br>The maximum length of the event source name is 255 bytes.<br><br>The default is 'MirroringControllerOpen'.   |

| Parameter          | Value set   | Explanation   |
|--------------------|---|---|
| heartbeat_interval | Interval time for operating system/server and process heartbeat monitoring, and disk abnormality monitoring (milliseconds)        | Contact between servers, and abnormality monitoring, will be performed at the specified interval.<br>Specify a value between 1 and 2147483647.<br>The default is 800 milliseconds.  |
| heartbeat_timeout  | Timeout time for operating system/server and process heartbeat monitoring, and disk abnormality monitoring (seconds)              | If there is no response for at least the number of seconds specified, it will be assumed that an error has occurred that requires the primary server to be switched, or the standby server to be disconnected.<br>Specify a value between 1 and 2147483647.<br>The default is 1 second.   |
| heartbeat_retry    | Number of retries for operating system/server and process heartbeat monitoring, and disk abnormality monitoring (number of times) | Specify the number of retries when an error has been detected that requires the primary server to be switched, or the standby server to be disconnected.<br>If an error is detected in succession more than the specified number of times, switch or disconnection will be performed.<br>Specify a value between 0 and 2147483647.<br>The default is 2 times. |

\*1: By using an event source name that is similar to the specified event\_source parameter of the postgresql.conf file, the Mirroring Controller output content can be referenced transparently, so log reference is easy.

# Appendix B Supplementary Information on Building the Primary Server and Standby Server on the Same Server

The primary server and standby server can be pseudo-configured on the same server for system testing, for example. Out of consideration for performance and reliability, do not use this type of configuration for any other purposes. For this reason, do not use this type of configuration in a production environment.

Note that the setup and operations is the same as if the primary and standby servers are built on different servers.

This appendix provides supplementary information explaining how to configure the primary server and standby server on the same server.

## B.1 Backup Data Storage Destination Directory

It is not a problem if the same backup data storage destination directory is used on the primary server and standby server.

## B.2 Registering Service Names and Event Source Names in the Windows Service

Ensure that the following names of resources to be registered on the operating system by FUJITSU Enterprise Postgres and Mirroring Controller are not duplicated between the primary server and standby server:

- Service name registered in the Windows service
- Event source name

## B.3 How to Execute the mc\_ctl Command

When executing the mc\_ctl command, specify the server identifier in the --local-server option in order to identify the operation destination server.

Below is an example of starting Mirroring Controller of the server "server1" defined in the network.conf file. For mc\_ctl command operations using another mode, also specify the --local-server option.

Define two server identifiers for the same IP address with different port numbers in the network.conf file.

Example)

```
server1 192.0.2.100 27540
server2 192.0.2.100 27541
```

Ensure that the port numbers of both primary server and standby server do not conflict with any other software.

Enabling automatic swith/disconnection

Start Mirroring Controller of the server "server1":

Example)

```
> mc_ctl start -M D:\mcdire\inst1 -w -f --local-server server1
```

Stop Mirroring Controller of the server "server1":

Example)

```
> mc_ctl stop -M D:\mcdire\inst1 --local-server server1
```

Disabling automatic swith/disconnection

Start Mirroring Controller of the server "server1":

Example)

```
> mc_ctl start -M D:\mdir\inst1 -w --local-server server1
```

Stop Mirroring Controller of the server "server1":

Example)

```
> mc_ctl stop -M D:\mdir\inst1 --local-server server1
```

## Note

To specify the mc\_ctl command with register mode, for registering to the Windows service, and the mc\_ctl command with unregister mode, for unregistering from the Windows service, add the --local-server option.

# Appendix C Supplementary Procedure on Configuring for Operation in Database Multiplexing Mode

This appendix explains a supplementary procedure on the configuration required for operation in database multiplexing mode.

## C.1 Security Policy Settings

---

This section explains how to configure the security settings to enable an operating system user account designated as an instance administrator user to log on as a service.

### 1. Displaying the [Local Security Policy] window

In Windows, select [Administrative Tools], and then click [Local Security Policy].

### 2. Setting up security

1. In the [Local Security Policy] window, select [Security Settings], select [Local Policies], and then click [User Rights Assignment].
2. Under [Policy] in the [User Rights Assignment] window, double-click [Log on as a service].
3. In the [Log on as a service Properties] window, set the following:
  - a. Select the [Local Security Setting] tab.
  - b. On the [Local Security Setting] tab, click [Add User or Group].
  - c. In the [Select Users or Groups] window, enter the operating system user account of the instance administrator user in [Enter the object names to select].
  - d. Click [OK].
4. In the [Log on as a service Properties] window, click [OK].
5. From the [Local Security Policy] tree, click [Local Policies], and then double-click [Security Options].
6. Scroll down and double-click [User Account Control: Behavior of the elevation prompt for administrators in Admin Approval Mode].
7. From the drop-down menu, select the "Elevate without prompting" in the [Local Security Setting] tab.
8. Click [OK].

## C.2 Windows Firewall Settings

---

This section explains how to enable the port number used by Mirroring Controller, if the Windows firewall feature is enabled.

### Windows Server(R) 2008:

1. In the [Start] menu, click [Control Panel].
2. Click [Security] and then click [Windows Firewall].
3. In the [Windows Firewall] window, click [Change settings].
4. On the [Exceptions] tab, click [Add port].
5. In the [Add a Port] window, set the following:
  - a. In [Name], specify any name.
  - b. In [Port number], specify the port number defined in the network definition file.
  - c. Select [TCP].
6. Click [OK].
7. On the [Exceptions] tab, in the [Program or port] list, check if the added port is enabled.

8. In the [Windows Firewall] window, click [OK].

### **Windows Server (R) 2008 R2:**

1. In the [Start] menu, click [Control Panel].
2. Click [System and Security], and then click [Windows Firewall].
3. In the [Windows Firewall] window, click [Advanced settings] on the left side of the window.
4. In the [Windows Firewall with Advanced Security] window, click [Inbound Rules] on the left side of the window.
5. Click [New Rule] on the right side of the window.
6. In the [New Inbound Rule Wizard] window, select [Port], and then click [Next].
7. Select [TCP] and [Specific local ports], then specify the port number defined in the network definition file, and then click [Next].
8. Select [Allow the connection], and then click [Next].
9. Select the profiles for which this rule applies, and then click [Next].
10. In [Name], specify any name, and then click [Finish].
11. In the [Windows Firewall with Advanced Security] window, check if the added rule is enabled under [Inbound Rules] in the center of the window.

### **Windows Server(R) 2012 or Windows Server(R) 2012 R2:**

1. Right-click the [Start] window, and then click [All apps] that is displayed at the bottom-right of the window. In the [Apps] window, click [Control Panel].
2. Click [Windows Firewall].
3. In the [Windows Firewall] window, click [Advanced settings] on the left side of the window.
4. In the [Windows Firewall with Advanced Security] window, click [Inbound Rules] on the left side of the window.
5. Click [New Rule] on the right side of the window.
6. In the [New Inbound Rule Wizard] window, select [Port], and then click [Next].
7. Select [TCP] and [Specific local ports], then specify the port number defined in the network definition file, and then click [Next].
8. Select [Allow the connection], and then click [Next].
9. Select the profiles for which this rule applies, and then click [Next].
10. In [Name], specify any name, and then click [Finish].
11. In the [Windows Firewall with Advanced Security] window, check if the added rule is enabled under [Inbound Rules] in the center of the window.

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# FUJITSU Enterprise Postgres 9.5



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# FUJITSU Enterprise Postgres 9.5



## Glossary

Windows/Linux

J2UL-2122-01ENZO(00)  
June 2016

# Preface

---

## **Purpose of This Document**

This document explains FUJITSU Enterprise Postgres terminology.

## **Intended Readers**

This document is aimed at all users of FUJITSU Enterprise Postgres.

## **Export Restrictions**

Exportation/release of this document may require necessary procedures in accordance with the regulations of your resident country and/or US export control laws.

## **Issue Date and Version**

|  |
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| Second edition: June 2016<br>First edition: March 2016 |
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# Glossary

---

## Archive log

Contains the history of updates made to the database, and is used during recovery.

## Backup data storage destination

The directory that stores the backup data.

## Client command

A command that is executed from the client machine and used. Also known as a client application.

## Data storage destination

The directory that stores the database clusters.

## Database cluster

The database storage area on the database storage disk. Database clusters are a collection of databases managed by an instance.

## Data masking

A feature that can change the returned data for queries generated by applications, to prevent exposing actual data.

## Database multiplexing

Mechanism in which a database is made redundant on multiple servers, by transferring transaction logs (WAL) via the network to enable application jobs to be continued.

## Database superuser

A user defined in the database with access privileges for all database objects.

## Encoding

Indicates the character set.

## Instance

A series of server processes for managing database clusters.

## Instance administrator

The OS user account that owns the database cluster files and operates the database server processes.

## Instance name

Indicates the instance name.

## Masking policy

A method of changing data under specific conditions when it is returned for a query from an application. You can configure masking target, masking type, masking condition and masking format.

## Mirrored transaction log

The log that mirrors the transaction log at the backup data storage destination.

## Primary server

The server that processes the main database jobs during multiplexed database operation.

---

## Server command

A command used on the database server. Also known as a server application.

---

## Standby server

A server that generates a replicated database synchronized with the primary server, and that can run as an alternative server in case the primary server fails during multiplexed database operation.

---

## Transaction log

Contains the history of updates made to the database by transactions. Also known as the WAL (Write-Ahead Log).

---

## Transaction log storage destination

The directory that stores the transaction log.

---

## VCI (Vertical Columnar Index)

An index with columnar data structure suitable for aggregation.

---

## WAL (Write-Ahead Log)

Has the same meaning as 'transaction log'.

---

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---

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# FUJITSU Enterprise Postgres 9.5



## Reference Guide

Windows/Linux

J2UL-2120-01ENZO(00)  
June 2016

# Preface

---

## Purpose of This Document

This document is a command reference, and explains FUJITSU Enterprise Postgres commands and options with features expanded on from PostgreSQL.

## Intended Readers

This document is aimed at people who manage and operate FUJITSU Enterprise Postgres. Readers of this document are also assumed to have general knowledge of:

- PostgreSQL
- SQL
- Linux
- Windows

L

W

## Structure of This Document

This document is structured as follows:

### [Chapter 1 Command List and Specification Format](#)

Lists commands and describes their specification format.

### [Chapter 2 Client Commands](#)

Explains options not listed in "PostgreSQL Client Applications" in the PostgreSQL Documentation.

### [Chapter 3 Server Commands](#)

Explains commands and options not listed in "PostgreSQL Server Applications" in the PostgreSQL Documentation.

### [Chapter 4 Mirroring Controller Commands](#)

Explains the Mirroring Controller commands

### [Chapter 5 PL/extJava Commands](#)

Explains the PL/extJava commands.

## How to Read This Document

Examples in this document are predominantly for UNIX/Linux.

For Windows, replace values (such as paths in the examples) as appropriate.

## Export Restrictions

If this document is to be exported or provided overseas, confirm legal requirements for the Foreign Exchange and Foreign Trade Act as well as other laws and regulations, including U.S. Export Administration Regulations, and follow the required procedures.

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# Chapter 1 Command List and Specification Format

This chapter lists commands and describes their specification format.

## 1.1 Command List

This chapter lists commands and options not explained in "PostgreSQL Client Applications" or in "PostgreSQL Server Applications" in the PostgreSQL Documentation.

### 1.1.1 Client Commands

The commands below have options not explained in "PostgreSQL Client Applications" in the PostgreSQL Documentation.

| Command                    | Functional overview                                      |
|----------------------------|--|
| <a href="#">pg_dumpall</a> | Extract a PostgreSQL database cluster into a script file |

### 1.1.2 Server Commands

The commands below have options not explained in "PostgreSQL Server Applications" in the PostgreSQL Documentation.

| Command                  | Functional overview                                     |
|--------------------------|---|
| <a href="#">pg_ctl</a>   | Initialize, start, stop, or control a PostgreSQL server |
| <a href="#">postgres</a> | PostgreSQL database server                              |

The commands below are not explained in "PostgreSQL Server Applications" in the PostgreSQL Documentation.

| Command  | Functional overview  |
|--|--|
| <a href="#">pgx_dmpall</a>   | Backs up the data directory, tablespaces, and configuration files.   |
| <a href="#">pgx_keystore</a>   | Manages keystore   |
|  <a href="#">pgx_pclrsc</a> | Register, unregister, or display FUJITSU Enterprise Postgres database cluster with PRIMECLUSTER as resource of PRIMECLUSTER. |
| <a href="#">pgx_rcvall</a>   | Recovers the data directory, tablespaces, and configuration files.   |

### 1.1.3 Mirroring Controller Commands

Mirroring Controller has the following commands:

| Command                | Functional overview  |
|------------------------|--|
| <a href="#">mc_ctl</a> | Start and stop Mirroring Controller, switch/disconnect the server, display the server status, build the standby server, or register and unregister from the Windows services |

### 1.1.4 PL/extJava Commands

PL/extJava has the following commands:

| Command                    | Functional overview                |
|----------------------------|------------------------------------|
| <a href="#">pgx_jadmin</a> | Setup and operation of PL/extJava. |

## 1.2 Command Specification Format

---

The table below shows the command specification format.

| Item | Explanation  |
|------|--|
| [ ]  | Indicates optional element.                          |
| ...  | Indicates that the item can be specified repeatedly. |

# Chapter 2 Client Commands

This chapter explains options not listed in "PostgreSQL Client Applications" in the PostgreSQL Documentation.

## 2.1 pg\_dumpall

---

### Name

`pg_dumpall` -- Extract a PostgreSQL database cluster into a script file

### Synopsis

`pg_dumpall` [*connecti onOpti on...*] [*opti on...*]

### Options

`--no-tablespace-encryption`

Do not output commands to encrypt tablespaces. Running the generated SQL script will restore the originally encrypted data without being encrypted.

### See

Refer to "pg\_dumpall" in the PostgreSQL Documentation for details.

## Chapter 3 Server Commands

This chapter explains commands and options not listed in "PostgreSQL Server Applications" in the PostgreSQL Documentation.

### 3.1 pg\_ctl

---

#### Name

pg\_ctl -- Initialize, start, stop, or control a PostgreSQL server

#### Synopsis

```
pg_ctl start [-w] [-t seconds] [-s] [-D datadir] [-l filename]
           [-o options] [-p path] [-c] [--keystore-passphrase]

pg_ctl restart [-w] [-t seconds] [-s] [-D datadir] [-c]
              [-m s[mart] | f[ast] | i[mmediate]] [-o options]
              [--keystore-passphrase]
```

#### Options

--keystore-passphrase

Prompt for the passphrase to open the keystore.

#### See

Refer to "pg\_ctl" in the PostgreSQL Documentation for details.

### 3.2 pgx\_dmpall

---

#### Name

pgx\_dmpall - Backs up the data directory, tablespaces, and configuration files.

#### Synopsis

```
pgx_dmpall [option...]
```

#### Description

The pgx\_dmpall command backs up the data directory, tablespaces, and configuration files. The backup data is stored in the directory specified by backup\_destination parameter of postgresql.conf. pgx\_dmpall command also deletes archived Write Ahead Logs (WAL) that are no longer necessary for recovery when the backup completes successfully.

#### Options

-c

This option only backs up configuration files. The configuration files are as follows:

- postgresql.conf (postgresql.conf)
- File for host-based authentication (pg\_hba.conf)
- Configuration file for ident authentication (pg\_ident.conf)

If an external reference, such as 'include' in postgresql.conf, is set, the reference destination files are also backed up.

**-C fast|spread**

**--checkpoint=fast|spread**

Sets checkpoint mode to fast or spread (default).

If fast is specified, the checkpoint processing at the start of backup becomes quick, but the impact on performance of running applications gets larger due to intense I/O. In spread mode, the impact on applications is smaller but the backup takes longer, because the checkpoint is performed slowly.

**-D *datadir***

Specify the data directory. If this option is omitted, the value of the environment variable PGDATA is used.

**-f *configFile***

Specify the postgresql.conf configuration file. This option is set if the data directory and the configuration file set in the 'data\_directory' parameter of the postgresql.conf file are running in separate directories.

**-U *username***

**--username=*username***

Specify the user name of the database superuser. This defaults to the name of the effective user running pgx\_dmpall.

**-w**

**--no-password**

Never issue a password prompt. If the server requires password authentication and a password is not available by other means such as a .pgpass file, the connection attempt will fail. This option can be useful in batch jobs and scripts where no user is present to enter a password.

**-W**

**--password**

Force pgx\_dmpall to prompt for a password before connecting to a database.

This option is never essential, since pgx\_dmpall will automatically prompt for a password if the server demands password authentication. However, pgx\_dmpall will waste a connection attempt finding out that the server wants a password. In some cases it is worth typing -W to avoid the extra connection attempt.

**--maintenance-db=*dbname***

Specifies the name of the database to connect to. If not specified, the postgres database will be used; if that does not exist, template1 will be used.

## Environment

PGDATA

Specify the data directory. You can overwrite using the -D option.

## Diagnostics

0: Normal exit

Other than 0: Abnormal exit

## Notes

This command can only be executed when the database server is running.

Execute this command as a PostgreSQL user account.

Do not update or delete files in the backup storage directory. Otherwise, you may not be able to recover the database.

Do not store other files in the backup storage directory.

This command uses one database connection. To establish a connection, this command uses the IPv4 loopback address 127.0.0.1 on Windows, and the UNIX domain socket on other operating systems. Therefore, permit these connections in pg\_hba.conf.

This command cannot be executed on the standby server.

## Example

In the following example, the data directory, tablespaces, and configuration files are backed up. At this time, stored WALs are no longer necessary because the backups are destroyed.

```
$ pgx_dmpall
```

## Related item

`pgx_rcvall`

## 3.3 pgx\_keystore

---

### Name

`pgx_keystore --` Manages keystore

### Synopsis

```
pgx_keystore [option... ] keystore_location
```

### Description

`pgx_keystore` enables auto-open of a keystore.

### Options

`-a`

`--enable-auto-open`

Enables auto-open of a keystore. This allows the keystore to open automatically without entering the passphrase when the database server starts.

When auto-open is enabled, an obfuscated copy `keystore.aks` is created in the same directory where the keystore file `keystore.ks` is stored. To disable auto-open, delete `keystore.aks`.

`-P passphrase`

`--passphrase=passphrase`

Specify the passphrase to open the keystore. If this option is omitted, the prompt to enter the passphrase is displayed.

*keystore\_location*

Specify the absolute or relative path of the keystore file.

### Diagnostics

0: Normal exit

Other than 0: Abnormal exit

### Notes

This command can be executed whether the database server is running or stopped. It does not connect to the database server.

### Example

Enables auto-open of a keystore.

```
$ pgx_keystore -a /key/store/location/keystore.ks
```



## 3.4 pgx\_pclrsc

---

## Name

`pgx_pclrsc` -- Register, unregister, or display FUJITSU Enterprise Postgres database cluster with PRIMECLUSTER as resource of PRIMECLUSTER.

## Synopsis

```
pgx_pclrsc -a -c name -u osuser -D directory -w directory
           -n nodes [options...]
pgx_pclrsc -d -c name
pgx_pclrsc -p [-c name]
```

## Description

`pgx_pclrsc` is an utility for registering or unregistering FUJITSU Enterprise Postgres database cluster with PRIMECLUSTER, or displaying settings of FUJITSU Enterprise Postgres database cluster registered with PRIMECLUSTER. Execute the command on a member node of the cluster. Only the super user(root) can execute this command.

## Options

`-a`

`--add`

Register the specified database cluster with PRIMECLUSTER. If the specified database cluster has already been registered with PRIMECLUSTER, then terminate abnormally.

`-c name`

`--db-cluster-name=name`

Specify database cluster name. *name* is case-sensitive, and must be within 16 bytes, and an initial letter must be ascii alphabet, and following letters must be ascii alphabet or ascii digit or underscore(\_).

`-d`

`--delete`

Unregister the specified database cluster from PRIMECLUSTER.

`-D directory`

`--pgdata=directory`

Specify an absolute path of data directory.

`--db-user=name`

Specify a database super user. Default is the user specified with '-u'.

`-n nodes`

`--member-nodes=nodes`

Specify names of all member nodes of the cluster. Specify a cluster node name with suffix "RMS" to the name. Separate names with comma(.). (e.g. `-n node1RMS,node2RMS`)

`-p`

`--print`

Print a list of database clusters registered with PRIMECLUSTER. If `-c` option is specified, then print settings of the database cluster.

`--response-timeout=seconds`

Specify timeout of the query for health check. It's used with a count specified with '--timeout-retry-num'. The query is "SELECT 1" to the database "template1". If '0', wait infinitely. (default: '0')

`--timeout-retry-count=count`

Specify a limit count of retrying query when timeout is occurred. If retry counter is over the limit, then PRIMECLUSTER considers status of the database server as FAULT. If a query doesn't timeout once, retry counter is reset. (default: '6')

`--trace-max-file-size=size`

Specify max size(KB) of trace file. (default: '10240')

`-u osuser`

`--os-user=osuser`

Specify an OS user who can start/stop FUJITSU Enterprise Postgres database server.

`-w directory`

`--work-dir=directory`

Specify a directory for temporary data and trace files. It's used for starting, stopping or checking FUJITSU Enterprise Postgres database server. If the directory doesn't exist, then create it. Owner of the directory created by the command is set to the user specified with '-u'. Permission of the directory created by the command is set to 0700.

`--watch-interval=seconds`

Specify an interval. It's used for the amount of time between health checks. (default: '3')

## Diagnostics

0 : On success

otherwise : On error

## Notes

Before unregistering a resource, stop RMS of PRIMECLUSTER.

## Example

The simplest example of registering a resource.

```
# pgx_pclrsc -a -c dbcluster1 -u postgres -D /mnt/swdsk1/pgdata -w /var/tmp/work -n  
node1RMS,node2RMS
```

# 3.5 pgx\_rcvall

---

## Name

`pgx_rcvall` - Recovers the data directory, tablespaces, and configuration files.

## Synopsis

```
pgx_rcvall [option...]
```

## Description

The `pgx_rcvall` command recovers the data directory, tablespaces, and configuration files using the data that was backed up with `pgx_dmpall` command and archived Write-Ahead-Log (WAL). If none of the options that indicate the recovery point is specified, all archived WAL are applied and the data will be recovered to the latest point.

## Options

`-B backupdir`

Specify the backup storage directory. If the data directory is damaged, this option cannot be omitted.

`-D datadir`

Specify the data directory. If this option is omitted, the value of the environment variable PGDATA is used.

`-e targetTime`

Specify this option to recover the data as of the specified date and time.

targetTime

Specify the time at which the data is recovered. The format is as follows:

"YYYY-MM-DD HH:MM:SS"

-l

This option displays a list of the backup data information in the backup storage directory that was obtained using the `pgx_dmpall` command. This cannot be specified together with `-p`, `-e` or `-n` option.

-n *restorePoint*

Specify this option to recover the data to the specified restore point. Restore points are created with SQL function `pg_create_restore_point`. If multiple restore points with the same names were created, the first one after the backup was taken is used for recovery. If the specified restore point does not exist, all archived WAL are applied. This cannot be specified together with `-e` or `-p` option.

-p

Specify this option to recover the data as of the time when the last backup completed. This cannot be specified together with `-e` or `-n` option.

-s *connectionString*

Construct a standby server from the backup created by `pgx_dmpall`. Specify as an argument a connection string for connecting to the primary server. This is the same as `primary_conninfo` parameter in `recovery.conf`. This option can only be specified together with `-D` and `-B`.

-x

Specify this option if you do not want to include transactions committed at the time specified in the `-e` option as part of the recovery.

--keystore-passphrase

Prompt for the passphrase to open the keystore.

## Environment

PGDATA

Specify the data directory. You can overwrite using the `-D` option.

PGPORT

Specify the port number for connecting to the database.

PGUSER

Specify the user name of the database superuser. This defaults to the name of the effective user running `pgx_dmpall`.

## Diagnosis

0: Normal exit

Other than 0: Abnormal exit

## Backup data information

Date

Date the backup data was created using the `pgx_dmpall` command.

Dir

This is the name of the directory in the backup storage directory that is used to store the backup data.  
Directory naming format: Time format (YYYY-MM-DD\_HH-MM-SS)

Status

This is the status of the `pgx_dmpall` command backup data.

COMPLETE: Complete

INCOMPLETE: Incomplete

## Notes

This command can only be executed when the database server is stopped, except when it is executed with `-l` option.

Execute this command as a PostgreSQL user account.

Use backup data that was taken from the recovery target data directory.

Before executing this command, disconnect all application database connections. Additionally, do not connect to the database during recovery.

Hash indexes cannot be recovered correctly in this command. If you are using the hash index, execute `REINDEX` for the corresponding index after this command finishes.

The configuration files are restored from those files that were taken by the last `pgx_dmpall` (including `-c` option).

This command connects to the database to determine whether the recovery has completed. So ensure that you set the port number with `PGPORT` environment variable in the environment where multiple instances exist.

Match the OS timezone setting when running `pgx_dmpall/pgx_rcvall` to the timezone specified by `timezone` parameter in `postgresql.conf`.

Otherwise, data might be recovered to an unexpected time when `-e` or `-p` is specified.

If you recover to a past point, a new timeline (history of database updates) begins at that point. That recovery point is the latest point in the new timeline when the recovery is completed. If you subsequently recover to the latest point, the database updates in the new timeline will be replayed.

Valid restore points are the ones that were created in the timeline where the backup had been taken. That means that if you recover to a past point, those restore points created thereafter are unavailable. Therefore, take a backup when you have restored the past data desired.

## Example

In the following example, the data directory, tablespaces, and configuration files are recovered.

```
$ pgx_rcvall -B /home/pgsql/Backupdir
```

In the following example, the data directory and tablespaces are recovered at 10:00:00 on 01-05-2015. The configuration files are recovered at the point at which the last of the data is obtained.

```
$ pgx_rcvall -B /home/pgsql/Backupdir -e "2015-05-01 10:00:00"
```

In the following example, the data directory and tablespaces are recovered upto the time of restore point "before\_match\_20150510\_1". The configuration files are restored from the latest backup.

```
$ pgx_rcvall -B /home/pgsql/Backupdir -n before_match_20150510_1
```

In the following example, the obtained backup data information in the backup storage directory is displayed in a list.

```
$ pgx_rcvall -l
```

## Related item

`pgx_dmpall`

## 3.6 postgres

---

### Name

`postgres` -- PostgreSQL database server

## Synopsis

`postgres [option...]`

## Options

`-K`

Prompt for the passphrase to open the keystore.

## See

Refer to "postgres" in the PostgreSQL Documentation for details.

# Chapter 4 Mirroring Controller Commands

This chapter explains the Mirroring Controller commands.

## 4.1 mc\_ctl

### Name

L

`mc_ctl` - Start and stop Mirroring Controller, switch/disconnect the server, or display the server status.

W

`mc_ctl` - Start and stop Mirroring Controller, switch/disconnect the server, display the server status, or register and unregister from the Windows services.

### Overview

```
mc_ctl start [-M mcdi r] [-w] [-f] [--mc-only] [--local-server server_id]
```

```
mc_ctl stop [-M mcdi r] [[-a] [--mc-only] | [-e][--local-server server_id]]
```

```
mc_ctl status [-M mcdi r] [--local-server server_id]
```

```
mc_ctl switch [-M mcdi r] [--local-server server_id]
```

```
mc_ctl enable-failover [-M mcdi r] [--local-server server_id]
```

```
mc_ctl disable-failover [-M mcdi r] [--local-server server_id]
```

W

```
mc_ctl register [-M mcdi r] [-w] [-f] [--mc-only] -P password  
[-S a[uto] | d[emand]] [--local-server server_id]
```

```
mc_ctl unregister [-M mcdi r] [--local-server server_id]
```

### Description

L

`mc_ctl` starts and stops Mirroring Controller, switches/disconnects the server, or displays the server status.

W

`mc_ctl` starts and stops Mirroring Controller, switches/disconnects the server, displays the server status, or registers and unregisters from the Windows services.

The start mode starts Mirroring Controller. If the `--mc-only` option is omitted, the command starts a database instance. Specify the `-w` option to get the status of this command.

The stop mode stops Mirroring Controller. If the `--mc-only` option is omitted, the database instance is stopped. If `--mc-only` option is not specified, database instance is also stopped. When executes on standby server without `--mc-only`, standby server will be detached from primary server.

The status mode displays the status of the servers, database instance processes, and disks monitored by Mirroring Controller.

The switch mode switches the primary server. When the server is switched, the database instance on the primary server stops, and the database instance on the standby server is upgraded to primary server and begins degrading operation.

The enable-failover mode enables automatic switching and disconnection. You can use this mode after installing the Mirroring Controller option.

The disable-failover mode disables automatic switching and disconnection. You can use this mode after installing the Mirroring Controller option.

W

The register mode registers Mirroring Controller in the Windows service. The `-w`, `-f`, `--mc-only`, and `--local-server` options are used when Mirroring Controller is started and stopped from the Windows services. If the `mc_ctl` command is used to start and stop Mirroring Controller, the option specified in the command will be valid.

The unregister mode unregisters Mirroring Controller from the Windows service.

L

If Mirroring Controller has not been started on the server that executes the command, commands for any mode other than the start mode, and status mode.

Execute this command as an instance administrator.

W

If Mirroring Controller has not been started on the server that executes the command, commands for any mode other than the start mode, status mode, register mode, and unregister mode terminate with an error.

Execute this command as an instance administrator user with the "Administrator" privilege (operating system user ID that belongs to the Administrator group).

Until you start Mirroring Controller of standby server after starting Mirroring Controller of the primary server, disconnect of the standby server occurs operation to be able to continue with only the primary server. Standby server is incorporated when you start the Mirroring Controller of standby server, and you should be able to operate in the multiplexing configuration.

## Options

-a

Specify this option to stop Mirroring Controller on all servers.

-e

Specify this option to forcibly stop Mirroring Controller on the active server.

-f

Specify this option to enable automatic switching and disconnection of Mirroring Controller immediately after startup.

This option is available only if you install the Mirroring Controller options.

--local-server *server\_id*

If you run a simulation build of the primary and standby servers in a single server (for system testing, for example), specify this option to identify the server to be operated.

For *server\_id*, specify the server identifier specified in the network.conf file. ASCII characters other than single-byte space can be specified in the server identifier. The operations will be executed as if the user has logged in to *server\_id*.

--mc-only

Specify this option to start and stop only Mirroring Controller processes. At the start mode, this option can be specified only while the database instance is running. If this option is omitted, the database instance is simultaneously started and stopped.

-M *mcdir*

Specify the Mirroring Controller management directory.

L

ASCII characters other than halfwidth spaces can be specified in the directory path.

W

ASCII characters can be specified in the directory path.

If this option is omitted, the value of the environment variable MCONTROLDIR is used.

-P *password*

W

For the register mode, specify the password for the user who executed the command.

W

-S *a[uto] | d[emand]*

Specify the start type for the Windows service to be registered. You can choose auto or demand as the start type by specifying the entire word or just its first letter. The default is auto.

-w

Waits for operations to finish.

## Environment variable

### MCCONTROLDIR

Specifies the Mirroring Controller management directory.

**L**

ASCII characters other than halfwidth spaces can be specified in the directory path.

**W**

ASCII characters can be specified in the directory path.

You can specify the -M option to override this value.

## Diagnostics

0: Normal end

Other: Abnormal end

## Notes

The message under execution might be output though the mc\_ctl command is not being executed and, besides, it terminate abnormally when the server is downed while processing execution of this command, an automatic switch, and an automatic separation, and the communication between a primary server and the standby server is cut off. Besides, please reactivate Mirroring Controller to solve this problem after confirming nobody is operating the mc\_ctl command. Afterwards, please execute a necessary operation.

If a time-out error occurs when the mc\_ctl command is in progress, the messages may be different from the processes. Take the actions described in the "Action" section of the message.

Automatic switching and disconnection by the enable-failover mode, the disable-failover mode, and the -f option of the start mode is effective only while Mirroring Controller is running. Therefore, please activate each time you start the Mirroring Controller if you want to enable automatic switching and disconnection.

**W**

Use the start mode and stop mode to start and stop the Windows services. To do this, use the register mode to register Mirroring Controller in the Windows services in advance.

In case of postgresql.conf has any incorrect parameter when this command is executed, this command will be abnormally terminated. If this is the case, please re-execute it again after correct the parameter in postgresql.conf.

**W**

In Windows Server(R) 2008, Windows Server(R) 2008 R2, Windows Server(R) 2012 or Windows Server(R) 2012 R2, the mc\_ctl command must be executed from "Administrator: Command Prompt". Right-click [Command Prompt], and then select [Run as administrator] from the menu to display the [Administrator: Command Prompt] window.

## Example

**L**

To start Mirroring Controller:

```
$ mc_ctl start -M /mdir/inst1
```

**W**

To start Mirroring Controller:

```
> mc_ctl start -M D:\mdir\inst1
```

Display details of mc\_ctl status

```
mirroring status
-----
(1)
server_id  host_role      host          host_status  db_proc_status  disk_status
(2)        (3)           (4)           (5)         (6)             (7)
```

```
(1) Multiplexing status
    switchable      : Switchable
```

```

switching          : Switching
switched          : Switched (displayed when switching has finished and the degrading
operations status has been enabled)
not-switchable    : Not switchable (displayed when a server is disconnected and
switching is not possible)
unknown           : Unknown (*1)
failover-disabled : Failover is disabled
(2) Server identifier
(3) Server role
primary : Primary
standby : Standby
none(inactivated primary): No role
                        (primary is stopped or being defined as primary)
none(inactivated standby): No role
                        (standby is stopped or being defined as primary)
(4) Host name or IP address
(5) Live/dead state of the server
normal : Normal operation
abnormal : Abnormal
unknown : Unknown (*1)
(6) DBMS process status
normal : Normal
abnormal (abnormal process name (*2)) : Abnormal
unknown : Unknown (*1)
(7) Disk status
normal : Normal
abnormal (abnormal disk type (*3)) : Abnormal
unknown : Unknown (*1)

```

\*1: Displayed when Mirroring Controller is stop state, the management network is abnormal, or Mirroring Controller has failed or is unresponsive.

\*2: The names of the DBMS processes in which the abnormality was detected are output separated by a comma. The name has the following meaning:

- postmaster: Process (postmaster) that accepts application connections
- wal\_sender or wal\_receiver: Process (WAL sender or WAL receiver) that sends and receives transaction logs

\*3: The types of disks where the abnormality was detected are output separated by a comma. The type has the following meaning:

- data: Data storage disk
- tran\_log: Transaction log storage disk
- tablespace: Tablespace storage disk

# Chapter 5 PL/extJava Commands

This chapter explains the PL/extJava commands.

## 5.1 pgx\_jadmin

### Name

pgx\_jadmin -- Setup and operation of PL/extJava

### Synopsis

```
pgx_jadmin init-domain --sharedir directory [--domainport port1, port2, port3]
                    --dbadminuser username
                    [--pgdata directory | -D directory]
                    [--cluster-standbynode]

pgx_jadmin delete-domain [-y] [--force] [--cluster-standbynode]

pgx_jadmin list-domain

pgx_jadmin modify-domain-port --domainport port1, port2, port3
                    [--cluster-standbynode]

pgx_jadmin create-container --dbname database_name [--instanceport port1, port2]
                    [--dbport port] --dbuser username
                    --dbpassword password
                    [--cluster-standbynode]

pgx_jadmin delete-container --dbname database_name [--cluster-standbynode]

pgx_jadmin list-container --dbname database_name

pgx_jadmin add-instance --dbname database_name
                    --instanceport port1, port2 [--cluster-standbynode]

pgx_jadmin delete-instance --dbname database_name [--cluster-standbynode]

pgx_jadmin modify-instance-port --instance name
                    --instanceport port1, port2 [--cluster-standbynode]

pgx_jadmin modify-container-db --dbname database_name [--dbport port]
                    [--dbuser username] [--dbpassword password]

pgx_jadmin list-jvm-options --dbname database_name

pgx_jadmin modify-jvm-options --dbname database_name [--heapsize size]
                    [--permsize size]

pgx_jadmin backup --backupdir directory

pgx_jadmin restore --backupdir directory [--cluster-standbynode]
```

### Description

The pgx\_jadmin unified command is used in FUJITSU Enterprise Postgres Java Application Server, which incorporates the PL/extJava environment into FUJITSU Enterprise Postgres. The pgx\_jadmin command consists of several subcommands. Each subcommand corresponds to an operation in the PL/extJava environment.

In init-domain subcommand, creates a domain for using the PL/extJava environment. This command creates a domain only once after FUJITSU Enterprise Postgres is installed.

In delete-domain subcommand, deletes the domain for using the PL/extJava environment.

In list-domain subcommand, displays domain information.

In modify-domain-port subcommand, modifies the domain management port numbers.

In create-container subcommand, creates a container in a domain. When you create a container, a server instance (JavaVM) is simultaneously created in the container. Create one container per database within an instance. To use Java functions in multiple databases, create a container for each one.

In delete-container subcommand, deletes a container from a domain.

In list-container subcommand, displays container information.

In add-instance subcommand, add a server instance (JavaVM) to a container.

In delete-instance subcommand, deletes a server instance (JavaVM) from a container. If multiple server instances (JavaVM) have been created in a container, this command deletes the one that was added last.

In modify-instance-port subcommand, modifies the server instance management port numbers.

In modify-container-db subcommand, modifies the database connection information of a container.

In list-jvm-options subcommand, displays JavaVM option information of a container.

In modify-jvm-options subcommand, modifies the JavaVM settings of a container.

In backup subcommand, backup the PL/extJava.

In restore subcommand, restore the PL/extJava.

## Options

--backupdir *directory*

Specify a backup storage directory for PL/extJava, using an absolute path.

W

Specify the directory name in up to 64 bytes.

L

Specify the directory name in up to 120 bytes.

You can use the following characters in the directory name:

- Alphanumeric characters
- Spaces
- Underscores "\_"
- Hyphens "-"
- Parentheses "()"

Do not specify the following directories:

- Same directory as the instance data storage directory, the backup storage directory and the domain root directory
- Directory in the instance data storage directory, the backup storage directory and the domain root directory
- Directory that exists under the instance data storage directory, the backup storage directory and the domain root directory is under the backup storage directory for PL/extJava

--cluster-standbynode

Specify this option to execute the command for the standby node in a cluster environment.

-D *directory*

--pgdata *directory*

Specify the absolute path of the data storage destination of the instance.

If you omit this option, the command references the environment variable (PGDATA).

**W****--dbadminuser *username***

Specify the name of the instance administrator.

Specify the user name in up to 20 bytes.

If you are specifying the domain user, use the "domainName\userName" format. Specify the domain name in up to 250 bytes.

After creating a domain, you cannot change the instance administrator set during creation of the domain.

**L****--dbadminuser *username***

Specify the name of the instance administrator. Refer to "User of PL/extJava" in "Setting up and Operating PL/extJava" of the Operation Guide for information on the instance administrator. Specify the user name in up to 8 bytes. After creating a domain, you cannot change the instance administrator set during creation of the domain.

**--dbname *database\_name***

Specify the database name using 1 to 28 bytes of the database corresponding to the container. You can use the following characters in the database name:

- Alphanumeric characters
- Underscores "\_"

You cannot specify an underscore as either the leading or trailing character. You cannot specify a database name already registered, even if you change name capitalization. For example, if the database name "database001" has already been registered, you cannot create a container with the database name "DATABASE001". You cannot specify the following as a database name:

- domain
- default
- server
- resources

The database name to the instance is not revokable. Recreate the container when you change the database name.

**W**

Windows operating system reserved words cannot be specified.

**--dbpassword *password***

Specify the password of the user who will connect to the database.

Ensure that it matches the password of the user registered in the instance.

Specify --dbpassword option or --dbuser option when you modify the database connection information.

**--dbport *port***

Specify the port number of the instance.

If you omit the port number, the default value of 27500 for the instance is used.

**--dbuser *username***

Specify a user name for connecting to the database. You must register the user in the instance in advance.

Specify --dbuser option or --dbpassword option when you modify the database connection information.

**--domainport *port1,port2,port3***

Specify the domain management port numbers separated with a comma. Three port numbers are required. If you omit the port numbers, the default values are used. Refer to "Preparation for portnumber" in "Setting up and Operating PL/extJava" of the Operation Guide for information on port numbers. Specify the portnumber not changed in order of specification for the init-domain subcommand when specifying it for the modify-domain-port subcommand.

**--force**

Specify this option to forcibly delete the domain even if it has containers.If you omit this option, the domain will fail to be deleted if it has containers.

**--heapsize *size***

Specify the size of the heap area in megabytes.Specify a value of 64 or greater for the size of the heap area.

Specify **--heapsize** option or **--permsize** option when you modify the JavaVM settings.

**--instance *name***

Specify the server instance name(JavaVM).

You can check the names of server instances(JavaVM). registered in a container by using the list-container subcommand.

**--instanceport *port1,port2***

Specify the server instance management port numbers separated with a comma. two port numbers are required. If you omit the port numbers, the default values are used. Refer to "Preparation for portnumber" in "Setting up and Operating PL/extJava" of the Operation Guide for information on port numbers.

For the port numbers you are not going to change, you must specify them in the same order for the create-container subcommand or add-instance subcommand when specifying them for the modify-instance-port subcommand.

**--permsize *size***

Specify the size of the Perm area in megabytes.Specify a value of 64 or greater for the size of the Perm area.

Specify **--permsize** option or **--heapsize** option when you modify the JavaVM settings.

**--shareddir *directory***

Specify the absolute path of the directory (domain root) that will store the domain resources.

**W**

Specify the directory that does not exist in the directory name in up to 64 bytes.

When specifying **--cluster-standbynode**, however, you must specify an existing directory for the directory name.

Specify the directory that there is a writing authority of the user who has the administrator authority in the parent directory of the domain root.

**L**

Specify the directory that does not exist in the directory name in up to 255 bytes.

Specify the directory that there is a writing authority of the user who has the instance administrator authority in the parent directory of the domain root.

You can use the following characters in the directory name:

- Alphanumeric characters
- Spaces
- Underscores "\_"
- Hyphens "-"
- Parentheses "()"

Do not specify the following directories for the domain root:

- Same directory as the instance data storage directory
- Directory in the instance data storage directory
- Directory for which the instance data storage directory is under the domain

**-y**

Specify this option to skip the message prompting you to confirm deletion of the domain.

If you omit this option, a message prompting you to confirm deletion of the domain will be displayed.

## Environment

PGDATA

Specify the absolute path of the data storage destination of the instance. If the `pgx_jadmin` command with the `-D` option or `--pgdata` is specified, then that will be used.

## Diagnostics

0 : On success

otherwise : On error

## Notes

The Executing of this command cannot be done at the same time.

## Using an escape character

To use any of the following characters as the value of an option or operand in the command, you must escape it with `"\"`. However, do not specify escape character when you specify `--dbuser` and `--dbpassword` excluding the metacharacter for the `modify-container-db` subcommand.

### W

#### Windows

| Character type   | Description  | Characters           |
|--|--|----------------------|
| Java escape sequence                                     | Character used as an escape character in Java                            | <code>"\"</code> etc |
| Special character of the <code>pgx_jadmin</code> command | Special character used as a delimiter or escape character in subcommands | <code>.-:=</code>    |

### L

#### Linux

| Character type   | Description  | Characters  |
|--|--|---|
| Metacharacter  | Character used as a metacharacter  | <code>;&amp;() &gt;&lt;?*?[]~+-@!"\"`\${}^(*1)</code> |
| Java escape sequence                                     | Character used as an escape character in Java                            | <code>"\"</code>                                      |
| Special character of the <code>pgx_jadmin</code> command | Special character used as a delimiter or escape character in subcommands | <code>.-:=</code>                                     |

\*1: The characters treated as metacharacters vary depending on the type of shell being used.

To set the password of the user who will connect to the instance to `"pass\word!"`:

### W

```
pgx_jadmin create-container --dbname db01 --dbuser user1 --dbpassword pass\\word\!
```

### L

```
pgx_jadmin create-container --dbname db01 --dbuser user1 --dbpassword pass\\\\word\!
```

## Stop of instance

The following subcommand can only be executed when the database server is stopping.

- `init-domain`
- `create-container`
- `add-instance`

- delete-instance
- modify-domain-port
- modify-instance-port
- modify-container-db
- modify-jvm-options
- delete-container
- delete-domain
- backup
- restore

### Start the instance

The following subcommand can only be executed when the instance is being started:

- list-jvm-options

### Command executing user

**W**

The all subcommand execute this command as:

- User with administrator privileges on the operating system

**L**

The init-domain subcommand and the delete-domain subcommand and the backup subcommand and the restore subcommand execute this command as:

- Operating system administrator

The others subcommand execute this command as:

- instance administrator

The list-domain subcommand is the Executing by the above-mentioned user.

**W**

### Create the domain

Register the instance in the Windows services before creating the domain.

### Deletion of domain

Delete of domain before uninstalling FUJITSU Enterprise Postgres. Deleting a domain deletes the domain root directory. Back up the required directories and files before executing this command.

### Backup storage directory of PL/extJava

Do not update or delete files in the backup storage directory of PL/extJava. Otherwise, you may not be able to recover the PL/extJava.

Do not store other files in the backup storage directory of PL/extJava.

## Examples

### Create a domain

The following example omits the domain management port numbers and the instance data storage directory.

**W**

```
pgx_jadmin init-domain --shreddir C:\database\domain --dbadminuser dbadmin1
```

**L**

```
pgx_jadmin init-domain --shreddir /database/domain --dbadminuser dbadmin1
```

The following example specifies the domain management port numbers and the instance data storage directory.

**W**

```
pgx_jadmin init-domain --sharedir C:\database\domain --dbadminuser dbadmin1
--domainport 27530,27521,27522 --pgdata C:\database\inst1
```

**L**

```
pgx_jadmin init-domain --sharedir /database/domain --dbadminuser dbadmin1
--domainport 27530,27521,27522 --pgdata /database/inst1
```

### Delete a domain

The following example shows the command when the domain has no containers.

```
pgx_jadmin delete-domain
```

The following example forcibly deletes the containers in the domain.

```
pgx_jadmin delete-domain --force
```

### Display domain information

To display the domain information:

```
pgx_jadmin list-domain
```

#### Contents of list-domain

```
domain status: (1)
sharedir:      (2)
domainport:    (3)
dbadminuser:   (4)
datadir:       (5)
```

- (1) Domain status
  - running : Start state
  - not running : Stop state
- (2) Directory (domain root) that will store the domain resources
- (3) Domain management port number (x 3)
- (4) Instance (database) administrator
- (5) Instance data storage directory

**W**

### Display example

```
domain status: running
sharedir: C:\database\domain
domainport: 27530,27521,27522
dbadminuser: dbadmin1
datadir: C:\database\inst1
```

**L**

### Display example

```
domain status: running
sharedir: /database/domain
domainport: 27530,27521,27522
dbadminuser: dbadmin1
datadir: /database/inst1
```

### Modify the domain management port numbers

To modify the domain management ports:

```
pgx_jadmin modify-domain-port --domainport 27600,27601,27602
```

### Create a container

The following example omits the port number of the instance and the port number of the server instance.

```
pgx_jadmin create-container --dbname db01 --dbuser user1 --dbpassword password1
```

The following example specifies the port number of the instance and the port number of the server instance.

```
pgx_jadmin create-container --dbname db01 --dbuser user1 --dbpassword password1
--dbport 27011 --instanceport 27531,27532
```

### Delete a container

To delete a container:

```
pgx_jadmin delete-container --dbname db01
```

### Display container information

To display container information:

```
pgx_jadmin list-container --dbname db01
```

### Contents of list-container display

```
container status: (1)
dbname:           (2)
instance:         (3) (4)
dbport:           (5)
dbuser:           (6)
```

- (1) Container status
  - running : Start state (all server instances are started)
  - partially running : Degrading start (some server instances are stopped)
  - not running : Stop state (all server instances are stopped)
- (2) Database name
- (3) Server instance name
- (4) Server instance management port number (x 2)
- (5) Instance port number
- (6) User name for connecting to the instance

### Display example

```
container status: running
dbname: db01
instance: db01-1 27531,27532
instance: db01-2 27801,27802
dbport: 27011
dbuser: user1
```

### Add a server instance(JavaVM)

To add a server instance(JavaVM):

```
pgx_jadmin add-instance --dbname db01 --instanceport 27801,27802
```

### Delete a server instance(JavaVM)

To delete a server instance(JavaVM):

```
pgx_jadmin delete-instance --dbname db01
```

### Modify the server instance(JavaVM) management port numbers

To modify the server instance(JavaVM) management port numbers:

```
pgx_jadmin modify-instance-port --instance db01-1 --instanceport 27701,27702
```

### Modify the instance connection information

To modify the user name and password used for connecting to the database:

```
pgx_jadmin modify-container-db --dbname db01 --dbuser user02 --dbpassword passwd2
```

## Display JavaVM option information of a container

To display the JavaVM options of a container:

```
pgx_jadmin list-jvm-options --dbname db01
```

## Modify the JavaVM settings

To modify the JavaVM heap area size and the Perm area size:

```
pgx_jadmin modify-jvm-options --dbname db01 --heapsize 1024 --permsize 384
```

## Backup the PL/extJava

To backup the PL/extJava:

**W**

```
pgx_jadmin backup --backupdir D:\backup
```

**L**

```
pgx_jadmin backup --backupdir /backup
```

## Restore the PL/extJava

To restore the PL/extJava:

**W**

```
pgx_jadmin restore --backupdir D:\backup
```

**L**

```
pgx_jadmin restore --backupdir /backup
```

# FUJITSU Enterprise Postgres 9.5



## Message Guide

Windows/Linux

J2UL-2113-02ENZO(00)  
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# Preface

---

## Purpose of this document

This document explains the messages output by FUJITSU Enterprise Postgres.

## Intended readers

This document is intended for the following readers:

- Persons using FUJITSU Enterprise Postgres

## Prerequisites

Knowledge of the following topics is required to read this document:

- A general understanding of computers
- Jobs
- PostgreSQL
- Linux
- Windows

L

W

## Structure of this document

This document is structured as follows:

### [Chapter 1 Overview of Messages](#)

This chapter explains the format in which messages are output.

### [Chapter 2 FUJITSU Enterprise Postgres Messages](#)

This chapter explains the messages that are output and the actions to take based on the message information.

### [Chapter 3 Mirroring Controller Messages](#)

This chapter explains messages output by the Mirroring Controller.

## Export Restrictions

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# Chapter 1 Overview of Messages

This chapter explains the format of messages.

## 1.1 Message Format

This section explains the format of messages.

- Output format
- Components

### 1.1.1 Output Format

The message output format is as follows:

#### Format of messages returned to an application

```
msgType: msgText (msgNumber)
```

#### Format of messages output to the server message log

```
SQLSTATE: date [processID]: [internalCode-1] user = userName, db = dbName, remote =  
clientIpAddress(portNumber) app = appName msgType: msgText (msgNumber)
```



See

Refer to "PostgreSQL Error Codes" under "Appendixes" in the PostgreSQL Documentation for information on SQLSTATE.



Note

- Notes on monitoring messages output to the server message log

Use SQLSTATE to monitor server messages, noting the following:

- Configuration method
  - Refer to "Error Log Settings" under "Setup" in the Installation and Setup Guide for Server for details.
- Notes
  - The user name, client IP address (port number), and application name may sometimes be blank.
  - Multiple message numbers may be output.
- Notes on monitoring messages returned to an application

You can output SQLSTATE to a message to be returned to an application. The following explains how to configure the settings for outputting SQLSTATE and gives cautions to be observed when doing so.

- How to configure the settings:
  - In the SET statement, set the log\_error\_verbosity parameter to VERBOSE.
  - For an application that uses the C language library, use the PQsetErrorVerbosity function to set message redundancy to PQERRORS\_VERBOSE.
- Cautions
  - SQLSTATE is output only to messages to be returned to applications that use the C language library.

- In some cases, *userName*, *clientIpAddress(portNumber)*, and *applicationName* may be blank.
- Multiple message numbers may be output.
- If the email address "pgsql-bugs@postgresql.org" is output to the message and the cause of the error cannot be identified, contact Fujitsu technical support.



## Example

### Message output to the server message log

```
3D000: 2015-07-10 19:41:05 JST [13899]: [1-1] user = fepuser,db = fep,remote =
127.0.0.1(51902) app = [unknown] FATAL: database "fep" does not exist (10571)
```

## 1.1.2 Components

This section explains the components of a message.

### Message type

The message type indicates the type of error denoted in the message.

The message type will be one of the following:

- Information (INFO, NOTICE, LOG, DEBUG)

This message type denotes a notification from the system, not an error. There is no need to take action.

- Warning (WARNING)

This message type denotes that no error occurred but confirmation or action is required by the user. Take the actions described in the "Action" section of the message.

- Error (ERROR, FATAL, PANIC)

This message type denotes that an error has occurred. Take the actions described in the "Action" section of the message.

- Supplementary information (DETAIL, HINT, QUERY, CONTEXT, LOCATION, STATEMENT)

This message type denotes supplementary information relating to the previous message. If the message was output in English, the message type will also be in English. (Detail, hint, query, context, location, statement)

### Message text

The text of the message reports the status of the system or an error in the system.

The notation "@numeric character@" that appears in "[Chapter 2 FUJITSU Enterprise Postgres Messages](#)" indicates an embedded character string. A character string is output to a message that is actually output.

If a message locale other than 'ja' is specified, messages added by FUJITSU Enterprise Postgres will be output in English.

For other message locales, the messages are output in English.

However, messages output by the `pgx_jadmin` command will always be displayed in English regardless of the message locale.

### Message number

The message number uniquely identifies each message. It is output as a string of five single-byte numeric characters. Use the message number that is output to find the explanation of the corresponding message in this document. The message numbers may change, so do not use them as keywords for monitoring.

No message number is assigned to messages output by a PL/pgSQL RAISE statement.

The message number is only output if the message locale is 'ja' or 'en'. For other message locales, the message number is not output.

## 1.2 Mirroring Controller Message Format

This section explains the format of messages output by the Mirroring Controller.

Mirroring Controller messages are output to the following locations:

**L**

- System log

**W**

- Event log

### Output format

```
programName[processId]: msgType: msgText (msgNumber)
```

For *programName*, use the value of the `syslog_ident` parameter or `event_source` parameter defined in the `serverIdentifier.conf` file.

**L**

The message types output by Mirroring Controller, their severity, and their corresponding value in the system log are shown in the table below.

**L**

Table 1.1 Message type, severity, and corresponding value in the system log

| Message type | Severity    | Meaning  | System log |
|--------------|-------------|--|------------|
| INFO         | Information | Provides information not categorized as LOG or NOTICE.   | INFO       |
| LOG          |             | Provides information recognized as a particularly important event in tracing the operation history.<br><br>(Example: Automatic switch is complete)                   |            |
| NOTICE       | Notice      | Outputs information that takes into account the user instructions within the program in response to an executed or automatically executed process.                   | NOTICE     |
| WARNING      | Warning     | Provides a warning, for example it will soon be impossible to maintain multiplexing capabilities.  | WARNING    |
| ERROR        | Error       | Reports that an error other than FATAL or PANIC has occurred.  | ERROR      |
| FATAL        |             | Reports that an error has been detected requiring system recovery in one of the multiplexed database systems. It also reports the content and cause of the error.    | CRIT       |
| PANIC        |             | Reports that an error has been detected requiring immediate system recovery in all multiplexed database systems. It also reports the content and cause of the error. | ALERT      |

**W**

The message types output by Mirroring Controller, their severity, and their corresponding value in the event log are shown in the table below.

Table 1.2 Message type, severity, and corresponding value in the event log

| Message type | Severity    | Meaning  | Event log   |
|--------------|-------------|--|-------------|
| INFO         | Information | Provides information not categorized as LOG or NOTICE.   | INFORMATION |
| LOG          |             | Provides information recognized as a particularly important event in tracing the operation history.<br><br>(Example: Automatic switch is complete)                   |             |
| NOTICE       | Notice      | Outputs information that takes into account the user instructions within the program in response to an executed or automatically executed process.                   |             |
| WARNING      | Warning     | Provides a warning, for example it will soon be impossible to maintain multiplexing capabilities.  | WARNING     |
| ERROR        | Error       | Reports that an error other than FATAL or PANIC has occurred.  | ERROR       |
| FATAL        |             | Reports that an error has been detected requiring system recovery in one of the multiplexed database systems. It also reports the content and cause of the error.    |             |
| PANIC        |             | Reports that an error has been detected requiring immediate system recovery in all multiplexed database systems. It also reports the content and cause of the error. |             |

The message severity has the following meanings:

- Information

Informational status. A message that was reported by the system is displayed. No action is required.

- Notice

Informational status, but a message that should be noted is displayed. If necessary, take the actions described in the "Action" section of the message.

- Warning

No error has occurred, but the user is requested to check, and take action. Take the actions described in the "Action" section of the message.

- Error

An error has occurred. Take the actions described in the "Action" section of the message.

## Chapter 2 FUJITSU Enterprise Postgres Messages

This chapter explains messages output by FUJITSU Enterprise Postgres.

### 2.1 Message Numbers Beginning with 10000

---

#### 2.1.1 10001

---

**no Snowball stemmer available for language "@1@" and encoding "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

#### 2.1.2 10002

---

**multiple StopWords parameters**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

#### 2.1.3 10003

---

**multiple Language parameters**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

#### 2.1.4 10004

---

**unrecognized Snowball parameter: "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.5 10005

---

### missing Language parameter

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.6 10006

---

### could not determine which collation to use for index expression

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.7 10007

---

### old GIN indexes do not support whole-index scans nor searches for nulls

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.8 10008

---

### index row size @1@ exceeds maximum @2@ for index "@3@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.9 10009

---

**"@1@" is an index**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.10 10010

---

**could not create archive status file "@1@": @2@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.1.11 10011

---

**could not write archive status file "@1@": @2@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.1.12 10012

---

**could not seek in log segment @1@ to offset @2@: @3@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.13 10013

---

**could not write to log file @1@ at offset @2@, length @3@: @4@**

### [Description]

There are the following cases:

- failed to write transaction log file
- failed to write transaction log file on backup data storage destination

### [System Processing]

Processing will be aborted.

### [Action]

Lack of storage space or malfunction of storage allocating the file shown in this message is considered.

If it's true, recover the database system according to "Actions when an Error Occurs" of "Operation Guide" or "Cluster Operation Guide".

If it's not true, identify the cause according to the informations in this message such as errno, and work around.

The following major causes are considered.

- the file has no permission or the permission has been changed
- power of the storage allocating the file has been turned off
- unmounted the storage allocating the file
- another process or human operated the file
- the storage allocating the file has crashed

## 2.1.14 10014

---

**updated min recovery point to @1@/@2@ on timeline @3@**

### [Description]

Terminated normally.

### [System Processing]

Continues processing.

### [Action]

No action required.

## 2.1.15 10015

---

**could not open file "@1@": @2@**

### [Description]

An error occurred during I/O processing in the database server.

### [System Processing]

Processing will be aborted.

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.16 10016

---

### could not create file "@1@": @2@

#### [Description]

There was insufficient free space in the disk of the database server during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Delete user data stored in the database server to free up space on the disk.

## 2.1.17 10017

---

### could not write to file "@1@": @2@

#### [Description]

There was insufficient free space in the disk of the database server during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Delete user data stored in the database server to free up space on the disk.

## 2.1.18 10018

---

### could not fsync file "@1@": @2@

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.19 10019

---

### could not close file "@1@": @2@

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.20 10022

---

---

**not enough data in file "@1@"****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.1.21 10023**

---

**could not link file "@1@" to "@2@" (initialization of log file): @3@****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.1.22 10024**

---

**could not rename file "@1@" to "@2@" (initialization of log file): @3@****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.1.23 10025**

---

**could not close log file @1@: @2@****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.1.24 10026**

---

**could not read file "@1@" : @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.25 10027

---

### could not remove file "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.1.26 10028

---

### archive file "@1@" has wrong size: @2@ instead of @3@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.27 10029

---

### restored log file "@1@" from archive

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.1.28 10030

---

### could not restore file "@1@" from archive: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.29 10032

---

### could not open transaction log directory "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.30 10033

---

### recycled transaction log file "@1@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.1.31 10034

---

### removing transaction log file "@1@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.1.32 10035

---

### could not rename old transaction log file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.1.33 10036

---

**could not remove old transaction log file "@1@": @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.1.34 10037

---

**required WAL directory "@1@" does not exist**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.1.35 10038

---

**creating missing WAL directory "@1@"**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

### 2.1.36 10039

---

**could not create missing directory "@1@": @2@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.1.37 10040

---

### removing transaction log backup history file "@1@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.1.38 10043

---

### incorrect resource manager data checksum in record at @1@/@2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.39 10044

---

### invalid record offset at @1@/@2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.40 10045

---

### contrecord is requested by @1@/@2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.41 10048

---

### invalid record length at @1@/@2@

#### [Description]

invalid record length was found on archive log or transaction log data.

#### [System Processing]

The following causes could be considered.

- if the log level is information(INFO, NOTICE, LOG, DEBUG)

Continue processing.

- if the log level is error(ERROR, FATAL, PANIC)

Processing will be aborted.

#### [Action]

If the log level is information(INFO, NOTICE, LOG, DEBUG), no action is required.

When the log level is error(ERROR, FATAL, PANIC), take either of the following actions.

- if this message is output during starting instance

Please restore according to "Deal at the time of abnormality" of "Operation Guide" or "Cluster Operation Guide".

- if this message is output during recovering

Cannot continue to recover with the current backup data because an archive log in the backup has an error.

Recover from the other backup data.

## 2.1.42 10049

---

### invalid resource manager ID @1@ at @2@/@3@

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.43 10050

---

### record with incorrect prev-link @1@/@2@ at @3@/@4@

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.44 10051

---

**record length @1@ at @2@/@3@ too long**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.45 10052

---

**there is no contrecord flag at @1@/@2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.46 10053

---

**invalid contrecord length @1@ at @2@/@3@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.47 10054

---

**invalid magic number @1@ in log segment @2@, offset @3@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.48 10055

---

---

**invalid info bits @1@ in log segment @2@, offset @3@****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.1.49 10056**

---

**WAL file is from different database system: WAL file database system identifier is @1@, pg\_control database system identifier is @2@****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.1.50 10057**

---

**unexpected pageaddr @1@/@2@ in log segment @3@, offset @4@****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.1.51 10058**

---

**unexpected timeline ID @1@ in log segment @2@, offset @3@****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.1.52 10059**

---

**out-of-sequence timeline ID @1@ (after @2@) in log segment @3@, offset @4@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.53 10060

---

**syntax error in history file: @1@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.54 10061

---

**invalid data in history file: @1@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.55 10062

---

**invalid data in history file "@1@"**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.56 10063

---

**new timeline @1@ is not a child of database system timeline @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.57 10064

---

**new target timeline is @1@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.1.58 10065

---

**could not rename file "@1@" to "@2@" : @3@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.59 10066

---

**could not link file "@1@" to "@2@" : @3@**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.1.60 10067

---

**could not create control file "@1@" : @2@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.1.61 10068

---

**could not write to control file: @1@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.1.62 10069

---

**could not fsync control file: @1@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.63 10070

---

**could not close control file: @1@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.64 10071

---

**could not open control file "@1@": @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.65 10072

---

### could not read from control file: @1@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.66 10073

---

### database files are incompatible with server

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.67 10074

---

### incorrect checksum in control file

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.68 10075

---

### could not write bootstrap transaction log file: @1@

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.1.69 10076

---

**could not fsync bootstrap transaction log file: @1@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.70 10077

---

**could not close bootstrap transaction log file: @1@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.71 10078

---

**could not open recovery command file "@1@": @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.72 10079

---

**parameter "@1@" requires a Boolean value**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.73 10080

---

---

**recovery\_target\_timeline is not a valid number: "@1@"****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.1.74 10081**

---

**recovery\_target\_xid is not a valid number: "@1@"****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.1.75 10082**

---

**recovery\_target\_name is too long (maximum @1@ characters)****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.1.76 10083**

---

**unrecognized recovery parameter "@1@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.1.77 10084**

---

**recovery command file "@1@" specified neither primary\_conninfo nor restore\_command**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.1.78 10085

---

### recovery command file "@1@" must specify restore\_command when standby mode is not enabled

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.79 10086

---

### recovery target timeline @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.80 10087

---

### archive recovery complete

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.1.81 10088

---

### recovery stopping after commit of transaction @1@, time @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.82 10089

---

### recovery stopping before commit of transaction @1@, time @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.83 10090

---

### recovery stopping after abort of transaction @1@, time @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.84 10091

---

### recovery stopping before abort of transaction @1@, time @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.85 10092

---

### recovery stopping at restore point "@1@", time @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.1.86 10093

---

**recovery has paused**

[Description]

An error occurred because execution is temporarily impossible.

[System Processing]

Processing will be aborted.

[Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.1.87 10094

---

**must be superuser to control recovery**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.88 10095

---

**recovery is in progress**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.89 10096

---

**hot standby is not possible because @1@ = @2@ is a lower setting than on the master server (its value was @3@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.90 10097

---

**WAL was generated with wal\_level=minimal, data may be missing**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.1.91 10098

---

**hot standby is not possible because wal\_level was not set to "hot\_standby" or higher on the master server**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.1.92 10099

---

**control file contains invalid data**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2 Message Numbers Beginning with 10100

---

### 2.2.1 10100

---

**database system was shut down at @1@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.2 10101

---

### database system was shut down in recovery at @1@

[Description]

Displaying the date and time that the standby server is shut down last time.

[System Processing]

Continues processing.

[Action]

No action is required.

## 2.2.3 10102

---

### database system shutdown was interrupted; last known up at @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.4 10103

---

### database system was interrupted while in recovery at @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.5 10104

---

### database system was interrupted while in recovery at log time @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.6 10105

---

### database system was interrupted; last known up at @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.7 10106

---

### requested timeline @1@ is not a child of this server's history

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.8 10107

---

### entering standby mode

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.9 10108

---

### starting point-in-time recovery to XID @1@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.10 10109

---

**starting point-in-time recovery to @1@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.11 10110

---

**starting point-in-time recovery to "@1@"**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.12 10111

---

**starting archive recovery**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.13 10112

---

**checkpoint record is at @1@/@2@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.14 10113

---

### could not find redo location referenced by checkpoint record

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.15 10114

---

### could not locate required checkpoint record

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.16 10115

---

### could not locate a valid checkpoint record

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.17 10116

---

### using previous checkpoint record at @1 @/@2 @

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.18 10121

---

---

### invalid next transaction ID

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.2.19 10122

---

### invalid redo in checkpoint record

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.2.20 10123

---

### invalid redo record in shutdown checkpoint

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.2.21 10124

---

### database system was not properly shut down; automatic recovery in progress

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.2.22 10125

---

### initializing for hot standby

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.23 10126

---

**redo starts at @1 @/@2@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.24 10127

---

**redo done at @1 @/@2@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.25 10128

---

**last completed transaction was at log time @1@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.26 10129

---

**redo is not required**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.2.27 10130

---

### requested recovery stop point is before consistent recovery point

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.28 10131

---

### WAL ends before end of online backup

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.29 10132

---

### WAL ends before consistent recovery point

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.30 10133

---

### selected new timeline ID: @1@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.31 10134

---

**consistent recovery state reached at @1@/@2@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.32 10135

---

**invalid primary checkpoint link in control file**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.33 10136

---

**invalid secondary checkpoint link in control file**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.34 10137

---

**invalid checkpoint link in backup\_label file**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.35 10138

---

### invalid primary checkpoint record

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.36 10139

---

### invalid secondary checkpoint record

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.37 10140

---

### invalid checkpoint record

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.38 10141

---

### invalid resource manager ID in primary checkpoint record

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.39 10142

---

### invalid resource manager ID in secondary checkpoint record

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.40 10143

---

### invalid resource manager ID in checkpoint record

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.41 10144

---

### invalid xl\_info in primary checkpoint record

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.42 10145

---

### invalid xl\_info in secondary checkpoint record

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.43 10146

---

---

### invalid xl\_info in checkpoint record

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.2.44 10147

---

### invalid length of primary checkpoint record

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.2.45 10148

---

### invalid length of secondary checkpoint record

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.2.46 10149

---

### invalid length of checkpoint record

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.2.47 10150

---

### shutting down

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.48 10151

---

### database system is shut down

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.49 10152

---

### concurrent transaction log activity while database system is shutting down

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.50 10153

---

### skipping restartpoint, recovery has already ended

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.51 10154

---

### skipping restartpoint, already performed at @1@/@2@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.52 10155

---

**recovery restart point at @1 @/ @2 @**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.53 10156

---

**restore point "@1 @" created at @2 @/ @3 @**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.54 10157

---

**unexpected timeline ID @1 @ (after @2 @) in checkpoint record**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.55 10158

---

**unexpected timeline ID @1 @ (should be @2 @) in checkpoint record**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.56 10159

---

### could not fsync log segment @1@: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.57 10160

---

### could not fsync write-through log file @1@: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.58 10161

---

### could not fdatsync log file @1@: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.59 10162

---

### must be superuser or replication role to run a backup

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.60 10163

---

### recovery is not in progress

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.61 10164

---

### WAL level not sufficient for making an online backup

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.62 10165

---

### backup label too long (max @1@ bytes)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.63 10166

---

### a backup is already in progress

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.64 10167

---

---

**could not stat file "@1@": @2@****[Description]**

There was insufficient free space in the disk of the database server during execution of the application.

**[System Processing]**

Processing will be aborted.

**[Action]**

Delete user data stored in the database server to free up space on the disk.

---

**2.2.65 10168**

---

**a backup is not in progress****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.2.66 10169**

---

**invalid data in file "@1@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.2.67 10170**

---

**pg\_stop\_backup cleanup done, waiting for required WAL segments to be archived****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.2.68 10171**

---

**pg\_stop\_backup still waiting for all required WAL segments to be archived (@1@ seconds elapsed)**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.2.69 10172

---

### **pg\_stop\_backup complete, all required WAL segments have been archived**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.70 10173

---

### **WAL archiving is not enabled; you must ensure that all required WAL segments are copied through other means to complete the backup**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.71 10174

---

### **must be superuser to switch transaction log files**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.72 10175

---

### **must be superuser to create a restore point**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.73 10176

---

### WAL level not sufficient for creating a restore point

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.74 10177

---

### value too long for restore point (maximum @1@ characters)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.75 10179

---

### could not read from log segment @1@, offset @2@: @3@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.76 10180

---

### received promote request

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.77 10181

---

**trigger file found: @1@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.78 10182

---

**database is not accepting commands to avoid wraparound data loss in database "@1@"**

[Description]

An error occurred because execution is temporarily impossible.

[System Processing]

Processing will be aborted.

[Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.2.79 10183

---

**database is not accepting commands to avoid wraparound data loss in database with OID @1@**

[Description]

An error occurred because execution is temporarily impossible.

[System Processing]

Processing will be aborted.

[Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.2.80 10184

---

**database "@1@" must be vacuumed within @2@ transactions**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.2.81 10185

---

**database with OID @1@ must be vacuumed within @2@ transactions**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.2.82 10186

---

**transaction ID wrap limit is @1@, limited by database with OID @2@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.2.83 10187

---

**transaction identifier "@1@" is too long**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.84 10188

---

**prepared transactions are disabled**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.85 10189

---

**transaction identifier "@1@" is already in use**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.86 10190

---

**maximum number of prepared transactions reached**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.87 10191

---

**prepared transaction with identifier "@1@" is busy**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.88 10192

---

**permission denied to finish prepared transaction**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.89 10193

---

### prepared transaction belongs to another database

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.90 10194

---

### prepared transaction with identifier "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.91 10195

---

### two-phase state file maximum length exceeded

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.2.92 10196

---

### could not create two-phase state file "@1@": @2@

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.2.93 10197

---

**could not write two-phase state file: @1@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.2.94 10198

---

**could not seek in two-phase state file: @1@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.2.95 10199

---

**could not close two-phase state file: @1@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.3 Message Numbers Beginning with 10200

---

### 2.3.1 10200

---

**could not open two-phase state file "@1@": @2@**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.3.2 10201

---

### could not stat two-phase state file "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.3.3 10202

---

### could not read two-phase state file "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.3.4 10203

---

### two-phase state file for transaction @1@ is corrupt

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.3.5 10204

---

### could not remove two-phase state file "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.3.6 10205

---

### could not recreate two-phase state file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.3.7 10206

---

### could not fsync two-phase state file: @1@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.3.8 10207

---

### could not fsync two-phase state file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.3.9 10208

---

### could not close two-phase state file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.3.10 10209

---

### removing future two-phase state file "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.3.11 10210

---

### removing corrupt two-phase state file "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.3.12 10211

---

### removing stale two-phase state file "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.3.13 10212

---

### recovering prepared transaction @1@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

### 2.3.14 10213

---

**file "@1@" doesn't exist, reading as zeroes**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

### 2.3.15 10214

---

**could not access status of transaction @1@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.3.16 10215

---

**could not truncate directory "@1@": apparent wraparound**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

### 2.3.17 10216

---

**removing file "@1@"**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

### 2.3.18 10217

---

**cannot have more than 2<sup>32</sup>-2 commands in a transaction**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.19 10218

---

**maximum number of committed subtransactions (@1@) exceeded**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.20 10219

---

**cannot PREPARE a transaction that has operated on temporary tables**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.21 10220

---

**@1@ cannot run inside a transaction block**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.22 10221

---

### @1@ cannot run inside a subtransaction

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.23 10222

---

### @1@ cannot be executed from a function or multi-command string

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.24 10223

---

### @1@ can only be used in transaction blocks

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.25 10224

---

### there is already a transaction in progress

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.3.26 10225

---

### there is no transaction in progress

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.3.27 10226

---

### no such savepoint

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.28 10227

---

### cannot have more than 2<sup>32</sup>-1 subtransactions in a transaction

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.29 10228

---

### index "@1@" is not a btree

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.3.30 10229

---

**version mismatch in index "@1@": file version @2@, code version @3@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.3.31 10230

---

**index "@1@" contains unexpected zero page at block @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.3.32 10231

---

**index "@1@" contains corrupted page at block @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.3.33 10232

---

**duplicate key value violates unique constraint "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.34 10233

---

---

### failed to re-find tuple within index "@1@"

#### [Description]

An unexpected error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

Contact Fujitsu technical support.

---

## 2.3.35 10234

---

### row is too big: size @1@, maximum size @2@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.3.36 10235

---

### "@1@" is not an index

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.3.37 10236

---

### "@1@" is a composite type

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.3.38 10237

---

### could not obtain lock on row in relation "@1@"

[Description]

An error occurred because execution is temporarily impossible.

[System Processing]

Processing will be aborted.

[Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.3.39 10238

---

### hash indexes do not support whole-index scans

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.40 10239

---

### index "@1@" is not a hash index

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.3.41 10240

---

### index "@1@" has wrong hash version

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.3.42 10241

---

### out of overflow pages in hash index "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.43 10242

---

**index row size @1@ exceeds hash maximum @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.44 10243

---

**column "@1@" cannot be declared SETOF**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.45 10244

---

**number of columns (@1@) exceeds limit (@2@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.46 10245

---

**user-defined relation parameter types limit exceeded**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### 2.3.47 10246

---

#### RESET must not include values for parameters

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### 2.3.48 10247

---

#### unrecognized parameter namespace "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### 2.3.49 10248

---

#### unrecognized parameter "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### 2.3.50 10249

---

#### parameter "@1@" specified more than once

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.51 10250

---

**invalid value for boolean option "@1@": @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.52 10251

---

**invalid value for integer option "@1@": @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.53 10252

---

**value @1@ out of bounds for option "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.54 10253

---

**invalid value for floating point option "@1@": @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.55 10254

---

**unsupported format code: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.56 10255

---

**number of index columns (@1@) exceeds limit (@2@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.57 10256

---

**index row requires @1@ bytes, maximum size is @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.58 10257

---

**picksplit method for column @1@ of index "@2@" failed**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.3.59 10259

---

---

### **index "@1@" contains an inner tuple marked as invalid**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.3.60 10260**

---

### **aggregate @1@ needs to have compatible input type and transition type**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.3.61 10261**

---

### **could not create exclusion constraint "@1@"**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.3.62 10262**

---

### **conflicting key value violates exclusion constraint "@1@"**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.3.63 10263**

---

### **RIGHT JOIN is only supported with merge-joinable join conditions**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.3.64 10264

---

### **FULL JOIN is only supported with merge-joinable join conditions**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.3.65 10265

---

### **could not determine actual type of argument declared @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.3.66 10266

---

### **@1@ is not allowed in a SQL function**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.3.67 10267

---

### **@1@ is not allowed in a non-volatile function**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.68 10268

---

#### could not determine actual result type for function declared to return type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.69 10269

---

#### set-valued function called in context that cannot accept a set

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.70 10270

---

#### return type mismatch in function declared to return @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.71 10271

---

#### return type @1@ is not supported for SQL functions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.72 10272

---

**cannot change sequence "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.73 10273

---

**cannot change TOAST relation "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.74 10274

---

**cannot insert into view "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.75 10275

---

**cannot update view "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.76 10276

---

### cannot copy from view "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.77 10278

---

### cannot change relation "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.78 10279

---

### cannot lock rows in sequence "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.79 10280

---

### cannot lock rows in TOAST relation "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.80 10281

---

---

### cannot lock rows in view "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.3.81 10282

---

### cannot lock rows in foreign table "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.3.82 10283

---

### cannot lock rows in relation "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.3.83 10284

---

### null value in column "@1@" violates not-null constraint

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.3.84 10285

---

### new row for relation "@1@" violates check constraint "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### 2.3.85 10286

---

#### could not serialize access due to concurrent update

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### 2.3.86 10287

---

#### ON COMMIT can only be used on temporary tables

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### 2.3.87 10288

---

#### cannot create temporary table within security-restricted operation

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### 2.3.88 10289

---

#### could not rewind hash-join temporary file: @1@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.3.89 10290

---

**could not write to hash-join temporary file: @1@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.3.90 10291

---

**could not read from hash-join temporary file: @1@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.3.91 10292

---

**relation "@1@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.92 10293

---

**cursor "@1@" is not a SELECT query**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.93 10294

---

**cursor "@1@" is held from a previous transaction**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.94 10295

---

**cursor "@1@" has multiple FOR UPDATE/SHARE references to table "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.95 10296

---

**cursor "@1@" does not have a FOR UPDATE/SHARE reference to table "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.3.96 10297

---

**cursor "@1@" is not positioned on a row**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.97 10298

---

### cursor "@1@" is not a simply updatable scan of table "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.3.98 10299

---

### type of parameter @1@ (@2@) does not match that when preparing the plan (@3@)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4 Message Numbers Beginning with 10300

---

### 2.4.1 10300

---

#### no value found for parameter @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.4.2 10301

---

#### more than one row returned by a subquery used as an expression

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.4.3 10302

---

#### frame starting offset must not be null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.4.4 10303

---

#### frame starting offset must not be negative

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.4.5 10304

---

#### frame ending offset must not be null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.4.6 10305

---

#### frame ending offset must not be negative

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.4.7 10306

---

---

### transaction left non-empty SPI stack

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.4.8 10307

---

### subtransaction left non-empty SPI stack

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.4.9 10308

---

### cannot open multi-query plan as cursor

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.4.10 10309

---

### cannot open @1@ query as cursor

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.4.11 10310

---

### **DECLARE SCROLL CURSOR ... FOR UPDATE/SHARE is not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.4.12 10311**

---

#### **number of array dimensions (@1@) exceeds the maximum allowed (@2@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.4.13 10312**

---

#### **array subscript in assignment must not be null**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.4.14 10313**

---

#### **attribute @1@ has wrong type**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.4.15 10314**

---

#### **table row type and query-specified row type do not match**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.16 10315

---

**cannot pass more than @1@ argument to a function  
cannot pass more than @2@ arguments to a function**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.17 10316

---

**functions and operators can take at most one set argument**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.18 10317

---

**function returning setof record called in context that cannot accept type record**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.19 10318

---

**function return row and query-specified return row do not match**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.20 10319

---

### table-function protocol for materialize mode was not followed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.21 10320

---

### unrecognized table-function returnMode: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.22 10321

---

### function returning set of rows cannot return null value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.23 10322

---

### rows returned by function are not all of the same row type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.24 10323

---

### IS DISTINCT FROM does not support set arguments

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.25 10324

---

### op ANY/ALL (array) does not support set arguments

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.26 10325

---

### cannot merge incompatible arrays

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.27 10326

---

### multidimensional arrays must have array expressions with matching dimensions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.28 10327

---

### NULLIF does not support set arguments

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.29 10328

---

### domain @1@ does not allow null values

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.30 10329

---

### value for domain @1@ violates check constraint "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.31 10330

---

### aggregate function calls cannot be nested

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.32 10331

---

### window function calls cannot be nested

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.33 10332

---

### target type is not an array

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.34 10333

---

### ROW() column has type @1@ instead of type @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.35 10334

---

### could not identify a comparison function for type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.36 10335

---

---

### OFFSET must not be negative

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.4.37 10336

---

### LIMIT must not be negative

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.4.38 10337

---

### @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.4.39 10338

---

### could not find array type for data type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.4.40 10339

---

### cannot assign to system column "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.41 10340

---

### cannot set an array element to DEFAULT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.42 10341

---

### cannot set a subfield to DEFAULT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.43 10342

---

### column "@1@" is of type @2@ but default expression is of type @3@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.44 10343

---

### row expansion via "\*" is not supported here

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.45 10344

---

**cannot assign to field "@1@" of column "@2@" because its type @3@ is not a composite type**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.46 10345

---

**cannot assign to field "@1@" of column "@2@" because there is no such column in data type @3@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.47 10346

---

**array assignment requires type @1@ but expression is of type @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.48 10347

---

**column "@1@" is of type @2@ but expression is of type @3@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.49 10348

---

### cannot cast type @1@ to @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.50 10349

---

### column "@1@" of relation "@2@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.51 10350

---

### column name "@1@" specified more than once

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.52 10351

---

### column reference "@1@" is ambiguous

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.53 10352

---

**cross-database references are not implemented: "@1@.@2@.@3@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.54 10353

---

**improper qualified name (too many dotted names): @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.55 10354

---

**SELECT \* with no tables specified is not valid**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.56 10355

---

**there is no parameter \$@1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.57 10356

---

### inconsistent types deduced for parameter \$@1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.58 10357

---

### could not determine data type of parameter \$@1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.59 10358

---

### identifier "@1@" will be truncated to "@2@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.4.60 10363

---

### aggregate functions are not allowed in DEFAULT expressions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.61 10365

---

### column name "@1@" appears more than once in USING clause

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.62 10366

---

### common column name "@1@" appears more than once in left table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.63 10367

---

### column "@1@" specified in USING clause does not exist in left table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.64 10368

---

### common column name "@1@" appears more than once in right table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.65 10369

---

---

### **column "@1@" specified in USING clause does not exist in right table**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.4.66 10370**

---

### **column alias list for "@1@" has too many entries**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.4.67 10371**

---

### **argument of @1@ must not contain variables**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.4.68 10372**

---

### **aggregate functions are not allowed in @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.4.69 10374**

---

### **@1@ "@2@" is ambiguous**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.70 10375

---

### non-integer constant in @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.71 10376

---

### @1@ position @2@ is not in select list

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.72 10377

---

### window "@1@" is already defined

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.73 10378

---

### schema "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.74 10379

---

**cannot override PARTITION BY clause of window "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.75 10380

---

**cannot override ORDER BY clause of window "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.76 10382

---

**in an aggregate with DISTINCT, ORDER BY expressions must appear in argument list**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.77 10383

---

**for SELECT DISTINCT, ORDER BY expressions must appear in select list**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.78 10384

---

### **SELECT DISTINCT ON expressions must match initial ORDER BY expressions**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.79 10385

---

### **"@1@" is not a valid operator name**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.80 10386

---

### **extension "@1@" already exists, skipping**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.4.81 10387

---

### **array of serial is not implemented**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.82 10388

---

**@1@ will create implicit sequence "@2@" for serial column "@3@.@4@"**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.4.83 10389

---

**conflicting NULL/NOT NULL declarations for column "@1@" of table "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.84 10390

---

**multiple default values specified for column "@1@" of table "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.85 10391

---

**referenced relation "@1@" is not a table**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.86 10392

---

### multiple primary keys for table "@1@" are not allowed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.87 10393

---

### cannot use an existing index in CREATE TABLE

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.88 10394

---

### conversion "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.89 10395

---

### index "@1@" is already associated with a constraint

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.4.90 10396

---

---

### **index "@1@" does not belong to table "@2@"**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.4.91 10397**

---

### **index "@1@" is not valid**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.4.92 10399**

---

### **"@1@" is not a unique index**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5 Message Numbers Beginning with 10400**

---

### **2.5.1 10400**

---

#### **index "@1@" contains expressions**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.2 10401

---

### "@1@" is a partial index

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.3 10402

---

### "@1@" is a deferrable index

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.4 10403

---

### index "@1@" does not have default sorting behavior

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.5 10404

---

### column "@1@" named in key does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.6 10405

---

---

### **column "@1@" appears twice in primary key constraint**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5.7 10406**

---

### **column "@1@" appears twice in unique constraint**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5.8 10407**

---

### **index expression cannot return a set**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5.9 10408**

---

### **index expressions and predicates can refer only to the table being indexed**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5.10 10409**

---

### **rule WHERE condition cannot contain references to other relations**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.11 10412

---

### rules with WHERE conditions can only have SELECT, INSERT, UPDATE, or DELETE actions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.12 10413

---

### conditional UNION/INTERSECT/EXCEPT statements are not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.13 10414

---

### ON SELECT rule cannot use OLD

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.14 10415

---

### ON SELECT rule cannot use NEW

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.15 10416

---

### ON INSERT rule cannot use OLD

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.16 10417

---

### ON DELETE rule cannot use NEW

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.17 10418

---

### cannot refer to OLD within WITH query

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.18 10419

---

### cannot refer to NEW within WITH query

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.19 10420

---

### **misplaced DEFERRABLE clause**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.20 10421

---

### **multiple DEFERRABLE/NOT DEFERRABLE clauses not allowed**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.21 10422

---

### **misplaced NOT DEFERRABLE clause**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.22 10423

---

### **constraint declared INITIALLY DEFERRED must be DEFERRABLE**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.23 10424

---

### **misplaced INITIALLY DEFERRED clause**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.24 10425

---

### **multiple INITIALLY IMMEDIATE/DEFERRED clauses not allowed**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.25 10426

---

### **misplaced INITIALLY IMMEDIATE clause**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.26 10427

---

### **collations are not supported by type @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.27 10428

---

---

### **CREATE specifies a schema (@1@) different from the one being created (@2@)**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5.28 10429**

---

### **table reference "@1@" is ambiguous**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5.29 10430**

---

### **table reference @1@ is ambiguous**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5.30 10431**

---

### **table name "@1@" specified more than once**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5.31 10432**

---

### **WITH query "@1@" has @2@ columns available but @3@ columns specified**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.32 10434

---

### **relation "@1@.@2@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.33 10435

---

### **type "@1@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.34 10436

---

### **a column definition list is only allowed for functions returning "record"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.35 10437

---

### **a column definition list is required for functions returning "record"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.36 10438

---

### function "@1@" in FROM has unsupported return type @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.37 10439

---

### VALUES lists "@1@" have @2@ columns available but @3@ columns specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.38 10440

---

### tables can have at most @1@ columns

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.39 10441

---

### WITH query "@1@" does not have a RETURNING clause

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.40 10442

---

**column @1@ of relation "@2@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.41 10443

---

**invalid reference to FROM-clause entry for table "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.42 10444

---

**missing FROM-clause entry for table "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.43 10445

---

**unrecognized role option "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.44 10446

---

### current database cannot be renamed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.45 10447

---

### time zone interval must be HOUR or HOUR TO MINUTE

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.46 10449

---

### MATCH PARTIAL not yet implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.47 10451

---

### CREATE ASSERTION is not yet implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.48 10452

---

---

### **DROP ASSERTION is not yet implemented**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5.49 10453**

---

### **RECHECK is no longer required**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5.50 10454**

---

### **missing argument**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5.51 10457**

---

### **number of columns does not match number of values**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.5.52 10458**

---

### **LIMIT #,# syntax is not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.53 10459

---

### VALUES in FROM must have an alias

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.54 10460

---

### subquery in FROM must have an alias

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.5.55 10461

---

### precision for type float must be at least 1 bit

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.56 10462

---

### precision for type float must be less than 54 bits

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.57 10463

---

### UNIQUE predicate is not yet implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.58 10464

---

### RANGE PRECEDING is only supported with UNBOUNDED

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.59 10465

---

### RANGE FOLLOWING is only supported with UNBOUNDED

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.60 10466

---

### frame start cannot be UNBOUNDED FOLLOWING

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.61 10467

---

### frame starting from following row cannot end with current row

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.62 10468

---

### frame end cannot be UNBOUNDED PRECEDING

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.63 10469

---

### frame starting from current row cannot have preceding rows

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.64 10470

---

### frame starting from following row cannot have preceding rows

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.65 10471

---

### type modifier cannot have parameter name

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.66 10472

---

### wrong number of parameters on left side of OVERLAPS expression

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.67 10473

---

### wrong number of parameters on right side of OVERLAPS expression

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.68 10474

---

### syntax error

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.69 10475

---

---

### multiple ORDER BY clauses not allowed

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.70 10476

---

### multiple OFFSET clauses not allowed

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.71 10477

---

### multiple LIMIT clauses not allowed

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.72 10478

---

### multiple WITH clauses not allowed

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.73 10479

---

### OUT and INOUT arguments aren't allowed in TABLE functions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.74 10480

---

### multiple COLLATE clauses not allowed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.75 10481

---

### operator does not exist: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.76 10482

---

### could not identify an ordering operator for type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.5.77 10483

---

### could not identify an equality operator for type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.78 10484

---

**operator requires run-time type coercion: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.79 10485

---

**operator @1@ is not commutative**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.80 10486

---

**operator is only a shell: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.81 10487

---

**op ANY/ALL (array) requires array on right side**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.82 10488

---

### op ANY/ALL (array) requires operator to yield boolean

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.83 10489

---

### op ANY/ALL (array) requires operator not to return a set

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.84 10490

---

### column "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.85 10491

---

### column "@1@" not found in data type @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.86 10492

---

### could not identify column "@1@" in record data type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.87 10493

---

### column notation .@1@ applied to type @2@, which is not a composite type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.88 10494

---

### function @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.89 10495

---

### NULLIF requires = operator to yield boolean

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.5.90 10498

---

---

### subquery must return only one column

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6 Message Numbers Beginning with 10500

---

### 2.6.1 10500

---

#### subquery has too many columns

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### 2.6.2 10501

---

#### subquery has too few columns

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### 2.6.3 10502

---

#### cannot determine type of empty array

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.4 10503

---

### could not find range type for data type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.5 10504

---

### unnamed XML attribute value must be a column reference

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.6 10505

---

### unnamed XML element value must be a column reference

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.7 10506

---

### XML attribute name "@1@" appears more than once

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.8 10507

---

---

### cannot cast XMLSERIALIZE result to @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6.9 10508

---

### unequal number of entries in row expressions

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6.10 10509

---

### cannot compare rows of zero length

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6.11 10510

---

### row comparison operator must yield type boolean, not type @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6.12 10511

---

### row comparison operator must not return a set

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.13 10512

---

### could not determine interpretation of row comparison operator @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.14 10513

---

### IS DISTINCT FROM requires = operator to yield boolean

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.15 10515

---

### VALUES lists must all be the same length

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.16 10520

---

### INSERT has more expressions than target columns

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6.17 10521

---

### INSERT has more target columns than expressions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6.18 10522

---

### DEFAULT can only appear in a VALUES list within INSERT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6.19 10525

---

### invalid UNION/INTERSECT/EXCEPT ORDER BY clause

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6.20 10526

---

### INTO is only allowed on first SELECT of UNION/INTERSECT/EXCEPT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.21 10527

---

**UNION/INTERSECT/EXCEPT member statement cannot refer to other relations of same query level**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.22 10528

---

**each @1@ query must have the same number of columns**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.23 10535

---

**cannot specify both SCROLL and NO SCROLL**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.24 10537

---

**DECLARE CURSOR must not contain data-modifying statements in WITH**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.25 10538

---

### **DECLARE CURSOR WITH HOLD ... @1@ is not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.26 10539

---

### **DECLARE INSENSITIVE CURSOR ... @1@ is not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.27 10552

---

### **aggregate function calls cannot contain window function calls**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.28 10558

---

### **window functions are not allowed in JOIN conditions**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.29 10562

---

### column "@1@.@2@" must appear in the GROUP BY clause or be used in an aggregate function

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.30 10563

---

### subquery uses ungrouped column "@1@.@2@" from outer query

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.31 10564

---

### parameter name "@1@" used more than once

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.32 10565

---

### positional argument cannot follow named argument

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.6.33 10566

---

#### @1@(\*) specified, but @2@ is not an aggregate function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.6.34 10567

---

#### DISTINCT specified, but @1@ is not an aggregate function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.6.35 10568

---

#### ORDER BY specified, but @1@ is not an aggregate function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.6.36 10569

---

#### OVER specified, but @1@ is not a window function nor an aggregate function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.6.37 10570

---

---

### **function @1@ is not unique**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.6.38 10571**

---

### **database "@1@" does not exist**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.6.39 10572**

---

### **@1@(\*) must be used to call a parameterless aggregate function**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.6.40 10573**

---

### **aggregates cannot return sets**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.6.41 10574**

---

### **aggregates cannot use named arguments**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.42 10576

---

### **DISTINCT is not implemented for window functions**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.43 10577

---

### **aggregate ORDER BY is not implemented for window functions**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.44 10578

---

### **window functions cannot return sets**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.45 10580

---

### **extension "@1@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.46 10582

---

### aggregate @1@(\*) does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.47 10583

---

### server "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.48 10584

---

### function "@1@" is an aggregate function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.49 10585

---

### argument of @1@ must be a type name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.50 10586

---

**argument of @1@ must not return a set**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.51 10587

---

**argument of @1@ must be type boolean, not type @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.52 10588

---

**@1@ types @2@ and @3@ cannot be matched**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.53 10589

---

**@1@ could not convert type @2@ to @3@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.54 10590

---

### arguments declared "anyelement" are not all alike

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.55 10591

---

### arguments declared "anyarray" are not all alike

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.56 10592

---

### argument declared "anyarray" is not an array but type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.57 10593

---

### argument declared "anyarray" is not consistent with argument declared "anyelement"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.58 10594

---

---

### could not determine polymorphic type because input has type "unknown"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6.59 10595

---

### type matched to anynonarray is an array type: @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6.60 10596

---

### type matched to anyenum is not an enum type: @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6.61 10597

---

### recursive reference to query "@1@" must not appear within its non-recursive term

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.6.62 10598

---

### recursive reference to query "@1@" must not appear within a subquery

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.6.63 10599

---

### **recursive reference to query "@1@" must not appear within an outer join**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7 Message Numbers Beginning with 10600

---

### 2.7.1 10600

---

#### **recursive reference to query "@1@" must not appear within INTERSECT**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.7.2 10601

---

#### **recursive reference to query "@1@" must not appear within EXCEPT**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.7.3 10602

---

#### **WITH query name "@1@" specified more than once**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.4 10604

---

### **WITH clause containing a data-modifying statement must be at the top level**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.5 10605

---

### **recursive query "@1@" column @2@ has type @3@ in non-recursive term but type @4@ overall**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.6 10606

---

### **recursive query "@1@" column @2@ has collation "@3@" in non-recursive term but collation "@4@" overall**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.7 10607

---

### **table "@1@" has @2@ columns available but @3@ columns specified**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.8 10608

---

### mutual recursion between WITH items is not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.9 10609

---

### recursive query "@1@" must not contain data-modifying statements

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.10 10610

---

### recursive query "@1@" does not have the form non-recursive-term UNION [ALL] recursive-term

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.11 10611

---

### ORDER BY in a recursive query is not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.12 10612

---

### OFFSET in a recursive query is not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.13 10613

---

### LIMIT in a recursive query is not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.14 10614

---

### FOR UPDATE/SHARE in a recursive query is not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.15 10615

---

### recursive reference to query "@1@" must not appear more than once

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.16 10616

---

### unsafe use of string constant with Unicode escapes

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.17 10617

---

### invalid Unicode escape

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.18 10618

---

### unsafe use of \\' in a string literal

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.19 10619

---

### @1@ at end of input

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.20 10620

---

[@1@ at or near "@2@"](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.21 10621

---

[nonstandard use of \\' in a string literal](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.22 10622

---

[nonstandard use of \\\ in a string literal](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.23 10623

---

[nonstandard use of escape in a string literal](#)

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.7.24 10624

---

### collation mismatch between implicit collations "@1@" and "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.25 10625

---

### collation mismatch between explicit collations "@1@" and "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.26 10626

---

### target lists can have at most @1@ entries

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.27 10627

---

### cannot subscript type @1@ because it is not an array

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.28 10628

---

### array subscript must have type integer

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.29 10629

---

### array assignment to "@1@" requires type @2@ but expression is of type @3@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.30 10630

---

### improper @1@TYPE reference (too few dotted names): @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.31 10631

---

### improper @1@TYPE reference (too many dotted names): @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.32 10632

---

### type reference @1@ converted to @2@

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.7.33 10633

---

### return type @1@ is only a shell

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.34 10634

---

### type modifier cannot be specified for shell type "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.35 10635

---

### type modifier is not allowed for type "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.36 10636

---

### type modifiers must be simple constants or identifiers

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.37 10637

---

### invalid type name "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.38 10638

---

### canceling the wait for synchronous replication and terminating connection due to administrator command

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.7.39 10639

---

### canceling wait for synchronous replication due to user request

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.7.40 10640

---

**standby "@1@" now has synchronous standby priority @2@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.7.41 10641

---

**standby "@1@" is now the synchronous standby with priority @2@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.7.42 10642

---

**could not connect to the primary server: @1@**

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
- b) If the total number of update records in a single transaction is high, split it into short transactions.
- c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

- a) Confirm that the database server has not stopped.

b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.7.43 10643

---

### could not receive database system identifier and timeline ID from the primary server: @1@

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.7.44 10644

---

### invalid response from primary server

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.7.45 10645

---

### database system identifier differs between the primary and standby

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.46 10646

---

### highest timeline @1@ of the primary is behind recovery timeline @2@

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.7.47 10647

---

### could not start WAL streaming: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.7.48 10649

---

### socket not open

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.7.49 10650

---

### select() failed: @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.7.50 10651

---

### could not receive data from WAL stream: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.7.51 10652

---

---

### replication terminated by primary server

[Description]

Primary server has stopped.

[System Processing]

Processing will be aborted.

[Action]

No action is required.

---

## 2.7.52 10653

---

### could not send data to WAL stream: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.7.53 10654

---

### syntax error: unexpected character "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.7.54 10655

---

### base backup could not send data, aborting backup

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.7.55 10656

---

### duplicate option "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.56 10658

---

### could not stat file or directory "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.7.57 10659

---

### could not remove symbolic link "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.7.58 10660

---

### skipping special file "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.7.59 10663

---

### unexpected EOF on standby connection

[Description]

An error occurred because execution is temporarily impossible.

[System Processing]

Processing will be aborted.

[Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.7.60 10664

---

### invalid standby message type "@1@"

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.7.61 10667

---

### terminating walsender process due to replication timeout

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.7.62 10668

---

### standby "@1@" has now caught up with primary

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.7.63 10669

---

### number of requested standby connections exceeds max\_wal\_senders (currently @1@)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.64 10670

---

### requested WAL segment @1@ has already been removed

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.7.65 10671

---

### could not read from log segment @1@, offset @2@, length @3@: @4@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.7.66 10672

---

### materialize mode required, but it is not allowed in this context

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.67 10673

---

### terminating walreceiver process due to administrator command

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.7.68 10674

---

**cannot continue WAL streaming, recovery has already ended**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.7.69 10675

---

**authentication failed for user "@1@": host rejected**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.70 10677

---

**"trust" authentication failed for user "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.71 10678

---

**Ident authentication failed for user "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.72 10679

---

### Peer authentication failed for user "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.73 10680

---

### password authentication failed for user "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.74 10681

---

### GSSAPI authentication failed for user "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.75 10682

---

### SSPI authentication failed for user "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.76 10683

---

### PAM authentication failed for user "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.77 10684

---

### LDAP authentication failed for user "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.78 10685

---

### certificate authentication failed for user "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.79 10686

---

### RADIUS authentication failed for user "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.80 10687

---

---

**authentication failed for user "@1@": invalid authentication method****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.7.81 10689**

---

**connection requires a valid client certificate****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.7.82 10690**

---

**pg\_hba.conf rejects replication connection for host "@1@", user "@2@", @3@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.7.83 10691**

---

**pg\_hba.conf rejects replication connection for host "@1@", user "@2@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.7.84 10692**

---

**pg\_hba.conf rejects connection for host "@1@", user "@2@", database "@3@", @4@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.85 10693

---

### **pg\_hba.conf rejects connection for host "@1@", user "@2@", database "@3@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.86 10694

---

### **no pg\_hba.conf entry for replication connection from host "@1@", user "@2@", @3@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.87 10695

---

### **no pg\_hba.conf entry for replication connection from host "@1@", user "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.88 10696

---

### **no pg\_hba.conf entry for host "@1@", user "@2@", database "@3@", @4@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.89 10697

---

**no pg\_hba.conf entry for host "@1@", user "@2@", database "@3@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.90 10698

---

**MD5 authentication is not supported when "db\_user\_namespace" is enabled**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.7.91 10699

---

**expected password response, got message type @1@**

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.8 Message Numbers Beginning with 10700

---

### 2.8.1 10700

---

**invalid password packet size**

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.8.2 10707

---

### GSSAPI is not supported in protocol version 2

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.3 10708

---

### out of memory

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.8.4 10709

---

### expected GSS response, got message type @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.8.5 10710

---

### SSPI is not supported in protocol version 2

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.6 10711

---

### expected SSPI response, got message type @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.8.7 10712

---

### could not create socket for Ident connection: @1@

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.8.8 10713

---

### could not bind to local address "@1@": @2@

#### [Description]

The database server was disconnected during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.8.9 10714

---

### could not connect to Ident server at address "@1@", port @2@: @3@

#### [Description]

The database server was disconnected during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.

b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.8.10 10715

---

**could not send query to Ident server at address "@1@", port @2@: @3@**

### [Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
- a) Confirm that the database server has not stopped.
  - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.8.11 10716

---

**could not receive response from Ident server at address "@1@", port @2@: @3@**

### [Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
- b) If the total number of update records in a single transaction is high, split it into short transactions.

c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

a) Confirm that the database server has not stopped.

b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.8.12 10717

---

### invalidly formatted response from Ident server: "@1@"

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.13 10718

---

### peer authentication is not supported on this platform

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.14 10719

---

### could not get peer credentials: @1@

#### [Description]

The database server was disconnected during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.

- b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
- a) Confirm that the database server has not stopped.
  - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.8.15 10720

---

### could not look up local user ID @1@: @2@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.16 10721

---

### empty password returned by client

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.17 10722

---

### error from underlying PAM layer: @1@

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.18 10723

---

### could not create PAM authenticator: @1@

#### [Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.8.19 10724

---

**pam\_set\_item(PAM\_USER) failed: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.8.20 10725

---

**pam\_set\_item(PAM\_CONV) failed: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.8.21 10726

---

**pam\_authenticate failed: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.8.22 10727

---

**pam\_acct\_mgmt failed: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.23 10728

---

### could not release PAM authenticator: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.24 10729

---

### could not initialize LDAP: error code @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.25 10730

---

### could not set LDAP protocol version: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.26 10731

---

### could not load wldap32.dll

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.27 10732

---

### could not load function \_ldap\_start\_tls\_sA in wldap32.dll

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.28 10733

---

### could not start LDAP TLS session: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.29 10734

---

### LDAP server not specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.30 10735

---

### invalid character in user name for LDAP authentication

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.31 10736

---

---

**could not perform initial LDAP bind for ldapbinddn "@1@" on server "@2@" : @3@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.8.32 10737**

---

**could not search LDAP for filter "@1@" on server "@2@" : @3@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.8.33 10738**

---

**LDAP search for filter "@1@" on server "@2@" returned no entries.****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.8.34 10740**

---

**could not get dn for the first entry matching "@1@" on server "@2@" : @3@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.8.35 10741**

---

**could not unbind after searching for user "@1@" on server "@2@" : @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.36 10742

---

### LDAP login failed for user "@1@" on server "@2@" : @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.37 10743

---

### certificate authentication failed for user "@1@" : client certificate contains no user name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.38 10744

---

### RADIUS server not specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.39 10745

---

### RADIUS secret not specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.40 10746

---

### could not translate RADIUS server name "@1@" to address: @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.41 10747

---

### RADIUS authentication does not support passwords longer than 16 characters

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.42 10748

---

### could not generate random encryption vector

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.43 10749

---

### could not perform MD5 encryption of password

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.44 10750

---

### could not create RADIUS socket: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.45 10751

---

### could not bind local RADIUS socket: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.46 10752

---

### could not send RADIUS packet: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.47 10753

---

### timeout waiting for RADIUS response

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.48 10754

---

**could not check status on RADIUS socket: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.49 10755

---

**could not read RADIUS response: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.50 10756

---

**RADIUS response was sent from incorrect port: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.51 10757

---

**RADIUS response too short: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.52 10759

---

---

**RADIUS response is to a different request: @1@ (should be @2@)****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.8.53 10760**

---

**could not perform MD5 encryption of received packet****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.8.54 10761**

---

**RADIUS response has incorrect MD5 signature****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.8.55 10762**

---

**RADIUS response has invalid code (@1@) for user "@2@"****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.8.56 10763**

---

**SSL error: @1@**

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.8.57 10764

---

### unrecognized SSL error code: @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.8.58 10767

---

### could not create SSL context: @1@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.59 10768

---

### could not load server certificate file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.60 10769

---

### could not access private key file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.61 10770

---

### private key file "@1@" has group or world access

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.62 10771

---

### could not load private key file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.63 10772

---

### check of private key failed: @1@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.64 10774

---

### could not load root certificate file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.65 10775

---

### SSL certificate revocation list file "@1@" ignored

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.8.66 10776

---

### could not load SSL certificate revocation list file "@1@" : @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.8.67 10777

---

### could not initialize SSL connection: @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.8.68 10778

---

### could not set SSL socket: @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.8.69 10779

---

### could not accept SSL connection: @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.8.70 10780

---

### could not accept SSL connection: EOF detected

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.8.71 10781

---

### could not accept SSL connection: @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.8.72 10782

---

### SSL certificate's common name contains embedded null

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.8.73 10783

---

### SSL connection from "@1@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.8.74 10784

---

### could not translate host name "@1@", service "@2@" to address: @3@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.75 10785

---

### could not translate service "@1@" to address: @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.76 10786

---

### could not bind to all requested addresses: MAXLISTEN (@1@) exceeded

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.77 10787

---

---

**could not create @1@ socket: @2@**

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.8.78 10788

---

**setsockopt(SO\_REUSEADDR) failed: @1@**

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:

- a) Confirm that the database server has not stopped.
- b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.8.79 10789

---

**setsockopt(IPV6\_V6ONLY) failed: @1 @**

### [Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.8.80 10790

---

**could not bind @1@ socket: @2@**

### [Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.

- b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
- a) Confirm that the database server has not stopped.
  - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.8.81 10791

---

**could not listen on @1@ socket: @2@**

### [Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
- a) Confirm that the database server has not stopped.
  - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.8.82 10792

---

**type @1@ does not exist**

### [Description]

An error occurred during execution of the application or command.

### [System Processing]

Processing will be aborted.

### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.8.83 10793

---

**could not set group of file "@1@": @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.84 10794

---

### could not set permissions of file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.8.85 10795

---

### could not accept new connection: @1@

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
- b) If the total number of update records in a single transaction is high, split it into short transactions.
- c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

- a) Confirm that the database server has not stopped.
- b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.8.86 10796

---

---

**could not set socket to nonblocking mode: @1@****[Description]**

An error occurred during communication between the application and the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

---

**2.8.87 10798**

---

**could not receive data from client: @1@****[Description]**

An error occurred during communication between the application and the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

---

**2.8.88 10799**

---

**unexpected EOF within message length word****[Description]**

An error occurred during communication between the application and the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

---

**2.9 Message Numbers Beginning with 10800**

---

**2.9.1 10800**

---

**invalid message length****[Description]**

An error occurred during communication between the application and the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.9.2 10801

---

### incomplete message from client

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.9.3 10802

---

### could not send data to client: @1@

[Description]

[System Processing]

[Action]

10803

authentication file token too long, skipping: "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.9.4 10804

---

### could not open secondary authentication file "@@1@" as "@2@": @3@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.9.5 10806

---

### authentication option "@1@" is only valid for authentication methods @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.9.6 10807

---

### authentication method "@1@" requires argument "@2@" to be set

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.9.7 10808

---

### local connections are not supported by this build

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.9.8 10809

---

### hostssl requires SSL to be turned on

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.9 10810

---

### hostssl is not supported by this build

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.9.10 10811

---

### invalid connection type "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.11 10812

---

### end-of-line before database specification

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.12 10813

---

### end-of-line before role specification

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.13 10814

---

### end-of-line before IP address specification

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.14 10815

---

### invalid IP address "@1@": @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.15 10816

---

### specifying both host name and CIDR mask is invalid: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.16 10817

---

### invalid CIDR mask in address "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.17 10818

---

### end-of-line before netmask specification

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.18 10819

---

---

### invalid IP mask "@1@": @2@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.9.19 10820

---

### IP address and mask do not match

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.9.20 10821

---

### end-of-line before authentication method

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.9.21 10822

---

### invalid authentication method "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.9.22 10823

---

### invalid authentication method "@1@": not supported by this build

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.9.23 10825

---

### **gssapi authentication is not supported on local sockets**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.24 10826

---

### **peer authentication is only supported on local sockets**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.25 10827

---

### **cert authentication is only supported on hostssl connections**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.26 10828

---

### **authentication option not in name=value format: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.27 10829

---

### clientcert can only be configured for "hostssl" rows

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.28 10830

---

### client certificates can only be checked if a root certificate store is available

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.9.29 10831

---

### clientcert can not be set to 0 when using "cert" authentication

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.30 10832

---

### invalid LDAP port number: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.31 10833

---

### invalid RADIUS port number: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.32 10834

---

### unrecognized authentication option name: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.33 10835

---

### cannot use ldapbasedn, ldapbinddn, ldapbindpasswd, ldapsearchattribute, or ldapurl together with ldapprefix

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.34 10836

---

### authentication method "ldap" requires argument "ldapbasedn", "ldapprefix", or "ldapsuffix" to be set

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.35 10837

---

### could not open configuration file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.9.36 10838

---

### invalid regular expression "@1@": @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.37 10839

---

### regular expression match for "@1@" failed: @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.38 10840

---

### regular expression "@1@" has no subexpressions as requested by backreference in "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.39 10841

---

### missing entry in file "@1@" at end of line @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.40 10842

---

### provided user name (@1@) and authenticated user name (@2@) do not match

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.41 10843

---

### no match in usermap "@1@" for user "@2@" authenticated as "@3@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.42 10844

---

### could not open server file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.9.43 10845

---

### invalid large-object descriptor: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.44 10846

---

### permission denied for large object @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.45 10847

---

### large object descriptor @1@ was not opened for writing

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.46 10848

---

### must be owner of large object @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.47 10849

---

---

**must be superuser to use server-side lo\_import()****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.9.48 10850**

---

**could not read server file "@1@": @2@****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.9.49 10851**

---

**could not create server file "@1@": @2@****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.9.50 10852**

---

**must be superuser to use server-side lo\_export()****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.9.51 10853**

---

**could not write server file "@1@": @2@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.9.52 10854

---

### could not write file "@1@": @2@

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.9.53 10855

---

### no data left in message

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.9.54 10856

---

### insufficient data left in message

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.55 10857

---

### invalid string in message

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.9.56 10858

---

### invalid message format

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.9.57 10859

---

### "@1@" is not a sequence

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.58 10860

---

### shared tables cannot be toasted after initdb

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.59 10861

---

### cannot drop @1@ because it is required by the database system

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.60 10862

---

### **role @1@ was concurrently dropped**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.61 10863

---

### **tablespace @1@ was concurrently dropped**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.62 10864

---

### **database @1@ was concurrently dropped**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.63 10865

---

### **cannot drop objects owned by @1@ because they are required by the database system**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.64 10866

---

### permission denied to create "@1@.@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.65 10867

---

### joins can have at most @1@ columns

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.66 10868

---

### column name "@1@" conflicts with a system column name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.67 10869

---

### column "@1@" specified more than once

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.68 10870

---

---

**column "@1@" has type "unknown"****[Description]**

Terminated normally but a warning was output.

**[System Processing]**

Continues processing.

**[Action]**

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

**2.9.69 10871**

---

**column "@1@" has pseudo-type @2@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.9.70 10872**

---

**composite type @1@ cannot be made a member of itself****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.9.71 10873**

---

**no collation was derived for column "@1@" with collatable type @2@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.9.72 10874**

---

**relation "@1@" already exists**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.73 10875

---

### type "@1@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.74 10876

---

### check constraint "@1@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.75 10877

---

### constraint "@1@" for relation "@2@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.76 10878

---

### merging constraint "@1@" with inherited definition

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.9.77 10879

---

### cannot use column references in default expression

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.78 10880

---

### default expression must not return a set

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.79 10881

---

### cannot use subquery in DEFAULT expression

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.80 10882

---

### aggregate functions are not allowed in index expressions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.81 10883

---

### aggregate functions are not allowed in transform expressions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.82 10884

---

### subfield "@1@" is of type @2@ but expression is of type @3@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.83 10885

---

### only table "@1@" can be referenced in check constraint

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.84 10886

---

### cannot use subquery in check constraint

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.85 10887

---

### aggregate functions are not allowed in check constraints

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.86 10888

---

### window functions are not allowed in check constraints

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.87 10889

---

### unsupported ON COMMIT and foreign key combination

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.88 10890

---

### cannot truncate a table referenced in a foreign key constraint

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.89 10891

---

---

### invalid type internal size @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.9.90 10892

---

### alignment "@1@" is invalid for passed-by-value type of size @2@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.9.91 10893

---

### internal size @1@ is invalid for passed-by-value type

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.9.92 10894

---

### alignment "@1@" is invalid for variable-length type

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.9.93 10895

---

### fixed-size types must have storage PLAIN

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.94 10896

---

### could not form array type name for type "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.95 10897

---

### cannot determine transition data type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.96 10898

---

### return type of transition function @1@ is not @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.9.97 10899

---

### must not omit initial value when transition function is strict and transition type is not compatible with input type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10 Message Numbers Beginning with 10900

---

### 2.10.1 10900

---

#### cannot determine result data type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.10.2 10901

---

#### unsafe use of pseudo-type "internal"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.10.3 10902

---

#### sort operator can only be specified for single-argument aggregates

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.10.4 10903

---

#### function @1@ returns a set

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.5 10904

---

### **function @1 @ requires run-time type coercion**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.6 10905

---

### **large object @1 @ does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.7 10906

---

### **primary keys cannot be expressions**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.8 10907

---

### **user-defined indexes on system catalog tables are not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.9 10908

---

### concurrent index creation on system catalog tables is not supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.10 10909

---

### shared indexes cannot be created after initdb

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.11 10910

---

### building index "@1@" on table "@2@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.10.12 10911

---

### cannot reindex temporary tables of other sessions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.13 10912

---

**invalid enum label "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.14 10913

---

**"@1@" is not an existing enum label**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.15 10914

---

**ALTER TYPE ADD BEFORE/AFTER is incompatible with binary upgrade**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.16 10915

---

**"@1@" is already an attribute of type @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.17 10916

---

### function "@1@" already exists with same argument types

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.18 10917

---

### cannot change return type of existing function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.19 10918

---

### cannot change name of input parameter "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.20 10919

---

### cannot remove parameter defaults from existing function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.21 10920

---

---

### cannot change data type of existing parameter default value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.10.22 10921

---

### function "@1@" is not an aggregate function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.10.23 10922

---

### "@1@" is an aggregate function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.10.24 10923

---

### function "@1@" is a window function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.10.25 10924

---

### function "@1@" is not a window function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.26 10925

---

### there is no built-in function named "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.27 10926

---

### SQL functions cannot return type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.28 10927

---

### SQL functions cannot have arguments of type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.29 10928

---

### invalid fork name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.30 10929

---

### cannot drop @1@ because @2@ requires it

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.31 10930

---

### drop auto-cascades to @1@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.10.32 10931

---

### cannot drop @1@ because other objects depend on it

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.33 10932

---

### cannot drop desired object(s) because other objects depend on them

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.34 10934

---

**constraint "@1@" for domain @2@ already exists**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.35 10935

---

**table "@1@" has multiple constraints named "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.36 10936

---

**constraint "@1@" for table "@2@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.37 10937

---

**grant options can only be granted to roles**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.38 10938

---

**no privileges were granted for column "@1@" of relation "@2@"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.10.39 10939

---

**no privileges were granted for "@1@"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.10.40 10940

---

**not all privileges were granted for column "@1@" of relation "@2@"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.10.41 10941

---

**not all privileges were granted for "@1@"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.10.42 10942

---

**no privileges could be revoked for column "@1@" of relation "@2@"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.10.43 10943

---

**no privileges could be revoked for "@1@"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.10.44 10944

---

**not all privileges could be revoked for column "@1@" of relation "@2@"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.10.45 10945

---

**not all privileges could be revoked for "@1@"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.10.46 10946

---

### invalid privilege type @1 @ for relation

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.47 10947

---

### invalid privilege type @1 @ for sequence

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.48 10948

---

### invalid privilege type @1 @ for database

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.49 10949

---

### invalid privilege type @1 @ for domain

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.50 10950

---

### invalid privilege type @1@ for function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.51 10951

---

### invalid privilege type @1@ for large object

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.52 10952

---

### invalid privilege type @1@ for language

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.53 10953

---

### invalid privilege type @1@ for schema

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.54 10954

---

### invalid privilege type @1 @ for foreign-data wrapper

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.55 10955

---

### invalid privilege type @1 @ for foreign server

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.56 10956

---

### column privileges are only valid for relations

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.57 10957

---

### conflicting or redundant options

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.58 10958

---

### default privileges cannot be set for columns

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.59 10959

---

### "@1@" is not a domain

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.60 10960

---

### sequence "@1@" only supports USAGE, SELECT, and UPDATE privileges

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.10.61 10961

---

### invalid privilege type USAGE for table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.62 10962

---

### invalid privilege type @1 @ for tablespace

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.63 10963

---

### sequence "@1@" only supports SELECT column privileges

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.10.64 10964

---

### language "@1@" is not trusted

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.65 10965

---

### unrecognized privilege type "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.66 10966

---

### permission denied for column @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.67 10967

---

### permission denied for relation @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.68 10968

---

### permission denied for sequence @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.69 10969

---

### permission denied for database @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.70 10970

---

---

### permission denied for function @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.10.71 10971

---

### permission denied for operator @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.10.72 10972

---

### permission denied for type @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.10.73 10973

---

### permission denied for language @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.10.74 10974

---

### permission denied for large object @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.75 10975

---

### [permission denied for schema @1@](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.76 10976

---

### [permission denied for operator class @1@](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.77 10977

---

### [permission denied for operator family @1@](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.78 10978

---

### [permission denied for collation @1@](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.79 10979

---

### permission denied for conversion @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.80 10980

---

### permission denied for tablespace @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.81 10981

---

### permission denied for text search dictionary @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.82 10982

---

### permission denied for text search configuration @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.83 10983

---

[permission denied for foreign-data wrapper @1@](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.84 10984

---

[permission denied for foreign server @1@](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.85 10985

---

[permission denied for extension @1@](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.86 10986

---

[must be owner of relation @1@](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.87 10987

---

**must be owner of sequence @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.88 10988

---

**must be owner of database @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.89 10989

---

**must be owner of function @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.90 10990

---

**must be owner of operator @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.91 10991

---

---

**must be owner of type @1@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.10.92 10992**

---

**must be owner of language @1@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.10.93 10993**

---

**must be owner of large object @1@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.10.94 10994**

---

**must be owner of schema @1@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.10.95 10995**

---

**must be owner of operator class @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.96 10996

---

### must be owner of operator family @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.97 10997

---

### must be owner of collation @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.98 10998

---

### must be owner of conversion @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.10.99 10999

---

### must be owner of tablespace @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.11 Message Numbers Beginning with 11000

---

### 2.11.1 11000

---

**must be owner of text search dictionary @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.11.2 11001

---

**must be owner of text search configuration @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.11.3 11002

---

**must be owner of foreign-data wrapper @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.11.4 11003

---

**must be owner of foreign server @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.5 11004

---

### **must be owner of extension @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.6 11005

---

### **permission denied for column "@1@" of relation "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.7 11007

---

### **attribute @1@ of relation with OID @2@ does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.8 11008

---

### **relation with OID @1@ does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.9 11009

---

### database with OID @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.10 11010

---

### function with OID @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.11 11011

---

### language with OID @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.12 11012

---

### schema with OID @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.13 11013

---

### tablespace with OID @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.14 11014

---

### foreign-data wrapper with OID @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.15 11015

---

### foreign server with OID @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.16 11016

---

### type with OID @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.17 11017

---

---

**operator with OID @1@ does not exist****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.11.18 11018**

---

**operator class with OID @1@ does not exist****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.11.19 11019**

---

**operator family with OID @1@ does not exist****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.11.20 11020**

---

**text search dictionary with OID @1@ does not exist****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.11.21 11021**

---

**text search configuration with OID @1@ does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.22 11022

---

### collation with OID @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.23 11023

---

### conversion with OID @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.24 11024

---

### extension with OID @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.25 11025

---

### conversion "@1@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.26 11026

---

### default conversion for @1@ to @2@ already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.27 11027

---

### cross-database references are not implemented: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.28 11028

---

### temporary tables cannot specify a schema name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.29 11029

---

### no schema has been selected to create in

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.30 11030

---

### text search parser "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.31 11031

---

### text search dictionary "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.32 11032

---

### text search template "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.33 11033

---

### text search configuration "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.34 11034

---

### @1@ is already in schema "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.35 11035

---

### cannot move objects into or out of temporary schemas

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.36 11036

---

### cannot move objects into or out of TOAST schema

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.37 11037

---

### language "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.38 11038

---

---

### **improper relation name (too many dotted names): @1@**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.11.39 11039**

---

### **collation "@1@" for encoding "@2@" does not exist**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.11.40 11040**

---

### **cursor "@1@" does not exist**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.11.41 11041**

---

### **permission denied to create temporary tables in database "@1@"**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.11.42 11042**

---

### **cannot create temporary tables during recovery**

[Description]

An error occurred because execution is temporarily impossible.

[System Processing]

Processing will be aborted.

[Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.11.43 11043

---

### database name cannot be qualified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.44 11044

---

### extension name cannot be qualified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.45 11045

---

### "@1@" is not a table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.46 11046

---

### "@1@" is not a foreign table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.47 11047

---

**must be owner of type @1@ or type @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.48 11048

---

**must be superuser**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.49 11049

---

**must have CREATEROLE privilege**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.50 11050

---

**schema "@1@" already exists**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.51 11051

---

### @1@ is not a valid encoding name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.52 11052

---

### only binary operators can have commutators

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.53 11053

---

### only binary operators can have join selectivity

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.54 11054

---

### only binary operators can merge join

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.55 11055

---

### only binary operators can hash

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.56 11056

---

### only boolean operators can have negators

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.57 11057

---

### only boolean operators can have restriction selectivity

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.58 11058

---

### only boolean operators can have join selectivity

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.59 11059

---

### only boolean operators can merge join

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.60 11060

---

### only boolean operators can hash

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.61 11061

---

### operator @1@ already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.62 11062

---

### operator cannot be its own negator or sort operator

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.63 11063

---

---

### cannot remove dependency on @1@ because it is a system object

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.11.64 11064

---

### collation "@1@" for encoding "@2@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.11.65 11065

---

### collation "@1@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.11.66 11066

---

### cannot access temporary or unlogged relations during recovery

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.11.67 11068

---

### could not implement GROUP BY

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.11.68 11069

---

### could not implement DISTINCT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.11.69 11070

---

### could not implement window PARTITION BY

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.11.70 11071

---

### could not implement window ORDER BY

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.11.71 11072

---

### could not implement recursive UNION

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.72 11073

---

### could not implement @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.73 11074

---

### FULL JOIN is only supported with merge-joinable or hash-joinable join conditions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.74 11075

---

### unexpected EOF on client connection

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.11.75 11076

---

### invalid frontend message type @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.11.76 11077

---

**statement:** @1@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.11.77 11078

---

**current transaction is aborted, commands ignored until end of transaction block**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.78 11079

---

**duration:** @1@ ms

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.11.79 11080

---

**duration:** @1@ ms **statement:** @2@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.11.80 11081

---

**parse @1@: @2@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.11.81 11082

---

**cannot insert multiple commands into a prepared statement**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.82 11083

---

**duration: @1@ ms parse @2@: @3@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.11.83 11084

---

**bind @1@ to @2@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.11.84 11085

---

---

### prepared statement "@1@" does not exist

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.11.85 11086

---

### bind message has @1@ parameter formats but @2@ parameters

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

---

## 2.11.86 11087

---

### bind message supplies @1@ parameters, but prepared statement "@2@" requires @3@

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

---

## 2.11.87 11088

---

### incorrect binary data format in bind parameter @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.11.88 11089

---

### duration: @1@ ms bind @2@@3@@4@: @5@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.11.89 11090

---

### table "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.11.90 11091

---

### @1@ @2@@3@@4@: @5@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.11.91 11092

---

### duration: @1@ ms @2@ @3@@4@@5@: @6@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.11.92 11094

---

### floating-point exception

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.11.93 11095

---

### terminating autovacuum process due to administrator command

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.11.94 11096

---

### terminating connection due to conflict with recovery

[Description]

An error occurred because execution is temporarily impossible.

[System Processing]

Processing will be aborted.

[Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

---

## 2.11.95 11097

---

### terminating connection due to administrator command

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.11.96 11098

---

### canceling authentication due to timeout

[Description]

Timeout occurred during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Check the following:

- If executing SQL that outputs a large volume of search results, add a conditional expression to filter the results further.
- If numerous SQLs are being simultaneously executed, reduce the number of simultaneously executed SQLs.
- If a large volume of data is to be updated in a single transaction, modify the SQL to reduce the volume of data to be updated in a single transaction.
- If executing a complex SQL, modify it to a simple SQL.
- Check if there are any problems in the network.
- Before conducting maintenance that involves the processing of a large volume of data, use the SET statement to temporarily increase the value of maintenance\_work\_mem.

## 2.11.97 11099

---

### canceling statement due to statement timeout

#### [Description]

Timeout occurred during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the following:

- If executing SQL that outputs a large volume of search results, add a conditional expression to filter the results further.
- If numerous SQLs are being simultaneously executed, reduce the number of simultaneously executed SQLs.
- If a large volume of data is to be updated in a single transaction, modify the SQL to reduce the volume of data to be updated in a single transaction.
- If executing a complex SQL, modify it to a simple SQL.
- Check if there are any problems in the network.
- Before conducting maintenance that involves the processing of a large volume of data, use the SET statement to temporarily increase the value of maintenance\_work\_mem.

## 2.12 Message Numbers Beginning with 11100

---

### 2.12.1 11100

---

#### canceling autovacuum task

#### [Description]

Processing was canceled.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text.

## 2.12.2 11101

---

### canceling statement due to conflict with recovery

[Description]

An error occurred because execution is temporarily impossible.

[System Processing]

Processing will be aborted.

[Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.12.3 11102

---

### canceling statement due to user request

[Description]

Processing was canceled.

[System Processing]

Processing will be aborted.

[Action]

Check the message text.

## 2.12.4 11103

---

### stack depth limit exceeded

[Description]

The depth of the execution stack exceeded the allowable value during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

If executing a complex SQL, modify it to a simple SQL.

## 2.12.5 11104

---

### --@1@ requires a value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.6 11105

---

### **-c @1@ requires a value**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.7 11107

---

### **@1@: invalid command-line arguments**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.8 11108

---

### **@1@: no database nor user name specified**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.9 11109

---

### **invalid CLOSE message subtype @1@**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.10 11110

---

---

### invalid DESCRIBE message subtype @1@

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

---

## 2.12.11 11111

---

### disconnection: session time: @1@: @2@: @3@. @4@ user=@5@ database=@6@ host=@7@@8@@9@

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

---

## 2.12.12 11112

---

### permission denied: "@1@" is a system catalog

#### [Description]

Terminated normally.

#### [System Processing]

Continues processing.

#### [Action]

No action required.

---

## 2.12.13 11113

---

### cannot execute @1@ in a read-only transaction

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.12.14 11114

---

### cannot execute @1@ during recovery

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.15 11115

---

### cannot execute @1@ within security-restricted operation

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.16 11116

---

### must be superuser to do CHECKPOINT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.17 11117

---

### invalid argument size @1@ in function call message

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.12.18 11118

---

### fastpath function call: "@1@" (OID @2@)

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.12.19 11119

---

**duration: @1@ ms fastpath function call: "@2@" (OID @3@)**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.12.20 11120

---

**function call message contains @1@ arguments but function requires @2@**

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.12.21 11121

---

**function call message contains @1@ argument formats but @2@ arguments**

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.12.22 11122

---

**incorrect binary data format in function argument @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.23 11123

---

**bind message has @1@ result formats but query has @2@ columns**

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.12.24 11124

---

**portal "@1@" cannot be run**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.25 11125

---

**cursor can only scan forward**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.26 11126

---

**could not open usermap file "@1@": @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.12.27 11127

---

### unexpected delimiter

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.28 11128

---

### unexpected end of line or lexeme

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.29 11129

---

### unexpected end of line

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.30 11130

---

### thesaurus sample word "@1@" isn't recognized by subdictionary (rule @2@)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.31 11131

---

---

**thesaurus sample word "@1@" is a stop word (rule @2@)****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.12.32 11132**

---

**thesaurus substitute word "@1@" is a stop word (rule @2@)****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.12.33 11133**

---

**thesaurus substitute word "@1@" isn't recognized by subdictionary (rule @2@)****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.12.34 11134**

---

**thesaurus substitute phrase is empty (rule @1@)****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.12.35 11135**

---

**multiple DictFile parameters**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.12.36 11136

---

### multiple Dictionary parameters

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.12.37 11137

---

### unrecognized Thesaurus parameter: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.12.38 11138

---

### missing DictFile parameter

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.12.39 11139

---

### missing Dictionary parameter

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.40 11140

---

### invalid text search configuration file name "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.41 11141

---

### could not open statistics file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.12.42 11142

---

### unrecognized headline parameter: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.43 11143

---

### MinWords should be less than MaxWords

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.44 11144

---

### MinWords should be positive

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.45 11145

---

### ShortWord should be >= 0

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.46 11146

---

### MaxFragments should be >= 0

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.47 11147

---

### string is too long for tsvector (@1@ bytes, max @2@ bytes)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.48 11148

---

### multiple Accept parameters

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.49 11149

---

### unrecognized simple dictionary parameter: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.50 11150

---

### could not open log file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.12.51 11151

---

### invalid regular expression: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.52 11152

---

---

### **multibyte flag character is not allowed**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.12.53 11153**

---

### **could not open synonym file "@1@": @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.12.54 11154**

---

### **ispell dictionary supports only default flag value**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.12.55 11155**

---

### **affix file contains both old-style and new-style commands**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.12.56 11156**

---

### **unrecognized synonym parameter: "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.12.57 11157

---

### missing Synonyms parameter

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.12.58 11158

---

### could not open thesaurus file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.12.59 11159

---

### word is too long to be indexed

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.12.60 11160

---

### conversion from wchar\_t to server encoding failed: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.12.61 11161

---

### text search parser does not support headline creation

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.12.62 11162

---

### multiple AffFile parameters

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.12.63 11163

---

### unrecognized Ispell parameter: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.12.64 11164

---

### missing AffFile parameter

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.65 11166

---

### WAL streaming (max\_wal\_senders > 0) requires wal\_level "archive", "hot\_standby", or "logical"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.66 11167

---

### invalid list syntax in parameter "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.67 11168

---

### could not create listen socket for "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.12.68 11169

---

### could not create any TCP/IP sockets

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.12.69 11170

---

**could not create Unix-domain socket in directory "@1@"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.12.70 11171

---

**no socket created for listening**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.12.71 11172

---

**could not create I/O completion port for child queue**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.12.72 11173

---

**could not load pg\_hba.conf**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.12.73 11174

---

### @1@: could not locate matching postgres executable

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.12.74 11175

---

### could not open directory "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.12.75 11176

---

### directory "@1@" does not exist

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.12.76 11177

---

### could not read permissions of directory "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.12.77 11178

---

### specified data directory "@1@" is not a directory

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.78 11179

---

### data directory "@1@" has wrong ownership

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.79 11180

---

### data directory "@1@" has group or world access

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.80 11181

---

### select() failed in postmaster: @1@

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
- b) If the total number of update records in a single transaction is high, split it into short transactions.
- c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

- a) Confirm that the database server has not stopped.
- b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.12.81 11182

---

### incomplete startup packet

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.12.82 11183

---

### invalid length of startup packet

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.12.83 11184

---

### failed to send SSL negotiation response: @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.12.84 11185

---

### unsupported frontend protocol @1@.@2@: server supports @3@.0 to @4@.@5@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.85 11186

---

### invalid value for boolean option "@1@": @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.86 11187

---

### invalid startup packet layout: expected terminator as last byte

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.12.87 11188

---

### no PostgreSQL user name specified in startup packet

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.88 11189

---

### the database system is starting up

[Description]

An error occurred because execution is temporarily impossible.

[System Processing]

Processing will be aborted.

[Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.12.89 11190

---

### the database system is shutting down

[Description]

The database system is shutting down.

[System Processing]

Processing will be aborted.

[Action]

Retry any necessary applications or commands after restarting the database system.

## 2.12.90 11191

---

### the database system is in recovery mode

[Description]

An error occurred because execution is temporarily impossible.

[System Processing]

Processing will be aborted.

[Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.12.91 11192

---

### sorry, too many clients already

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.12.92 11193

---

**wrong key in cancel request for process @1@**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.12.93 11194

---

**PID @1@ in cancel request did not match any process**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.12.94 11195

---

**received SIGHUP, reloading configuration files**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.12.95 11196

---

**pg\_hba.conf not reloaded**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.12.96 11197

---

### received smart shutdown request

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.12.97 11198

---

### received fast shutdown request

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.12.98 11199

---

### aborting any active transactions

[Description]

Rollback any active transactions because the database system is being requested to shut down.

[System Processing]

Continues processing.

[Action]

Retry any necessary applications or commands after restarting the database system.

## 2.13 Message Numbers Beginning with 11200

---

### 2.13.1 11200

---

#### received immediate shutdown request

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.2 11201

---

### aborting startup due to startup process failure

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.3 11202

---

### database system is ready to accept connections

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.4 11203

---

### terminating any other active server processes

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.5 11204

---

### @1@ (PID @2@) exited with exit code @3@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.6 11205

---

**@1@ (PID @2@) was terminated by exception 0x@3@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.7 11206

---

**@1@ (PID @2@) was terminated by signal @3@: @4@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.8 11207

---

**@1@ (PID @2@) was terminated by signal @3@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.9 11208

---

**@1@ (PID @2@) exited with unrecognized status @3@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.10 11209

---

### abnormal database system shutdown

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.11 11210

---

### all server processes terminated; reinitializing

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.12 11211

---

### could not fork new process for connection: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.13 11212

---

### connection received: host=@1@ port=@2@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.14 11213

---

---

**connection received: host=@1@****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.13.15 11214**

---

**could not execute server process "@1@": @2@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.13.16 11215**

---

**database system is ready to accept read only connections****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.13.17 11216**

---

**could not fork startup process: @1@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.13.18 11217**

---

**could not fork background writer process: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.13.19 11218

---

**could not fork WAL writer process: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.13.20 11219

---

**could not fork WAL receiver process: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.13.21 11220

---

**could not fork archiver: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.13.22 11221

---

**could not duplicate socket @1@ for use in backend: error code @2@**

[Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
- a) Confirm that the database server has not stopped.
  - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.13.23 11223

---

### transaction log switch forced (archive\_timeout=@1 @)

#### [Description]

Terminated normally.

#### [System Processing]

Continues processing.

#### [Action]

No action required.

## 2.13.24 11224

---

### checkpoint request failed

#### [Description]

An unexpected error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

Contact Fujitsu technical support.

## 2.13.25 11225

---

### compacted fsync request queue from @1 @ entries to @2 @ entries

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.26 11226

---

### could not resolve "localhost": @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.13.27 11227

---

### trying another address for the statistics collector

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.13.28 11228

---

### could not create socket for statistics collector: @1@

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
- a) Confirm that the database server has not stopped.
  - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.13.29 11229

---

**could not bind socket for statistics collector: @1@**

### [Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
- a) Confirm that the database server has not stopped.
  - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.13.30 11230

---

**could not get address of socket for statistics collector: @1@**

### [Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
- b) If the total number of update records in a single transaction is high, split it into short transactions.
- c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

- a) Confirm that the database server has not stopped.
- b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.13.31 11231

---

**could not connect socket for statistics collector: @1@**

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
- b) If the total number of update records in a single transaction is high, split it into short transactions.
- c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

- a) Confirm that the database server has not stopped.
- b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.13.32 11232

---

**could not send test message on socket for statistics collector: @1@**

[Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.13.33 11233

---

**select() failed in statistics collector: @1@**

### [Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.13.34 11234

---

### test message did not get through on socket for statistics collector

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.13.35 11235

---

### could not receive test message on socket for statistics collector: @1@

#### [Description]

The database server was disconnected during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.13.36 11236

---

### incorrect test message transmission on socket for statistics collector

#### [Description]

An unexpected error occurred.

#### [System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.13.37 11237

---

### could not set statistics collector socket to nonblocking mode: @1@

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.13.38 11238

---

### disabling statistics collector for lack of working socket

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.13.39 11239

---

### could not fork statistics collector: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.40 11240

---

### must be superuser to reset statistics counters

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.13.41 11241

---

### unrecognized reset target: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.13.42 11243

---

### could not read statistics message: @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.13.43 11244

---

### could not open temporary statistics file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.44 11245

---

### could not write temporary statistics file "@1@": @2@

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.13.45 11246

---

### could not close temporary statistics file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.46 11247

---

### could not rename temporary statistics file "@1@" to "@2@": @3@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.47 11248

---

### could not open dictionary file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.48 11249

---

### corrupted statistics file "@1@"

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.13.49 11250

---

### database hash table corrupted during cleanup --- abort

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.50 11252

---

### could not read from logger pipe: @1@

#### [Description]

The database server was disconnected during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
- b) If the total number of update records in a single transaction is high, split it into short transactions.
- c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

- a) Confirm that the database server has not stopped.

b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.13.51 11253

---

### logger shutting down

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.52 11254

---

### could not create pipe for syslog: @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.13.53 11255

---

### could not fork system logger: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.54 11256

---

### could not redirect stdout: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.13.55 11257

---

### could not redirect stderr: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.13.56 11258

---

### could not open affix file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.57 11259

---

### disabling automatic rotation (use SIGHUP to re-enable)

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.13.58 11260

---

### could not fork process: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.59 11261

---

### archive\_mode enabled, yet archive\_command is not set

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.13.60 11262

---

### archiving transaction log file "@1@" failed too many times, will try again later

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.13.61 11263

---

### archive command failed with exit code @1@

[Description]

An error occurred during executing the command specified by archive\_command parameter at postgresql.conf.

[System Processing]

Processing will be aborted.

[Action]

Identify the cause according to the messages shown before this message and the return code shown in this message. And then work around if necessary.

## 2.13.62 11264

---

### archive command was terminated by exception 0x@1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.13.63 11265

---

### archive command was terminated by signal @1@: @2@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.13.64 11266

---

### archive command was terminated by signal @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.13.65 11267

---

### archive command exited with unrecognized status @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.13.66 11268

---

### archived transaction log file "@1@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.67 11269

---

---

### could not open archive status directory "@1@": @2@

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.13.68 11270

---

### could not fork autovacuum launcher process: @1@

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.13.69 11271

---

### autovacuum launcher started

#### [Description]

Terminated normally.

#### [System Processing]

Continues processing.

#### [Action]

No action required.

---

## 2.13.70 11272

---

### autovacuum launcher shutting down

#### [Description]

Terminated normally.

#### [System Processing]

Continues processing.

#### [Action]

No action required.

---

## 2.13.71 11273

---

### could not fork autovacuum worker process: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.72 11274

---

### autovacuum: processing database "@1@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.73 11275

---

### autovacuum: dropping orphan temp table "@1@". "@2@" in database "@3@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.13.74 11276

---

### autovacuum: found orphan temp table "@1@". "@2@" in database "@3@"

[Description]

Uncollected garbage of the temporary table was found during automatic vacuuming

[System Processing]

Continues processing.

[Action]

No action required. The garbage of the temporary table will be collected automatically later.

If you want to collect it and obtain the storage space immediately,

drop the schema derived from @1 with the database user having superuser permission.

## 2.13.75 11277

---

---

### autovacuum not started because of misconfiguration

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.13.76 11278

---

### no empty local buffer available

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

---

## 2.13.77 11279

---

### cannot cluster temporary tables of other sessions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.13.78 11280

---

### unexpected data beyond EOF in block @1@ of relation @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.13.79 11281

---

### Continues processing past damaged page headers.

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.13.80 11283

---

### could not write block @1@ of @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.13.81 11284

---

### could not truncate file "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.13.82 11285

---

### cannot extend file "@1@" beyond @2@ blocks

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.13.83 11286

---

### could not seek to block @1@ in file "@2@": @3@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.84 11287

---

**could not extend file "@1@": @2@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.13.85 11288

---

**could not extend file "@1@": wrote only @2@ of @3@ bytes at block @4@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.13.86 11289

---

**could not read block @1@ in file "@2@": @3@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.87 11290

---

**could not read block @1@ in file "@2@": read only @3@ of @4@ bytes**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.88 11291

---

**could not write block @1@ in file "@2@": @3@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.13.89 11292

---

**could not write block @1@ in file "@2@": wrote only @3@ of @4@ bytes**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.13.90 11293

---

**could not truncate file "@1@" to @2@ blocks: it's only @3@ blocks now**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.91 11294

---

**could not truncate file "@1@" to @2@ blocks: @3@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.92 11295

---

### could not fsync file "@1@" but retrying: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.93 11296

---

### could not forward fsync request because request queue is full

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.13.94 11297

---

### could not open file "@1@" (target block @2@): @3@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.95 11298

---

### could not seek to end of file "@1@" : @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.13.96 11299

---

### memory for serializable conflict tracking is nearly exhausted

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14 Message Numbers Beginning with 11300

---

### 2.14.1 11300

---

#### not enough shared memory for data structure "@1@" (@2@ bytes requested)

#### [Description]

There was insufficient free space in the database server's shared memory during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

### 2.14.2 11301

---

#### deferrable snapshot was unsafe; trying a new one

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

### 2.14.3 11302

---

#### out of shared memory

#### [Description]

There was insufficient free space in the database server's shared memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.14.4 11303

---

### could not serialize access due to read/write dependencies among transactions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.5 11304

---

### deadlock detected

[Description]

An error occurred because execution is temporarily impossible.

[System Processing]

Processing will be aborted.

[Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.14.6 11305

---

### cannot acquire lock mode @1@ on database objects while recovery is in progress

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.7 11306

---

### could not send signal to process @1@: @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.8 11307

---

**process @1@ avoided deadlock for @2@ on @3@ by rearranging queue order after @4@.@5@ ms**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.9 11308

---

**process @1@ detected deadlock while waiting for @2@ on @3@ after @4@.@5@ ms**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.10 11309

---

**process @1@ still waiting for @2@ on @3@ after @4@.@5@ ms**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.11 11310

---

**process @1@ acquired @2@ on @3@ after @4@.@5@ ms**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.14.12 11311

---

**process @1@ failed to acquire @2@ on @3@ after @4@.@5@ ms**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.13 11314

---

**getrlimit failed: @1@**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.14 11315

---

**insufficient file descriptors available to start server process**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.14.15 11316

---

**out of file descriptors: @1 @; release and retry**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.14.16 11317

---

**temporary file: path "@1@", size @2@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.14.17 11318

---

**could not read directory "@1@": @2@**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.18 11320

---

**could not create directory "@1@": @2@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.14.19 11321

---

### not enough shared memory for elements of data structure "@1@" (@2@ bytes requested)

#### [Description]

There was insufficient free space in the database server's shared memory during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.14.20 11322

---

### could not create ShmemIndex entry for data structure "@1@"

#### [Description]

There was insufficient free space in the database server's shared memory during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.14.21 11323

---

### ShmemIndex entry size is wrong for data structure "@1@" : expected @2@, actual @3@

#### [Description]

An unexpected error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

Contact Fujitsu technical support.

## 2.14.22 11324

---

### requested shared memory size overflows size\_t

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.23 11325

---

**corrupted page pointers: lower = @1@, upper = @2@, special = @3@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.14.24 11326

---

**corrupted item pointer: @1@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.14.25 11327

---

**corrupted item lengths: total @1@, available space @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.14.26 11328

---

**corrupted item pointer: offset = @1@, size = @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.14.27 11329

---

### could not write block @1@ of temporary file: @2@

#### [Description]

There was insufficient free space in the disk of the database server during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Delete user data stored in the database server to free up space on the disk.

## 2.14.28 11330

---

### could not read block @1@ of temporary file: @2@

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.14.29 11331

---

### could not create unique index "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.30 11332

---

### could not find function "@1@" in file "@2@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.31 11333

---

---

**could not access file "@1@": @2@****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.14.32 11334**

---

**could not load library "@1@": @2@****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.14.33 11335**

---

**incompatible library "@1@": missing magic block****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.14.34 11336**

---

**incompatible library "@1@": version mismatch****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.14.35 11337**

---

**incompatible library "@1@": magic block mismatch**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.36 11338

---

### access to library "@1@" is not allowed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.37 11339

---

### invalid macro name in dynamic library path: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.38 11340

---

### zero-length component in parameter "dynamic\_library\_path"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.39 11341

---

### component in parameter "dynamic\_library\_path" is not an absolute path

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.40 11342

---

### could not determine actual result type for function "@1@" declared to return type @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.41 11343

---

### number of aliases does not match number of columns

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.42 11344

---

### no column alias was provided

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.43 11345

---

### could not determine row description for function returning record

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.44 11346

---

### internal function "@1@" is not in internal lookup table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.45 11347

---

### unrecognized API version @1@ reported by info function "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.46 11348

---

### function @1@ has too many arguments (@2@, maximum is @3@)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.47 11349

---

### cached plan must not change result type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.48 11350

---

### "@1@" is not a type

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.49 11351

---

### record type has not been registered

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.50 11352

---

### @1@ is not an enum

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.51 11353

---

### could not create relation-cache initialization file "@1@": @2@

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.52 11354

---

### cannot PREPARE a transaction that modified relation mapping

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.53 11355

---

### could not open relation mapping file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.14.54 11356

---

### could not read relation mapping file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.14.55 11357

---

### relation mapping file "@1@" contains invalid data

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.14.56 11358

---

---

### relation mapping file "@1@" contains incorrect checksum

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.14.57 11359

---

### could not write to relation mapping file "@1@": @2@

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

---

## 2.14.58 11360

---

### could not fsync relation mapping file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.14.59 11361

---

### could not close relation mapping file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.14.60 11362

---

### argument type @1@ is only a shell

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.14.61 11363

---

**no binary input function available for type @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.14.62 11364

---

**no binary output function available for type @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.14.63 11365

---

**no input function available for type @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.14.64 11366

---

**no output function available for type @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.65 11367

---

**could not reopen file "@1@" as stderr: @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.14.66 11368

---

**could not reopen file "@1@" as stdout: @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.14.67 11369

---

**cursor "@1@" already exists**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.68 11370

---

**closing existing cursor "@1@"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.69 11371

---

### cannot drop active portal "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.70 11372

---

### cannot PREPARE a transaction that has created a cursor WITH HOLD

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.71 11373

---

### word is too long (@1@ bytes, max @2@ bytes)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.72 11374

---

### string is too long for tsvector (@1@ bytes, max @2@ bytes)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.73 11375

---

### argument of ntile must be greater than zero

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.74 11376

---

### argument of nth\_value must be greater than zero

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.75 11379

---

### integer out of range

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.76 11380

---

### argument must be empty or one-dimensional array

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.77 11381

---

### cannot concatenate incompatible arrays

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.78 11382

---

### invalid number of dimensions: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.79 11383

---

### could not determine input data type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.80 11384

---

### invalid input syntax for type boolean: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.81 11385

---

---

### division by zero

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.14.82 11386

---

### invalid time zone name: "@1@"

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.14.83 11387

---

### timestamp out of range

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.14.84 11388

---

### cannot convert abstime "invalid" to timestamp

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.14.85 11389

---

### invalid status in external "tinterval" value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.86 11390

---

### cannot convert retime "invalid" to interval

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.87 11391

---

### invalid input syntax for type money: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.88 11393

---

### PID @1@ is not a PostgreSQL server process

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.89 11394

---

### must be superuser to signal the postmaster

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.90 11395

---

### failed to send signal to postmaster: @1@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.91 11396

---

### must be superuser to rotate log files

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.14.92 11397

---

### rotation not possible because log collection not active

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.93 11398

---

### global tablespace never has databases

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.14.94 11399

---

### @1@ is not a tablespace OID

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.15 Message Numbers Beginning with 11400

---

### 2.15.1 11400

---

#### invalid input syntax for integer: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.15.2 11401

---

#### syntax error in tsquery: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.15.3 11402

---

#### **syntax error in tsvector: "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.15.4 11403

---

#### **there is no escaped character: "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.15.5 11404

---

#### **wrong position info in tsvector: "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.15.6 11405

---

#### **sequence "@1@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.15.7 11406

---

---

### more than one function named "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.8 11407

---

### more than one operator named @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.9 11408

---

### too many arguments

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.10 11409

---

### invalid name syntax

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.11 11410

---

### expected a left parenthesis

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.12 11411

---

### expected a right parenthesis

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.13 11412

---

### expected a type name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.14 11413

---

### improper type name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.15 11414

---

### invalid type modifier

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.16 11415

---

### TIME(@1 @)@2@ precision must not be negative

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.17 11416

---

### TIME(@1 @)@2@ precision reduced to maximum allowed, @3@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.15.18 11417

---

### date out of range: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.19 11418

---

### date/time value "current" is no longer supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.20 11419

---

### timestamp cannot be NaN

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.21 11420

---

### timestamp(@1@) precision must be between @2@ and @3@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.22 11421

---

### interval out of range

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.23 11422

---

### invalid INTERVAL type modifier

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.24 11423

---

**TIMESTAMP(@1 @)@2@ precision must not be negative**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.25 11424

---

**TIMESTAMP(@1 @)@2@ precision reduced to maximum allowed, @3@**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.15.26 11425

---

**interval(@1 @) precision must be between @2@ and @3@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.27 11426

---

**cannot subtract infinite timestamps**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.28 11427

---

### timestamp units "@1@" not supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.29 11428

---

### "time" units "@1@" not recognized

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.30 11429

---

### timestamp with time zone units "@1@" not supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.31 11430

---

### "time with time zone" units "@1@" not recognized

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.32 11431

---

### interval units "@1@" not supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.33 11432

---

### timestamp units "@1@" not recognized

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.34 11433

---

### could not convert to time zone "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.35 11434

---

### time zone "@1@" not recognized

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.36 11435

---

---

**interval time zone "@1@" must not include months or days****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.15.37 11436**

---

**step size cannot equal zero****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.15.38 11437**

---

**invalid input syntax for uuid: "@1@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.15.39 11438**

---

**value "@1@" is out of range for type bigint****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.15.40 11439**

---

**bigint out of range**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.41 11440

---

### smallint out of range

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.42 11441

---

### OID out of range

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.43 11442

---

### input of anonymous composite types is not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.44 11443

---

### malformed record literal: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.45 11444

---

**wrong number of columns: @1@, expected @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.46 11445

---

**wrong data type: @1@, expected @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.47 11446

---

**improper binary format in record column @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.48 11447

---

**cannot compare dissimilar column types @1@ and @2@ at record column @3@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.49 11448

---

### cannot compare record types with different numbers of columns

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.50 11449

---

### int2vector has too many elements

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.51 11450

---

### invalid int2vector data

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.52 11451

---

### oidvector has too many elements

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.53 11452

---

### invalid input syntax for type @1@: "@2@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.54 11453

---

### invalid cidr value: "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.55 11454

---

### could not format inet value: @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.56 11455

---

### invalid address family in external "@1@" value

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.57 11456

---

---

### invalid bits in external "@1@" value

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.58 11457

---

### invalid length in external "@1@" value

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.59 11458

---

### invalid external "cidr" value

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.60 11459

---

### invalid mask length: @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.61 11460

---

### could not format cidr value: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.62 11461

---

### cannot AND inet values of different sizes

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.63 11462

---

### cannot OR inet values of different sizes

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.64 11463

---

### input is out of range

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.65 11464

---

### cannot subtract inet values of different sizes

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.66 11465

---

### invalid Datum pointer

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.67 11466

---

### dimension values cannot be null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.68 11467

---

### "[" must introduce explicitly-specified array dimensions.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.69 11468

---

### upper bound cannot be less than lower bound

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.70 11469

---

**Array value must start with "{" or dimension information.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.71 11471

---

**Specified array dimensions do not match array contents.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.72 11472

---

**malformed array literal: "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.73 11473

---

**array size exceeds the maximum allowed (@1@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.74 11474

---

### invalid array flags

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.75 11475

---

### wrong element type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.76 11476

---

### improper binary format in array element @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.77 11477

---

### slices of fixed-length arrays not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.78 11478

---

---

### wrong number of array subscripts

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.79 11479

---

### array subscript out of range

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.80 11480

---

### cannot assign null value to an element of a fixed-length array

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.81 11481

---

### updates on slices of fixed-length arrays not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.82 11482

---

### source array too small

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.83 11483

---

### null array element not allowed in this context

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.84 11484

---

### cannot compare arrays of different element types

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.85 11485

---

### could not identify a hash function for type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.86 11486

---

### dimension array or low bound array cannot be null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.87 11487

---

### wrong range of array subscripts

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.88 11489

---

### value out of range: overflow

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.89 11490

---

### value out of range: underflow

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.15.90 11491

---

### invalid input syntax for type real: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.91 11492

---

**"@1@" is out of range for type real**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.92 11493

---

**invalid input syntax for type double precision: "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.93 11494

---

**"@1@" is out of range for type double precision**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.94 11495

---

**cannot take square root of a negative number**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.95 11496

---

### zero raised to a negative power is undefined

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.96 11497

---

### a negative number raised to a non-integer power yields a complex result

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.97 11498

---

### cannot take logarithm of zero

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.15.98 11499

---

### cannot take logarithm of a negative number

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16 Message Numbers Beginning with 11500

---

### 2.16.1 11500

---

#### result is out of range

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.16.2 11501

---

#### count must be greater than zero

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.16.3 11502

---

#### operand, lower bound, and upper bound cannot be NaN

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.16.4 11503

---

#### lower and upper bounds must be finite

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.5 11504

---

### lower bound cannot equal upper bound

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.6 11505

---

### requested length too large

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.7 11506

---

### requested character too large

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.8 11507

---

### requested character too large for encoding: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.9 11508

---

---

### **null character not permitted**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.16.10 11509**

---

### **typmod array must be typecstring[]**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.16.11 11510**

---

### **typmod array must be one-dimensional**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.16.12 11511**

---

### **typmod array must not contain nulls**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.16.13 11512**

---

### **suppress\_redundant\_updates\_trigger: must be called as trigger**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.14 11513

---

### [suppress\\_redundant\\_updates\\_trigger: must be called on update](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.15 11514

---

### [suppress\\_redundant\\_updates\\_trigger: must be called before update](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.16 11515

---

### [suppress\\_redundant\\_updates\\_trigger: must be called for each row](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.17 11516

---

### [invalid input syntax for type box: "@1@"](#)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.18 11517

---

### value "@1@" is out of range for type integer

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.19 11518

---

### invalid oidvector data

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.20 11519

---

### invalid input syntax for type line: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.21 11520

---

### date/time value "@1@" is no longer supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.22 11521

---

**date/time field value out of range: "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.23 11522

---

**interval field value out of range: "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.24 11523

---

**time zone displacement out of range: "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.25 11524

---

**unrecognized encoding: "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.26 11525

---

### invalid hexadecimal digit: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.27 11526

---

### invalid hexadecimal data: odd number of digits

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.28 11527

---

### unexpected "=" while decoding base64 sequence

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.29 11528

---

### invalid symbol "@1@" while decoding base64 sequence

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.30 11529

---

---

### invalid base64 end sequence

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.31 11530

---

### invalid input syntax for type bytea

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.32 11531

---

### ts\_stat query must return one tsvector column

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.33 11532

---

### tsvector column "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.34 11533

---

### column "@1@" is not of tsvector type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.35 11534

---

### configuration column "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.36 11535

---

### column "@1@" is not of regconfig type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.37 11536

---

### configuration column "@1@" must not be null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.38 11537

---

### text search configuration name "@1@" must be schema-qualified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.39 11538

---

### column "@1@" is not of a character type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.40 11539

---

### ts\_rewrite query must return two tsquery columns

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.41 11540

---

### encoding conversion from @1@ to ASCII not supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.42 11541

---

### "@1@" is not a valid encoding name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.43 11542

---

### @1@ is not a valid encoding code

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.44 11543

---

### insert or update on table "@1@" violates foreign key constraint "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.45 11544

---

### function "@1@" was not called by trigger manager

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.46 11545

---

### function "@1@" must be fired AFTER ROW

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.47 11546

---

### function "@1@" must be fired for INSERT

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.48 11547

---

### function "@1@" must be fired for UPDATE

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.49 11548

---

### function "@1@" must be fired for INSERT or UPDATE

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.50 11549

---

### function "@1@" must be fired for DELETE

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.51 11550

---

---

### no pg\_constraint entry for trigger "@1@" on table "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.52 11551

---

### referential integrity query on "@1@" from constraint "@2@" on "@3@" gave unexpected result

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.16.53 11552

---

### update or delete on table "@1@" violates foreign key constraint "@2@" on table "@3@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.54 11553

---

### invalid input value for enum @1@: "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.55 11554

---

### invalid internal value for enum: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.56 11555

---

### could not determine actual enum type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.57 11556

---

### enum @1@ contains no values

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.58 11557

---

### invalid format specification for an interval value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.59 11558

---

### "EEEE" must be the last pattern used

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.60 11559

---

### "9" must be ahead of "PR"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.61 11560

---

### "0" must be ahead of "PR"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.62 11561

---

### multiple decimal points

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.63 11562

---

### cannot use "V" and decimal point together

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.64 11563

---

**cannot use "S" twice**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.65 11564

---

**cannot use "S" and "PL"/"MI"/"SG"/"PR" together**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.66 11565

---

**cannot use "S" and "MI" together**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.67 11566

---

**cannot use "S" and "PL" together**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.68 11567

---

### cannot use "S" and "SG" together

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.69 11568

---

### cannot use "PR" and "S"/"PL"/"MI"/"SG" together

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.70 11569

---

### cannot use "EEEE" twice

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.71 11570

---

### "EEEE" is incompatible with other formats

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.72 11571

---

---

### "@1@" is not a view

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.73 11572

---

### could not determine which collation to use for regular expression

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.74 11573

---

### could not determine which collation to use for lower() function

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.75 11574

---

### could not determine which collation to use for upper() function

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.76 11575

---

### invalid combination of date conventions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.77 11576

---

### conflicting values for "@1@" field in formatting string

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.78 11577

---

### source string too short for "@1@" formatting field

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.79 11578

---

### invalid argument for @1@: "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.80 11579

---

### value for "@1@" in source string is out of range

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.81 11580

---

### "TZ"/"tz"/"OF" format patterns are not supported in to\_date

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.82 11581

---

### invalid input string for "Y,YYY"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.83 11582

---

### hour "@1@" is invalid for the 12-hour clock

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.84 11584

---

### cannot calculate day of year without year information

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.85 11585

---

### "EEEE" not supported for input

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.86 11586

---

### "RN" not supported for input

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.87 11587

---

### could not open directory "@1@": @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.88 11588

---

### array of weight must be one-dimensional

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.89 11589

---

### array of weight is too short

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.90 11590

---

### array of weight must not contain nulls

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.91 11591

---

### weight out of range

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.92 11592

---

### regular expression failed: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.16.93 11593

---

---

### invalid regexp option: "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.94 11594

---

### invalid escape string

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.95 11595

---

### regexp\_split does not support the global option

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.96 11596

---

### unsupported XML feature

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.97 11597

---

### invalid encoding name "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.98 11598

---

### invalid XML comment

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.16.99 11599

---

### not an XML document

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17 Message Numbers Beginning with 11600

---

---

### 2.17.1 11600

---

#### invalid XML processing instruction

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### 2.17.2 11601

---

#### xmlvalidate is not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.17.3 11602

---

#### could not initialize XML library

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.17.4 11603

---

#### date out of range

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.17.5 11604

---

#### invalid query

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.17.6 11605

---

#### invalid array for XML namespace mapping

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.7 11606

---

### empty XPath expression

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.8 11607

---

### neither namespace name nor URI may be null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.9 11608

---

### could not register XML namespace with name "@1@" and URI "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.10 11609

---

### value "@1@" is out of range for type smallint

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.11 11610

---

### value "@1@" is out of range for type oid

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.12 11611

---

### value "@1@" is out of range for 8-bit integer

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.13 11612

---

### gtsvector\_in not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.14 11613

---

### identifier too long

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.15 11614

---

### invalid input syntax for type path: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.16 11615

---

### no operand in tsquery: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.17 11616

---

### value is too big in tsquery: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.18 11617

---

### operand is too long in tsquery: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.19 11618

---

---

**word is too long in tsquery: "@1@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.17.20 11619**

---

**text-search query doesn't contain lexemes: "@1@"****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.17.21 11620**

---

**length for type @1@ must be at least 1****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.17.22 11621**

---

**length for type @1@ cannot exceed @2@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.17.23 11622**

---

**value too long for type character(@1@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.24 11623

---

### value too long for type character varying(@1@)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.25 11624

---

### reference to parent directory ("..") not allowed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.26 11625

---

### absolute path not allowed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.27 11626

---

### path must be in or below the current directory

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.28 11627

---

### could not open file "@1@" for writing: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.17.29 11628

---

### could not seek in file "@1@" : @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.17.30 11629

---

### must be superuser to read files

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.31 11630

---

### requested length cannot be negative

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.32 11631

---

### must be superuser to get file information

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.33 11632

---

### must be superuser to get directory listings

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.34 11633

---

### too many points requested

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.35 11634

---

### could not format "path" value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.36 11635

---

### invalid input syntax for type point: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.37 11636

---

### invalid input syntax for type lseg: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.38 11638

---

### invalid input syntax for type polygon: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.39 11639

---

### invalid number of points in external "path" value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.40 11640

---

---

### invalid input syntax for type circle: "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.41 11641

---

### invalid input syntax for type macaddr: "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.42 11642

---

### function "dist\_lb" not implemented

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.43 11643

---

### function "close\_lb" not implemented

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.44 11644

---

### cannot create bounding box for empty polygon

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.45 11645

---

### invalid input syntax for type tinterval: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.46 11646

---

### invalid number of points in external "polygon" value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.47 11647

---

### function "poly\_distance" not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.48 11648

---

### function "path\_center" not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.49 11649

---

### open path cannot be converted to polygon

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.50 11650

---

### invalid input syntax for type numeric: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.51 11651

---

### could not format "circle" value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.52 11652

---

### invalid radius in external "circle" value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.53 11653

---

### cannot convert circle with radius zero to polygon

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.54 11654

---

### must request at least 2 points

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.55 11655

---

### cannot convert empty polygon to circle

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.56 11656

---

### bit string length @1 @ does not match type bit(@2@)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.57 11657

---

### "@1@" is not a valid binary digit

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.58 11658

---

### "@1@" is not a valid hexadecimal digit

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.59 11659

---

### invalid length in external bit string

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.60 11660

---

### bit string too long for type bit varying(@1@)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.61 11661

---

---

### negative substring length not allowed

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.62 11662

---

### cannot AND bit strings of different sizes

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.63 11663

---

### cannot OR bit strings of different sizes

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.64 11664

---

### cannot XOR bit strings of different sizes

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.65 11665

---

### bit index @1@ out of valid range (0..@2@)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.66 11666

---

### new bit must be 0 or 1

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.67 11667

---

### unrecognized key word: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.68 11668

---

### missing name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.69 11669

---

### missing "=" sign

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.70 11670

---

**invalid mode character: must be one of "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.71 11671

---

**a name must follow the "/" sign**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.72 11672

---

**defaulting grantor to user ID @1@**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.17.73 11673

---

**ACL array contains wrong data type**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.74 11674

---

### ACL arrays must be one-dimensional

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.75 11675

---

### ACL arrays must not contain null values

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.76 11676

---

### extra garbage at the end of the ACL specification

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.77 11677

---

### grant options cannot be granted back to your own grantor

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.78 11678

---

### dependent privileges exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.79 11679

---

### aclinsert is no longer supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.80 11680

---

### aclremove is no longer supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.81 11681

---

### unrecognized privilege type: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.82 11682

---

### must be member of role "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.83 11683

---

### view "@1@" does not exist

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.84 11684

---

### INTERVAL(@1@) precision must not be negative

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.85 11685

---

### INTERVAL(@1@) precision reduced to maximum allowed, @2@

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.17.86 11686

---

### timestamp out of range: "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.87 11687

---

### cannot subtract infinite dates

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.88 11688

---

### date out of range for timestamp

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.89 11689

---

### cannot convert reserved abstime value to date

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.17.90 11690

---

---

### **time out of range**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.17.91 11691**

---

### **interval units "@1@" not recognized**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.17.92 11692**

---

### **time zone displacement out of range**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.17.93 11693**

---

### **timestamp with time zone units "@1@" not recognized**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.17.94 11695**

---

### **"@1@" is not a composite type**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.95 11696

---

### invalid input syntax for type oid: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.96 11697

---

### invalid octet value in "macaddr" value: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.97 11698

---

### could not determine which collation to use for initcap() function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.17.98 11699

---

### could not convert string to UTF-16: error code @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18 Message Numbers Beginning with 11700

---

### 2.18.1 11700

---

**could not compare Unicode strings: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.18.2 11701

---

**index @1@ out of valid range, 0..@2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.18.3 11702

---

**field position must be greater than zero**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.18.4 11703

---

**unrecognized conversion type specifier "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.5 11705

---

### **format specifies argument 0, but arguments are numbered from 1**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.6 11706

---

### **could not create locale "@1@": @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.7 11707

---

### **collations with different collate and ctype values are not supported on this platform**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.8 11708

---

### **nondefault collations are not supported on this platform**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.9 11709

---

### invalid multibyte character for locale

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.10 11710

---

### could not determine which collation to use for ILIKE

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.11 11711

---

### text-search query contains only stop words or doesn't contain lexemes, ignored

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.18.12 11712

---

### invalid input syntax for type tid: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.13 11713

---

### invalid length in external "numeric" value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.14 11714

---

### invalid sign in external "numeric" value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.15 11715

---

### invalid digit in external "numeric" value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.16 11716

---

### NUMERIC precision @1@ must be between 1 and @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.17 11717

---

---

**NUMERIC scale @1@ must be between 0 and precision @2@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.18.18 11718**

---

**invalid NUMERIC type modifier****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.18.19 11719**

---

**value overflows numeric format****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.18.20 11720**

---

**cannot convert NaN to integer****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.18.21 11721**

---

**cannot convert NaN to bigint**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.22 11722

---

### cannot convert NaN to smallint

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.23 11723

---

### numeric field overflow

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.24 11724

---

### argument for function "exp" too big

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.25 11725

---

### cannot accept a value of type any

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.26 11726

---

### cannot display a value of type any

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.27 11727

---

### cannot accept a value of type anyarray

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.28 11728

---

### cannot accept a value of type anyenum

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.29 11729

---

### cannot accept a value of type anyrange

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.30 11730

---

### cannot accept a value of type trigger

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.31 11731

---

### cannot accept a value of type language\_handler

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.32 11732

---

### cannot display a value of type trigger

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.33 11733

---

### cannot accept a value of type fdw\_handler

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.34 11734

---

### cannot display a value of type language\_handler

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.35 11735

---

### cannot accept a value of type internal

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.36 11736

---

### cannot display a value of type fdw\_handler

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.37 11737

---

### cannot accept a value of type opaque

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.38 11738

---

---

### cannot display a value of type internal

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.39 11739

---

### cannot accept a value of type anyelement

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.40 11740

---

### cannot display a value of type opaque

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.41 11741

---

### cannot accept a value of type anynonarray

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.42 11742

---

### cannot display a value of type anyelement

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.43 11743

---

### cannot accept a value of a shell type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.44 11744

---

### cannot display a value of type anynonarray

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.45 11745

---

### cannot accept a value of type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.46 11746

---

### "char" out of range

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.47 11747

---

### LIKE pattern must not end with escape character

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.48 11748

---

### case insensitive matching not supported on type bytea

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.49 11749

---

### regular-expression matching not supported on type bytea

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.50 11750

---

### function @1@ is not an aggregate

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.51 11751

---

**rule "@1@" has unsupported event type @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.52 11752

---

**replication connection authorized: user=@1@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.18.53 11753

---

**connection authorized: user=@1@ database=@2@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.18.54 11754

---

**database "@1@" has disappeared from pg\_database**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.55 11755

---

### database "@1@" is not currently accepting connections

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.56 11756

---

### permission denied for database "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.57 11757

---

### too many connections for role "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.58 11758

---

### database locale is incompatible with operating system

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.59 11759

---

---

**no roles are defined in this database system****[Description]**

Terminated normally but a warning was output.

**[System Processing]**

Continues processing.

**[Action]**

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

**2.18.60 11760**

---

**new replication connections are not allowed during database shutdown****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.18.61 11761**

---

**must be superuser to connect during database shutdown****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.18.62 11762**

---

**must be superuser to connect in binary upgrade mode****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.18.63 11763**

---

**remaining connection slots are reserved for non-replication superuser connections**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.64 11765

---

### template database "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.65 11766

---

### database @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.18.66 11767

---

### could not stat directory "@1@" : @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.18.67 11768

---

### could not change directory to "@1@" : @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.18.68 11769

---

### cannot set parameter "@1@" within security-restricted operation

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.69 11770

---

### role "@1@" is not permitted to log in

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.70 11771

---

### too many connections for database "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.71 11772

---

### permission denied to set session authorization

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.72 11773

---

**invalid role OID: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.73 11774

---

**could not create lock file "@1@": @2@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.18.74 11775

---

**could not open stop-word file "@1@": @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.18.75 11776

---

**could not open lock file "@1@": @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.18.76 11777

---

### lock file "@1@" already exists

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.18.77 11778

---

### pre-existing shared memory block (key @1@, ID @2@) is still in use

#### [Description]

An error occurred because execution is temporarily impossible.

#### [System Processing]

Processing will be aborted.

#### [Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.18.78 11779

---

### could not remove old lock file "@1@" : @2@

#### [Description]

An error occurred during I/O processing in the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.18.79 11780

---

### could not read lock file "@1@" : @2@

#### [Description]

There was insufficient free space in the disk of the database server during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Delete user data stored in the database server to free up space on the disk.

## 2.18.80 11781

---

### could not read from file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.18.81 11782

---

### "@1@" is not a valid data directory

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.82 11784

---

### loaded library "@1@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.18.83 11785

---

### unexpected encoding ID @1@ for WIN character sets

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.18.84 11786

---

---

**unexpected encoding ID @1@ for ISO 8859 character sets****[Description]**

An unexpected error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

Contact Fujitsu technical support.

---

**2.18.85 11787**

---

**conversion between @1@ and @2@ is not supported****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.18.86 11788**

---

**default conversion function for encoding "@1@" to "@2@" does not exist****[Description]**

Terminated normally but a warning was output.

**[System Processing]**

Continues processing.

**[Action]**

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

**2.18.87 11789**

---

**invalid source encoding name "@1@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.18.88 11790**

---

**invalid destination encoding name "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.89 11791

---

### invalid byte value for encoding "@1@": 0x@2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.90 11792

---

### encoding name too long

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.91 11793

---

### invalid byte sequence for encoding "@1@": @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.92 11795

---

### invalid encoding number: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.93 11796

---

### unrecognized configuration parameter "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.94 11797

---

### parameter "@1@" cannot be changed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.95 11798

---

### parameter "@1@" cannot be changed without restarting the server

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.18.96 11799

---

### parameter "@1@" cannot be changed now

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19 Message Numbers Beginning with 11800

---

### 2.19.1 11800

---

**parameter "@1@" cannot be set after connection start**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.19.2 11801

---

**permission denied to set role "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.19.3 11802

---

**cannot set parameter "@1@" within security-definer function**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.19.4 11803

---

**invalid value for parameter "@1@": "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.5 11804

---

**@1@ is outside the valid range for parameter "@2@" (@3@ .. @4@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.6 11805

---

**@1@ requires a numeric value**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.7 11806

---

**@1@ is outside the valid range for parameter "@2@" (@3@ .. @4@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.8 11807

---

**must be superuser to examine "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.9 11808

---

### SET @1@ takes only one argument

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.10 11809

---

### SET requires parameter name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.11 11810

---

### attempt to redefine parameter "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.19.12 11811

---

### could not parse setting for parameter "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.19.13 11812

---

### invalid value for parameter "@1@": @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.14 11813

---

### invalid value for parameter "@1@": @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.15 11814

---

### parameter "@1@" removed from configuration file, reset to default

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.19.16 11815

---

### parameter "@1@" changed to "@2@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.19.17 11816

---

### could not open configuration file "@1@": maximum nesting depth exceeded

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.18 11817

---

### syntax error in file "@1@" line @2@, near end of line

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.19 11818

---

### syntax error in file "@1@" line @2@, near token "@3@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.20 11819

---

### user mapping not found for "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.21 11820

---

---

### foreign-data wrapper "@1@" has no handler

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.19.22 11821

---

### invalid option "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.19.23 11822

---

### foreign-data wrapper "@1@" does not exist

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.19.24 11823

---

### index "@1@" does not exist

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.19.25 11824

---

### could not create shared memory segment: @1@

[Description]

There was insufficient free space in the database server's shared memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.19.26 11825

---

### could not stat data directory "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.19.27 11826

---

### could not create semaphore: error code @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.19.28 11827

---

### could not lock semaphore: error code @1@

[Description]

An error occurred because execution is temporarily impossible.

[System Processing]

Processing will be aborted.

[Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.19.29 11828

---

---

**could not unlock semaphore: error code @1@****[Description]**

An unexpected error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

Contact Fujitsu technical support.

---

**2.19.30 11829**

---

**could not try-lock semaphore: error code @1@****[Description]**

An error occurred because execution is temporarily impossible.

**[System Processing]**

Processing will be aborted.

**[Action]**

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

---

**2.19.31 11830**

---

**could not create semaphores: @1@****[Description]**

An unexpected error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

Contact Fujitsu technical support.

---

**2.19.32 11832**

---

**pre-existing shared memory block is still in use****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.19.33 11833**

---

**oldest xmin is far in the past**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.19.34 11834

---

### some databases have not been vacuumed in over 2 billion transactions

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.19.35 11835

---

### skipping analyze of "@1@" --- lock not available

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.19.36 11836

---

### skipping "@1@" --- only superuser can analyze it

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.19.37 11837

---

---

**skipping "@1@" --- only superuser or database owner can analyze it****[Description]**

Terminated normally but a warning was output.

**[System Processing]**

Continues processing.

**[Action]**

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

**2.19.38 11838**

---

**skipping "@1@" --- only table or database owner can analyze it****[Description]**

Terminated normally but a warning was output.

**[System Processing]**

Continues processing.

**[Action]**

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

**2.19.39 11839**

---

**skipping "@1@" --- cannot analyze non-tables or special system tables****[Description]**

Terminated normally but a warning was output.

**[System Processing]**

Continues processing.

**[Action]**

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

**2.19.40 11840**

---

**operator class "@1@" does not exist for access method "@2@", skipping****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.41 11841

---

### operator family "@1@" does not exist for access method "@2@", skipping

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.42 11842

---

### operator family "@1@" for access method "@2@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.43 11843

---

### access method "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.44 11844

---

### must be superuser to create an operator class

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.45 11845

---

---

**invalid operator number @1@, must be between 1 and @2@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.19.46 11846**

---

**invalid procedure number @1@, must be between 1 and @2@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.19.47 11847**

---

**storage type specified more than once****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.19.48 11848**

---

**storage type cannot be different from data type for access method "@1@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.19.49 11849**

---

**operator class "@1@" for access method "@2@" already exists**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.19.50 11850

---

### could not make operator class "@1@" be default for type @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.19.51 11851

---

### must be superuser to create an operator family

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.19.52 11852

---

### must be superuser to alter an operator family

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.19.53 11853

---

### operator argument types must be specified in ALTER OPERATOR FAMILY

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.19.54 11854

---

### STORAGE cannot be specified in ALTER OPERATOR FAMILY

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.19.55 11855

---

### one or two argument types must be specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.19.56 11856

---

### index operators must be binary

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.19.57 11857

---

### access method "@1@" does not support ordering operators

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.58 11858

---

### index search operators must return boolean

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.59 11859

---

### btree comparison procedures must have two arguments

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.60 11860

---

### btree comparison procedures must return integer

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.61 11861

---

### hash procedures must have one argument

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.62 11862

---

### hash procedures must return integer

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.63 11863

---

### associated data types must be specified for index support procedure

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.64 11864

---

### procedure number @1@ for (@2@, @3@) appears more than once

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.65 11865

---

### operator number @1@ for (@2@, @3@) appears more than once

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.66 11866

---

---

**operator @1@(@2@,@3@) already exists in operator family "@4@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.19.67 11867**

---

**function @1@(@2@,@3@) already exists in operator family "@4@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.19.68 11868**

---

**operator @1@(@2@,@3@) does not exist in operator family "@4@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.19.69 11869**

---

**function @1@(@2@,@3@) does not exist in operator family "@4@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.19.70 11870**

---

**operator class "@1@" for access method "@2@" already exists in schema "@3@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.71 11871

---

### **operator family "@1@" for access method "@2@" already exists in schema "@3@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.72 11872

---

### **no security label providers have been loaded**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.73 11873

---

### **must specify provider when multiple security label providers have been loaded**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.74 11874

---

### **security label provider "@1@" is not loaded**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.75 11875

---

### **"@1@" is not a table, view, materialized view, composite type, or foreign table**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.76 11876

---

### **aggregate attribute "@1@" not recognized**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.77 11877

---

### **parameter "lc\_collate" must be specified**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.78 11878

---

### **database "@1@" does not exist, skipping**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.19.79 11879

---

### collation "@1@" for encoding "@2@" already exists in schema "@3@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.80 11880

---

### function @1@ already exists in schema "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.81 11881

---

### unrecognized value for EXPLAIN option "@1@": "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.82 11882

---

### unrecognized EXPLAIN option "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.83 11883

---

### **EXPLAIN option BUFFERS requires ANALYZE**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.84 11884

---

### **type "@1@" already exists in schema "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.85 11885

---

### **collation attribute "@1@" not recognized**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.19.86 11886

---

### **aggregate stype must be specified**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.87 11887

---

### aggregate sfunc must be specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.88 11888

---

### aggregate input type must be specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.89 11889

---

### basetype is redundant with aggregate input type specification

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.90 11890

---

### aggregate transition data type cannot be @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.91 11891

---

**function @1 @(@2@) does not exist, skipping**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.19.92 11892

---

**collation "@1@" already exists in schema "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.19.93 11894

---

**vacuuming "@1@.@2@"**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.19.94 11895

---

**relation "@1@" page @2@ is uninitialized --- fixing**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.19.95 11896

---

**"@1@": removed @2@ row versions in @3@ pages**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.19.96 11897

---

**"@1@": found @2@ removable, @3@ nonremovable row versions in @4@ pages**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.19.97 11898

---

**"@1@": removed @2@ row versions in @3@ pages**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.19.98 11899

---

**scanned index "@1@" to remove @2@ row versions**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.20 Message Numbers Beginning with 11900

---

### 2.20.1 11900

---

**index "@1@" now contains @2@ row versions in @3@ pages**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

### 2.20.2 11901

---

**"@1@": truncated @2@ to @3@ pages**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

### 2.20.3 11902

---

**option "@1@" not found**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.20.4 11903

---

**option "@1@" provided more than once**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.5 11904

---

### permission denied to change owner of foreign-data wrapper "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.6 11905

---

### function @1@ must return type "fdw\_handler"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.7 11906

---

### permission denied to create foreign-data wrapper "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.8 11907

---

### foreign-data wrapper "@1@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.9 11908

---

---

### permission denied to alter foreign-data wrapper "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.10 11909

---

### changing the foreign-data wrapper handler can change behavior of existing foreign tables

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.20.11 11910

---

### changing the foreign-data wrapper validator can cause the options for dependent objects to become invalid

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.20.12 11912

---

### foreign-data wrapper "@1@" does not exist, skipping

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.20.13 11913

---

### server "@1@" already exists

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.14 11914

---

### type "@1@" does not exist, skipping

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.20.15 11915

---

### user mapping "@1@" already exists for server @2@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.16 11916

---

### user mapping "@1@" does not exist for the server

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.17 11917

---

### server "@1@" does not exist, skipping

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.20.18 11918

---

### user mapping "@1@" does not exist for the server, skipping

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.20.19 11919

---

### foreign table "@1@" does not exist

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.20 11920

---

### collation "@1@" does not exist, skipping

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.20.21 11921

---

### tablespace "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.22 11922

---

### conversion "@1@" does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.20.23 11923

---

### constraint "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.24 11924

---

### schema "@1@" does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.20.25 11925

---

### extension "@1@" does not exist, skipping

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.20.26 11926

---

### operator @1@ does not exist, skipping

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.20.27 11927

---

### @1@ is not a domain

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.28 11929

---

### table "@1@" does not exist, skipping

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.20.29 11931

---

### only shared relations can be placed in pg\_global tablespace

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.30 11933

---

### truncate cascades to table "@1@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.20.31 11934

---

### cannot vacuum temporary tables of other sessions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.32 11935

---

### cannot inherit from temporary relation "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.33 11936

---

---

### relation "@1@" would be inherited from more than once

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.34 11937

---

### merging multiple inherited definitions of column "@1@"

#### [Description]

Terminated normally.

#### [System Processing]

Continues processing.

#### [Action]

No action required.

---

## 2.20.35 11938

---

### inherited column "@1@" has a type conflict

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.36 11939

---

### inherited column "@1@" has a collation conflict

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.37 11940

---

### inherited column "@1@" has a storage parameter conflict

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.38 11941

---

### merging column "@1@" with inherited definition

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.20.39 11942

---

### column "@1@" has a type conflict

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.40 11943

---

### column "@1@" has a collation conflict

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.41 11944

---

### column "@1@" has a storage parameter conflict

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.42 11945

---

### column "@1@" inherits conflicting default values

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.43 11946

---

### check constraint name "@1@" appears multiple times but with different expressions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.44 11947

---

### cannot rename column of typed table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.45 11948

---

### "@1@" is not a table, view, materialized view, composite type, index, or foreign table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.46 11949

---

### **inherited column "@1@" must be renamed in child tables too**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.47 11950

---

### **cannot rename system column "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.48 11951

---

### **cannot rename inherited column "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.49 11952

---

### **column "@1@" of relation "@2@" already exists**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.50 11953

---

### cannot @1@ "@2@" because it is being used by active queries in this session

#### [Description]

An error occurred because execution is temporarily impossible.

#### [System Processing]

Processing will be aborted.

#### [Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.20.51 11954

---

### cannot @1@ "@2@" because it has pending trigger events

#### [Description]

An error occurred because execution is temporarily impossible.

#### [System Processing]

Processing will be aborted.

#### [Action]

Restart the application. If the same error occurs when you restart the application, to check if there are any problems in the database server.

## 2.20.52 11955

---

### type @1@ is not a composite type

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.53 11956

---

### cannot rewrite system relation "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.54 11957

---

### cannot truncate temporary tables of other sessions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.55 11958

---

### rewriting table "@1@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.20.56 11959

---

### verifying table "@1@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.20.57 11960

---

### column "@1@" contains null values

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.58 11961

---

---

**check constraint "@1@" is violated by some row****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.20.59 11962**

---

**"@1@" is not a table, materialized view, or index****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.20.60 11963**

---

**"@1@" is not a table or view****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.20.61 11964**

---

**"@1@" is not a table or foreign table****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.20.62 11965**

---

**"@1@" is not a table, composite type, or foreign table**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.63 11966

---

### "@1@" is of the wrong type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.64 11967

---

### cannot alter type "@1@" because it is the type of a typed table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.65 11968

---

### type @1@ is not a domain

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.66 11969

---

### cannot add column to typed table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.67 11970

---

### **child table "@1@" has different type for column "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.68 11971

---

### **child table "@1@" has different collation for column "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.69 11972

---

### **child table "@1@" has a conflicting "@2@" column**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.70 11973

---

### **merging definition of column "@1@" for child "@2@"**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.20.71 11974

---

### column must be added to child tables too

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.72 11975

---

### cannot alter system column "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.73 11976

---

### column "@1@" is in a primary key

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.74 11977

---

### statistics target @1@ is too low

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.75 11978

---

### lowering statistics target to @1@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.20.76 11979

---

### invalid storage type "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.77 11980

---

### column data type @1@ can only have storage PLAIN

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.78 11981

---

### cannot drop column from typed table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.79 11982

---

### column "@1@" of relation "@2@" does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.20.80 11983

---

### cannot drop system column "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.81 11984

---

### cannot drop inherited column "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.82 11985

---

### ALTER TABLE / ADD CONSTRAINT USING INDEX will rename index "@1@" to "@2@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.20.83 11986

---

### constraint must be added to child tables too

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.84 11987

---

### inherited relation "@1@" is not a table or foreign table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.85 11988

---

### constraints on permanent tables may reference only permanent tables

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.86 11989

---

### constraints on unlogged tables may reference only permanent or unlogged tables

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.87 11990

---

---

### constraints on temporary tables may reference only temporary tables

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.88 11991

---

### number of referencing and referenced columns for foreign key disagree

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.89 11992

---

### foreign key constraint "@1@" cannot be implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.90 11993

---

### constraint "@1@" of relation "@2@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.20.91 11994

---

### column "@1@" referenced in foreign key constraint does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.92 11995

---

### cannot have more than @1@ keys in a foreign key

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.93 11996

---

### cannot use a deferrable primary key for referenced table "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.94 11997

---

### there is no primary key for referenced table "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.95 11998

---

### cannot use a deferrable unique constraint for referenced table "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.20.96 11999

---

**there is no unique constraint matching given keys for referenced table "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21 Message Numbers Beginning with 12000

---

### 2.21.1 12000

---

**validating foreign key constraint "@1@"**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

### 2.21.2 12001

---

**cannot drop inherited constraint "@1@" of relation "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.21.3 12002

---

**constraint "@1@" of domain "@2@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.4 12003

---

**constraint "@1@" of relation "@2@" does not exist, skipping**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.21.5 12004

---

**cannot alter column type of typed table**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.6 12005

---

**cannot alter inherited column "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.7 12006

---

**transform expression must not return a set**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.8 12007

---

### cannot use subquery in index expression

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.9 12010

---

### column "@1@" cannot be cast automatically to type @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.10 12011

---

### type of inherited column "@1@" must be changed in child tables too

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.11 12012

---

### cannot alter type of column "@1@" twice

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.12 12013

---

### default for column "@1@" cannot be cast automatically to type @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.13 12014

---

### cannot alter type of a column used by a view or rule

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.14 12015

---

### cannot alter type of a column used in a trigger definition

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.15 12016

---

### cannot change owner of index "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.21.16 12017

---

### cannot change owner of sequence "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.17 12018

---

### "@1@" is not a table, materialized view, index, or foreign table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.18 12019

---

### index "@1@" for table "@2@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.19 12020

---

### cannot have multiple SET TABLESPACE subcommands

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.20 12021

---

### "@1@" is not a table, view, materialized view, index, or TOAST table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.21 12022

---

### cannot move system relation "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.22 12023

---

### cannot rewrite temporary tables of other sessions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.23 12024

---

### cannot change inheritance of typed table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.24 12025

---

### **circular inheritance not allowed**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.25 12026

---

### **table "@1@" without OIDs cannot inherit from table "@2@" with OIDs**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.26 12027

---

### **column "@1@" in child table must be marked NOT NULL**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.27 12028

---

### **child table is missing column "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.28 12029

---

---

**child table "@1@" has different definition for check constraint "@2@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.21.29 12030**

---

**child table is missing constraint "@1@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.21.30 12031**

---

**relation "@1@" is not a parent of relation "@2@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.21.31 12032**

---

**typed tables cannot inherit****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.21.32 12033**

---

**table is missing column "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.33 12034

---

**table has column "@1@" where type requires "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.34 12035

---

**table "@1@" has different type for column "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.35 12036

---

**table has extra column "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.36 12037

---

**"@1@" is not a typed table**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.37 12038

---

### cannot move an owned sequence into another schema

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.38 12039

---

### conversion "@1@" already exists in schema "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.39 12040

---

### unlogged sequences are not supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.40 12041

---

### nextval: reached maximum value of sequence "@1@" (@2@)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.41 12042

---

**nextval: reached minimum value of sequence "@1@" (@2@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.42 12043

---

**currvl of sequence "@1@" is not yet defined in this session**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.43 12044

---

**lastval is not yet defined in this session**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.44 12045

---

**setval: value @1@ is out of bounds for sequence "@2@" (@3@..@4@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.45 12046

---

### **INCREMENT must not be zero**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.46 12047

---

### **MINVALUE (@1@) must be less than MAXVALUE (@2@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.47 12048

---

### **START value (@1@) cannot be less than MINVALUE (@2@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.48 12049

---

### **START value (@1@) cannot be greater than MAXVALUE (@2@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.49 12050

---

---

**RESTART value (@1@) cannot be less than MINVALUE (@2@)****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.21.50 12051**

---

**RESTART value (@1@) cannot be greater than MAXVALUE (@2@)****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.21.51 12052**

---

**CACHE (@1@) must be greater than zero****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.21.52 12053**

---

**invalid OWNED BY option****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.21.53 12054**

---

**sequence must have same owner as table it is linked to**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.54 12055

---

### sequence must be in same schema as table it is linked to

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.55 12056

---

### invalid cursor name: must not be empty

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.56 12057

---

### utility statements cannot be prepared

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.57 12058

---

### prepared statement is not a SELECT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.58 12059

---

### wrong number of parameters for prepared statement "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.59 12060

---

### cannot use subquery in EXECUTE parameter

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.60 12061

---

### aggregate functions are not allowed in EXECUTE parameters

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.61 12062

---

### window functions are not allowed in EXECUTE parameters

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.62 12063

---

**parameter \$@1@ of type @2@ cannot be coerced to the expected type @3@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.63 12064

---

**prepared statement "@1@" already exists**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.64 12065

---

**unnamed prepared statement does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.65 12066

---

**skipping vacuum of "@1@" --- lock not available**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.21.66 12067

---

**skipping "@1@" --- only superuser can vacuum it**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.21.67 12068

---

**skipping "@1@" --- only superuser or database owner can vacuum it**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.21.68 12069

---

**skipping "@1@" --- only table or database owner can vacuum it**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.21.69 12070

---

**skipping "@1@" --- cannot vacuum non-tables or special system tables**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.21.70 12071

---

**analyzing "@1@.@2@" inheritance tree**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.21.71 12072

---

**analyzing "@1@.@2@"**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.21.72 12073

---

**automatic analyze of table "@1@.@2@.@3@" system usage: @4@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.21.73 12074

---

**"@1@": scanned @2@ of @3@ pages, containing @4@ live rows and @5@ dead rows; @6@ rows in sample, @7@ estimated total rows**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.21.74 12075

---

### cannot move temporary tables of other sessions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.75 12076

---

### there is no previously clustered index for table "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.76 12077

---

### cannot cluster a shared catalog

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.77 12078

---

### cannot access temporary tables of other sessions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.78 12079

---

**"@1@" is not an index for table "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.79 12080

---

**cannot cluster on index "@1@" because access method does not support clustering**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.80 12081

---

**cannot cluster on partial index "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.81 12082

---

**cannot cluster on invalid index "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.82 12083

---

### clustering "@1@.@2@" using index scan on "@3@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.21.83 12084

---

### clustering "@1@.@2@" using sequential scan and sort

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.21.84 12086

---

### invalid statement name: must not be empty

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.85 12087

---

### could not reposition held cursor

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.86 12088

---

---

### SQL function cannot return shell type @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.21.87 12089

---

### type "@1@" is only a shell

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.21.88 12090

---

### type "@1@" is not yet defined

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.21.89 12091

---

### SQL function cannot accept shell type @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.21.90 12092

---

### type @1@ is only a shell

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.21.91 12093

---

### **token type "@1@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.92 12094

---

### **functions cannot accept set arguments**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.93 12095

---

### **VARIADIC parameter must be the last input parameter**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.21.94 12096

---

### **VARIADIC parameter must be an array**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.21.95 12097

---

### argument name "@1@" used more than once

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.21.96 12098

---

### only input parameters can have default values

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.21.97 12099

---

### cannot use table references in parameter default value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22 Message Numbers Beginning with 12100

---

---

### 2.22.1 12103

---

#### input parameters after one with a default value must also have defaults

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.2 12104

---

### no function body specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.3 12105

---

### no language specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.4 12106

---

### COST must be positive

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.5 12107

---

### ROWS must be positive

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.6 12108

---

**unrecognized function attribute "@1@" ignored**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.22.7 12109

---

**only one AS item needed for language "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.8 12110

---

**role "@1@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.9 12111

---

**function result type must be @1@ because of OUT parameters**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.10 12112

---

**function result type must be specified**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.11 12113

---

**ROWS is not applicable when function does not return a set**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.12 12114

---

**aggregate @1@(@2@) does not exist, skipping**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.22.13 12116

---

**source data type @1@ is a pseudo-type**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.14 12117

---

### target data type @1 @ is a pseudo-type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.15 12118

---

### cast function must take one to three arguments

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.16 12119

---

### argument of cast function must match or be binary-coercible from source data type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.17 12120

---

### second argument of cast function must be type integer

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.18 12121

---

### third argument of cast function must be type boolean

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.19 12122

---

### return data type of cast function must match or be binary-coercible to target data type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.20 12123

---

### cast function must not be volatile

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.21 12124

---

### cast function must not be an aggregate function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.22 12125

---

### cast function must not be a window function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.23 12126

---

### cast function must not return a set

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.24 12127

---

### must be superuser to create a cast WITHOUT FUNCTION

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.25 12128

---

### source and target data types are not physically compatible

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.26 12129

---

---

### **composite data types are not binary-compatible**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.22.27 12130**

---

### **enum data types are not binary-compatible**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.22.28 12131**

---

### **array data types are not binary-compatible**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.22.29 12132**

---

### **domain data types must not be marked binary-compatible**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.22.30 12133**

---

### **source data type and target data type are the same**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.31 12134

---

### cast from type @1@ to type @2@ already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.32 12135

---

### cast from type @1@ to type @2@ does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.22.33 12136

---

### cast from type @1@ to type @2@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.34 12138

---

### no inline code specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.35 12139

---

### language "@1@" does not support inline code execution

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.36 12140

---

### channel name cannot be empty

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.37 12141

---

### channel name too long

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.38 12142

---

### payload string too long

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.39 12143

---

### cannot PREPARE a transaction that has executed LISTEN, UNLISTEN, or NOTIFY

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.40 12144

---

### too many notifications in the NOTIFY queue

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.41 12145

---

### NOTIFY queue is @1@@2@ full

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.22.42 12146

---

### function @1@ must return type "language\_handler"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.43 12147

---

### must be superuser to create text search parsers

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.44 12148

---

### text search parser parameter "@1@" not recognized

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.45 12149

---

### text search parser start method is required

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.46 12150

---

### text search parser gettoken method is required

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.47 12151

---

**text search parser end method is required**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.48 12152

---

**text search parser lextypes method is required**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.49 12153

---

**must be superuser to rename @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.50 12154

---

**text search parser "@1@" does not exist, skipping**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.22.51 12156

---

### text search parser "@1@" already exists in schema "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.52 12157

---

### text search template "@1@" does not accept options

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.53 12158

---

### text search template is required

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.54 12159

---

### text search dictionary "@1@" already exists in schema "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.55 12160

---

### text search dictionary "@1@" does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.22.56 12161

---

### must be superuser to create text search templates

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.57 12162

---

### text search template parameter "@1@" not recognized

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.58 12163

---

### text search template lexize method is required

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.59 12165

---

### text search template "@1@" already exists in schema "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.60 12167

---

### text search template "@1@" does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.22.61 12168

---

### text search configuration parameter "@1@" not recognized

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.62 12169

---

### cannot specify both PARSER and COPY options

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.63 12170

---

### text search parser is required

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.64 12171

---

### text search configuration "@1@" already exists in schema "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.65 12172

---

### text search configuration "@1@" does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.22.66 12174

---

### mapping for token type "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.67 12175

---

### mapping for token type "@1@" does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.22.68 12176

---

### invalid parameter list format: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.69 12177

---

### group "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.70 12178

---

### invalid extension name: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.71 12179

---

### invalid extension version name: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.72 12180

---

### could not open extension control file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.22.73 12181

---

### parameter "@1@" cannot be set in a secondary extension control file

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.74 12183

---

### parameter "@1@" must be a list of extension names

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.75 12184

---

### unrecognized parameter "@1@" in file "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.76 12185

---

### parameter "schema" cannot be specified when "relocatable" is true

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.77 12186

---

### transaction control statements are not allowed within an extension script

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.78 12187

---

### permission denied to create extension "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.22.79 12188

---

---

**permission denied to update extension "@1@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.22.80 12189**

---

**extension "@1@" has no update path from version "@2@" to version "@3@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.22.81 12190**

---

**relation "@1@" already exists, skipping****[Description]**

Terminated normally but a warning was output.

**[System Processing]**

Continues processing.

**[Action]**

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

**2.22.82 12191**

---

**extension "@1@" already exists****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.22.83 12192**

---

**nested CREATE EXTENSION is not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.84 12193

---

### version to install must be specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.85 12194

---

### FROM version must be different from installation target version "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.86 12195

---

### extension "@1@" must be installed in schema "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.87 12196

---

### required extension "@1@" is not installed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.88 12197

---

**language "@1@" does not exist, skipping**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.22.89 12198

---

**OID @1@ does not refer to a table**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.22.90 12199

---

**table "@1@" is not a member of the extension being created**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23 Message Numbers Beginning with 12200

---

---

### 2.23.1 12200

---

**extension "@1@" does not support SET SCHEMA**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.2 12201

---

### **nested ALTER EXTENSION is not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.3 12202

---

### **version "@1@" of extension "@2@" is already installed**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.23.4 12203

---

### **@1@ is already a member of extension "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.5 12204

---

### **@1@ is not a member of extension "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.6 12205

---

### using pg\_pltemplate information instead of CREATE LANGUAGE parameters

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.23.7 12206

---

### must be superuser to create procedural language "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.8 12207

---

### function @1@ must return type "trigger"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.9 12208

---

### unsupported language "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.10 12209

---

### must be superuser to create custom procedural language

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.11 12210

---

### changing return type of function @1@ from "opaque" to "language\_handler"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.23.12 12211

---

### language "@1@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.13 12212

---

### relation "@1@" does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.23.14 12213

---

### unacceptable schema name "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.15 12214

---

### sequence "@1@" does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.23.16 12215

---

### source encoding "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.17 12216

---

### destination encoding "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.18 12217

---

### encoding conversion function @1@ must return type "void"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.19 12218

---

### view "@1@" does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.23.20 12219

---

### relation "@1@" already exists in schema "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.21 12220

---

### could not remove directory "@1@" : @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.23.22 12221

---

### "@1@" exists but is not a directory

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.23 12222

---

### permission denied to create tablespace "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.24 12223

---

### tablespace location cannot contain single quotes

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.25 12224

---

### tablespace location must be an absolute path

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.26 12225

---

### tablespace location "@1@" is too long

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.27 12226

---

### unacceptable tablespace name "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.28 12227

---

### tablespace "@1@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.29 12228

---

### tablespaces are not supported on this platform

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.23.30 12229

---

### window "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.31 12230

---

### index "@1@" does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.23.32 12231

---

### tablespace "@1@" is not empty

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.33 12232

---

### aggregate @1@ does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.34 12233

---

### could not set permissions on directory "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.23.35 12234

---

### some useless files may be left behind in old database directory "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.23.36 12235

---

### directory "@1@" already in use as a tablespace

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.37 12236

---

### could not create symbolic link "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.23.38 12237

---

### could not read symbolic link "@1@": @2@

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.23.39 12238

---

### could not read directory "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.23.40 12239

---

### "@1@" is a foreign table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.41 12240

---

### "@1@" is a view

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.42 12241

---

---

### **TRUNCATE FOR EACH ROW triggers are not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.23.43 12242**

---

#### **INSTEAD OF triggers must be FOR EACH ROW**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.23.44 12243**

---

#### **INSTEAD OF triggers cannot have WHEN conditions**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.23.45 12244**

---

#### **INSTEAD OF triggers cannot have column lists**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.23.46 12245**

---

#### **cannot use subquery in trigger WHEN condition**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.47 12246

---

### aggregate functions are not allowed in trigger WHEN conditions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.48 12247

---

### window functions are not allowed in trigger WHEN conditions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.49 12248

---

### statement trigger's WHEN condition cannot reference column values

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.50 12249

---

### INSERT trigger's WHEN condition cannot reference OLD values

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.51 12250

---

### DELETE trigger's WHEN condition cannot reference NEW values

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.52 12251

---

### BEFORE trigger's WHEN condition cannot reference NEW system columns

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.53 12252

---

### changing return type of function @1@ from "opaque" to "trigger"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.23.54 12254

---

### trigger "@1@" for relation "@2@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.55 12255

---

**ignoring incomplete trigger group for constraint "@1@" @2@**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.23.56 12256

---

**converting trigger group into constraint "@1@" @2@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.23.57 12257

---

**trigger "@1@" for relation "@2@" does not exist, skipping**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.23.58 12258

---

**trigger "@1@" for table "@2@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.59 12259

---

**permission denied: "@1@" is a system trigger**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.60 12260

---

**trigger function @1@ returned null value**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.61 12261

---

**BEFORE STATEMENT trigger cannot return a value**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.62 12262

---

**constraint "@1@" is not deferrable**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.63 12263

---

**rule "@1@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.64 12264

---

**SYSID can no longer be specified**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.65 12265

---

**invalid connection limit: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.66 12266

---

**must be superuser to create superusers**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.67 12267

---

### must be superuser to create replication users

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.68 12268

---

### permission denied to create database

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.69 12269

---

### role name "@1@" is reserved

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.70 12270

---

### role "@1@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.71 12271

---

---

### **must be superuser to alter superusers**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.23.72 12272**

---

### **must be superuser to alter replication users**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.23.73 12273**

---

### **permission denied**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.23.74 12274**

---

### **permission denied to create role**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.23.75 12275**

---

### **tablespace "@1@" does not exist, skipping**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.23.76 12276

---

### current user cannot be dropped

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.77 12277

---

### session user cannot be dropped

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.78 12278

---

### must be superuser to drop superusers

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.79 12279

---

### role "@1@" cannot be dropped because some objects depend on it

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.80 12280

---

### session user cannot be renamed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.81 12281

---

### current user cannot be renamed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.82 12282

---

### must be superuser to rename superusers

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.83 12283

---

### permission denied to rename database

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.84 12284

---

### MD5 password cleared because of role rename

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.23.85 12285

---

### column names cannot be included in GRANT/REVOKE ROLE

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.86 12286

---

### permission denied to drop role

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.87 12287

---

### permission denied to drop objects

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.88 12288

---

**must have admin option on role "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.89 12289

---

**must be superuser to set grantor**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.90 12290

---

**role "@1@" is a member of role "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.23.91 12291

---

**role "@1@" is already a member of role "@2@"**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.23.92 12292

---

**role "@1@" is not a member of role "@2@"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.23.93 12293

---

**COPY BINARY is not supported to stdout or from stdin**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.23.94 12294

---

**could not write to COPY file: @1@**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

## 2.23.95 12295

---

**connection lost during COPY to stdout**

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- If the COMMIT process is not executed after update, add the COMMIT process.
  - If the total number of update records in a single transaction is high, split it into short transactions.
  - If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - Confirm that the database server has not stopped.
    - If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.23.96 12296

---

**could not read from COPY file: @1@**

### [Description]

An error occurred during I/O processing in the database server.

### [System Processing]

Processing will be aborted.

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.23.97 12297

---

**COPY from stdin failed: @1@**

### [Description]

Processing was canceled.

### [System Processing]

Processing will be aborted.

### [Action]

Check the message text.

## 2.23.98 12298

---

**unexpected message type 0x@1@ during COPY from stdin**

### [Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.23.99 12299

---

**must be superuser to COPY to or from a file**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24 Message Numbers Beginning with 12300

---

### 2.24.1 12300

---

**COPY format "@1@" not recognized**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.24.2 12301

---

**argument to option "@1@" must be a list of column names**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.24.3 12302

---

**argument to option "@1@" must be a valid encoding name**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.4 12303

---

### option "@1@" not recognized

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.24.5 12304

---

### cannot specify DELIMITER in BINARY mode

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.6 12305

---

### cannot specify NULL in BINARY mode

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.7 12306

---

### COPY delimiter must be a single one-byte character

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.8 12307

---

### **COPY delimiter cannot be newline or carriage return**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.9 12308

---

### **COPY null representation cannot use newline or carriage return**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.10 12309

---

### **COPY delimiter cannot be "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.11 12310

---

### **COPY HEADER available only in CSV mode**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.12 12311

---

### **COPY quote available only in CSV mode**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.13 12312

---

### **COPY quote must be a single one-byte character**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.14 12313

---

### **COPY delimiter and quote must be different**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.15 12314

---

### **COPY escape available only in CSV mode**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.16 12315

---

---

### **COPY escape must be a single one-byte character**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.24.17 12316**

---

### **COPY force quote available only in CSV mode**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.24.18 12317**

---

### **COPY force quote only available using COPY TO**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.24.19 12318**

---

### **COPY force not null available only in CSV mode**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.24.20 12319**

---

### **COPY force not null only available using COPY FROM**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.21 12320

---

### **COPY delimiter must not appear in the NULL specification**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.22 12321

---

### **CSV quote character must not appear in the NULL specification**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.23 12322

---

### **table "@1@" does not have OIDs**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.24 12323

---

### **COPY (SELECT) WITH OIDS is not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.25 12324

---

### **COPY (SELECT INTO) is not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.26 12325

---

### **FORCE QUOTE column "@1@" not referenced by COPY**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.27 12326

---

### **FORCE NOT NULL column "@1@" not referenced by COPY**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.28 12327

---

### **cannot copy from sequence "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.29 12328

---

### cannot copy from foreign table "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.30 12329

---

### cannot copy to sequence "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.31 12330

---

### cannot copy from non-table relation "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.32 12331

---

### relative path not allowed for COPY to file

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.33 12332

---

### could not open file "@1@" for reading: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.24.34 12333

---

### "@1@" is a directory

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.35 12334

---

### cannot copy to view "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.36 12335

---

### cannot copy to foreign table "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.37 12337

---

---

### cannot copy to non-table relation "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.24.38 12338

---

### COPY file signature not recognized

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.24.39 12339

---

### invalid COPY file header (missing flags)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.24.40 12340

---

### unrecognized critical flags in COPY file header

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.24.41 12341

---

### invalid COPY file header (missing length)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.42 12342

---

### invalid COPY file header (wrong length)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.43 12343

---

### extra data after last expected column

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.44 12344

---

### missing data for OID column

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.45 12345

---

### null OID in COPY data

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.46 12346

---

### invalid OID in COPY data

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.47 12347

---

### missing data for column "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.48 12348

---

### received copy data after EOF marker

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.49 12349

---

### row field count is @1@, expected @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.50 12350

---

### literal carriage return found in data

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.51 12351

---

### unquoted carriage return found in data

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.52 12352

---

### literal newline found in data

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.53 12353

---

### unquoted newline found in data

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.54 12354

---

### end-of-copy marker does not match previous newline style

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.55 12355

---

### end-of-copy marker corrupt

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.56 12356

---

### unterminated CSV quoted field

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.57 12357

---

### unexpected EOF in COPY data

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.58 12358

---

---

### invalid field size

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.24.59 12359

---

### incorrect binary data format

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.24.60 12360

---

### must specify at least one column

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.24.61 12361

---

### cannot use more than @1@ columns in an index

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.24.62 12362

---

### cannot create index on foreign table "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.63 12363

---

### cannot create indexes on temporary tables of other sessions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.64 12364

---

### substituting access method "gist" for obsolete method "rtree"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.24.65 12365

---

### access method "@1@" does not support unique indexes

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.66 12366

---

### access method "@1@" does not support multicolumn indexes

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.67 12367

---

### access method "@1@" does not support exclusion constraints

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.68 12368

---

### @1@ @2@ will create implicit index "@3@" for table "@4@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.24.69 12369

---

### cannot use subquery in index predicate

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.70 12370

---

### aggregate functions are not allowed in index predicates

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.71 12371

---

### functions in index predicate must be marked IMMUTABLE

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.72 12372

---

### cannot use subquery in transform expression

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.73 12374

---

### functions in index expression must be marked IMMUTABLE

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.74 12375

---

### could not determine which collation to use for string comparison

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.75 12376

---

### **operator is not unique: @1@**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.76 12377

---

### **operator @1@ is not a member of operator family "@2@"**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.77 12378

---

### **access method "@1@" does not support ASC/DESC options**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.78 12379

---

### **access method "@1@" does not support NULLS FIRST/LAST options**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.79 12380

---

---

**data type @1@ has no default operator class for access method "@2@"****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.24.80 12381**

---

**operator class "@1@" does not accept data type @2@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.24.81 12382**

---

**there are multiple default operator classes for data type @1@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.24.82 12383**

---

**table "@1@" has no indexes****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.24.83 12384**

---

**can only reindex the currently open database**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.84 12385

---

### table "@1@.@2@" was reindexed

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.24.85 12386

---

### @1@ requires a parameter

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.86 12387

---

### @1@ requires a Boolean value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.87 12389

---

### argument of @1@ must be a name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.88 12391

---

### @1@ requires an integer value

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.89 12393

---

### LOCATION is not supported anymore

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.24.90 12396

---

### permission denied to copy database "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.91 12397

---

### invalid server encoding @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.24.92 12399

---

**new encoding (@1@) is incompatible with the encoding of the template database (@2@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25 Message Numbers Beginning with 12400

---

### 2.25.1 12400

---

**new collation (@1@) is incompatible with the collation of the template database (@2@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.25.2 12401

---

**new LC\_CTYPE (@1@) is incompatible with the LC\_CTYPE of the template database (@2@)**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.25.3 12402

---

**pg\_global cannot be used as default tablespace**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.4 12403

---

### cannot assign new default tablespace "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.5 12404

---

### database "@1@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.6 12405

---

### source database "@1@" is being accessed by other users

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.7 12406

---

### encoding "@1@" does not match locale "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.8 12407

---

**role "@1@" does not exist, skipping**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.25.9 12408

---

**cannot drop a template database**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.10 12409

---

**cannot drop the currently open database**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.11 12410

---

**database "@1@" is being accessed by other users**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.12 12411

---

### permission denied to rename role

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.13 12412

---

### current database cannot be changed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.14 12413

---

### cannot change the tablespace of the currently open database

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.15 12414

---

### some relations of database "@1@" are already in tablespace "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.16 12415

---

### permission denied to change owner of database

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.17 12417

---

### SETOF type not allowed for operator argument

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.18 12418

---

### operator attribute "@1@" not recognized

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.25.19 12419

---

### operator procedure must be specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.20 12420

---

### at least one of leftarg or rightarg must be specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.21 12421

---

### restriction estimator function @1@ must return type "float8"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.22 12422

---

### join estimator function @1@ must return type "float8"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.23 12424

---

### must be superuser to create a base type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.24 12425

---

---

### type attribute "@1@" not recognized

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.25.25 12426

---

### invalid type category "@1@": must be simple ASCII

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.26 12427

---

### array element type cannot be @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.27 12428

---

### alignment "@1@" not recognized

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.28 12429

---

### storage "@1@" not recognized

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.29 12430

---

### type input function must be specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.30 12431

---

### type output function must be specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.31 12432

---

### type modifier output function is useless without a type modifier input function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.32 12433

---

### changing return type of function @1@ from "opaque" to @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.25.33 12434

---

**type input function @1@ must return type @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.34 12435

---

**changing return type of function @1@ from "opaque" to "cstring"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.25.35 12436

---

**type output function @1@ must return type "cstring"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.36 12437

---

**type receive function @1@ must return type @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.37 12438

---

**type send function @1@ must return type "bytea"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.38 12439

---

**"@1@" is not a number**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.39 12440

---

**"@1@" is not a valid base type for a domain**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.40 12441

---

**multiple default expressions**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.41 12442

---

### conflicting NULL/NOT NULL constraints

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.42 12443

---

### unique constraints not possible for domains

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.43 12444

---

### primary key constraints not possible for domains

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.44 12445

---

### exclusion constraints not possible for domains

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.45 12446

---

### foreign key constraints not possible for domains

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.46 12447

---

### specifying constraint deferrability not supported for domains

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.47 12448

---

### changing argument type of function @1@ from "opaque" to "cstring"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.25.48 12449

---

### changing argument type of function @1@ from "opaque" to @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.25.49 12450

---

### **typmod\_in function @1@ must return type "integer"**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.50 12451

---

### **typmod\_out function @1@ must return type "cstring"**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.51 12452

---

### **type analyze function @1@ must return type "boolean"**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.52 12453

---

### **column "@1@" of table "@2@" contains null values**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.53 12454

---

---

**column "@1@" of table "@2@" contains values that violate the new constraint****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.25.54 12456**

---

**cannot use table references in domain check constraint****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.25.55 12457**

---

**@1@ is a table's row type****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.25.56 12458**

---

**cannot alter array type @1@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.25.57 12460**

---

**could not obtain lock on relation "@1@.@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.58 12462

---

### could not determine which collation to use for view column "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.59 12463

---

### view must have at least one column

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.60 12464

---

### cannot drop columns from view

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.61 12465

---

### cannot change name of view column "@1@" to "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.62 12466

---

**cannot change data type of view column "@1@" from @2@ to @3@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.63 12467

---

**views must not contain SELECT INTO**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.64 12468

---

**views must not contain data-modifying statements in WITH**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.65 12469

---

**CREATE VIEW specifies more column names than columns**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.66 12470

---

**view "@1@" will be a temporary view**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.25.67 12471

---

**views cannot be unlogged because they do not have storage**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.68 12472

---

**rule "@1@" for relation "@2@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.69 12473

---

**portal "@1@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.70 12474

---

### there are multiple rules named "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.71 12475

---

### rule "@1@" for relation "@2@" does not exist, skipping

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.25.72 12476

---

### WITH query name "@1@" appears in both a rule action and the query being rewritten

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.73 12477

---

### cannot have RETURNING lists in multiple rules

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.74 12478

---

### multiple assignments to same column "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.75 12479

---

### infinite recursion detected in rules for relation "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.76 12480

---

### DO INSTEAD NOTHING rules are not supported for data-modifying statements in WITH

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.77 12481

---

### conditional DO INSTEAD rules are not supported for data-modifying statements in WITH

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.78 12482

---

---

### **DO ALSO rules are not supported for data-modifying statements in WITH**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.25.79 12483**

---

#### **multi-statement DO INSTEAD rules are not supported for data-modifying statements in WITH**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.25.80 12484**

---

#### **cannot perform INSERT RETURNING on relation "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.25.81 12485**

---

#### **cannot perform UPDATE RETURNING on relation "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.25.82 12486**

---

#### **cannot perform DELETE RETURNING on relation "@1@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.83 12487

---

### WITH cannot be used in a query that is rewritten by rules into multiple queries

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.84 12488

---

### conditional utility statements are not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.85 12489

---

### WHERE CURRENT OF on a view is not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.86 12490

---

### rule "@1@" for relation "@2@" already exists

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.87 12491

---

### rule actions on OLD are not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.88 12492

---

### rule actions on NEW are not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.89 12493

---

### INSTEAD NOTHING rules on SELECT are not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.25.90 12494

---

### multiple actions for rules on SELECT are not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.91 12495

---

### rules on SELECT must have action INSTEAD SELECT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.92 12496

---

### rules on SELECT must not contain data-modifying statements in WITH

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.93 12497

---

### event qualifications are not implemented for rules on SELECT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.94 12498

---

### "@1@" is already a view

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.25.95 12499

---

### view rule "@1@" must be named "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26 Message Numbers Beginning with 12500

---

### 2.26.1 12500

---

#### could not convert table "@1@" to a view because it is not empty

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.26.2 12501

---

#### could not convert table "@1@" to a view because it has triggers

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.26.3 12502

---

#### could not convert table "@1@" to a view because it has indexes

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.4 12503

---

### could not convert table "@1@" to a view because it has child tables

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.5 12504

---

### cannot have multiple RETURNING lists in a rule

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.6 12505

---

### RETURNING lists are not supported in conditional rules

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.7 12506

---

### RETURNING lists are not supported in non-INSTEAD rules

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.8 12507

---

---

### **SELECT rule's target list has too many entries**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.26.9 12508**

---

### **RETURNING list has too many entries**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.26.10 12509**

---

### **cannot convert relation containing dropped columns to view**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.26.11 12510**

---

### **SELECT rule's target entry @1@ has different column name from column "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.26.12 12511**

---

### **SELECT rule's target entry @1@ has different type from column "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.13 12512

---

### RETURNING list's entry @1@ has different type from column "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.14 12513

---

### SELECT rule's target entry @1@ has different size from column "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.15 12514

---

### RETURNING list's entry @1@ has different size from column "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.16 12515

---

### SELECT rule's target list has too few entries

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.17 12516

---

### RETURNING list has too few entries

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.18 12517

---

### @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.19 12518

---

### Perl hash contains nonexistent column "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.20 12519

---

### number of array dimensions (@1@) exceeds the maximum allowed (@2@)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.21 12520

---

### **multidimensional arrays must have array expressions with matching dimensions**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.22 12521

---

### **PL/Perl function must return reference to hash or array**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.23 12522

---

### **\$\_TD->{new} does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.24 12523

---

### **\$\_TD->{new} is not a hash reference**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.25 12524

---

### PL/Perl functions cannot return type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.26 12525

---

### PL/Perl functions cannot accept type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.27 12526

---

### didn't get a CODE reference from compiling function "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.26.28 12527

---

### set-valued function called in context that cannot accept a set

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.29 12528

---

---

### set-returning PL/Perl function must return reference to array or use return\_next

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.30 12529

---

### function returning record called in context that cannot accept type record

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.31 12530

---

### ignoring modified row in DELETE trigger

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.26.32 12531

---

### result of PL/Perl trigger function must be undef, "SKIP", or "MODIFY"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.33 12532

---

### out of memory

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.26.34 12533

---

### trigger functions can only be called as triggers

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.35 12534

---

### cannot use return\_next in a non-SETOF function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.36 12535

---

### SETOF-composite-returning PL/Perl function must call return\_next with reference to hash

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.37 12536

---

### PL/pgSQL functions cannot accept type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.38 12537

---

### could not determine actual return type for polymorphic function "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.39 12538

---

### trigger functions can only be called as triggers

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.40 12539

---

### PL/pgSQL functions cannot return type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.41 12540

---

### trigger functions cannot have declared arguments

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.42 12541

---

### parameter name "@1@" used more than once

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.43 12542

---

### column reference "@1@" is ambiguous

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.44 12543

---

### record "@1@" has no field "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.45 12544

---

### variable "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.46 12545

---

**relation "@1@" does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.47 12546

---

**variable "@1@" has pseudo-type @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.48 12547

---

**relation "@1@" is not a table**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.49 12548

---

**type "@1@" is only a shell**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.50 12549

---

### unrecognized exception condition "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.51 12550

---

### could not determine actual argument type for polymorphic function "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.52 12551

---

### CONTINUE cannot be used outside a loop

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.53 12552

---

### control reached end of function without RETURN

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.54 12553

---

---

### set-valued function called in context that cannot accept a set

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.55 12554

---

### control reached end of trigger procedure without RETURN

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.56 12555

---

### trigger procedure cannot return a set

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.57 12556

---

### variable "@1@" declared NOT NULL cannot default to NULL

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.58 12557

---

### case not found

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.59 12558

---

### lower bound of FOR loop cannot be null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.60 12559

---

### upper bound of FOR loop cannot be null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.61 12560

---

### BY value of FOR loop cannot be null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.62 12561

---

### BY value of FOR loop must be greater than zero

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.63 12562

---

### cursor "@1@" already in use

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.64 12563

---

### arguments given for cursor without arguments

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.65 12564

---

### arguments required for cursor

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.66 12565

---

### FOREACH expression must not be null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.67 12566

---

### **FOREACH expression must yield an array, not type @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.68 12567

---

### **slice dimension (@1@) is out of the valid range 0..@2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.69 12568

---

### **FOREACH ... SLICE loop variable must be of an array type**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.70 12569

---

### **FOREACH loop variable must not be of an array type**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.71 12570

---

### cannot use RETURN NEXT in a non-SETOF function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.72 12571

---

### wrong result type supplied in RETURN NEXT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.73 12572

---

### record "@1@" is not assigned yet

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.74 12573

---

### wrong record type supplied in RETURN NEXT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.75 12574

---

---

### **RETURN NEXT must have a parameter**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.26.76 12575**

---

### **cannot use RETURN QUERY in a non-SETOF function**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.26.77 12576**

---

### **RAISE without parameters cannot be used outside an exception handler**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.26.78 12577**

---

### **too few parameters specified for RAISE**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.26.79 12578**

---

### **too many parameters specified for RAISE**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.80 12579

---

### RAISE statement option cannot be null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.81 12580

---

### RAISE option already specified: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.82 12581

---

### cannot COPY to/from client in PL/pgSQL

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.83 12582

---

### cannot begin/end transactions in PL/pgSQL

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.84 12583

---

### INTO used with a command that cannot return data

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.85 12584

---

### query returned no rows

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.86 12585

---

### query returned more than one row

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.26.87 12586

---

### query has no destination for result data

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.88 12587

---

### query string argument of EXECUTE is null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.89 12588

---

### EXECUTE of SELECT ... INTO is not implemented

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.90 12589

---

### cursor variable "@1@" is null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.91 12590

---

### cursor "@1@" does not exist

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.92 12591

---

### relative or absolute cursor position is null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.93 12592

---

### null value cannot be assigned to variable "@1@" declared NOT NULL

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.94 12593

---

### cannot assign non-composite value to a row variable

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.95 12594

---

### cannot assign non-composite value to a record variable

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.26.96 12595

---

---

**number of array dimensions (@1@) exceeds the maximum allowed (@2@)****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.26.97 12596**

---

**subscripted object is not an array****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.26.98 12597**

---

**array subscript in assignment must not be null****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.26.99 12598**

---

**query "@1@" did not return data****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27 Message Numbers Beginning with 12600

---

### 2.27.1 12600

---

#### row or record variable cannot be NOT NULL

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.27.2 12601

---

#### default value for row or record variable is not supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.27.3 12603

---

#### "@1@" is not a scalar variable

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.27.4 12604

---

#### loop variable of loop over rows must be a record or row variable or list of scalar variables

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.5 12605

---

### cursor FOR loop must have only one target variable

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.6 12606

---

### cursor FOR loop must use a bound cursor variable

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.7 12607

---

### integer FOR loop must have only one target variable

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.8 12608

---

### cannot specify REVERSE in query FOR loop

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.9 12609

---

---

### **loop variable of FOREACH must be a known variable or list of variables**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.27.10 12610**

---

### **FETCH statement cannot return multiple rows**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.27.11 12611**

---

### **cursor variable must be a simple variable**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.27.12 12612**

---

### **variable "@1@" must be of type cursor or refcursor**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.27.13 12613**

---

### **"@1@" is not a known variable**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.14 12614

---

### missing "@1@" at end of SQL expression

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.15 12615

---

### missing "@1@" at end of SQL statement

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.16 12616

---

### RETURN cannot have a parameter in function returning set

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.17 12617

---

### RETURN cannot have a parameter in function with OUT parameters

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.18 12618

---

### **RETURN cannot have a parameter in function returning void**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.19 12620

---

### **RETURN NEXT cannot have a parameter in function with OUT parameters**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.20 12622

---

### **"@1@" is declared CONSTANT**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.21 12623

---

### **record or row variable cannot be part of multiple-item INTO list**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.22 12624

---

### too many INTO variables specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.23 12625

---

### end label "@1@" specified for unlabelled block

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.24 12626

---

### end label "@1@" differs from block's label "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.25 12627

---

### cursor "@1@" has no arguments

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.26 12628

---

### cursor "@1@" has arguments

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.27 12629

---

### @1@ at end of input

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.28 12630

---

### unexpected return value from trigger procedure

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.29 12631

---

### PL/Python trigger function returned "MODIFY" in a DELETE trigger -- ignored

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.27.30 12632

---

### TD["new"] deleted, cannot modify row

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.31 12633

---

### TD["new"] is not a dictionary

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.32 12634

---

### TD["new"] dictionary key at ordinal position @1@ is not a string

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.33 12635

---

### key "@1@" found in TD["new"] does not exist as a column in the triggering row

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.34 12636

---

---

### unsupported set function return mode

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.35 12637

---

### returned object cannot be iterated

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.36 12638

---

### PL/Python function with return type "void" did not return None

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.37 12639

---

### forcibly aborting a subtransaction that has not been exited

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.27.38 12640

---

### function returning record called in context that cannot accept type record

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.39 12641

---

### trigger functions can only be called as triggers

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.40 12642

---

### PL/Python functions cannot return type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.41 12643

---

### PL/Python functions cannot accept type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.42 12644

---

### cannot convert multidimensional array to Python list

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.43 12645

---

### could not convert Python object into cstring: Python string representation appears to contain null bytes

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.44 12646

---

### key "@1@" not found in mapping

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.45 12647

---

### length of returned sequence did not match number of columns in row

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.46 12648

---

### attribute "@1@" does not exist in Python object

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.47 12649

---

**plpy.prepare: type name at ordinal position @1@ is not a string**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.48 12651

---

**Python major version mismatch in session**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.49 12652

---

**@1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.27.50 12653

---

**@1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.51 12654

---

### out of memory

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.27.52 12655

---

### trigger functions can only be called as triggers

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.53 12656

---

### PL/Tcl functions cannot return type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.27.54 12657

---

### PL/Tcl functions cannot return composite types

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.28 Message Numbers Beginning with 12700

---

### 2.28.1 12704

---

**function "@1@" does not exist**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

### 2.28.2 12725

---

**operator @1@ is not a valid ordering operator**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.29 Message Numbers Beginning with 12900

---

### 2.29.1 12908

---

**could not remove cache file "@1@": @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.29.2 12909

---

**could not open tablespace directory "@1@": @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.30 Message Numbers Beginning with 13000**

---

### **2.30.1 13092**

---

**too few arguments for format**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### **2.30.2 13094**

---

**null values cannot be formatted as an SQL identifier**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## **2.31 Message Numbers Beginning with 13300**

---

### **2.31.1 13359**

---

**online backup was canceled, recovery cannot continue**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

### **2.31.2 13362**

---

---

### online backup mode canceled

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.31.3 13363

---

### online backup mode was not canceled

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.32 Message Numbers Beginning with 13400

---

### 2.32.1 13449

---

#### cannot convert whole-row table reference

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### 2.32.2 13452

---

#### cannot alter type "@1@" because column "@2@.@3@" uses it

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.32.3 13453

---

#### cannot alter foreign table "@1@" because column "@2@.@3@" uses its row type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.32.4 13454

---

#### cannot alter table "@1@" because column "@2@.@3@" uses its row type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.32.5 13478

---

#### parameter "lc\_ctype" must be specified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.32.6 13481

---

#### operator family "@1@" does not exist for access method "@2@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.32.7 13490

---

### directories for tablespace @1@ could not be removed

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.32.8 13497

---

### cannot drop extension "@1@" because it is being modified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.32.9 13499

---

### pg\_extension\_config\_dump() can only be called from an SQL script executed by CREATE EXTENSION

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.33 Message Numbers Beginning with 13500

---

### 2.33.1 13508

---

#### must be superuser to set schema of @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.33.2 13580

---

### cannot PREPARE while holding both session-level and transaction-level locks on the same object

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.33.3 13589

---

### sending cancel to blocking autovacuum PID @1@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.33.4 13597

---

### not enough elements in RWConflictPool to record a read/write conflict

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.33.5 13598

---

### not enough elements in RWConflictPool to record a potential read/write conflict

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.34 Message Numbers Beginning with 13700

---

### 2.34.1 13761

---

**cannot move extension "@1@" into schema "@2@" because the extension contains the schema**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.35 Message Numbers Beginning with 13800

---

### 2.35.1 13833

---

**column @1@**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

### 2.35.2 13860

---

**symbolic link "@1@" target is too long**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

### 2.35.3 13864

---

#### unexpected message type "@1@"

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

### 2.35.4 13884

---

#### could not create signal listener pipe for PID @1@: error code @2@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.36 Message Numbers Beginning with 13900

---

### 2.36.1 13922

---

#### could not close handle to backend parameter variables: error code @1@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

### 2.36.2 13941

---

#### conflicting constraint properties

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.36.3 13943

---

#### @1@ constraints cannot be marked DEFERRABLE

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.36.4 13944

---

#### @1@ constraints cannot be marked NOT VALID

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.37 Message Numbers Beginning with 14000

---

### 2.37.1 14024

---

#### column name must be qualified

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.37.2 14028

---

#### cannot create relations in temporary schemas of other sessions

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.37.3 14029

---

#### cannot create temporary relation in non-temporary schema

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.37.4 14030

---

#### only temporary relations may be created in temporary schemas

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.37.5 14042

---

#### cannot reassign ownership of objects owned by @1@ because they are required by the database system

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.38 Message Numbers Beginning with 14100

---

### 2.38.1 14104

---

#### cannot convert Perl array to non-array type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.38.2 14105

---

**cannot convert Perl hash to non-composite type @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.39 Message Numbers Beginning with 14200

---

### 2.39.1 14211

---

**PL/Tcl functions cannot accept type @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.39.2 14218

---

**"@1@" is a table**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.39.3 14282

---

**cannot add schema "@1@" to extension "@2@" because the schema contains the extension**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.39.4 14284

---

### could not identify current directory: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.39.5 14285

---

### invalid binary "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.39.6 14286

---

### could not read binary "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.39.7 14287

---

### could not find a "@1@" to execute

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.39.8 14289

---

**could not read symbolic link "@1@"**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.39.9 14290

---

**child process exited with exit code @1@**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.39.10 14291

---

**child process was terminated by exception 0x@1@**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.39.11 14292

---

**child process was terminated by signal @1@**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.39.12 14293

---

### child process was terminated by signal @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.39.13 14294

---

### child process exited with unrecognized status @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.39.14 14295

---

### could not identify current directory: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.39.15 14296

---

### invalid binary "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.39.16 14297

---

---

### could not read binary "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.39.17 14298

---

### could not find a "@1@" to execute

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.39.18 14299

---

### could not change directory to "@1@": @2@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40 Message Numbers Beginning with 14300

---

### 2.40.1 14300

---

#### could not read symbolic link "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.2 14301

---

### child process exited with exit code @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.3 14302

---

### child process was terminated by exception 0x@1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.4 14303

---

### child process was terminated by signal @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.5 14304

---

### child process was terminated by signal @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.6 14305

---

---

### child process exited with unrecognized status @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40.7 14306

---

### could not identify current directory: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40.8 14307

---

### invalid binary "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40.9 14308

---

### could not read binary "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40.10 14309

---

### could not find a "@1@" to execute

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.11 14310

---

### could not change directory to "@1@": @2@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.12 14311

---

### could not read symbolic link "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.13 14318

---

### could not identify current directory: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.14 14319

---

### invalid binary "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.15 14320

---

**could not read binary "@1@"**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.16 14321

---

**could not find a "@1@" to execute**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.17 14322

---

**could not change directory to "@1@": @2@**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.18 14323

---

**could not read symbolic link "@1@"**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.19 14324

---

### child process exited with exit code @1 @

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.20 14325

---

### child process was terminated by exception 0x@1 @

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.21 14326

---

### child process was terminated by signal @1 @

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.22 14327

---

### child process was terminated by signal @1 @

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.23 14328

---

### auto-open of the keystore has been enabled

[Description]

Enabled automatic opening of the keystore.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.40.24 14329

---

### could not identify current directory: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.25 14330

---

### invalid binary "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.26 14331

---

### could not read binary "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.27 14332

---

---

### could not find a "@1@" to execute

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40.28 14333

---

### could not change directory to "@1@": @2@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40.29 14334

---

### could not read symbolic link "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40.30 14335

---

### child process exited with exit code @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40.31 14336

---

### child process was terminated by exception 0x@1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40.32 14337

---

**child process was terminated by signal @1@**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40.33 14338

---

**child process was terminated by signal @1@**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40.34 14339

---

**@1@: no database directory specified and environment variable PGDATA unset**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.40.35 14340

---

**could not identify current directory: @1@**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.36 14341

---

### invalid binary "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.37 14342

---

### could not read binary "@1@"

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.38 14343

---

### could not find a "@1@" to execute

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.39 14344

---

### could not change directory to "@1@" : @2@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.40 14345

---

**could not read symbolic link "@1@"**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.41 14346

---

**child process exited with exit code @1@**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.42 14347

---

**child process was terminated by exception 0x@1@**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.43 14348

---

**child process was terminated by signal @1@**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.44 14349

---

### child process was terminated by signal @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.40.45 14351

---

### could not access directory for core file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.40.46 14352

---

### path specified by configuration parameter "@1@" is invalid: "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.40.47 14353

---

### WAL archiving is not active

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.40.48 14354

---

---

**could not set permissions on path specified by configuration parameter "@1@": "@2@": @3@****[Description]**

An error occurred during I/O processing in the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.40.49 14359**

---

**could not extend file "@1@", but retrying: @2@****[Description]**

Terminated normally but a warning was output.

**[System Processing]**

Continues processing.

**[Action]**

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

**2.40.50 14360**

---

**could not read block @1@ in file "@2@", but retrying: @3@****[Description]**

Terminated normally but a warning was output.

**[System Processing]**

Continues processing.

**[Action]**

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

**2.40.51 14361**

---

**could not write block @1@ in file "@2@", but retrying: @3@****[Description]**

Terminated normally but a warning was output.

**[System Processing]**

Continues processing.

**[Action]**

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.40.52 14366

---

### a failure has occurred while multiplexing transaction log files

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.40.53 14367

---

### multiplexing of transaction log files has been stopped

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.40.54 14368

---

### must be superuser to control WAL multiplexing

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.40.55 14369

---

### WAL multiplexing is not configured

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.40.56 14370

---

---

### WAL multiplexing is already paused

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.40.57 14371

---

### WAL multiplexing is not paused

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.40.58 14372

---

### could not fork XLog multiplexer process: @1 @

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.40.59 14373

---

### could not set junction for "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.40.60 14374

---

### could not set junction for "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.40.61 14375

---

### could not remove file or directory "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.40.62 14376

---

### could not remove file "@1@": @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.40.63 14377

---

### could not set junction for "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.40.64 14378

---

### could not get junction for "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.40.65 14379

---

### could not open directory "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.40.66 14380

---

### could not read directory "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.40.67 14381

---

### could not stat file or directory "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.40.68 14384

---

### could not determine encoding for locale "@1@": codeset is "@2@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.40.69 14385

---

### could not remove file or directory "@1@": @2@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.40.70 14388

---

### @1@ at or near "@2@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.40.71 14390

---

### query "@1@" returned more than one row

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.40.72 14391

---

### query "@1@" is not a SELECT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.40.73 14392

---

### block label must be placed before DECLARE, not after

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.40.74 14393

---

### collations are not supported by type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.40.75 14394

---

### row or record variable cannot be CONSTANT

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.40.76 14395

---

### cannot use serializable mode in a hot standby

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.41 Message Numbers Beginning with 14400

---

### 2.41.1 14419

---

**could not write lock file "@1@": @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.41.2 14421

---

**Expected 1 tuple with 2 fields, got @1@ tuples with @2@ fields.**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

### 2.41.3 14422

---

**The primary's identifier is @1@, the standby's identifier is @2@.**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.41.4 14423

---

**The transaction has already committed locally, but might not have been replicated to the standby.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.5 14424

---

**You can choose the collation by applying the COLLATE clause to one or both expressions.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.6 14425

---

**Query has too few columns.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.7 14426

---

**Cannot cast type @1@ to @2@ in column @3@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.8 14427

---

**Query has too many columns.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.9 14430

---

**No aggregate function matches the given name and argument types. Perhaps you misplaced ORDER BY; ORDER BY must appear after all regular arguments of the aggregate.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.10 14431

---

**No function matches the given name and argument types. You might need to add explicit type casts.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.11 14432

---

**There is a WITH item named "@1@", but it cannot be referenced from this part of the query.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.12 14433

---

**Use WITH RECURSIVE, or re-order the WITH items to remove forward references.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.13 14434

---

**Perhaps you meant to reference the table alias "@1@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.14 14435

---

**There is an entry for table "@1@", but it cannot be referenced from this part of the query.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.15 14436

---

**String constants with Unicode escapes cannot be used when `standard_conforming_strings` is off.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.16 14437

---

**Unicode escapes must be `\uXXXX` or `\UXXXXXXXX`.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.17 14438

---

**Use " to write quotes in strings. \\' is insecure in client-only encodings.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.18 14439

---

**Use " to write quotes in strings, or use the escape string syntax (E'...').**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.19 14440

---

**Use the escape string syntax for backslashes, e.g., E'\\'.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.20 14441

---

**Use the escape string syntax for escapes, e.g., E'\\r\\n'.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.21 14442

---

**Cast the output of the non-recursive term to the correct type.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.22 14443

---

**Use the COLLATE clause to set the collation of the non-recursive term.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.23 14444

---

**Explicitly cast to the desired type, for example ARRAY[]::integer[].**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.24 14445

---

**Row comparison operators must be associated with btree operator families.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.25 14446

---

**There are multiple equally-plausible candidates.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.26 14447

---

**You will need to rewrite or cast the expression.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.27 14448

---

**Use an explicit ordering operator or modify the query.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.28 14449

---

**Could not choose a best candidate operator. You might need to add explicit type casts.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.29 14450

---

---

**No operator matches the given name and argument type(s). You might need to add explicit type casts.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.41.30 14451

---

**Aggregates with DISTINCT must be able to sort their inputs.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.41.31 14452

---

**Constraint "@1@" contains a whole-row reference to table "@2@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.41.32 14453

---

**Index "@1@" contains a whole-row table reference.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.41.33 14454

---

**Cannot create a primary key or unique constraint using such an index.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.34 14455

---

### Cannot create a non-deferrable constraint using a deferrable index.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.35 14456

---

### Ordering operators must be "<" or ">" members of btree operator families.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.36 14457

---

### Update your data type.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.37 14458

---

### Use NONE to denote the missing argument of a unary operator.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.38 14459

---

**Use separate LIMIT and OFFSET clauses.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.39 14460

---

**For example, FROM (VALUES ...) [AS] foo.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.40 14461

---

**For example, FROM (SELECT ...) [AS] foo.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.41 14463

---

**The insertion source is a row expression containing the same number of columns expected by the INSERT. Did you accidentally use extra parentheses?**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.42 14464

---

**Only result column names can be used, not expressions or functions.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.43 14465

---

**Add the expression/function to every SELECT, or move the UNION into a FROM clause.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.44 14466

---

**Scrollable cursors must be READ ONLY.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.45 14467

---

**Holdable cursors must be READ ONLY.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.46 14468

---

**Insensitive cursors must be READ ONLY.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.47 14469

---

**Valid options in this context are: @1@**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.48 14470

---

**Specify OWNED BY table.column or OWNED BY NONE.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.49 14471

---

**Extension names must not be empty.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.50 14472

---

### Extension names must not contain "--".

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.51 14473

---

### Extension names must not begin or end with "-".

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.52 14474

---

### Extension names must not contain directory separator characters.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.53 14475

---

### Version names must not be empty.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.54 14476

---

---

**Version names must not contain "--".****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.41.55 14477**

---

**Version names must not begin or end with "-".****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.41.56 14478**

---

**Version names must not contain directory separator characters.****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.41.57 14479**

---

**Must be superuser to create this extension.****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.41.58 14480**

---

**Must be superuser to update this extension.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.59 14481

---

[@1@ is not in the extension's schema "@2@"](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.60 14482

---

[Consider using tablespaces instead.](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.61 14483

---

[Use the same encoding as in the template database, or use template0 as template.](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.62 14484

---

[Use the same collation as in the template database, or use template0 as template.](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.63 14485

---

**Use the same LC\_CTYPE as in the template database, or use template0 as template.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.64 14486

---

**There is a conflict because database "@1@" already has some tables in this tablespace.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.65 14487

---

**The chosen LC\_CTYPE setting requires encoding "@1@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.41.66 14488

---

**The chosen LC\_COLLATE setting requires encoding "@1@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.67 14489

---

**You must move them back to the database's default tablespace before using this command.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.68 14490

---

**There are @1@ other session(s) and @2@ prepared transaction(s) using the database.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.69 14493

---

**@1@ dead row versions cannot be removed yet. @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.70 14494

---

**The prefix "pg\_" is reserved for system schemas.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.71 14496

---

**The server process with PID @1@ is among those with the oldest transactions.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.72 14497

---

**The NOTIFY queue cannot be emptied until that process ends its current transaction.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.73 14498

---

**Use the COLLATE clause to set the collation explicitly.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.41.74 14499

---

**The supported languages are listed in the pg\_pltemplate system catalog.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42 Message Numbers Beginning with 14500

---

### 2.42.1 14500

---

**Anyone can COPY to stdout or from stdin. psql's \copy command also works for anyone.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

### 2.42.2 14501

---

**Try the COPY (SELECT ...) TO variant.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

### 2.42.3 14502

---

**COPY @1@, line @2@, column @3@**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

### 2.42.4 14503

---

**COPY @1@, line @2@**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.5 14504

---

**COPY @1@, line @2@, column @3@: "@4@"**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.6 14505

---

**COPY @1@, line @2@, column @3@: null input**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.7 14506

---

**COPY @1@, line @2@: "@3@"**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.8 14507

---

**Use "\r" to represent carriage return.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.9 14508

---

---

**Use quoted CSV field to represent carriage return.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.10 14509

---

**Use "\n" to represent newline.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.11 14510

---

**Use quoted CSV field to represent newline.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.12 14512

---

**@1@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.13 14513

---

**@1@ index row versions were removed. @2@ index pages have been deleted, @3@ are currently reusable. @4@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.14 14514

---

**Operator class "@1@" already is the default.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.15 14515

---

**Must be superuser to change owner of a foreign-data wrapper.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.16 14516

---

**The owner of a foreign-data wrapper must be a superuser.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.17 14517

---

**Must be superuser to create a foreign-data wrapper.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.18 14518

---

**Must be superuser to alter a foreign-data wrapper.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.19 14520

---

**Expected @1@ parameters but got @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.20 14521

---

**Close open transactions soon to avoid wraparound problems.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.21 14522

---

**You might have already suffered transaction-wraparound data loss.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.22 14523

---

**Must be superuser to create a tablespace.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.23 14524

---

**The prefix "pg\_" is reserved for system tablespaces.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.24 14525

---

**Create this directory for the tablespace before restarting the server.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.25 14526

---

**You can remove the directories manually if necessary.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.26 14528

---

**You can alter type @1@, which will alter the array type as well.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.27 14529

---

**Tables cannot have INSTEAD OF triggers.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.28 14530

---

**Views cannot have row-level BEFORE or AFTER triggers.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.29 14531

---

**Views cannot have TRUNCATE triggers.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.30 14532

---

---

### "@1@" versus "@2@"

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.31 14533

---

### To resolve the conflict, specify a default explicitly.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.32 14534

---

### Use ALTER TYPE instead.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.33 14535

---

### Use ALTER ... CASCADE to alter the typed tables too.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.34 14536

---

### Key columns "@1@" and "@2@" are of incompatible types: @3@ and @4@.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.35 14537

---

[@1@ depends on @2@](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.36 14538

---

[Change the ownership of the index's table, instead.](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.37 14539

---

[Sequence "@1@" is linked to table "@2@".](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.38 14540

---

["@1@" is already a child of "@2@".](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.39 14541

---

**Only commutative operators can be used in exclusion constraints.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.40 14542

---

**The exclusion operator must be related to the index operator class for the constraint.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.41 14543

---

**You must specify an operator class for the index or define a default operator class for the data type.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.42 14544

---

**Creating a shell type definition.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.43 14545

---

**Use CREATE LANGUAGE to load the language into the database.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.44 14546

---

**Use DROP AGGREGATE to drop aggregate functions.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.45 14549

---

**Key @1@ is duplicated.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.46 14551

---

**Perhaps you need a different "datestyle" setting.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.47 14552

---

**The operating system could not find any locale data for the locale name "@1@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.48 14553

---

**The server's LC\_CTYPE locale is probably incompatible with the database encoding.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.49 14554

---

**Provide two argument types for operator.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.50 14555

---

**Missing left parenthesis.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.51 14556

---

### Too few columns.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.52 14557

---

### Unexpected end of input.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.53 14558

---

### Too many columns.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.54 14559

---

### Junk after right parenthesis.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.55 14560

---

---

**Intervals are not tied to specific calendar dates.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.56 14561

---

**"EEEE" may only be used together with digit and decimal point patterns.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.57 14562

---

**Do not mix Gregorian and ISO week date conventions in a formatting template.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.58 14563

---

**This value contradicts a previous setting for the same field type.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.59 14564

---

**Field requires @1@ characters, but only @2@ remain.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.60 14565

---

**If your source string is not fixed-width, try using the "FM" modifier.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.61 14566

---

**Field requires @1@ characters, but only @2@ could be parsed.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.62 14567

---

**Value must be an integer.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.63 14568

---

**Value must be in the range @1@ to @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.64 14569

---

**The given value did not match any of the allowed values for this field.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.65 14570

---

**Use the 24-hour clock, or give an hour between 1 and 12.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.66 14571

---

**Escape string must be empty or one character.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.67 14572

---

**Value has bits set to right of mask.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.68 14573

---

**Target must be "archiver" or "bgwriter".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.69 14574

---

**Identifier must be less than @1@ characters.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.70 14575

---

**This functionality requires the server to be built with libxml support.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.71 14576

---

**You need to rebuild PostgreSQL using --with-libxml.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.72 14577

---

**XML processing instruction target name cannot be "@1@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.73 14578

---

**XML processing instruction cannot contain "?>".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.74 14579

---

**libxml2 has incompatible char type: sizeof(char)=@1@, sizeof(xmlChar)=@2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.75 14580

---

**XML does not support infinite date values.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.76 14581

---

---

**XML does not support infinite timestamp values.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

**2.42.77 14582**

---

**The array must be two-dimensional with length of the second axis equal to 2.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

**2.42.78 14583**

---

**ACL key word must be "group" or "user".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

**2.42.79 14584**

---

**A name must follow the "group" or "user" key word.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

**2.42.80 14585**

---

**Use CASCADE to revoke them too.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.81 14586

---

### Dimension array must be one dimensional.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.82 14587

---

### Lower bound of dimension array must be one.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.83 14588

---

### Low bound array has different size than dimensions array.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.42.84 14589

---

### MATCH FULL does not allow mixing of null and nonnull key values.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.85 14590

---

**Remove this referential integrity trigger and its mates, then do ALTER TABLE ADD CONSTRAINT.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.86 14591

---

**This is most likely due to a rule having rewritten the query.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.87 14593

---

**Key (@1@)=(@2@) is not present in table "@3@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.88 14594

---

**Key (@1@)=(@2@) is still referenced from table "@3@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.89 14595

---

**A field with precision @1@, scale @2@ must round to an absolute value less than @3@@4@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.90 14596

---

**Arrays with element types @1@ and @2@ are not compatible for concatenation.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.91 14597

---

**Arrays of @1@ and @2@ dimensions are not compatible for concatenation.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.92 14598

---

**Arrays with differing element dimensions are not compatible for concatenation.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.42.93 14599

---

**Arrays with differing dimensions are not compatible for concatenation.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43 Message Numbers Beginning with 14600

---

### 2.43.1 14600

---

**Is another postgres (PID @1@) running in data directory "@2@"?**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

### 2.43.2 14601

---

**Is another postmaster (PID @1@) running in data directory "@2@"?**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

### 2.43.3 14602

---

**Is another postgres (PID @1@) using socket file "@2@"?**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

#### 2.43.4 14603

---

**Is another postmaster (PID @1@) using socket file "@2@"?**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

#### 2.43.5 14604

---

**If you're sure there are no old server processes still running, remove the shared memory block or just delete the file "@1@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

#### 2.43.6 14605

---

**The file seems accidentally left over, but it could not be removed. Please remove the file by hand and try again.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

#### 2.43.7 14606

---

**File "@1@" is missing.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.8 14607

---

**File "@1@" does not contain valid data.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.9 14608

---

**You might need to initdb.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.10 14609

---

**The data directory was initialized by PostgreSQL version @1@.@2@, which is not compatible with this version @3@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.11 14610

---

**Specify an absolute path.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.12 14611

---

**Set up WAL archiving when you configure "@1@" parameter.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.13 14612

---

**Database OID @1@ now seems to belong to "@2@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.14 14613

---

**User does not have CONNECT privilege.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.15 14614

---

**The database was initialized with LC\_COLLATE "@1@", which is not recognized by setlocale().**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.16 14615

---

**Recreate the database with another locale or install the missing locale.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.17 14616

---

**The database was initialized with LC\_CTYPE "@1@", which is not recognized by setlocale().**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.18 14617

---

**You should immediately run CREATE USER "@1@" SUPERUSER;.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.19 14618

---

**It seems to have just been dropped or renamed.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.20 14619

---

---

**The database subdirectory "@1@" is missing.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

**2.43.21 14620**

---

**String of @1@ bytes is too long for encoding conversion.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

**2.43.22 14621**

---

**Continuing anyway, but there's something wrong.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

**2.43.23 14622**

---

**Failed while creating memory context "@1@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

**2.43.24 14623**

---

**Failed on request of size @1@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.25 14624

---

**Extension libraries are required to use the PG\_MODULE\_MAGIC macro.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.26 14625

---

**Server is version @1@.@2@, library is version @3@.@4@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.27 14626

---

**Specify a relation name as well as a rule name.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.28 14627

---

**You need an unconditional ON INSERT DO INSTEAD rule with a RETURNING clause.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.43.29 14628

---

**You need an unconditional ON UPDATE DO INSTEAD rule with a RETURNING clause.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.43.30 14629

---

**You need an unconditional ON DELETE DO INSTEAD rule with a RETURNING clause.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.43.31 14630

---

**Use views or triggers instead.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.43.32 14631

---

**Use triggers instead.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

### 2.43.33 14632

---

**Use views instead.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

### 2.43.34 14633

---

**In particular, the table cannot be involved in any foreign key relationships.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

### 2.43.35 14634

---

**Failed system call was shmget(key=@1 @, size=@2 @, 0@3 @).**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

### 2.43.36 14638

---

**Failed system call was CreateFileMapping(size=@1 @, name=@2 @).**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.37 14639

---

### Check if there are any old server processes still running, and terminate them.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.38 14640

---

### Failed system call was DuplicateHandle.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.39 14641

---

### Failed system call was MapViewOfFileEx.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.40 14642

---

### Failed system call was semget(@1@, @2@, 0@3@).

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.41 14643

---

---

This error does *\*not\** mean that you have run out of disk space. It occurs when either the system limit for the maximum number of semaphore sets (SEMMNI), or the system wide maximum number of semaphores (SEMMNS), would be exceeded. You need to raise the respective kernel parameter. Alternatively, reduce PostgreSQL's consumption of semaphores by reducing its max\_connections parameter. The PostgreSQL documentation contains more information about configuring your system for PostgreSQL.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.42 14644

---

You possibly need to raise your kernel's SEMVMX value to be at least @1@. Look into the PostgreSQL documentation for details.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.43 14645

---

Some of the datatypes only support hashing, while others only support sorting.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.44 14646

---

Window partitioning columns must be of sortable datatypes.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.45 14647

---

### Window ordering columns must be of sortable datatypes.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.46 14648

---

### SQL function "@1@" during startup

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.47 14649

---

### All column datatypes must be hashable.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.48 14650

---

### See server log for query details.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.49 14651

---

---

**Client IP address resolved to "@1@", forward lookup matches.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.50 14652

---

**Client IP address resolved to "@1@", forward lookup not checked.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.51 14653

---

**Client IP address resolved to "@1@", forward lookup does not match.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.52 14654

---

**LDAP over SSL is not supported on this platform.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.53 14655

---

**Is another postmaster already running on port @1@? If not, remove socket file "@2@" and retry.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.54 14656

---

**Is another postmaster already running on port @1@? If not, wait a few seconds and retry.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.55 14657

---

**Anyone can use the client-side lo\_import() provided by libpq.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.56 14658

---

**Anyone can use the client-side lo\_export() provided by libpq.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.57 14659

---

**Permissions should be u=rw (0600) or less.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.58 14660

---

**SSL library does not support certificate revocation lists.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.59 14662

---

**line @1 @ of configuration file "@2@"**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.60 14663

---

**Set ssl = on in postgresql.conf.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.61 14664

---

**Compile with --with-openssl to use SSL connections.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.62 14666

---

**Cannot enlarge string buffer containing @1@ bytes by @2@ more bytes.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.63 14667

---

**Please REINDEX it.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.64 14668

---

**Values larger than 1/3 of a buffer page cannot be indexed. Consider a function index of an MD5 hash of the value, or use full text indexing.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.65 14669

---

**Key @1@ already exists.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.66 14670

---

**This may be because of a non-immutable index expression.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.67 14671

---

**To fix this, do REINDEX INDEX "@1@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.68 14672

---

**This is caused by an incomplete page split at crash recovery before upgrading to PostgreSQL 9.1.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.69 14673

---

**The index is not optimal. To optimize it, contact a developer, or try to use the column as the second one in the CREATE INDEX command.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.70 14674

---

**Could not open file "@1@": @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.71 14675

---

**Could not seek in file "@1@" to offset @2@: @3@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.72 14676

---

**Could not read from file "@1@" at offset @2@: @3@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.73 14677

---

**Could not write to file "@1@" at offset @2@: @3@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.74 14678

---

### Could not fsync file "@1@": @2@.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.75 14679

---

### Could not close file "@1@": @2@.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.76 14680

---

### Set max\_prepared\_transactions to a nonzero value.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.77 14681

---

### Increase max\_prepared\_transactions (currently @1@).

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.78 14682

---

---

**Must be superuser or the user that prepared the transaction.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.79 14683

---

**Connect to the database where the transaction was prepared to finish it.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.80 14685

---

**WAL file is from different database system: Incorrect XLOG\_SEG\_SIZE in page header**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.81 14686

---

**WAL file is from different database system: Incorrect XLOG\_BLCKSZ in page header**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.82 14687

---

**Expected a numeric timeline ID.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.83 14688

---

**Timeline IDs must be in increasing sequence.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.84 14689

---

**Timeline IDs must be less than child timeline's ID.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.85 14690

---

**The database cluster was initialized with PG\_CONTROL\_VERSION @1@ (0x@2@), but the server was compiled with PG\_CONTROL\_VERSION @3@ (0x@4@).**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.43.86 14691

---

**This could be a problem of mismatched byte ordering. It looks like you need to initdb.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.87 14692

---

**The database cluster was initialized with PG\_CONTROL\_VERSION @1@, but the server was compiled with PG\_CONTROL\_VERSION @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.88 14693

---

**It looks like you need to initdb.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.89 14694

---

**The database cluster was initialized with CATALOG\_VERSION\_NO @1@, but the server was compiled with CATALOG\_VERSION\_NO @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.90 14695

---

**The database cluster was initialized with MAXALIGN @1@, but the server was compiled with MAXALIGN @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.91 14696

---

**The database cluster appears to use a different floating-point number format than the server executable.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.92 14697

---

**The database cluster was initialized with BLCKSZ @1@, but the server was compiled with BLCKSZ @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.93 14698

---

**It looks like you need to recompile or initdb.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.43.94 14699

---

---

The database cluster was initialized with RELSEG\_SIZE @1@, but the server was compiled with RELSEG\_SIZE @2@.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44 Message Numbers Beginning with 14700

---

### 2.44.1 14700

---

---

The database cluster was initialized with XLOG\_BLCKSZ @1@, but the server was compiled with XLOG\_BLCKSZ @2@.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.44.2 14701

---

---

The database cluster was initialized with XLOG\_SEG\_SIZE @1@, but the server was compiled with XLOG\_SEG\_SIZE @2@.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.44.3 14702

---

---

The database cluster was initialized with NAMEDATALEN @1@, but the server was compiled with NAMEDATALEN @2@.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

#### 2.44.4 14703

---

**The database cluster was initialized with INDEX\_MAX\_KEYS @1@, but the server was compiled with INDEX\_MAX\_KEYS @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

#### 2.44.5 14704

---

**The database cluster was initialized with TOAST\_MAX\_CHUNK\_SIZE @1@, but the server was compiled with TOAST\_MAX\_CHUNK\_SIZE @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

#### 2.44.6 14705

---

**The database cluster was initialized without HAVE\_INT64\_TIMESTAMP but the server was compiled with HAVE\_INT64\_TIMESTAMP.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

#### 2.44.7 14706

---

**The database cluster was initialized with HAVE\_INT64\_TIMESTAMP but the server was compiled without HAVE\_INT64\_TIMESTAMP.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.8 14707

---

**The database cluster was initialized without USE\_FLOAT4\_BYVAL but the server was compiled with USE\_FLOAT4\_BYVAL.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.9 14708

---

**The database cluster was initialized with USE\_FLOAT4\_BYVAL but the server was compiled without USE\_FLOAT4\_BYVAL.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.10 14709

---

**The database cluster was initialized without USE\_FLOAT8\_BYVAL but the server was compiled with USE\_FLOAT8\_BYVAL.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.11 14710

---

**The database cluster was initialized with USE\_FLOAT8\_BYVAL but the server was compiled without USE\_FLOAT8\_BYVAL.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.12 14711

---

**The database server will regularly poll the `pg_xlog` subdirectory to check for files placed there.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.13 14712

---

**Execute `pg_xlog_replay_resume()` to continue.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.14 14713

---

**Recovery control functions can only be executed during recovery.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.15 14714

---

**This happens if you temporarily set `wal_level=minimal` without taking a new base backup.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.16 14715

---

**Either set wal\_level to "hot\_standby" on the master, or turn off hot\_standby here.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.17 14716

---

**This probably means that some data is corrupted and you will have to use the last backup for recovery.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.18 14717

---

**If this has occurred more than once some data might be corrupted and you might need to choose an earlier recovery target.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.19 14718

---

**If you are not restoring from a backup, try removing the file "@1@/backup\_label".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.20 14719

---

**Online backup started with `pg_start_backup()` must be ended with `pg_stop_backup()`, and all WAL up to that point must be available at recovery.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.21 14720

---

**WAL control functions cannot be executed during recovery.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.22 14721

---

**`wal_level` must be set to "archive", "hot\_standby", or "logical" at server start.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.23 14722

---

**Run `pg_stop_backup()` and try again.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.24 14723

---

**If you're sure there is no backup in progress, remove file "@1@" and try again.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.25 14724

---

**Check that your archive\_command is executing properly. pg\_stop\_backup can be canceled safely, but the database backup will not be usable without all the WAL segments.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.26 14725

---

**pg\_xlogfile\_name\_offset() cannot be executed during recovery.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.27 14726

---

**pg\_xlogfile\_name() cannot be executed during recovery.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.28 14727

---

**xlog redo @1@**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.29 14731

---

**To avoid a database shutdown, execute a database-wide VACUUM in that database. You might also need to commit or roll back old prepared transactions.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.30 14732

---

**Values larger than a buffer page cannot be indexed.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.31 14733

---

**Valid values are between "@1@" and "@2@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.32 14734

---

**Valid values are between "@1@" and "@2@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.33 14735

---

**Returned type @1@ does not match expected type @2@ in column @3@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.34 14736

---

**Number of returned columns (@1@) does not match expected column count (@2@).**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.35 14737

---

**Attribute "@1@" of type @2@ does not match corresponding attribute of type @3@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.36 14738

---

**Attribute "@1@" of type @2@ does not exist in type @3@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.37 14739

---

**To enable inserting into the view, provide an INSTEAD OF INSERT trigger or an unconditional ON INSERT DO INSTEAD rule.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.38 14740

---

**To enable updating the view, provide an INSTEAD OF UPDATE trigger or an unconditional ON UPDATE DO INSTEAD rule.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.39 14741

---

**To enable deleting from the view, provide an INSTEAD OF DELETE trigger or an unconditional ON DELETE DO INSTEAD rule.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.40 14742

---

**SQL function "@1@" statement @2@**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.41 14743

---

**SQL function "@1@"**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.42 14744

---

**SQL function "@1@" during inlining**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.43 14745

---

**Function's final statement must be SELECT or INSERT/UPDATE/DELETE RETURNING.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.44 14746

---

### Final statement must return exactly one column.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.45 14747

---

### Actual return type is @1@.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.46 14748

---

### Final statement returns too many columns.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.47 14749

---

### Final statement returns @1@ instead of @2@ at column @3@.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.48 14750

---

---

**Final statement returns too few columns.****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.44.49 14751**

---

**Input has too many columns.****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.44.50 14752**

---

**Table has type @1@ at ordinal position @2@, but query expects @3@.****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.44.51 14753**

---

**Query provides a value for a dropped column at ordinal position @1@.****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.44.52 14754**

---

**Input has too few columns.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.53 14755

---

### Check for missing "SPI\_finish" calls.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.54 14756

---

### SQL statement "@1@"

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.55 14757

---

### Table has type @1@, but query expects @2@.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.56 14758

---

### Table row contains @1@ attribute, but query expects @2@.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.57 14759

---

**Physical storage mismatch on dropped attribute at ordinal position @1@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.58 14760

---

**Returned row contains @1@ attribute, but query expects @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.59 14761

---

**Returned type @1@ at ordinal position @2@, but query expects @3@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.60 14762

---

**Array with element type @1@ cannot be included in ARRAY construct with element type @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.61 14763

---

**Key @1@ conflicts with key @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.62 14764

---

**Key @1@ conflicts with existing key @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.63 14765

---

**This has been seen to occur with buggy kernels; consider updating your system.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.64 14766

---

**Multiple failures --- write error might be permanent.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.65 14767

---

### writing block @1@ of relation @2@

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.66 14768

---

### Only RowExclusiveLock or less can be acquired on database objects during recovery.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.67 14769

---

### You might need to increase max\_locks\_per\_transaction.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.68 14771

---

### You might need to run fewer transactions at a time or increase max\_connections.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.69 14772

---

---

**There might be an idle transaction or a forgotten prepared transaction causing this.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## **2.44.70 14773**

---

**"default\_transaction\_isolation" is set to "serializable".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## **2.44.71 14774**

---

**You can use "SET default\_transaction\_isolation = 'repeatable read'" to change the default.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## **2.44.72 14775**

---

**You might need to increase max\_pred\_locks\_per\_transaction.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## **2.44.73 14776**

---

**The transaction might succeed if retried.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.74 14778

---

### User transaction caused buffer deadlock with recovery.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.75 14779

---

### System allows @1 @, we need at least @2 @.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.76 14782

---

### Check free disk space.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.77 14783

---

### Consider increasing the configuration parameter "max\_wal\_size".

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.78 14784

---

**Consult recent messages in the server log for details.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.79 14785

---

**This may indicate an incomplete PostgreSQL installation, or that the file "@1@" has been moved away from its proper location.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.80 14786

---

**The server must be started by the user that owns the data directory.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.81 14787

---

**Permissions should be u=rwx (0700).**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.82 14788

---

[See C include file "ntstatus.h" for a description of the hexadecimal value.](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.83 14789

---

[automatic vacuum of table "@1@.@2@.@3@"](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.84 14790

---

[automatic analyze of table "@1@.@2@.@3@"](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.85 14791

---

[Enable the "track\\_counts" option.](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.86 14792

---

**The failed archive command was: @1@**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.87 14793

---

**Some of the transaction logs were lost that are necessary to recover the database completely.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.88 14794

---

**Fix the problem by referring to the messages prior to this one. Then take a full backup of the database.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.44.89 14795

---

**line @1@ of configuration file "@2@": "@3@"**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.90 14796

---

**Words longer than @1@ characters are ignored.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.91 14797

---

**Use "?" to represent a stop word within a sample phrase.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.92 14798

---

**Declare it with SCROLL option to enable backward scan.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.44.93 14799

---

**prepare: @1@**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45 Message Numbers Beginning with 14800

---

### 2.45.1 14800

---

**parameters:** @1@

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

### 2.45.2 14801

---

**abort reason: recovery conflict**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

### 2.45.3 14802

---

**User was holding shared buffer pin for too long.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

### 2.45.4 14803

---

**User was holding a relation lock for too long.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.5 14804

---

### User was or might have been using tablespace that must be dropped.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.6 14805

---

### User query might have needed to see row versions that must be removed.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.7 14806

---

### User was connected to a database that must be dropped.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.8 14808

---

### In a moment you should be able to reconnect to the database and repeat your command.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.9 14809

---

---

**An invalid floating-point operation was signaled. This probably means an out-of-range result or an invalid operation, such as division by zero.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.10 14810

---

**Increase the configuration parameter "max\_stack\_depth" (currently @1@kB), after ensuring the platform's stack depth limit is adequate.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.11 14811

---

**Try "@1@ --help" for more information.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.12 14812

---

**An aggregate returning a polymorphic type must have at least one polymorphic argument.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.13 14813

---

---

**A function returning "internal" must have at least one "internal" argument.****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.45.14 14814**

---

**Use DROP FUNCTION @1 @ first.****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.45.15 14815**

---

**Row type defined by OUT parameters is different.****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.45.16 14816**

---

**System catalog modifications are currently disallowed.****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.45.17 14817**

---

**Proceeding with relation creation anyway.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.18 14818

---

**A relation has an associated type of the same name, so you must use a name that doesn't conflict with any existing type.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.19 14819

---

**Table "@1@" references "@2@", but they do not have the same ON COMMIT setting.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.20 14820

---

**Table "@1@" references "@2@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.21 14821

---

**Truncate table "@1@" at the same time, or use TRUNCATE ... CASCADE.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.22 14822

---

### Only superusers can use untrusted languages.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.23 14823

---

### You can drop @1 @ instead.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.24 14824

---

### Use DROP ... CASCADE to drop the dependent objects too.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.25 14825

---

### An aggregate using a polymorphic transition type must have at least one polymorphic argument.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.26 14826

---

### A function returning a polymorphic type must have at least one polymorphic argument.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.27 14827

---

### Labels must be @1@ characters or less.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.28 14828

---

### Valid fork names are "main", "fsm", "vm", and "init".

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.29 14830

---

### Continuing to retry for 30 seconds.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.45.30 14831

---

**You might have antivirus, backup, or similar software interfering with the database system.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.45.31 14832

---

**while executing PostgreSQL::InServer::SPI::bootstrap**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.45.32 14833

---

**while parsing Perl initialization**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

### 2.45.33 14834

---

**while running Perl initialization**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.34 14835

---

[while executing PLC\\_TRUSTED](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.35 14836

---

[while executing utf8fix](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.36 14837

---

[while executing plperl.on\\_plperl\\_init](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.37 14838

---

[while executing plperl.on\\_plperlu\\_init](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.38 14839

---

### PL/Perl function "@1@"

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.39 14840

---

### compilation of PL/Perl function "@1@"

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.40 14841

---

### PL/Perl anonymous code block

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.41 14842

---

### PL/Python function "@1@"

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.42 14843

---

---

### PL/Python anonymous code block

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.43 14844

---

### while modifying trigger row

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.44 14845

---

### while creating return value

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.45 14846

---

### Expected None or a string.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.46 14847

---

### Expected None, "OK", "SKIP", or "MODIFY".

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.47 14848

---

**PL/Python set-returning functions only support returning one value per call.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.48 14849

---

**PL/Python set-returning functions must return an iterable object.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.49 14851

---

**PL/Python only supports one-dimensional arrays.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.50 14852

---

**To return null in a column, add the value None to the mapping with the key named after the column.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.51 14853

---

**To return null in a column, let the returned object have an attribute named after column with value None.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.52 14854

---

**This session has previously used Python major version @1@, and it is now attempting to use Python major version @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.53 14855

---

**Start a new session to use a different Python major version.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.54 14856

---

**The arguments of the trigger can be accessed through TG\_NARGS and TG\_ARGV instead.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.55 14857

---

### [compilation of PL/pgSQL function "@1@" near line @2@](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.56 14858

---

### [It could refer to either a PL/pgSQL variable or a table column.](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.57 14859

---

### [PL/pgSQL function @1@ line @2@ @3@](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.58 14860

---

### [PL/pgSQL function @1@ @2@](#)

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.59 14861

---

**PL/pgSQL function @1@ line @2@ at @3@**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.60 14862

---

**PL/pgSQL function @1@**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.61 14863

---

**CASE statement is missing ELSE part.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.45.62 14864

---

**The tuple structure of a not-yet-assigned record is indeterminate.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.63 14865

---

@1@

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.64 14866

---

**Use a BEGIN block with an EXCEPTION clause instead.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.65 14867

---

**If you want to discard the results of a SELECT, use PERFORM instead.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.66 14868

---

**You might want to use EXECUTE ... INTO or EXECUTE CREATE TABLE ... AS instead.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.67 14869

---

### Use RETURN NEXT or RETURN QUERY.

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.68 14870

---

### @1@in PL/Tcl function "@2@"

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.45.69 14871

---

### could not translate host name "@1@" to address: @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.45.70 14873

---

### out of memory

[Description]

There was insufficient free space in the client's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- Modify the application to reduce memory usage.

## 2.45.71 14877

---

### host name must be specified

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.45.72 14881

---

### GSSAPI continuation error

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.45.73 14882

---

### duplicate GSS authentication request

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.45.74 14883

---

### GSSAPI name import error

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.45.75 14884

---

### SSPI continuation error

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.45.76 14885

---

### could not acquire SSPI credentials

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.45.77 14886

---

### SCM\_CRED authentication method not supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.45.78 14887

---

### Kerberos 4 authentication not supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.45.79 14888

---

---

### **Kerberos 5 authentication not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.45.80 14889**

---

### **GSSAPI authentication not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.45.81 14890**

---

### **SSPI authentication not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.45.82 14891**

---

### **Crypt authentication not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.45.83 14892**

---

### **authentication method @1@ not supported**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.45.84 14893

---

### invalid sslmode value: "@1@"

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.45.85 14894

---

### sslmode value "@1@" invalid when SSL support is not compiled in

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.45.86 14895

---

### could not set socket to TCP no delay mode: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.45.87 14896

---

### could not connect to server: @1@ Is the server running locally and accepting connections on Unix domain socket "@2@"?

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.45.88 14897

---

**could not connect to server: @1@ Is the server running on host "@2@" (@3@) and accepting TCP/IP connections on port @4@?**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.45.89 14898

---

**could not connect to server: @1@ Is the server running on host "@2@" and accepting TCP/IP connections on port @3@?**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.45.90 14899

---

**setsockopt(TCP\_KEEPIIDLE) failed: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46 Message Numbers Beginning with 14900

---

### 2.46.1 14900

---

[setsockopt\(TCP\\_KEEPAIVE\) failed: @1@](#)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.46.2 14901

---

[setsockopt\(TCP\\_KEEPIVTL\) failed: @1@](#)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.46.3 14902

---

[setsockopt\(TCP\\_KEEPCNT\) failed: @1@](#)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.46.4 14903

---

[WSAIoctl\(SIO\\_KEEPAIVE\\_VALS\) failed: @1@i](#)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.5 14904

---

### invalid port number: "@1@"

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.6 14905

---

### could not find a suitable target server

#### [Description]

Could not find a suitable target server.

#### [System Processing]

Processing is aborted.

#### [Action]

Check following settings (host, IP address, port number, or targetServer):

- Connection string
- Connection service file
- Data source of JDBC or ODBC
- Environment variables for default connection parameter values(ex. PGHOST)
- Arguments of functions of libpq
- Options of command

## 2.46.7 14906

---

### could not translate Unix-domain socket path "@1@" to address: @2@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.8 14907

---

### invalid connection state, probably indicative of memory corruption

#### [Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.46.9 14908

---

**could not create socket: @1@**

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.46.10 14909

---

**could not set socket to nonblocking mode: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.11 14910

---

**could not set socket to close-on-exec mode: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.12 14911

---

**keepalives parameter must be an integer**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.13 14912

---

**setsockopt(SO\_KEEPALIVE) failed: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.14 14913

---

**could not get socket error status: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.15 14914

---

**could not get client address from socket: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.16 14915

---

**requirepeer parameter is not supported on this platform**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.17 14916

---

**could not get peer credentials: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.18 14917

---

**local user with ID @1@ does not exist**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.19 14918

---

**requirepeer specifies "@1@", but actual peer user name is "@2@"**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.20 14919

---

**could not send startup packet: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.21 14920

---

### server does not support auto connection switching

[Description]

The server does not support auto connection switching.

[System Processing]

Processing is aborted.

[Action]

Specify servers that support auto connection switching.

## 2.46.22 14921

---

### unexpected message from server during startup

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.46.23 14922

---

### could not send SSL negotiation packet: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.24 14923

---

### server does not support SSL, but SSL was required

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.25 14924

---

---

**received invalid response to SSL negotiation: @1@****[Description]**

An error occurred during communication between the application and the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

---

**2.46.26 14925**

---

**expected authentication request from server, but received @1@****[Description]**

An error occurred during communication between the application and the database server.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

---

**2.46.27 14926**

---

**out of memory allocating GSSAPI buffer (@1@)****[Description]**

There was insufficient free space in the client's memory during execution of the application.

**[System Processing]**

Processing will be aborted.

**[Action]**

Estimate memory usage and take the following action:

- Modify the application to reduce memory usage.

---

**2.46.28 14927**

---

**invalid connection state @1@, probably indicative of memory corruption****[Description]**

An unexpected error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

Contact Fujitsu technical support.

---

**2.46.29 14928**

---

**PGEventProc "@1@" failed during PGEVT\_CONNRESET event**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.30 14929

---

### invalid LDAP URL "@1@": scheme must be ldap://

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.31 14930

---

### invalid LDAP URL "@1@": missing distinguished name

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.32 14931

---

### invalid LDAP URL "@1@": must have exactly one attribute

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.33 14932

---

### invalid LDAP URL "@1@": must have search scope (base/one/sub)

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.34 14933

---

### invalid LDAP URL "@1@": no filter

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.35 14934

---

### invalid LDAP URL "@1@": invalid port number

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.36 14935

---

### could not create LDAP structure

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.46.37 14936

---

### lookup on LDAP server failed: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.38 14937

---

### more than one entry found on LDAP lookup

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.39 14938

---

### no entry found on LDAP lookup

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.40 14939

---

### attribute has no values on LDAP lookup

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.41 14940

---

### missing "=" after "@1@" in connection info string

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.46.42 14941

---

### invalid connection option "@1@"

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.46.43 14942

---

### unterminated quoted string in connection info string

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.46.44 14943

---

### could not get home directory to locate service definition file

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.45 14944

---

### definition of service "@1@" not found

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.46 14945

---

### service file "@1@" not found

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.46.47 14946

---

### line @1@ too long in service file "@2@"

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.46.48 14947

---

### syntax error in service file "@1@", line @2@

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.46.49 14948

---

### connection pointer is NULL

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.50 14951

---

### password retrieved from file "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.46.51 14952

---

### command string is a null pointer

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.52 14953

---

### statement name is a null pointer

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.53 14954

---

### function requires at least protocol version 3.0

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.54 14955

---

### no connection to the server

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.55 14956

---

### another command is already in progress

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.56 14957

---

### length must be given for binary parameter

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.57 14958

---

### unexpected asyncStatus: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.46.58 14959

---

### **PGEvtProc "@1@" failed during PGEVT\_RESULTCREATE event**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.59 14960

---

### **COPY terminated by new PQexec**

[Description]

Processing was canceled.

[System Processing]

Processing will be aborted.

[Action]

Check the message text.

## 2.46.60 14961

---

### **COPY IN state must be terminated first**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.61 14962

---

### **COPY OUT state must be terminated first**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.62 14963

---

### PQexec not allowed during COPY BOTH

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.63 14964

---

### no COPY in progress

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.64 14965

---

### connection in wrong state

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.65 14966

---

### invalid ExecStatusType code

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.66 14967

---

**column number @1@ is out of range 0..@2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.67 14968

---

**row number @1@ is out of range 0..@2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.68 14969

---

**parameter number @1@ is out of range 0..@2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.69 14970

---

**could not interpret result from server: @1@**

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.46.70 14971

---

---

### incomplete multibyte character

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

---

## 2.46.71 14972

---

### cannot determine OID of function lo\_truncate

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.72 14973

---

### cannot determine OID of function lo\_create

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.73 14974

---

### could not open file "@1@": @2@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.74 14975

---

### could not read from file "@1@": @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.75 14976

---

### could not write to file "@1@": @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.76 14977

---

### query to initialize large object functions did not return data

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.77 14978

---

### cannot determine OID of function lo\_open

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.78 14979

---

### cannot determine OID of function lo\_close

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.79 14980

---

### cannot determine OID of function lo\_creat

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.80 14981

---

### cannot determine OID of function lo\_unlink

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.81 14982

---

### cannot determine OID of function lo\_lseek

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.46.82 14983

---

### cannot determine OID of function lo\_tell

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.83 14984

---

### cannot determine OID of function loread

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.84 14985

---

### cannot determine OID of function lowrite

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.85 14986

---

### integer of size @1@ not supported by pqGetInt

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.86 14987

---

### integer of size @1@ not supported by pqPutInt

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.87 14988

---

### connection not open

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.46.88 14989

---

### server closed the connection unexpectedly This probably means the server terminated abnormally before or while processing the request.

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.46.89 14990

---

### timeout expired

#### [Description]

Timeout occurred during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the following:

- If executing SQL that outputs a large volume of search results, add a conditional expression to filter the results further.
- If numerous SQLs are being simultaneously executed, reduce the number of simultaneously executed SQLs.
- If a large volume of data is to be updated in a single transaction, modify the SQL to reduce the volume of data to be updated in a single transaction.
- If executing a complex SQL, modify it to a simple SQL.
- Check if there are any problems in the network.
- Before conducting maintenance that involves the processing of a large volume of data, use the SET statement to temporarily increase the value of maintenance\_work\_mem.

## 2.46.90 14991

---

### socket not open

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.46.91 14992

---

**select() failed: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.46.92 14993

---

**invalid setenv state @1@, probably indicative of memory corruption**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.46.93 14994

---

**invalid state @1@, probably indicative of memory corruption**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.46.94 14995

---

**message type 0x@1@ arrived from server while idle**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.46.95 14996

---

### unexpected character @1@ following empty query response ("I" message)

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.46.96 14997

---

### server sent data ("D" message) without prior row description ("T" message)

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.46.97 14998

---

### server sent binary data ("B" message) without prior row description ("T" message)

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.46.98 14999

---

### unexpected response from server; first received character was "@1@"

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.47 Message Numbers Beginning with 15000

---

### 2.47.1 15000

---

#### out of memory for query result

[Description]

There was insufficient free space in the client's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- Modify the application to reduce memory usage.

### 2.47.2 15001

---

#### lost synchronization with server, resetting connection

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- If the COMMIT process is not executed after update, add the COMMIT process.
- If the total number of update records in a single transaction is high, split it into short transactions.
- If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

- Confirm that the database server has not stopped.
- If the database server is starting or stopping, re-execute the command after the database server starts.

### 2.47.3 15002

---

#### protocol error: id=0x@1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

### 2.47.4 15003

---

#### server sent data ("D" message) without prior row description ("T" message)

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

### 2.47.5 15004

---

#### message contents do not agree with length in message type "@1@"

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

### 2.47.6 15005

---

#### lost synchronization with server: got message type "@1@", length @2@

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

a) If the COMMIT process is not executed after update, add the COMMIT process.

b) If the total number of update records in a single transaction is high, split it into short transactions.

c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

a) Confirm that the database server has not stopped.

b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.47.7 15006

---

### unexpected field count in "D" message

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.47.8 15007

---

### PQgetline: not doing text COPY OUT

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.47.9 15008

---

### could not establish SSL connection: @1@

#### [Description]

The database server was disconnected during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
- b) If the total number of update records in a single transaction is high, split it into short transactions.
- c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

- a) Confirm that the database server has not stopped.
- b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.47.10 15009

---

### SSL SYSCALL error: @1@

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.11 15010

---

### SSL SYSCALL error: EOF detected

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.12 15011

---

### SSL error: @1@

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.13 15012

---

### SSL connection has been closed unexpectedly

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.47.14 15013

---

### unrecognized SSL error code: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.15 15014

---

### could not receive data from server: @1@

[Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.47.16 15015

---

**could not send data to server: @1@**

### [Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.47.17 15016

---

### could not get server common name from server certificate

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.18 15017

---

### SSL certificate's common name contains embedded null

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.19 15018

---

### host name must be specified for a verified SSL connection

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.47.20 15019

---

### server common name "@1@" does not match host name "@2@"

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.47.21 15020

---

### could not create SSL context: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.22 15021

---

### could not open certificate file "@1@": @2@

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.47.23 15022

---

### could not read certificate file "@1@": @2@

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.47.24 15023

---

### could not load SSL engine "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.25 15024

---

### could not initialize SSL engine "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.26 15025

---

### could not read private SSL key "@1@" from engine "@2@": @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.27 15026

---

### could not load private SSL key "@1@" from engine "@2@": @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.28 15027

---

### certificate present, but not private key file "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.29 15028

---

### private key file "@1@" has group or world access; permissions should be u=rw (0600) or less

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.47.30 15029

---

### could not load private key file "@1@": @2@

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.47.31 15030

---

### certificate does not match private key file "@1@": @2@

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.47.32 15031

---

### could not read root certificate file "@1@": @2@

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.47.33 15032

---

### SSL library does not support CRL certificates (file "@1@")

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.47.34 15033

---

### could not get home directory to locate root certificate fileEither provide the file or change sslmode to disable server certificate verification.

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.47.35 15034

---

### root certificate file "@1@" does not existEither provide the file or change sslmode to disable server certificate verification.

[Description]

The operating environment such as the status of the connection definition file and the connection method specification is abnormal.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the operating environment such as the status of the connection definition file and the connection method specification is normal.

## 2.47.36 15035

---

### certificate could not be obtained: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.37 15036

---

### no SSL error reported

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.38 15037

---

### SSL error code @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.39 15038

---

### @1@: vacuuming database "@2@"

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.47.40 15042

---

### skipped creating .ready file for multiplexed transaction log file "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.47.41 15043

---

### skipped recycling multiplexed transaction log file "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.47.42 15044

---

### skipped removing multiplexed transaction log file "@1@"

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.47.43 15045

---

### no data found on line @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.44 15046

---

### out of memory on line @1@

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.47.45 15047

---

### unsupported type "@1@" on line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.46 15048

---

### too many arguments on line @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.47 15049

---

### too few arguments on line @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.48 15050

---

### invalid input syntax for type int: "@1@", on line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.49 15051

---

### invalid input syntax for type unsigned int: "@1@", on line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.50 15052

---

### invalid input syntax for floating-point type: "@1@", on line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.51 15053

---

### invalid syntax for type boolean: "@1@", on line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.52 15054

---

**could not convert boolean value: size mismatch, on line @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.53 15055

---

**empty query on line @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.54 15056

---

**null value without indicator on line @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.55 15057

---

**variable does not have an array type on line @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.56 15058

---

---

**data read from server is not an array on line @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.47.57 15059**

---

**inserting an array of variables is not supported on line @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.47.58 15060**

---

**connection "@1@" does not exist on line @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.47.59 15061**

---

**not connected to connection "@1@" on line @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.47.60 15062**

---

**invalid statement name "@1@" on line @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.61 15063

---

### descriptor "@1@" not found on line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.62 15064

---

### descriptor index out of range on line @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.63 15065

---

### unrecognized descriptor item "@1@" on line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.64 15066

---

### variable does not have a numeric type on line @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.65 15067

---

### variable does not have a character type on line @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.66 15068

---

### error in transaction processing on line @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.67 15069

---

### could not connect to database "@1@" on line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.68 15070

---

### SQL error @1@ on line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.69 15071

---

### the connection to the server was lost

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.70 15072

---

### empty message text

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.71 15074

---

### SP-GiST inner tuple size @1@ exceeds maximum @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.72 15075

---

### backup\_label contains data inconsistent with control file

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.73 15076

---

### WAL generated with full\_page\_writes=off was replayed since last restartpoint

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.74 15077

---

### the standby was promoted during online backup

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.75 15078

---

### WAL generated with full\_page\_writes=off was replayed during online backup

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.76 15079

---

### index @1@ out of valid range, 0..@2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.77 15080

---

---

**cannot set privileges of array types****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.47.78 15081**

---

**drop cascades to @1@ other object  
drop cascades to @2@ other objects****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.47.79 15082**

---

**constraint "@1@" conflicts with non-inherited constraint on relation "@2@"****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.47.80 15083**

---

**DROP INDEX CONCURRENTLY must be first action in transaction****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.47.81 15084**

---

**foreign-data wrapper name cannot be qualified**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.82 15085

---

### domain "@1@" has multiple constraints named "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.83 15086

---

### functions cannot have more than @1@ argument functions cannot have more than @2@ arguments

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.84 15087

---

### skipping "@1@" --- cannot analyze this foreign table

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.47.85 15088

---

### could not convert row type

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.47.86 15089

---

### unexpected EOF on client connection with an open transaction

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.87 15090

---

### EXPLAIN option TIMING requires ANALYZE

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.88 15091

---

### only superuser can define a leakproof function

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.47.89 15092

---

### cast will be ignored because the source data type is a domain

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.47.90 15093

---

### cast will be ignored because the target data type is a domain

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.47.91 15094

---

### btree sort support procedures must accept type "internal"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.47.92 15095

---

### btree sort support procedures must return void

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.47.93 15096

---

### Use DROP TABLE to remove a table.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.47.94 15097

---

**Use DROP SEQUENCE to remove a sequence.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.47.95 15098

---

**Use DROP VIEW to remove a view.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.47.96 15099

---

**Use DROP INDEX to remove an index.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.48 Message Numbers Beginning with 15100

---

---

### 2.48.1 15100

---

**Use DROP TYPE to remove a type.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.2 15101

---

**Use DROP FOREIGN TABLE to remove a foreign table.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.3 15102

---

**DROP INDEX CONCURRENTLY does not support dropping multiple objects**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.4 15103

---

**DROP INDEX CONCURRENTLY does not support CASCADE**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.5 15104

---

**cannot inherit from temporary relation of another session**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.6 15105

---

### **constraints on temporary tables must involve temporary tables of this session**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.7 15106

---

### **constraint must be validated on child tables too**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.8 15107

---

### **cannot inherit to temporary relation of another session**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.9 15108

---

### **constraint "@1@" conflicts with non-inherited constraint on child table "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.10 15109

---

### Found referenced table's UPDATE trigger.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.11 15110

---

### Found referenced table's DELETE trigger.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.12 15111

---

### Found referencing table's trigger.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.13 15112

---

### @1@ constraints cannot be marked NO INHERIT

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.14 15113

---

---

**type attribute "subtype" is required****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.48.15 15114**

---

**range collation specified but subtype does not support collation****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.48.16 15115**

---

**range canonical function @1@ must be immutable****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.48.17 15116**

---

**range subtype diff function @1@ must return type double precision****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.48.18 15117**

---

**range subtype diff function @1@ must be immutable**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.19 15118

---

### **constraint "@1@" of domain "@2@" does not exist, skipping**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.20 15119

---

### **"@1@": suspending truncate due to conflicting lock request**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.21 15120

---

### **cannot set transaction read-write mode inside a read-only transaction**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.22 15121

---

### **transaction read-write mode must be set before any query**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.23 15122

---

**cannot set transaction read-write mode during recovery**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.24 15123

---

**SET TRANSACTION ISOLATION LEVEL must be called before any query**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.25 15124

---

**SET TRANSACTION ISOLATION LEVEL must not be called in a subtransaction**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.26 15125

---

**SET TRANSACTION [NOT] DEFERRABLE cannot be called within a subtransaction**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.27 15126

---

### SET TRANSACTION [NOT] DEFERRABLE must be called before any query

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.28 15127

---

### cannot delete from view "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.29 15128

---

### GLOBAL is deprecated in temporary table creation

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.30 15129

---

### duplicate trigger events specified

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.48.31 15130

---

### unrecognized configuration parameter "@1@" in file "@2@" line @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.32 15131

---

### configuration file "@1@" contains errors

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.33 15132

---

### configuration file "@1@" contains errors; unaffected changes were applied

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.34 15133

---

### configuration file "@1@" contains errors; no changes were applied

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.35 15134

---

### too many syntax errors found, abandoning file "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.36 15135

---

### accepting GSS security context failed

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.37 15136

---

### retrieving GSS user name failed

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.38 15137

---

### could not acquire SSPI credentials

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.39 15138

---

### could not accept SSPI security context

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.40 15139

---

### could not get token from SSPI security context

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.41 15140

---

### multiple values in ident field

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.48.42 15141

---

### multiple values specified for connection type

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.48.43 15142

---

---

### multiple values specified for host address

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.48.44 15143

---

### multiple values specified for netmask

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.48.45 15144

---

### multiple values specified for authentication type

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.48.46 15145

---

### ident, peer, gssapi, sspi, and cert

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.48.47 15146

---

### gssapi and sspi

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.48.48 15147

---

### configuration file "@1@" contains no entries

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.49 15148

---

### Unix-domain socket path "@1@" is too long (maximum @2@ bytes)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.50 15149

---

### @1@: WSASStartup failed: @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.51 15150

---

### @1@: real and effective user IDs must match

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.48.52 15151

---

**could not look up effective user ID @1@: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.48.53 15153

---

**too many range table entries**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.48.54 15154

---

**SELECT ... INTO is not allowed here**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.48.55 15155

---

**arguments declared "anyrange" are not all alike**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.56 15156

---

### argument declared "anyrange" is not consistent with argument declared "anyelement"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.57 15157

---

### could not load dbghelp.dll, cannot write crash dump

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.58 15158

---

### could not load required functions in dbghelp.dll, cannot write crash dump

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.59 15159

---

### could not open crash dump file "@1@" for writing: error code @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.60 15160

---

**could not write crash dump to file "@1@": error code @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.61 15161

---

**could not open process token: error code @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.62 15162

---

**could not get SID for Administrators group: error code @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.63 15163

---

**could not get SID for PowerUsers group: error code @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.64 15164

---

---

**could not create signal listener pipe: error code @1@; retrying****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.48.65 15165**

---

**could not create signal dispatch thread: error code @1@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.48.66 15166**

---

**@1@: superuser\_reserved\_connections must be less than max\_connections****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.48.67 15167**

---

**@1@: max\_wal\_senders must be less than max\_connections****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.48.68 15168**

---

**@1@: invalid datetoken tables, please fix**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.48.69 15169

---

**@1@: could not change permissions of external PID file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.48.70 15170

---

**@1@: could not write external PID file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.48.71 15171

---

**could not fork new process for connection:**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.48.72 15172

---

**could not read exit code for process**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.73 15173

---

### could not post child completion status

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.74 15174

---

### could not write to log file: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.75 15175

---

### invalid streaming start location

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.76 15176

---

### unterminated quoted string

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.77 15177

---

### unexpected WAL file size "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.78 15178

---

### unterminated bit string literal

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.79 15179

---

### unterminated hexadecimal string literal

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.80 15180

---

### invalid Unicode surrogate pair

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.81 15181

---

### unterminated dollar-quoted string

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.82 15182

---

### zero-length delimited identifier

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.83 15183

---

### unterminated quoted identifier

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.84 15184

---

### Unicode escape values cannot be used for code point values above 007F when the server encoding is not UTF8

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.85 15185

---

### invalid Unicode escape value

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.86 15186

---

### invalid Unicode escape character

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.87 15187

---

### temporary file size exceeds temp\_file\_limit (@1@kB)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.88 15188

---

### a snapshot-importing transaction must not be READ ONLY DEFERRABLE

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.89 15189

---

---

### could not import the requested snapshot

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.48.90 15190

---

### connection to client lost

[Description]

[System Processing]

[Action]

15191

invalid command-line argument for server process: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.48.91 15194

---

### range constructor flags argument must not be null

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.48.92 15195

---

### result of range difference would not be contiguous

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.93 15196

---

### result of range union would not be contiguous

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.94 15197

---

### range lower bound must be less than or equal to range upper bound

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.95 15198

---

### invalid range bound flags

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.48.96 15199

---

### could not set up XML error handler

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49 Message Numbers Beginning with 15200

---

### 2.49.1 15200

---

#### keystore\_location is not supported by this build

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.49.2 15201

---

#### keystore location is not configured

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.49.3 15202

---

#### could not encrypt or decrypt data because the keystore is not open

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.49.4 15203

---

#### keystore is already open

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.5 15204

---

### passphrase is too short or too long

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.6 15205

---

### passphrase-based key derivation failed: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.7 15206

---

### a new master encryption key has been set

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.8 15207

---

### passphrase of the keystore has been changed

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.9 15208

---

---

### encryption or decryption of data in tablespace @1@ failed: @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.49.10 15209

---

### encryption or decryption of data failed: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.49.11 15210

---

### could not open keystore "@1@": necessary master encryption key does not exist in the keystore

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.49.12 15211

---

### decryption of the auto-open keystore "@1@" failed: error code = @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.49.13 15212

---

### encryption of the auto-open keystore "@1@" failed: error code = @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.14 15213

---

**keystore "@1@" is corrupted: size = @2@ bytes, expected size = @3@ bytes**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.15 15214

---

**could not open keystore "@1@" : passphrase is wrong, or the auto-open keystore was created by another computer or user**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.16 15215

---

**keystore "@1@" is corrupted: invalid CRC**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.17 15216

---

**encryption or decryption of the keystore "@1@" failed: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.18 15217

---

**character with byte sequence @1@ in encoding "@2@" has no equivalent in encoding "@3@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.19 15218

---

**Enables the planner's use of sequential-scan plans.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.20 15219

---

**Enables the planner's use of index-scan plans.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.21 15220

---

**Enables the planner's use of index-only-scan plans.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.22 15221

---

**Enables the planner's use of bitmap-scan plans.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.23 15222

---

**Enables the planner's use of TID scan plans.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.24 15223

---

**Enables the planner's use of explicit sort steps.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.25 15224

---

**Enables the planner's use of hashed aggregation plans.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.26 15225

---

**Enables the planner's use of materialization.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.27 15226

---

**Enables the planner's use of nested-loop join plans.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.28 15227

---

**Enables the planner's use of merge join plans.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.29 15228

---

**Enables the planner's use of hash join plans.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.30 15229

---

**Enables genetic query optimization.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.31 15230

---

**Shows whether the current user is a superuser.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.32 15231

---

**Enables advertising the server via Bonjour.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.33 15232

---

**Enables SSL connections.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.34 15233

---

---

**Forces synchronization of updates to disk.****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.49.35 15235**

---

**Writes full pages to WAL when first modified after a checkpoint.****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.49.36 15236**

---

**Logs each checkpoint.****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.49.37 15237**

---

**Logs each successful connection.****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.49.38 15238**

---

**Logs end of a session, including duration.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.49.39 15239

---

### Shows whether the running server has assertion checks enabled.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.49.40 15240

---

### Terminate session on any error.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.49.41 15241

---

### Restarts all server processes on WAL multiplexing errors.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.49.42 15242

---

### Enables fast WAL multiplexing.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.43 15243

---

**Enables encryption of temporary files used in large queries.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.44 15244

---

**Reinitialize server after backend crash.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.45 15245

---

**Logs the duration of each completed SQL statement.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.46 15246

---

**Logs each query's parse tree.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.47 15247

---

**Logs each query's rewritten parse tree.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.48 15248

---

**Logs each query's execution plan.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.49 15249

---

**Indents parse and plan tree displays.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.50 15250

---

**Writes parser performance statistics to the server log.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.51 15251

---

### Writes planner performance statistics to the server log.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.52 15252

---

### Writes executor performance statistics to the server log.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.53 15253

---

### Writes cumulative performance statistics to the server log.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.54 15255

---

### Collects information about executing commands.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.55 15256

---

---

**Collects statistics on database activity.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

**2.49.56 15257**

---

**Collects timing statistics for database I/O activity.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

**2.49.57 15258**

---

**Updates the process title to show the active SQL command.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

**2.49.58 15259**

---

**Starts the autovacuum subprocess.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

**2.49.59 15260**

---

**Generates debugging output for LISTEN and NOTIFY.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.60 15261

---

### Logs long lock waits.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.61 15262

---

### Logs the host name in the connection logs.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.62 15263

---

### Causes subtables to be included by default in various commands.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.63 15264

---

### Encrypt passwords.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.49.64 15265

---

**Treats "expr=NULL" as "expr IS NULL".**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.49.65 15266

---

**Enables per-database user names.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.49.66 15268

---

**Sets the default read-only status of new transactions.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.49.67 15269

---

**Sets the current transaction's read-only status.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## **2.49.68 15270**

---

**Sets the default deferrable status of new transactions.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## **2.49.69 15271**

---

**Whether to defer a read-only serializable transaction until it can be executed with no possible serialization failures.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## **2.49.70 15272**

---

**Check function bodies during CREATE FUNCTION.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## **2.49.71 15273**

---

**Enable input of NULL elements in arrays.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.49.72 15274

---

**Create new tables with OIDs by default.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.49.73 15275

---

**Start a subprocess to capture stderr output and/or csvlogs into log files.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.49.74 15276

---

**Truncate existing log files of same name during log rotation.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.49.75 15277

---

**Emit information about resource usage in sorting.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.76 15278

---

### Generate debugging output for synchronized scanning.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.77 15279

---

### Enable bounded sorting using heap sort.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.78 15280

---

### Emit WAL-related debugging output.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.79 15281

---

### Datetimes are integer based.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.80 15282

---

---

### Sets whether Kerberos and GSSAPI user names should be treated as case-insensitive.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.49.81 15283

---

### Warn about backslash escapes in ordinary string literals.

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.49.82 15284

---

### Causes '...' strings to treat backslashes literally.

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.49.83 15285

---

### Enable synchronized sequential scans.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.49.84 15286

---

---

**Allows archiving of WAL files using archive\_command.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.49.85 15287**

---

**Allows connections and queries during recovery.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.49.86 15288**

---

**Allows feedback from a hot standby to the primary that will avoid query conflicts.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.49.87 15289**

---

**Allows modifications of the structure of system tables.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.49.88 15290**

---

**Disables reading from system indexes.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.89 15291

---

**Enables backward compatibility mode for privilege checks on large objects.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.90 15292

---

**When generating SQL fragments, quote all identifiers.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.91 15293

---

**Forces a switch to the next xlog file if a new file has not been started within N seconds.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.49.92 15294

---

**Waits N seconds on connection startup after authentication.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.93 15295

---

**Sets the default statistics target.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.94 15296

---

**Sets the FROM-list size beyond which subqueries are not collapsed.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.95 15297

---

**Sets the FROM-list size beyond which JOIN constructs are not flattened.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.96 15298

---

**Sets the threshold of FROM items beyond which GEQO is used.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.49.97 15299

---

**GEQO: effort is used to set the default for other GEQO parameters.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50 Message Numbers Beginning with15300

---

### 2.50.1 15300

---

**GEQO: number of individuals in the population.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

### 2.50.2 15301

---

**GEQO: number of iterations of the algorithm.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

### 2.50.3 15302

---

**Sets the time to wait on a lock before checking for deadlock.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.4 15303

---

**Sets the maximum delay before canceling queries when a hot standby server is processing archived WAL data.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.5 15304

---

**Sets the maximum delay before canceling queries when a hot standby server is processing streamed WAL data.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.6 15305

---

**Sets the maximum interval between WAL receiver status reports to the primary.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.7 15306

---

**Sets the maximum number of concurrent connections.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.8 15307

---

**Sets the number of connection slots reserved for superusers.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.9 15308

---

**Sets the number of shared memory buffers used by the server.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.10 15309

---

**Sets the maximum number of temporary buffers used by each session.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.11 15310

---

**Sets the TCP port the server listens on.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.12 15311

---

**Sets the access permissions of the Unix-domain socket.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.13 15312

---

**Sets the file permissions for log files.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.14 15313

---

**Sets the maximum memory to be used for query workspaces.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.15 15314

---

**Sets the maximum memory to be used for maintenance operations.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.16 15315

---

---

**Sets the maximum stack depth, in kilobytes.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.50.17 15316**

---

**Limits the total size of all temporary files used by each session.**

[Description]

There was insufficient free space in the disk of the database server during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Delete user data stored in the database server to free up space on the disk.

---

## **2.50.18 15317**

---

**Vacuum cost for a page found in the buffer cache.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.50.19 15318**

---

**Vacuum cost for a page not found in the buffer cache.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.50.20 15319**

---

**Vacuum cost for a page dirtied by vacuum.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.21 15320

---

### Vacuum cost amount available before napping.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.22 15321

---

### Vacuum cost delay in milliseconds.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.23 15322

---

### Vacuum cost delay in milliseconds, for autovacuum.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.24 15323

---

### Vacuum cost amount available before napping, for autovacuum.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.25 15324

---

**Sets the maximum number of simultaneously open files for each server process.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.26 15325

---

**Sets the maximum number of simultaneously prepared transactions.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.27 15326

---

**Sets the maximum allowed duration of any statement.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.28 15327

---

**Minimum age at which VACUUM should freeze a table row.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.29 15328

---

**Age at which VACUUM should scan whole table to freeze tuples.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.30 15329

---

**Number of transactions by which VACUUM and HOT cleanup should be deferred, if any.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.31 15330

---

**Sets the maximum number of locks per transaction.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.32 15331

---

**Sets the maximum number of predicate locks per transaction.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.33 15332

---

**Sets the maximum allowed time to complete client authentication.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.34 15333

---

**Waits N seconds on connection startup before authentication.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.35 15334

---

**Sets the number of WAL files held for standby servers.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.36 15336

---

**Sets the maximum time between automatic WAL checkpoints.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.37 15337

---

---

**Enables warnings if checkpoint segments are filled more frequently than this.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.50.38 15338**

---

**Sets the number of disk-page buffers in shared memory for WAL.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.50.39 15339**

---

**WAL writer sleep time between WAL flushes.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.50.40 15340**

---

**Sets the maximum number of simultaneously running WAL sender processes.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.50.41 15341**

---

**Sets the maximum time to wait for WAL replication.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.42 15342

---

**Sets the delay in microseconds between transaction commit and flushing WAL to disk.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.43 15343

---

**Sets the minimum concurrent open transactions before performing commit\_delay.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.44 15344

---

**Sets the number of digits displayed for floating-point values.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.45 15345

---

**Sets the minimum execution time above which statements will be logged.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.50.46 15346

---

**Sets the minimum execution time above which autovacuum actions will be logged.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.50.47 15347

---

**Background writer sleep time between rounds.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.50.48 15348

---

**Background writer maximum number of LRU pages to flush per round.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.50.49 15349

---

**Number of simultaneous requests that can be handled efficiently by the disk subsystem.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.50 15350

---

**Automatic log file rotation will occur after N minutes.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.51 15351

---

**Automatic log file rotation will occur after N kilobytes.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.52 15352

---

**Shows the maximum number of function arguments.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.53 15353

---

**Shows the maximum number of index keys.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.54 15354

---

**Shows the maximum identifier length.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.55 15355

---

**Shows the size of a disk block.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.56 15356

---

**Shows the number of pages per disk file.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.57 15357

---

**Shows the block size in the write ahead log.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.58 15358

---

---

**Shows the number of pages per write ahead log segment.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.50.59 15359**

---

**Time to sleep between autovacuum runs.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.50.60 15360**

---

**Minimum number of tuple updates or deletes prior to vacuum.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.50.61 15361**

---

**Minimum number of tuple inserts, updates, or deletes prior to analyze.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.50.62 15362**

---

**Age at which to autovacuum a table to prevent transaction ID wraparound.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.63 15363

---

**Sets the maximum number of simultaneously running autovacuum worker processes.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.64 15364

---

**Time between issuing TCP keepalives.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.65 15365

---

**Time between TCP keepalive retransmits.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.66 15366

---

**SSL renegotiation is no longer supported; this can only be 0.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.50.67 15367

---

**Maximum number of TCP keepalive retransmits.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.50.68 15368

---

**Sets the maximum allowed result for exact search by GIN.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.50.69 15369

---

**Sets the planner's assumption about the size of the disk cache.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.50.70 15370

---

**Shows the server version as an integer.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.71 15371

---

**Log the use of temporary files larger than this number of kilobytes.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.72 15372

---

**Sets the size reserved for `pg_stat_activity.query`, in bytes.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.73 15373

---

**Sets the planner's estimate of the cost of a sequentially fetched disk page.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.74 15374

---

**Sets the planner's estimate of the cost of a nonsequentially fetched disk page.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.75 15375

---

**Sets the planner's estimate of the cost of processing each tuple (row).**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.76 15376

---

**Sets the planner's estimate of the cost of processing each index entry during an index scan.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.77 15377

---

**Sets the planner's estimate of the cost of processing each operator or function call.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.78 15378

---

**Sets the planner's estimate of the fraction of a cursor's rows that will be retrieved.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.79 15379

---

---

**GEQO: selective pressure within the population.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.50.80 15380

---

**GEQO: seed for random path selection.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.50.81 15381

---

**Multiple of the average buffer usage to free per round.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.50.82 15382

---

**Sets the seed for random-number generation.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.50.83 15383

---

**Number of tuple updates or deletes prior to vacuum as a fraction of reltuples.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.84 15384

---

**Number of tuple inserts, updates, or deletes prior to analyze as a fraction of reltuples.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.85 15385

---

**Time spent flushing dirty buffers during checkpoint, as fraction of checkpoint interval.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.86 15386

---

**Sets the shell command that will be called to archive a WAL file.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.87 15387

---

**Sets the client's character set encoding.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.88 15388

---

**Controls information prefixed to each log line.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.89 15389

---

**Sets the time zone to use in log messages.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.90 15390

---

**Sets the display format for date and time values.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.91 15391

---

**Sets the default tablespace to create tables and indexes in.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.92 15392

---

**Sets the tablespace(s) to use for temporary tables and sort files.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.93 15393

---

**Sets the path for dynamically loadable modules.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.94 15394

---

**Sets the location of the Kerberos server key file.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.95 15396

---

**Sets the Bonjour service name.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.96 15397

---

**Shows the collation order locale.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.97 15398

---

**Shows the character classification and case conversion locale.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.50.98 15399

---

**Sets the language in which messages are displayed.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51 Message Numbers Beginning with 15400

---

### 2.51.1 15400

---

**Sets the locale for formatting monetary amounts.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.2 15401

---

**Sets the locale for formatting numbers.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.3 15402

---

**Sets the locale for formatting date and time values.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.4 15403

---

**Lists shared libraries to preload into server.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.5 15404

---

**Lists shared libraries to preload into each backend.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.6 15405

---

---

**Sets the schema search order for names that are not schema-qualified.****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.51.7 15406**

---

**Sets the server (database) character set encoding.****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.51.8 15407**

---

**Shows the server version.****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.51.9 15408**

---

**Sets the current role.****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.51.10 15409**

---

**Sets the session user name.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.11 15410

---

### Sets the destination for server log output.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.12 15411

---

### Sets the destination directory for log files.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.13 15412

---

### Sets the file name pattern for log files.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.14 15413

---

### Sets the program name used to identify PostgreSQL messages in syslog.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.15 15414

---

**Sets the application name used to identify PostgreSQL messages in the event log.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.16 15415

---

**Sets the time zone for displaying and interpreting time stamps.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.17 15416

---

**Selects a file of time zone abbreviations.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.18 15417

---

**Sets the current transaction's isolation level.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.19 15418

---

**Sets the owning group of the Unix-domain socket.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.20 15419

---

**Sets the directories where Unix-domain sockets will be created.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.21 15420

---

**Sets the host name or IP address(es) to listen to.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.22 15421

---

**Sets the server's data directory.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.23 15422

---

### Sets the server's backup directory.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.24 15423

---

### Sets the directory where multiplexed transaction log files are stored.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.25 15424

---

### Sets the directory where server's core files are dumped.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.26 15425

---

### Sets the location where the keystore is stored

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.27 15426

---

---

**Sets the server's main configuration file.****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.51.28 15427**

---

**Sets the server's "hba" configuration file.****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.51.29 15428**

---

**Sets the server's "ident" configuration file.****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.51.30 15429**

---

**Writes the postmaster PID to the specified file.****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.51.31 15430**

---

**Location of the SSL server certificate file.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.32 15431

---

### Location of the SSL server private key file.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.33 15432

---

### Location of the SSL certificate authority file.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.34 15433

---

### Location of the SSL certificate revocation list file.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.35 15434

---

### Writes temporary statistics files to the specified directory.

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.36 15435

---

**List of names of potential synchronous standbys.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.37 15436

---

**Sets default text search configuration.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.38 15437

---

**Sets the list of allowed SSL ciphers.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.39 15438

---

**Sets the application name to be reported in statistics and logs.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.40 15439

---

**Sets whether "\" is allowed in string literals.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.41 15440

---

**Sets the output format for bytea.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.42 15441

---

**Sets the message levels that are sent to the client.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.43 15442

---

**Enables the planner to use constraints to optimize queries.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.44 15443

---

**Sets the transaction isolation level of each new transaction.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.45 15444

---

**Sets the display format for interval values.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.46 15445

---

**Sets the verbosity of logged messages.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.47 15446

---

**Sets the message levels that are logged.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.48 15447

---

---

**Causes all statements generating error at or above this level to be logged.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.51.49 15448**

---

**Sets the type of statements logged.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.51.50 15449**

---

**Sets the syslog "facility" to be used when syslog enabled.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.51.51 15450**

---

**Sets the session's behavior for triggers and rewrite rules.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## **2.51.52 15451**

---

**Sets the current transaction's synchronization level.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.53 15452

---

**Enables logging of recovery-related debugging information.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.54 15453

---

**Collects function-level statistics on database activity.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.55 15454

---

**Set the level of information written to the WAL.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.56 15455

---

**Selects the method used for forcing WAL updates to disk.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.57 15456

---

**Sets how binary values are to be encoded in XML.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.58 15457

---

**Sets whether XML data in implicit parsing and serialization operations is to be considered as documents or content fragments.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.59 15458

---

**Sets what to dump in core files.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.60 15459

---

**Selects the algorithm for encrypting tablespaces.**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.51.61 15460

---

**@1@ cannot access the server configuration file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.62 15461

---

**SET LOCAL TRANSACTION SNAPSHOT is not implemented**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.63 15464

---

**Bonjour is not supported by this build**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.64 15465

---

**SSL is not supported by this build**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.65 15466

---

### internal error: unrecognized run-time parameter type

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.66 15467

---

### time zone abbreviation "@1@" is too long (maximum @2@ characters) in time zone file "@3@", line @4@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.67 15468

---

### invalid number for time zone offset in time zone file "@1@", line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.68 15469

---

### time zone offset @1@ is out of range in time zone file "@2@", line @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.69 15470

---

### missing time zone abbreviation in time zone file "@1@", line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.70 15471

---

### missing time zone offset in time zone file "@1@", line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.71 15473

---

### invalid syntax in time zone file "@1@", line @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.72 15474

---

### time zone abbreviation "@1@" is multiply defined

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.73 15475

---

**invalid time zone file name "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.74 15476

---

**time zone file recursion limit exceeded in file "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.75 15477

---

**line is too long in time zone file "@1@", line @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.76 15478

---

**@INCLUDE without file name in time zone file "@1@", line @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.77 15479

---

---

### cannot export a snapshot from a subtransaction

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.51.78 15480

---

### invalid snapshot data in file "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.51.79 15481

---

### SET TRANSACTION SNAPSHOT must be called before any query

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.51.80 15482

---

### a snapshot-importing transaction must have isolation level **SERIALIZABLE** or **REPEATABLE READ**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.51.81 15483

---

### invalid snapshot identifier: "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.82 15484

---

### **a serializable transaction cannot import a snapshot from a non-serializable transaction**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.83 15485

---

### **a non-read-only serializable transaction cannot import a snapshot from a read-only transaction**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.84 15486

---

### **cannot import a snapshot from a different database**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.85 15487

---

### **out of memory**

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.51.86 15488

---

@1@: could not open file "@2@" for reading: @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.87 15489

---

@1@: could not open file "@2@" for writing: @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.88 15490

---

@1@: could not write file "@2@" : @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.89 15491

---

@1@: could not execute command "@2@" : @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.90 15492

---

### @1@: removing data directory "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.91 15493

---

### @1@: failed to remove data directory

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.92 15494

---

### @1@: removing contents of data directory "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.51.93 15495

---

### @1@: failed to remove contents of data directory

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.51.94 15496

---

**@1@: removing transaction log directory "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.51.95 15497

---

**@1@: failed to remove transaction log directory**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.51.96 15498

---

**@1@: removing contents of transaction log directory "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.51.97 15499

---

**@1@: failed to remove contents of transaction log directory**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52 Message Numbers Beginning with 15500

---

### 2.52.1 15500

---

**@1@: data directory "@2@" not removed at user's request**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.52.2 15501

---

**@1@: transaction log directory "@2@" not removed at user's request**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.52.3 15503

---

**user name lookup failure: error code @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.52.4 15504

---

**@1@: "@2@" is not a valid server encoding name**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.5 15505

---

**@1 @: could not create directory "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.6 15506

---

**@1 @: file "@2@" does not exist**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.7 15507

---

**@1 @: could not access file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.8 15508

---

**@1 @: file "@2@" is not a regular file**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.9 15509

---

### **Passwords didn't match.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.10 15510

---

### **@1@: could not read password from file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.11 15511

---

### **@1@: locale name too long, skipped: "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.12 15512

---

### **@1@: locale name has non-ASCII characters, skipped: "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.13 15513

---

---

**No usable system locales were found.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.14 15514

---

**not supported on this platform**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.15 15515

---

**could not write to child process: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.16 15516

---

**ok**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.52.17 15517

---

**@1@: failed to restore old locale "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.18 15518

---

**@1@: invalid locale name "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.19 15519

---

**@1@: encoding mismatch**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.20 15525

---

**@1@ initializes a PostgreSQL database cluster.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.21 15527

---

**@1@: invalid authentication method "@2@" for "@3@" connections**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.22 15528

---

**@1@: must specify a password for the superuser to enable @2@ authentication**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.23 15529

---

**@1@: too many command-line arguments (first is "@2@")**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.24 15530

---

**@1@: password prompt and password file cannot be specified together**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.25 15533

---

**The program "postgres" is needed by @1@ but was not found in the same directory as "@2@". Check your installation.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.26 15534

---

**The program "postgres" was found by "@1@"but was not the same version as "@2@".Check your installation.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.27 15535

---

**@1@: input file location must be an absolute path**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.28 15536

---

**@1@: could not find suitable encoding for locale "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.29 15537

---

**@1@: locale "@2@" requires unsupported encoding "@3@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.30 15538

---

**@1@: could not find suitable text search configuration for locale "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.31 15539

---

**@1@: warning: suitable text search configuration for locale "@2@" is unknown**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.52.32 15540

---

**@1@: warning: specified text search configuration "@2@" might not match locale "@3@"**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.52.33 15541

---

**The default text search configuration will be set to "@1@".**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.52.34 15542

---

**@1@: directory "@2@" exists but is not empty**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.35 15543

---

**@1@: could not access directory "@2@" : @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.36 15544

---

**@1@: transaction log directory location must be an absolute path**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.37 15545

---

**@1@: could not create symbolic link "@2@" : @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.38 15546

---

**@1@: symlinks are not supported on this platform**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.39 15547

---

**@1@: could not read from ready pipe: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.40 15548

---

**@1@: could not parse transaction log location "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.41 15549

---

**@1@: could not create pipe for background process: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.42 15550

---

**@1@: could not create background process: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.43 15551

---

**@1@: could not create background thread: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.44 15552

---

**@1@: could not create directory "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.45 15553

---

**@1@: directory "@2@" exists but is not empty**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.46 15554

---

---

**@1@: could not access directory "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.47 15555

---

**@1@s/@2@ kB (100@3@), @4@/@5@ tablespace @6@s**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.52.48 15556

---

**@1@s/@2@ kB (@3@@4@), @5@/@6@ tablespace (@7@%-\*.\*s)**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.52.49 15560

---

**@1@s/@2@ kB (@3@@4@), @5@/@6@ tablespace**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.52.50 15561

---

**@1@: could not set compression level @2@: @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.51 15562

---

**@1@: could not create compressed file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.52 15563

---

**@1@: could not create file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.53 15564

---

**@1@: could not get COPY data stream: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.54 15565

---

**@1@: could not write to compressed file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.55 15566

---

**@1@: could not write to file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.56 15567

---

**@1@: could not close compressed file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.57 15568

---

**@1@: could not close file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.58 15569

---

**@1@: could not read COPY data: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.59 15570

---

**@1@: invalid tar block header size: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.60 15573

---

**@1@: could not set permissions on directory "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.61 15574

---

**@1@: could not create symbolic link from "@2@" to "@3@": @4@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.62 15575

---

**@1@: unrecognized link indicator "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.63 15576

---

**@1@: could not set permissions on file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.64 15577

---

**@1@: COPY stream ended before last file was finished**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.65 15578

---

**@1@: could not send replication command "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.66 15579

---

**@1@: could not identify system: got @2@ rows and @3@ fields, expected @4@ rows and @5@ or more fields**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.67 15580

---

**@1@: could not initiate base backup: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.68 15581

---

**@1@: no data returned from server**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.69 15582

---

**@1@: could not get backup header: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.70 15584

---

**@1@: can only write single tablespace to stdout, database has @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.71 15585

---

---

**@1@: starting background WAL receiver****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.52.72 15586**

---

**@1@: could not get transaction log end position from server: @2@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.52.73 15587**

---

**@1@: no transaction log end position returned from server****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.52.74 15588**

---

**@1@: final receive failed: @2@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.52.75 15589**

---

**@1@: could not send command to background pipe: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.76 15590

---

**@1@: could not wait for child process: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.77 15591

---

**@1@: child @2@ died, expected @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.78 15592

---

**@1@: child process did not exit normally**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.79 15593

---

**@1@: child process exited with error @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.80 15594

---

**@1@: could not wait for child thread: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.81 15595

---

**@1@: could not get child thread exit status: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.82 15596

---

**@1@: child thread exited with error @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.52.83 15597

---

**@1@: invalid output format "@2@", must be "plain" or "tar"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.84 15598

---

### @1@: cannot specify both --xlog and --xlog-method

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.52.85 15599

---

### @1@: invalid compression level "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53 Message Numbers Beginning with 15600

---

### 2.53.1 15600

---

#### @1@: invalid checkpoint argument "@2@", must be "fast" or "spread"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.53.2 15601

---

#### @1@: invalid status interval "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.53.3 15602

---

**@1 @: too many command-line arguments (first is "@2@")**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.53.4 15603

---

**@1 @: no target directory specified**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.53.5 15604

---

**@1 @: only tar mode backups can be compressed**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.53.6 15605

---

**@1 @: WAL streaming can only be used in plain mode**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.7 15606

---

**@1@: this build does not support compression**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.8 15607

---

**@1@: finished segment at @2@/@3@ (timeline @4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.9 15608

---

**@1@: received interrupt signal, exiting**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.10 15609

---

**@1@: could not open directory "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.11 15611

---

---

**@1@: could not stat file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.12 15612

---

**@1@: segment file "@2@" has incorrect size @3@, skipping**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.13 15613

---

**@1@: starting log streaming at @2@/@3@ (timeline @4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.14 15614

---

**@1@: invalid port number "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.15 15615

---

**@1@: disconnected**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.16 15616

---

**@1@: disconnected; waiting @2@ seconds to try again**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.17 15617

---

**@1@: could not open transaction log file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.18 15618

---

**@1@: could not stat transaction log file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.19 15619

---

**@1@: transaction log file "@2@" has @3@ bytes, should be 0 or @4@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.20 15620

---

**@1@: could not pad transaction log file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.21 15621

---

**@1@: could not seek to beginning of transaction log file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.22 15622

---

**@1@: could not determine seek position in file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.23 15623

---

**@1@: could not fsync file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.24 15624

---

**@1@: could not rename file "@2@" : @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.25 15625

---

**@1@: not renaming "@2@@3@", segment is not complete**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.26 15626

---

**@1@: system identifier does not match between base backup and streaming connection**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.27 15628

---

**@1@: could not send feedback packet: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.28 15629

---

**@1@: select() failed: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.29 15630

---

**@1@: could not receive data from WAL stream: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.30 15632

---

**@1@: unrecognized streaming header: "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.31 15633

---

**@1@: streaming header too small: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.32 15634

---

---

**@1@: received transaction log record for offset @2@ with no file open****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.53.33 15635**

---

**@1@: got WAL data offset @2@, expected @3@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.53.34 15636**

---

**@1@: could not write @2@ bytes to WAL file "@3@": @4@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.53.35 15637**

---

**@1@: unexpected termination of replication stream: @2@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.53.36 15638**

---

**@1@: replication stream was terminated before stop point**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.37 15640

---

**@1@: could not connect to server**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.38 15642

---

**@1@: could not determine server setting for integer\_datetimes**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.39 15643

---

**@1@: integer\_datetimes compile flag does not match server**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.40 15644

---

**not recorded**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.41 15645

---

**@1@: could not find own program executable**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.42 15646

---

**@1@: invalid argument: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.43 15647

---

**@1@: no data directory specified**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.44 15648

---

**@1@: could not open file "@2@" for reading: @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.45 15649

---

**@1@: could not read file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.46 15652

---

**child process exited with unrecognized status @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.47 15653

---

**@1@: could not open PID file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.48 15654

---

**@1@: invalid data in PID file "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.49 15655

---

**@1@: -w option is not supported when starting a pre-9.1 server**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.50 15656

---

**@1@: -w option cannot use a relative socket directory specification**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.51 15658

---

**@1@: cannot set core file size limit; disallowed by hard limit**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.52 15659

---

**@1@: could not read file "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.53 15660

---

---

**@1@: option file "@2@" must have exactly one line**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

### 2.53.54 15661

---

**The program "@1@" is needed by @2@ but was not found in the same directory as "@3@". Check your installation.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

### 2.53.55 15662

---

**The program "@1@" was found by "@2@" but was not the same version as @3@. Check your installation.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

### 2.53.56 15663

---

**@1@: database system initialization failed**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

### 2.53.57 15664

---

**@1@: another server might be running; trying to start server anyway**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.58 15666

---

**@1@: could not start serverExamine the log output.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.59 15667

---

**@1@: could not wait for server because of misconfiguration**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.60 15668

---

**@1@: PID file "@2@" does not exist**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.61 15669

---

**Is server running?**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.62 15670

---

**@1@: cannot stop server; single-user server is running (PID: @2@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.63 15671

---

**@1@: could not send stop signal (PID: @2@): @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.64 15673

---

**@1@: server does not shut down**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.65 15674

---

**@1@: cannot restart server; single-user server is running (PID: @2@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.66 15675

---

**@1@: old server process (PID: @2@) seems to be gone**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.67 15676

---

**@1@: cannot reload server; single-user server is running (PID: @2@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.68 15677

---

**@1@: could not send reload signal (PID: @2@): @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.69 15678

---

**@1@: cannot promote server; single-user server is running (PID: @2@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.70 15679

---

**@1@: cannot promote server; server is not in standby mode**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.71 15680

---

**@1@: could not create promote signal file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.72 15681

---

**@1@: could not write promote signal file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.73 15682

---

**@1@: could not send promote signal (PID: @2@): @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.74 15683

---

**@1@: could not send signal @2@ (PID: @3@): @4@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.75 15684

---

**@1@: could not find own program executable**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.76 15685

---

**@1@: could not find postgres program executable**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.77 15686

---

**@1@: could not open service manager**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.53.78 15687

---

---

### **@1@: service "@2@" already registered**

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.53.79 15688**

---

### **@1@: could not register service "@2@": error code @3@**

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.53.80 15689**

---

### **@1@: service "@2@" not registered**

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.53.81 15690**

---

### **@1@: could not open service "@2@": error code @3@**

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.53.82 15691**

---

### **@1@: could not unregister service "@2@": error code @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.83 15692

---

### Timed out waiting for server startup

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.84 15693

---

### @1@: could not start service "@2@": error code @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.85 15695

---

### @1@: could not open process token: error code @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.86 15696

---

### @1@: could not allocate SIDs: error code @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.87 15697

---

**@1@: could not create restricted token: error code @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.53.88 15699

---

**@1@: unrecognized shutdown mode "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54 Message Numbers Beginning with 15700

---

---

### 2.54.1 15700

---

**@1@: unrecognized signal name "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

### 2.54.2 15701

---

**@1@: unrecognized start type "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.54.3 15702

---

**@1@: could not determine the data directory using command "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.54.4 15703

---

**@1@: -S option not supported on this platform**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.54.5 15704

---

**@1@: too many command-line arguments (first is "@2@")**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.54.6 15705

---

**@1@: missing arguments for kill mode**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.7 15706

---

### @1@: unrecognized operation mode "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.8 15707

---

### @1@: no operation specified

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.9 15708

---

### child process exited with unrecognized status @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.10 15709

---

### failed sanity check, parent OID @1@ of table "@2@" (OID @3@) not found

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.11 15710

---

### could not parse numeric array "@1@": too many numbers

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.12 15711

---

### could not parse numeric array "@1@": invalid character in number

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.13 15712

---

### invalid compression code: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.14 15713

---

### not built with zlib support

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.15 15714

---

---

**could not initialize compression library: @1@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.54.16 15715**

---

**could not close compression stream: @1@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.54.17 15716**

---

**could not compress data: @1@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.54.18 15718**

---

**could not uncompress data: @1@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.54.19 15719**

---

**could not close compression library: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.20 15720

---

### cannot duplicate null pointer (internal error)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.21 15721

---

### @1@: unrecognized section name: "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.22 15722

---

### out of on\_exit\_nicely slots

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.23 15723

---

### could not close output file: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.24 15725

---

**unexpected section code @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.25 15726

---

**parallel restore is not supported with this archive file format**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.26 15727

---

**parallel restore is not supported with archives made by pre-8.0 pg\_dump**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.27 15728

---

**cannot restore from compressed archive (compression not supported in this installation)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.28 15729

---

### connecting to database for restore

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.54.29 15730

---

### direct database connections are not supported in pre-1.3 archives

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.30 15731

---

### warning from original dump file: @1@

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.54.31 15732

---

### internal error -- WriteData cannot be called outside the context of a DataDumper routine

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.32 15733

---

### large-object output not supported in chosen format

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.33 15734

---

### restored @1 @ large object

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.34 15736

---

### could not create large object @1@: @2@

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.54.35 15737

---

### could not open large object @1@: @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.36 15738

---

### could not open TOC file "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.37 15740

---

### could not find entry for ID @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.38 15741

---

### could not close TOC file: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.39 15742

---

### could not open output file "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.40 15743

---

---

**could not open output file: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.41 15744

---

**wrote @1@ byte of large object data (result = @2@)**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

---

## 2.54.42 15746

---

**could not write to large object (result: @1@, expected: @2@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.43 15748

---

**Error while INITIALIZING:**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.44 15749

---

**Error while PROCESSING TOC:**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.45 15750

---

### Error while FINALIZING:

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.46 15751

---

### Error from TOC entry @1@; @2@ @3@ @4@ @5@ @6@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.47 15752

---

### bad dumpld

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.48 15753

---

### bad table dumpld for TABLE DATA item

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.49 15754

---

**unexpected data offset flag @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.50 15755

---

**file offset in dump file is too large**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.51 15757

---

**directory name too long: "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.52 15758

---

**directory "@1@" does not appear to be a valid archive ("toc.dat" does not exist)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.53 15759

---

**could not open input file "@1@": @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.54 15760

---

**could not open input file: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.55 15761

---

**could not read input file: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.56 15762

---

**input file is too short (read @1@, expected 5)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.57 15763

---

**input file appears to be a text format dump. Please use psql.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.58 15764

---

**input file does not appear to be a valid archive (too short?)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.59 15765

---

**input file does not appear to be a valid archive**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.60 15766

---

**could not close input file: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.61 15767

---

---

### unrecognized file format "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.62 15768

---

### entry ID @1@ out of range -- perhaps a corrupt TOC

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.63 15769

---

### read TOC entry @1@ (ID @2@) for @3@ @4@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.64 15770

---

### unrecognized encoding "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.54.65 15771

---

### invalid ENCODING item: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.66 15772

---

### invalid STDSTRINGS item: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.67 15773

---

### could not set session user to "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.68 15774

---

### could not set default\_with\_oids: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.69 15775

---

### could not set search\_path to "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.70 15776

---

### could not set default\_tablespace to @1@: @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.71 15779

---

### did not find magic string in file header

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.72 15780

---

### unsupported version (@1@.@2@) in file header

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.73 15781

---

### sanity check on integer size (@1@) failed

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.74 15783

---

**expected format (@1 @) differs from format found in file (@2 @)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.75 15786

---

**a worker process died unexpectedly**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.76 15787

---

**processing missed item @1 @ @2 @ @3 @**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.77 15789

---

**could not create worker process: @1 @**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.78 15791

---

### no item ready

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.79 15792

---

### could not find slot of finished worker

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.80 15793

---

### worker process failed: exit code @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.81 15794

---

### transferring dependency @1@ -> @2@ to @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.54.82 15795

---

---

**table "@1@" could not be created, will not restore its data**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.54.83 15796**

---

**invalid OID for large object**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.54.84 15797**

---

**unrecognized data block type (@1@) while searching archive**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.54.85 15798**

---

**error during file seek: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.54.86 15799**

---

**could not find block ID @1@ in archive -- possibly due to out-of-order restore request, which cannot be handled due to lack of data offsets in archive**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55 Message Numbers Beginning with 15800

---

### 2.55.1 15800

---

**could not find block ID @1@ in archive -- possibly due to out-of-order restore request, which cannot be handled due to non-seekable input file**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.55.2 15801

---

**could not find block ID @1@ in archive -- possibly corrupt archive**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.55.3 15802

---

**found unexpected block ID (@1@) when reading data -- expected @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.55.4 15803

---

---

### unrecognized data block type @1@ while restoring archive

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.5 15804

---

### could not read from input file: end of file

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.6 15805

---

### could not read from input file: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.7 15807

---

### could not close archive file: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.8 15808

---

### can only reopen input archives

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.9 15809

---

### parallel restore from standard input is not supported

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.10 15810

---

### parallel restore from non-seekable file is not supported

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.11 15811

---

### could not determine seek position in archive file: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.12 15812

---

### could not set seek position in archive file: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.13 15814

---

### @1@: could not parse server version "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.14 15815

---

### could not get server\_version from libpq

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.15 15816

---

### aborting because of server version mismatch

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.16 15817

---

### failed to reconnect to database

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.17 15818

---

**could not reconnect to database: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.18 15819

---

**connection needs password**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.19 15820

---

**already connected to a database**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.20 15821

---

**failed to connect to database**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.21 15822

---

**connection to database "@1@" failed: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.22 15823

---

**query failed: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.23 15824

---

**query was: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.24 15825

---

**@1@: @2@ Command was: @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.25 15826

---

---

### could not execute query

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.26 15827

---

### error returned by PQputCopyData: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.27 15828

---

### error returned by PQputCopyEnd: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.28 15829

---

### COPY failed for table "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.29 15830

---

### could not start database transaction

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.30 15831

---

### could not commit database transaction

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.31 15832

---

### no output directory specified

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.32 15833

---

### could not create directory "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.33 15834

---

### could not close data file: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.34 15835

---

**could not open large object TOC file "@1@" for input: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.35 15836

---

**invalid line in large object TOC file "@1@": "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.36 15837

---

**error reading large object TOC file "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.37 15838

---

**could not close large object TOC file "@1@": @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.38 15840

---

**could not write to blobs TOC file**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.39 15841

---

**file name too long: "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.40 15842

---

**this format cannot be read**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.41 15843

---

**could not open TOC file "@1@" for output: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.42 15844

---

### could not open TOC file for output: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.43 15845

---

### compression is not supported by tar archive format

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.44 15846

---

### could not open TOC file "@1@" for input: @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.45 15847

---

### could not open TOC file for input: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.46 15848

---

---

### could not find file "@1@" in archive

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.47 15849

---

### could not generate temporary file name: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.48 15850

---

### could not open temporary file

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.49 15851

---

### could not close tar member

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.50 15852

---

### internal error -- neither th nor fh specified in tarReadRaw()

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.51 15856

---

### invalid OID for large object (@1@)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.52 15858

---

### could not close temporary file: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.53 15859

---

### actual file length (@1@) does not match expected (@2@)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.54 15861

---

### could not find header for file "@1@" in tar archive

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.55 15862

---

**skipping tar member @1@**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.55.56 15863

---

**restoring data out of order is not supported in this archive format: "@1@" is required, but comes before "@2@" in the archive file.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.57 15864

---

**incomplete tar header found (@1@ byte)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.58 15866

---

**TOC Entry @1@ at @2@ (length @3@, checksum @4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.59 15867

---

**corrupt tar header found in @1@ (expected @2@, computed @3@) file position @4@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.60 15868

---

**@1@: too many command-line arguments (first is "@2@")**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.61 15869

---

**could not open output file "@1@" for writing**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.62 15870

---

**No matching schemas were found**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.63 15871

---

### No matching tables were found

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.64 15872

---

### invalid client encoding "@1@" specified

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.65 15873

---

### invalid output format "@1@" specified

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.66 15874

---

### server version must be at least 7.3 to use schema selection switches

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.67 15875

---

### dumping contents of table "@1@.@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.68 15876

---

### Dumping the contents of table "@1@" failed: PQgetCopyData() failed.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.69 15877

---

### Dumping the contents of table "@1@" failed: PQgetResult() failed.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.70 15878

---

### error reading large object @1@: @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.71 15879

---

---

### could not find parent extension for @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.72 15881

---

### schema with OID @1@ does not exist

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.73 15889

---

### failed sanity check, parent table OID @1@ of pg\_rewrite entry OID @2@ not found

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.74 15890

---

### query produced null referenced table name for foreign key trigger "@1@" on table "@2@" (OID of table: @3@)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.55.75 15891

---

### invalid column numbering in table "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.76 15892

---

### invalid adnum value @1@ for table "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.77 15893

---

### expected @1@ check constraint on table "@2@" but found @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.55.78 15895

---

### (The system catalogs might be corrupted.)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56 Message Numbers Beginning with 15900

---

### 2.56.1 15902

---

#### unrecognized provolatile value for function "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.2 15907

---

### could not parse default ACL list (@1@)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.3 15908

---

### could not parse ACL list (@1@) for object "@2@" (@3@)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.4 15909

---

### query to obtain definition of view "@1@" returned no data

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.5 15910

---

### query to obtain definition of view "@1@" returned more than one definition

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.6 15911

---

**definition of view "@1@" appears to be empty (length zero)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.7 15912

---

**invalid column number @1@ for table "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.8 15913

---

**missing index for constraint "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.9 15914

---

**unrecognized constraint type: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.10 15915

---

**query to get data of sequence "@1@" returned @2@ row (expected 1)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.11 15917

---

**query to get data of sequence "@1@" returned name "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.12 15918

---

**unexpected tctype value: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.13 15919

---

**invalid argument string (@1@) for trigger "@2@" on table "@3@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.14 15920

---

### query to get rule "@1@" for table "@2@" failed: wrong number of rows returned

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.15 15921

---

### query returned @1@ row instead of one: @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.16 15923

---

### invalid dumpId @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.17 15924

---

### invalid dependency @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.18 15925

---

---

### could not identify dependency loop

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

### 2.56.19 15927

---

**The program "pg\_dump" is needed by @1@ but was not found in the same directory as "@2@". Check your installation.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

### 2.56.20 15928

---

**The program "pg\_dump" was found by "@1@" but was not the same version as @2@. Check your installation.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

### 2.56.21 15929

---

**@1@: could not connect to database "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

### 2.56.22 15930

---

---

**@1@: could not connect to databases "postgres" or "template1"Please specify an alternative database.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.23 15931

---

**@1@: could not open the output file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.24 15932

---

**@1@: could not parse ACL list (@2@) for tablespace "@3@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.25 15933

---

**@1@: could not parse ACL list (@2@) for database "@3@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.26 15934

---

**@1@: pg\_dump failed on database "@2@", exiting**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.27 15935

---

**@1@: could not re-open the output file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.28 15936

---

**@1@: running "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.29 15937

---

**@1@: could not connect to database "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.30 15938

---

**@1@: could not get server version**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.31 15941

---

**@1@: executing @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.32 15942

---

**@1@: query failed: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.33 15943

---

**@1@: query was: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.34 15944

---

**unrecognized archive format "@1@"; please specify "c", "d", or "t"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.35 15946

---

**@1 @: invalid argument for option @2 @**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.36 15947

---

**@1 @: transaction ID epoch (-e) must not be -1**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.37 15949

---

**@1 @: transaction ID (-x) must not be 0**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.38 15951

---

**@1 @: OID (-o) must not be 0**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.39 15953

---

### @1@: multitransaction ID (-m) must not be 0

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.40 15955

---

### @1@: multitransaction offset (-O) must not be -1

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.41 15957

---

### @1@: no data directory specified

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.42 15958

---

### @1@: cannot be executed by "root"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.43 15959

---

---

**@1@: could not change directory to "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.56.44 15960**

---

**@1@: could not open file "@2@" for reading: @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.56.45 15961**

---

**If these values seem acceptable, use -f to force reset.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.56.46 15962**

---

**Transaction log reset**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.56.47 15963**

---

**@1@: could not read file "@2@" : @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.48 15964

---

**@1@: pg\_control exists but has invalid CRC; proceed with caution**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.49 15965

---

**@1@: pg\_control exists but is broken or unknown version; ignoring it**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.50 15966

---

**@1@: internal error -- sizeof(ControlFileData) is too large ... fix PG\_CONTROL\_SIZE**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.51 15967

---

**@1@: could not create pg\_control file: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.52 15968

---

**@1@: could not write pg\_control file: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.53 15969

---

**@1@: fsync error: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.54 15970

---

**@1@: could not open directory "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.55 15971

---

**@1@: could not read directory "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.56 15972

---

**@1@: could not delete file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.57 15973

---

**@1@: could not open file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.58 15974

---

**@1@: could not write file "@2@": @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.59 15975

---

**could not create directory "@1@": @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.60 15976

---

**could not open directory "@1@": @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.61 15977

---

**could not stat file "@1@": @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.62 15978

---

**could not read symbolic link "@1@": @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.63 15979

---

**could not create symbolic link "@1@": @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.64 15980

---

---

## out of memory

### [Description]

There was insufficient free space in the server's memory during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

---

## 2.56.65 15981

---

### could not open file "@1@": @2@

### [Description]

An error occurred.

### [System Processing]

Processing will be aborted.

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.66 15982

---

### could not create file "@1@": @2@

### [Description]

An error occurred.

### [System Processing]

Processing will be aborted.

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.67 15983

---

### could not read file "@1@": @2@

### [Description]

An error occurred.

### [System Processing]

Processing will be aborted.

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.68 15984

---

**could not write to file "@1@": @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.69 15985

---

**could not fsync file "@1@": @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.70 15986

---

**could not close file "@1@": @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.71 15987

---

**@1@: could not find own program executable**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.72 15988

---

---

**@1@: invalid checkpoint argument "@2@", must be "fast" or "spread"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.73 15989

---

**@1@: invalid argument @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.74 15990

---

**@1@: option @2@ conflicts with option @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.75 15991

---

**@1@: the configured database storage directory differs from the data\_directory parameter**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.56.76 15992

---

**@1@: an invalid value was specified for the option -@2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.77 15993

---

**@1@: backup data "@2@" is lost**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.78 15994

---

**@1@: cannot be run as root**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.79 15995

---

**@1@: invalid option --@2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.80 15996

---

**@1@: invalid option -@2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.81 15997

---

**@1@: backup of the database has not yet been performed, or an incorrect backup storage directory was specified**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.82 15998

---

**@1@: the database storage directory and the \$PGDATA environment variable have not been specified**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.56.83 15999

---

**@1@: option @2@ is necessary for option @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57 Message Numbers Beginning with 16000

---

### 2.57.1 16000

---

**@1@: the requested recovery point is earlier than the date and time that the backup finished**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.2 16001

---

**@1@: the specified backup does not exist**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.3 16002

---

**@1@: the directory "@2@" for the tablespace with OID "@3@" does not exist**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.4 16003

---

**@1@: the specified backup storage directory "@2@" is not correct**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.5 16004

---

**@1@: the specified database storage directory is not correct**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.6 16005

---

**@1@: the token in the file "pg\_hba.conf" is too long and will be skipped: "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.7 16006

---

**the directory "@1@" for storing WAL does not exist**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.8 16007

---

**@1@: "@2@" is being executed by another user**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.9 16008

---

**@1@: the "@2@" parameter was not found**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.10 16009

---

**@1@: could not find the configuration file "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.11 16010

---

**@1@: could not open the configuration file "@2@" : maximum nesting depth exceeded**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.12 16011

---

**@1@: the PID file "@2@" does not exist**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.13 16012

---

**@1@: the server is running**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.14 16013

---

### @1@: the server is not running

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.15 16014

---

### @1@: caught signal @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.16 16015

---

### @1@: failed to build the absolute path "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.17 16016

---

### @1@: failed to check the completion of archiving WAL files

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.18 16017

---

---

**@1@: failed to connect to the database****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.57.19 16018**

---

**@1@: failed to get the database OID : @2@ (@3@)****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.57.20 16019**

---

**@1@: failed to remove old backup data****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.57.21 16020**

---

**@1@: failed to restore the database storage directory "@2@"****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.57.22 16021**

---

**@1@: failed to restore the tablespace directory "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.57.23 16022

---

**@1@: retried backup @2@ times, but failed**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.57.24 16023

---

**@1@: SQL command failed (@2@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.57.25 16024

---

**@1@: the database with OID @2@ was created during backup**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.57.26 16025

---

**@1@: backup control function "@2@" failed**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.27 16026

---

**@1@: command failed: "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.28 16027

---

**@1@: could not close the file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.29 16028

---

**@1@: could not close the PID file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.30 16029

---

**@1@: could not create the directory "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.31 16030

---

**@1@: could not create the file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.32 16031

---

**@1@: could not create the PID file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.33 16032

---

**@1@: could not create the symbolic link "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.34 16033

---

**@1@: could not identify the current directory: @2@ (errno=@3@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.35 16034

---

**@1@: could not open the directory "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.36 16035

---

**@1@: could not open the file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.37 16036

---

**@1@: could not open the PID file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.38 16037

---

**@1@: could not read the file "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.39 16038

---

---

**@1@: could not read the PID file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.57.40 16039**

---

**@1@: could not read the symbolic link "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.57.41 16040**

---

**@1@: could not remove the file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.57.42 16041**

---

**@1@: could not remove the PID file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.57.43 16042**

---

**@1@: could not rename the directory "@2@" to "@3@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.44 16043

---

**@1@: could not rename the file "@2@" to "@3@": @4@ (errno=@5@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.45 16044

---

**@1@: could not write the file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.46 16045

---

**@1@: could not write the PID file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.47 16046

---

**@1@: failed to find the internal file "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.57.48 16047

---

**@1@: failed to parse the internal file "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.57.49 16048

---

**@1@: failed to parse the internal file: "@2@" (@3@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.57.50 16049

---

**@1@: failed to parse the configuration file "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.57.51 16050

---

**@1@: failed to remove archived transaction log files**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.52 16051

---

### @1 @: failed to replace the contents of the pg\_xlog directory

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.53 16052

---

### @1 @: failed to restore the configuration files

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.54 16053

---

### @1 @: invalid data in the PID file "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.55 16054

---

### @1 @: out of memory

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.57.56 16055

---

### @1@: cannot find the server process (PID: @2@)

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.57 16056

---

### @1@: an error occurred during recovery

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.58 16057

---

### @1@: could not remove the directory "@2@": @3@ (errno=@4@)

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.59 16058

---

### @1@: target "@2@" mismatch (internal error)

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.60 16059

---

**the program "@1@" is needed by @2@ but was not found in the same directory as "@3@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.61 16060

---

**the program "@1@" was found in "@2@" but was not the same version as @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.62 16061

---

**@1@: failed to get port number (internal error)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.63 16062

---

**backup of configuration files completed successfully**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.57.64 16063

---

---

**backup of database and configuration files completed successfully****[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.57.65 16064**

---

**Confirm that the specified directory is correct. If it is correct, the backup data may be corrupted. Copy the backup data to the backup storage directory from backup media.**

**[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.57.66 16065**

---

**Check the installation.**

**[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.57.67 16066**

---

**Continue the backup.**

**[Description]**

Terminated normally.

**[System Processing]**

Continues processing.

**[Action]**

No action required.

---

**2.57.68 16067**

---

---

**Create an empty directory "@1@" on which the database administrator has full permissions, and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.57.69 16068**

---

**Create an empty directory "@1@" on which the database administrator has full permissions.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.57.70 16069**

---

**Recover the corrupt resource.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.57.71 16070**

---

**Is the server running?**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.57.72 16071**

---

**Please check whether the backup data exists or is not in the backup storage directory.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.73 16072

---

**Please decrease the length of the path and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.74 16073

---

**Please decrease the number of digits and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.75 16074

---

**Please log in as the user that owns the server process.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.76 16075

---

**Please remove the cause of the error, and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.57.77 16076

---

**Please set the database storage directory "@1@" to -D option, and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.57.78 16077

---

**Please set the recovery point to be after the date and time that the backup finished, and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.57.79 16078

---

**Please set the backup storage directory to the 'backup\_destination' parameter and restart the server.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.57.80 16079

---

**Please specify the database storage directory as "@1@" and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.81 16080

---

**Please specify the database storage directory correctly and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.82 16081

---

**Please specify the port number correctly and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.83 16082

---

**Please specify an integer greater than 0, and try again.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.84 16083

---

**Please specify an integer greater than 0, or the 'all' keyword, and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.57.85 16084**

---

**Please specify an integer greater than or equal to 0, and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.57.86 16085**

---

**Please specify the backup storage directory correctly and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.57.87 16086**

---

**Please specify the time stamp using the correct length and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.57.88 16087**

---

**Please start the server and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.89 16088

---

### Please stop the server and retry.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.90 16089

---

### Please wait for a short period and retry.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.91 16090

---

### Recovery of database completed successfully.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.92 16091

---

### Retrying backup. (@1@ times).

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.93 16092

---

---

**Specify the backup storage directory with the -B option, and retry.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.57.94 16093**

---

**Refer to "@1@ --help" for more information.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.57.95 16094**

---

**Retry after the other process terminates.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.57.96 16095**

---

**Failed to identify backup data.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.57.97 16096**

---

**restore point name is too long (maximum @1@ bytes)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.98 16097

---

[Try "@1@ --help" for more information.](#)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.99 16098

---

[@1@: keystore location is not specified](#)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.57.100 16099

---

[@1@: too many command-line arguments \(first is "@2@"\)](#)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58 Message Numbers Beginning with 16100

---

### 2.58.1 16100

---

**@1@: no operation is specified**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.58.2 16101

---

**@1@: could not open file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.58.3 16102

---

**@1@: could not read file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.58.4 16103

---

**@1@: keystore "@2@" is corrupted: size = @3@ bytes, expected size = @4@ bytes**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.5 16104

---

### @1@: file "@2@" is not a keystore

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.6 16105

---

### @1@: key is too long

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.7 16106

---

### @1@: key is wrong

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.8 16107

---

### @1@: passphrase-based key derivation failed: @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.9 16108

---

---

**@1@: decryption of the keystore failed: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.10 16109

---

**@1@: decryption of the keystore failed: passphrase is wrong**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.11 16110

---

**@1@: keystore "@2@" is corrupted: invalid CRC**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.12 16111

---

**@1@: encryption of the keystore failed: error code = @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.13 16112

---

**@1@: encryption of the keystore failed: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.14 16113

---

**@1@: could not create file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.15 16114

---

**@1@: could not write file "@2@": @3@ (errno=@4@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.16 16115

---

**child process exited with unrecognized status @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.17 16116

---

**Invalid command \@1@. Try \? for help.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.18 16117

---

**invalid command \\@1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.19 16118

---

**\\@1@: extra argument "@2@" ignored**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.20 16119

---

**could not get home directory for user ID @1@: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.21 16120

---

**\\@1@: could not change directory to "@2@" : @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.22 16121

---

**You are currently not connected to a database.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.23 16122

---

**no query buffer**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.24 16123

---

**@1@: invalid encoding name or conversion procedure not found**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.25 16124

---

**\\@1@: missing required argument**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.26 16125

---

### Passwords didn't match.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.27 16126

---

### Password encryption failed.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.28 16127

---

### \\@1@: error while setting variable

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.29 16128

---

### out of memory

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.30 16129

---

---

**\\@1@: environment variable name must not contain "="****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.58.31 16130**

---

**The server (version @1@.@2@) does not support showing function source.****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.58.32 16131**

---

**function name is required****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.58.33 16132**

---

**@1@: @2@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.58.34 16137**

---

**environment variable PSQL\_EDITOR\_LINENUMBER\_ARG must be set to specify a line number**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.35 16138

---

### could not start editor "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.36 16139

---

### could not start /bin/sh

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.37 16140

---

### could not locate temporary directory: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.38 16141

---

### could not open temporary file "@1@" : @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.39 16142

---

**\pset: allowed formats are unaligned, aligned, wrapped, html, asciidoc, latex, latex-longtable, troff-ms**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.40 16143

---

**\pset: allowed line styles are ascii, old-ascii, unicode**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.41 16144

---

**\pset: unknown option: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.42 16145

---

**\!: failed**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.43 16146

---

**cannot duplicate null pointer (internal error)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.44 16147

---

**connection to server was lost**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.45 16148

---

**Failed.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

---

## 2.58.46 16149

---

**unexpected PQresultStatus: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.47 16150

---

**The server (version @1@.@2@) does not support savepoints for ON\_ERROR\_ROLLBACK.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.48 16151

---

**unexpected transaction status (@1@)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.49 16152

---

**\copy: arguments required**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.50 16153

---

**\copy: parse error at "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.51 16154

---

**\\copy: parse error at end of line**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.52 16155

---

**@1@: cannot copy from/to a directory**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.53 16156

---

**could not write COPY data: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.54 16158

---

**Enter data to be copied followed by a newline.End with a backslash and a period on a line by itself.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.55 16159

---

### aborted because of read failure

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.56 16160

---

### The server (version @1@.@2@) does not support tablespaces.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.57 16161

---

### \ddf only takes [antwS+] as options

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.58 16162

---

### \ddf does not take a "w" option with server version @1@.@2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.59 16163

---

---

**The server (version @1@.@2@) does not support altering default privileges.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.60 16164

---

**Did not find any relation named "@1@".**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.61 16165

---

**Did not find any relation with OID @1@.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.62 16166

---

**No per-database role settings support in this server version.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.63 16167

---

**No matching settings found.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.64 16168

---

**No settings found.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.65 16169

---

**No matching relations found.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.66 16170

---

**No relations found.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.67 16171

---

**The server (version @1@.@2@) does not support collations.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.68 16172

---

### The server (version @1@.@2@) does not support full text search.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.69 16173

---

### Did not find any text search configuration named "@1@".

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.70 16174

---

### The server (version @1@.@2@) does not support foreign-data wrappers.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.71 16175

---

### The server (version @1@.@2@) does not support foreign servers.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.72 16176

---

**The server (version @1@.@2@) does not support user mappings.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.73 16177

---

**The server (version @1@.@2@) does not support foreign tables.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.74 16178

---

**The server (version @1@.@2@) does not support extensions.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.75 16179

---

**Did not find any extension named "@1@".**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.76 16180

---

### Did not find any extensions.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.77 16181

---

### user name lookup failure: error code @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.78 16182

---

### could not read from input file: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.79 16183

---

### could not save history to file "@1@": @2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.80 16184

---

---

### **history is not supported by this installation**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.58.81 16185**

---

### **@1@: not connected to a database**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.58.82 16186**

---

### **@1@: current transaction is aborted**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.58.83 16187**

---

### **@1@: unknown transaction status**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.58.84 16188**

---

### **Cannot add header to table content: column count of @1@ exceeded.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.85 16189

---

### Cannot add cell to table content: total cell count of @1@ exceeded.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.86 16190

---

### invalid output format (internal error): @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.87 16191

---

### skipping recursive expansion of variable "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.88 16192

---

### unterminated quoted string

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.89 16193

---

### @1@: out of memory

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.58.90 16194

---

### can't escape without active connection

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.91 16195

---

### @1@: could not open log file "@2@": @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.58.92 16196

---

### @1@: could not set printing parameter "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.93 16197

---

**@1@: could not delete variable "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.94 16198

---

**@1@: could not set variable "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.58.95 16199

---

**@1@: warning: extra command-line argument "@2@" ignored**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59 Message Numbers Beginning with 16200

---

---

### 2.59.1 16200

---

**tab completion query failed: @1@Query was: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.2 16201

---

**unrecognized value "@1@" for "@2@"; assuming "@3@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.3 16202

---

**Try "@1@ --help" for more information.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.4 16203

---

**@1@: too many command-line arguments (first is "@2@")**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.5 16204

---

**@1@: cannot cluster all databases and a specific one at the same time**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.6 16205

---

**@1@: cannot cluster specific table(s) in all databases**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.7 16206

---

**@1@: clustering of table "@2@" in database "@3@" failed: @4@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.8 16207

---

**@1@: clustering of database "@2@" failed: @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.9 16208

---

**@1@: clustering database "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.10 16213

---

**@1@: could not connect to database @2@: @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.11 16214

---

**@1@: query failed: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.12 16215

---

**cannot duplicate null pointer (internal error)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.13 16216

---

**out of memory**

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.59.14 16217

---

### Cancel request sent

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.15 16218

---

### Could not send cancel request: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.16 16219

---

### @1@: only one of --locale and --lc-ctype can be specified

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.17 16220

---

### @1@: only one of --locale and --lc-collate can be specified

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.18 16221

---

---

**@1 @: "@2@" is not a valid encoding name****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.59.19 16222**

---

**@1 @: database creation failed: @2@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.59.20 16223**

---

**@1 @: comment creation failed (database was created): @2@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.59.21 16224**

---

**Procedural Languages****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.59.22 16225**

---

**@1 @: missing required argument language name**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59.23 16226

---

**@1@: language "@2@" is already installed in database "@3@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59.24 16227

---

**@1@: language installation failed: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59.25 16228

---

**Passwords didn't match.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59.26 16229

---

**Password encryption failed.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.27 16230

---

**@1@: creation of new role failed: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.28 16231

---

**@1@: missing required argument database name**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.29 16232

---

**Database "@1@" will be permanently removed.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.30 16233

---

**@1@: database removal failed: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.31 16234

---

**@1 @: language "@2@" is not installed in database "@3@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.32 16235

---

**@1 @: language removal failed: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.33 16236

---

**@1 @: missing required argument role name**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.34 16237

---

**Role "@1@" will be permanently removed.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.35 16238

---

**@1@: removal of role "@2@" failed: @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.36 16239

---

**@1@: cannot reindex all databases and a specific one at the same time**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.37 16240

---

**@1@: cannot reindex all databases and system catalogs at the same time**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.38 16241

---

**@1@: cannot reindex specific table(s) in all databases**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.39 16242

---

---

**@1@: cannot reindex specific index(es) in all databases****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.59.40 16243**

---

**@1@: cannot reindex specific table(s) and system catalogs at the same time****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.59.41 16244**

---

**@1@: cannot reindex specific index(es) and system catalogs at the same time****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.59.42 16245**

---

**@1@: reindexing of table "@2@" in database "@3@" failed: @4@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.59.43 16246**

---

**@1@: reindexing of index "@2@" in database "@3@" failed: @4@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.44 16247

---

**@1@: reindexing of database "@2@" failed: @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.45 16248

---

**@1@: reindexing database "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.46 16249

---

**@1@: reindexing of system catalogs failed: @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.47 16250

---

**@1@: cannot use the "@2@" option when performing only analyze**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59.48 16252

---

**@1@: cannot vacuum all databases and a specific one at the same time**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59.49 16253

---

**@1@: cannot vacuum specific table(s) in all databases**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59.50 16254

---

**@1@: vacuuming of table "@2@" in database "@3@" failed: @4@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59.51 16255

---

**@1@: vacuuming of database "@2@" failed: @3@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.52 16256

---

**SQL error: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.53 16257

---

**variable "@1@" must have a numeric type**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.54 16258

---

**descriptor "@1@" does not exist**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.55 16259

---

**descriptor header item "@1@" does not exist**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.56 16260

---

### nullable is always 1

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.57 16261

---

### key\_member is always 0

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.58 16262

---

### descriptor item "@1@" is not implemented

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.59 16263

---

### descriptor item "@1@" cannot be set

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.60 16264

---

---

**@1@: could not open file "@2@": @3@****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.59.61 16265**

---

**Try "@1@ --help" for more information.****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.59.62 16266**

---

**@1@: parser debug support (-d) not available****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.59.63 16268**

---

**@1@: no input files specified****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.59.64 16269**

---

**cursor "@1@" has been declared but not opened**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.65 16270

---

### could not remove output file "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.66 16272

---

### invalid bit string literal

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.67 16273

---

### unterminated bit string literal

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.68 16274

---

### unterminated hexadecimal string literal

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.69 16275

---

### unterminated quoted string

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.70 16276

---

### zero-length delimited identifier

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.71 16277

---

### unterminated quoted identifier

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.72 16278

---

### missing identifier in EXEC SQL UNDEF command

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.73 16279

---

### missing matching "EXEC SQL IFDEF" / "EXEC SQL IFNDEF"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.74 16280

---

### missing "EXEC SQL ENDIF;"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.75 16281

---

### more than one EXEC SQL ELSE

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.76 16282

---

### unmatched EXEC SQL ENDIF

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.77 16283

---

### too many nested EXEC SQL IFDEF conditions

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.78 16284

---

### missing identifier in EXEC SQL IFDEF command

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.79 16285

---

### missing identifier in EXEC SQL DEFINE command

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.80 16286

---

### syntax error in EXEC SQL INCLUDE command

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.81 16287

---

---

**internal error: unreachable state; If the cause of errors cannot be found, contact the Fujitsu Systems Engineer (SE).**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause. If the cause of errors cannot be found, contact the Fujitsu Systems Engineer (SE).

## 2.59.82 16288

---

**Error: include path "@1@/@2@" is too long on line @3@, skipping**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.83 16289

---

**could not open include file "@1@" on line @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.84 16290

---

**cursor "@1@" does not exist**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.59.85 16291

---

---

### **initializer not allowed in type definition**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.59.86 16292**

---

### **type name "string" is reserved in Informix mode**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.59.87 16293**

---

### **type "@1@" is already defined**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.59.88 16294**

---

### **multidimensional arrays for simple data types are not supported**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.59.89 16295**

---

### **AT option not allowed in CLOSE DATABASE statement**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59.90 16296

---

### AT option not allowed in CONNECT statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59.91 16297

---

### AT option not allowed in DISCONNECT statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59.92 16298

---

### AT option not allowed in SET CONNECTION statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.59.93 16299

---

### AT option not allowed in TYPE statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60 Message Numbers Beginning with 16300

---

### 2.60.1 16300

---

**AT option not allowed in VAR statement**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.60.2 16301

---

**AT option not allowed in WHENEVER statement**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.60.3 16302

---

**unsupported feature will be passed to server**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.60.4 16303

---

**SHOW ALL is not implemented**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.5 16304

---

### **COPY FROM STDIN is not implemented**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.6 16308

---

### **using variable "@1@" in different declare statements is not supported**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.7 16309

---

### **cursor "@1@" is already defined**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.8 16310

---

### **no longer supported LIMIT #,# syntax passed to server**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.9 16311

---

**subquery in FROM must have an alias**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.10 16312

---

**CREATE TABLE AS cannot specify INTO**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.11 16313

---

**expected "@", found "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.12 16314

---

**only protocols "tcp" and "unix" and database type "postgresql" are supported**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.13 16315

---

**expected "://", found "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.14 16316

---

**Unix-domain sockets only work on "localhost" but not on "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.15 16317

---

**expected "postgresql", found "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.16 16318

---

**invalid connection type: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.17 16319

---

---

### expected "@" or "://", found "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.18 16320

---

### invalid data type

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.19 16321

---

### incomplete statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.20 16322

---

### unrecognized token "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.21 16323

---

### only data types numeric and decimal have precision/scale argument

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.22 16324

---

**interval specification not allowed here**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.23 16325

---

**too many levels in nested structure/union definition**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.24 16326

---

**pointers to varchar are not implemented**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.25 16327

---

**using unsupported DESCRIBE statement**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.26 16328

---

### initializer not allowed in EXEC SQL VAR command

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.27 16329

---

### arrays of indicators are not allowed on input

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.28 16330

---

### @1@ at or near "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.29 16331

---

### out of memory

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.60.30 16332

---

### unrecognized variable type code @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.31 16333

---

### variable "@1@" is hidden by a local variable of a different type

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.32 16334

---

### variable "@1@" is hidden by a local variable

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.33 16335

---

### indicator variable "@1@" is hidden by a local variable of a different type

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.34 16336

---

**indicator variable "@1@" is hidden by a local variable**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.35 16337

---

**indicator for array/pointer has to be array/pointer**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.36 16338

---

**nested arrays are not supported (except strings)**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.37 16339

---

**indicator for struct has to be a struct**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.38 16340

---

### indicator for simple data type has to be simple

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.39 16341

---

### unrecognized descriptor item code @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.40 16342

---

### incorrectly formed variable "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.41 16343

---

### variable "@1@" is not a pointer

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.42 16344

---

---

**variable "@1@" is not a pointer to a structure or a union****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.60.43 16345**

---

**variable "@1@" is neither a structure nor a union****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.60.44 16346**

---

**variable "@1@" is not an array****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.60.45 16347**

---

**variable "@1@" is not declared****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.60.46 16348**

---

**indicator variable must have an integer type**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.47 16349

---

### unrecognized data type name "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.48 16350

---

### multidimensional arrays are not supported

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.49 16351

---

### multilevel pointers (more than 2 levels) are not supported; found @1@ level

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.50 16353

---

### pointer to pointer is not supported for this data type

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.51 16354

---

### multidimensional arrays for structures are not supported

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.52 16355

---

### invalid URI propagated to internal parser routine: "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.53 16356

---

### end of string reached when looking for matching "]" in IPv6 host address in URI: "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.54 16357

---

### IPv6 host address may not be empty in URI: "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.55 16358

---

**unexpected character "@1@" at position @2@ in URI (expected ":" or "/"): "@3@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.56 16359

---

**extra key/value separator "=" in URI query parameter: "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.57 16360

---

**missing key/value separator "=" in URI query parameter: "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.58 16361

---

**invalid URI query parameter: "@1@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.59 16362

---

### invalid percent-encoded token: "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.60 16363

---

### forbidden value @1@00 in percent-encoded value: "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.61 16364

---

### insufficient data in "T" message

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.62 16365

---

### extraneous data in "T" message

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.63 16366

---

---

### insufficient data in "D" message

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.64 16367

---

### extraneous data in "D" message

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.65 16368

---

### at character @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.66 16369

---

### unrecognized socket error: 0x@1@/@2@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.67 16370

---

### If true, trusted and untrusted Perl code will be compiled in strict mode.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.68 16371

---

### Perl initialization code to execute when a Perl interpreter is initialized.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.69 16372

---

### Perl initialization code to execute once when plperl is first used.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.70 16373

---

### Perl initialization code to execute once when plperl is first used.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.71 16374

---

### duplicate declaration

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.72 16375

---

**diagnostics item @1@ is not allowed in GET STACKED DIAGNOSTICS**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.73 16376

---

**diagnostics item @1@ is not allowed in GET CURRENT DIAGNOSTICS**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.74 16377

---

**unrecognized GET DIAGNOSTICS item**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.75 16378

---

**unexpected end of function definition**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.76 16379

---

### **syntax error**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.77 16380

---

### **invalid SQLSTATE code**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.78 16381

---

### **syntax error, expected "FOR"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.79 16382

---

### **mismatched parentheses**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.80 16383

---

### missing expression

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.81 16384

---

### missing SQL statement

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.82 16385

---

### incomplete data type declaration

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.83 16386

---

### missing data type declaration

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.60.84 16387

---

---

### **INTO specified more than once**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.60.85 16388**

---

### **expected FROM or IN**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.60.86 16389**

---

### **cursor "@1@" has no argument named "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.60.87 16390**

---

### **value for parameter "@1@" of cursor "@2@" specified more than once**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.60.88 16391**

---

### **unrecognized RAISE statement option**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.89 16392

---

### **syntax error, expected "="**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.90 16393

---

### **during initialization of execution state**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.91 16394

---

### **while storing call arguments into local variables**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.92 16395

---

### **during function entry**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.93 16396

---

**while casting return value to function's return type**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.94 16397

---

**returned record type does not match expected record type**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.95 16398

---

**during function exit**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.60.96 16399

---

**returned row structure does not match the structure of the triggering table**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61 Message Numbers Beginning with 16400

---

### 2.61.1 16400

---

#### during statement block local variable initialization

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.61.2 16401

---

#### during statement block entry

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.61.3 16402

---

#### during statement block exit

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.61.4 16403

---

#### during exception cleanup

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.5 16404

---

### structure of query does not match function result type

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.6 16405

---

### query "@1@" returned @2@ column query "@3@" returned @4@ columns

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.7 16406

---

### Sets handling of conflicts between PL/pgSQL variable names and table column names.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.8 16407

---

### plpy.cursor expected a query or a plan

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.9 16408

---

### plpy.cursor takes a sequence as its second argument

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.10 16409

---

### could not execute plan

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.11 16410

---

### Expected sequence of @1@ argument, got @2@: @3@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.12 16412

---

### iterating a closed cursor

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.13 16413

---

### iterating a cursor in an aborted subtransaction

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.14 16414

---

### fetch from a closed cursor

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.15 16415

---

### closing a cursor in an aborted subtransaction

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.16 16416

---

### error fetching next item from iterator

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.17 16417

---

---

### **PyList\_SetItem() failed, while setting up arguments**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.61.18 16418**

---

### **PyDict\_SetItemString() failed, while setting up arguments**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.61.19 16419**

---

### **could not create new dictionary while building trigger arguments**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.61.20 16420**

---

### **untrapped error in initialization**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.61.21 16421**

---

### **could not import "\_\_main\_\_" module**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.22 16422

---

### could not create globals

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.23 16423

---

### plan.status takes no arguments

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.24 16424

---

### could not import "plpy" module

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.25 16425

---

### could not add the spiexceptions module

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.26 16426

---

### could not create the base SPI exceptions

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.27 16427

---

### could not generate SPI exceptions

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.28 16428

---

### could not unpack arguments in plpy.eleg

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.29 16429

---

### could not parse error message in plpy.eleg

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.30 16430

---

### could not compile PL/Python function "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.31 16431

---

### could not compile anonymous PL/Python code block

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.32 16432

---

### command did not produce a result set

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.33 16433

---

### second argument of plpy.prepare must be a sequence

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.34 16434

---

### **plpy.execute expected a query or a plan**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.35 16435

---

### **plpy.execute takes a sequence as its second argument**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.36 16437

---

### **this subtransaction has already been entered**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.37 16438

---

### **this subtransaction has already been exited**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.38 16439

---

---

**this subtransaction has not been entered**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.39 16440

---

**there is no subtransaction to exit from**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.40 16441

---

**could not create new dictionary**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.41 16442

---

**could not create new Python list**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.42 16443

---

**could not create bytes representation of Python object**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.43 16444

---

### could not create string representation of Python object

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.44 16445

---

### return value of function with array return type is not a Python sequence

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.45 16446

---

### could not extract bytes from encoded string

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.46 16447

---

### The name: @1@ is invalid.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.47 16448

---

### **";" is not permitted in COBOL**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.48 16449

---

### **"END-EXEC" is not permitted in C**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.49 16450

---

### **missing "EXEC SQL ENDIF END-EXEC."**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.50 16451

---

### **debug line with EXEC SQL is not permitted**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.51 16452

---

### SQL string literal cannot continue multiline by COBOL syntax

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.52 16453

---

### COBOL string literal cannot continue multiline by SQL syntax

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.53 16454

---

### syntax error at or near "END-EXEC" in declare section

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.54 16455

---

### syntax error in include file

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.55 16456

---

### internal error: unreachable state;

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.56 16457

---

### could not open temporary file "@1@" for continue line

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.57 16458

---

### FILLER or implicit FILLER is not available in EXEC SQL TYPE statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.58 16459

---

### VALUE clause is not available in EXEC SQL TYPE statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.59 16460

---

---

### REDEFINES clause is not available in EXEC SQL TYPE statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.60 16461

---

### FILLER or implicit FILLER is not available in EXEC SQL VAR statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.61 16462

---

### VALUE clause is not available in EXEC SQL VAR statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.62 16463

---

### syntax error in WHENEVER statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.63 16464

---

### FILLER or implicit FILLER is not available in TYPEDEF statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.64 16465

---

### VALUE clause is not available in TYPEDEF statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.65 16466

---

### REDEFINES clause is not available in TYPEDEF statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.66 16467

---

### FILLER or implicit FILLER can use only for elementary item in group item

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.67 16468

---

### USAGE clause is not available for group item name

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.68 16469

---

**SIGN clause is not available for group item name**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.69 16470

---

**VALUE clause is not available for group item name**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.70 16471

---

**more than one USAGE clause**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.71 16472

---

**more than one OCCURS clause**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.72 16473

---

### more than one VALUE clause

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.73 16474

---

### more than one SIGN clause

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.74 16475

---

### more than one REDEFINES clause

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.75 16476

---

### syntax error at or near "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.76 16477

---

### length of varchar type is not assigned

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.77 16478

---

### invalid NULL is set

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.61.78 16479

---

### you can not be set to more than 1024 bytes of the string

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.61.79 16480

---

### group item is too deep

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.80 16481

---

---

### **multidimensional array is not supported**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.61.81 16482**

---

### **syntax is not available**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.61.82 16483**

---

### **there is a character code that can not be determined**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.61.83 16484**

---

### **the number of variables reached the max number 100000**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.61.84 16485**

---

### **host array variable is needed when using FOR ARRAY\_SIZE**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.85 16486

---

### unsupported datatype found at FOR statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.86 16487

---

### FOR value should be positive integer

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.87 16488

---

### SELECT..INTO returns too many rows on line @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.61.88 16489

---

### not prepared for charset\_conv\_convert

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

This messages is output in the case of HA Database Ready.

Contact Fujitsu technical support.

## 2.61.89 16490

---

### **iconv failed (@1@)**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

This messages is output in the case of HA Database Ready.

Contact Fujitsu technical support.

## 2.61.90 16491

---

### **@1@ failed**

[Description]

Aborted the processing of this operation because an error occurred.

[System Processing]

Processing will be aborted.

[Action]

Identify the cause according to the messages shown before this message, and then work around if necessary.

## 2.61.91 16492

---

### **CREATE TRIGGER will create implicit function "@1@"."@2@"() for TRIGGER "@3@" on TABLE "@4@"**

[Description]

Terminated normally.

[System Processing]

Continues processing.

[Action]

No action required.

## 2.61.92 16493

---

### **The cursor is invalid on line @1@**

[Description]

An error occurred during execution of the command.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.61.93 16494

---

### Constraint trigger "@1@" for relation "@2@" cannot be replaced with non-constraint trigger

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.61.94 16495

---

### Trigger "@1@" for relation "@2@" cannot be replaced with constraint trigger

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.61.95 16496

---

### invalid value for targetserver: "@1@"

[Description]

value of targetserver is invalid.

[System Processing]

Processing is aborted.

[Action]

Set one of the following:

- primary
- standby
- prefer\_standby
- any(can be specified only JDBC)

## 2.61.96 16497

---

### unterminated /\*+ comment for hint of pg\_hint\_plan

[Description]

An unterminated /\*+ comment for hint of pg\_hint\_plan is detected.

[System Processing]

Processing will be aborted.

[Action]

Terminate /\*+ comment for hint of pg\_hint\_plan.

## 2.61.97 16498

---

### trigger created with EXECUTE PROCEDURE cannot be replaced by DO block

[Description]

Trigger created with EXECUTE PROCEDURE cannot be replaced by DO block.

[System Processing]

Processing is aborted.

[Action]

Please redefine it after deleting the trigger.

## 2.61.98 16499

---

### trigger created with DO block cannot be replaced by EXECUTE PROCEDURE

[Description]

Trigger created with DO block cannot be replaced by EXECUTE PROCEDURE.

[System Processing]

Processing is aborted.

[Action]

Please redefine it after deleting the trigger.

## 2.62 Message Numbers Beginning with 16500

---

### 2.62.1 16500

---

#### the connection is not the same as the connection in DECLARE STATEMENT, on line @1@

[Description]

The connection is not the same as the connection in DECLARE STATEMENT, on line @1@

[System Processing]

Processing is aborted.

[Action]

Please do not specify the connection when you use SQL statement identifier declared with DECLARE STATEMENT.

## 2.62.2 16501

---

### cannot copy window "@1@" because it has a frame clause

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.62.3 16502

---

### could not find any WAL files

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.62.4 16503

---

### exceeded maxAllocatedDescs (@1@) while trying to open file "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.62.5 16504

---

### exceeded maxAllocatedDescs (@1@) while trying to open directory "@2@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.62.6 16505

---

---

### **tsquery is too large**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.62.7 16506**

---

### **bit string length exceeds the maximum allowed (@1@)**

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.62.8 16507**

---

### **error occurred at @1@: @2@ before error message processing is available**

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.62.9 16508**

---

### **language validation function @1@ called for language @2@ instead of @3@**

#### [Description]

An error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.62.10 16509**

---

### **could not acquire mutex: @1@**

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.62.11 16510

---

### The sslservercertcn "@1@" could not be verified

[Description]

value of sslservercertcn is different from common name in the server certificate.

[System Processing]

Processing is aborted.

[Action]

Set SSL certificate's common name to sslservercertcn.

## 2.62.12 16511

---

### @1@: must be superuser to run this command

[Description]

Must be superuser to run this command.

[System Processing]

Processing will be aborted.

[Action]

Re-execute the command by the superuser.

## 2.62.13 16512

---

### @1@: must be database super user to run this command

#### [Description]

Must be database super user to run this command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Re-execute the command by the database super user.

## 2.62.14 16513

---

### @1@: no subcommand specified

#### [Description]

No subcommand specified.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the command-line, and re-execute the command with correct options or operands.

## 2.62.15 16514

---

### @1@: unrecognized subcommand "@2@"

#### [Description]

Unknown subcommand is specified.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the command-line, and re-execute the command with correct subcommand.

## 2.62.16 16515

---

### @1@: too many command-line arguments (first is "@2@")

#### [Description]

Too many command-line arguments.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the command-line, and re-execute the command with correct options or operands.

## 2.62.17 16516

---

---

**@1@: argument to an option "@2@" must be a list of port numbers****[Description]**

Argument to the option must be a list of port numbers.

**[System Processing]**

Processing will be aborted.

**[Action]**

Specify multiple port number, separated by commas argument to an option, and re-execute the command. Specify a number from 1024 to 32767 for the port number.

---

**2.62.18 16517**

---

**@1@: invalid argument for an option "@2@"****[Description]**

Invalid argument for an option.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the options specified in command-line, and re-execute the command with correct operands.

---

**2.62.19 16518**

---

**@1@: option "@2@" is required****[Description]**

The indispensable option is not specified.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the command-line, and re-execute the command with correct options or confirm the indispensable option is being used correctly.

---

**2.62.20 16519**

---

**@1@: requires an option "@2@" or setting the "@3@" environment variable****[Description]**

Requires an option or setting the environment variable.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the command-line, and re-execute the command with correct options. Or, set a correct value to the environment variable, and re-execute the command.

## 2.62.21 16520

---

### @1@: successfully completed

#### [Description]

Command successfully completed.

#### [System Processing]

Continues processing.

#### [Action]

No action required.

## 2.62.22 16521

---

### @1@: user "@2@" does not exist

#### [Description]

The user is not registered into OS.

#### [System Processing]

Processing will be aborted.

#### [Action]

Register the user into OS, and re-execute the command. Or, re-execute the command which specified the registered user.

## 2.62.23 16522

---

### @1@: data directory "@2@" does not exist

#### [Description]

The data directory does not exist.

#### [System Processing]

Processing will be aborted.

#### [Action]

Confirm that an option "--cluster-standbypnode" is being used correctly. Or, check the command-line, and re-execute the command with existing data directory.

## 2.62.24 16523

---

### @1@: "@2@" is not a valid data directory

#### [Description]

The data directory is not valid.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the command-line, and re-execute the command with valid data directory.

## 2.62.25 16524

---

### @1@: database cluster is not stopped

#### [Description]

Database cluster is not stopped.

#### [System Processing]

Processing will be aborted.

#### [Action]

Stop the database cluster, and re-execute the command.

## 2.62.26 16525

---

### @1@: domain root "@2@" already exists

#### [Description]

The domain root already exists.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the command-line, and re-execute the command with correct domain root.

## 2.62.27 16526

---

### @1@: could not create directory "@2@"

#### [Description]

Could not create the directory.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the following and eliminate the cause of errors, and re-execute the command.

- the state of a disk and file system to creating the directory
- permission of the upper directory of specified directory

## 2.62.28 16527

---

### @1@: start of PL/extJava has timed out : @2@

#### [Description]

Timed out waiting for start of PL/extJava.

#### [System Processing]

Processing will be aborted.

#### [Action]

Re-execute the command after the load on the system has decreased.

## 2.62.29 16528

---

**@1@: stop of PL/extJava has timed out : @2@**

[Description]

Timed out waiting for stop of PL/extJava.

[System Processing]

Processing will be aborted.

[Action]

Re-execute the command after the load on the system has decreased.

## 2.62.30 16529

---

**@1@: port number "@2@" is already in use**

[Description]

The port number is already in use.

[System Processing]

Processing will be aborted.

[Action]

Re-execute the command with a port number which is not used in other processes.

## 2.62.31 16530

---

**@1@: domain name can only be specified "domain1"**

[Description]

Domain name can only be specified "domain1".

[System Processing]

Processing will be aborted.

[Action]

Check the command-line, and re-execute the command with correct domain name.

## 2.62.32 16531

---

**@1@: domain "@2@" has already been created**

[Description]

The domain has already been created.

[System Processing]

Processing will be aborted.

[Action]

Check the command-line, and re-execute the command with correct domain name.

## 2.62.33 16532

---

---

**@1@: domain "@2@" has not been created****[Description]**

The domain has not been created.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the command-line, and re-execute the command with correct domain name.

---

**2.62.34 16533**

---

**@1@: permission denied to update file "@2@"****[Description]**

Permission denied to update the file.

**[System Processing]**

Processing will be aborted.

**[Action]**

Permit writing to the file by execution user, and re-execute the command.

---

**2.62.35 16534**

---

**@1@: container for database "@2@" does not exist****[Description]**

Container for database does not exist.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the command-line, and re-execute the command with correct database name.

---

**2.62.36 16535**

---

**@1@: container for database "@2@" already exists****[Description]**

Container for database already exists.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the command-line, and re-execute the command with correct database name.

---

**2.62.37 16536**

---

**@1@: command error occurred**

[Description]

Internal command error occurred.

[System Processing]

Processing will be aborted.

[Action]

Fix the problem by referring to the messages prior to this one.

## 2.62.38 16537

---

### @1@: the domain was not able to be deleted because there was a container

[Description]

The domain was not able to be deleted because the domain have a container.

[System Processing]

Processing will be aborted.

[Action]

Delete all containers on the domain, and re-execute the command. Or, re-execute the command with "--force" option.

## 2.62.39 16538

---

### @1@: could not access the data directory

[Description]

Could not access the data directory.

[System Processing]

Processing will be aborted.

[Action]

Confirm that an option "--cluster-standbynode" is being used correctly. Or, specify database super user in "--dbadminuser" option and re-execute the command.

## 2.62.40 16539

---

### @1@: server instance "@2@" does not exist

[Description]

Server instance does not exist.

[System Processing]

Processing will be aborted.

[Action]

Check the command-line, and re-execute the command with correct server instance.

## 2.62.41 16540

---

### @1@: specified database name "@2@" does not follow the naming rules

[Description]

Specified database name does not follow the naming rules.

[System Processing]

Processing will be aborted.

[Action]

Check the command-line, and re-execute the command with correct database name.

## 2.62.42 16541

---

**@1@: all the server instances of the container cannot be deleted**

[Description]

All the server instances of the container cannot be deleted.

[System Processing]

Processing will be aborted.

[Action]

Check the command-line, and re-execute the command with correct database name.

## 2.62.43 16542

---

**@1@: the mount does the shared-file system of the domain root or the data directory**

[Description]

A command executing node is not a standby node.

[System Processing]

Processing will be aborted.

[Action]

Execute the command on standby node.

## 2.62.44 16543

---

**@1@: cannot execute this subcommand on standby node**

[Description]

Cannot execute this subcommand on standby node.

[System Processing]

Processing will be aborted.

[Action]

Execute the command on primary node.

## 2.62.45 16544

---

**@1@: cannot execute this command concurrently**

[Description]

Cannot execute this command concurrently.

[System Processing]

Processing will be aborted.

[Action]

Re-execute the command after a command executing was finished.

## 2.62.46 16545

---

**@1@: domain root "@2@" does not exist**

[Description]

Domain root does not exist.

[System Processing]

Processing will be aborted.

[Action]

Confirm that the shared-file system of the domain root is mounted. Or, restore domain root from backup and re-execute the command.

## 2.62.47 16546

---

**parameter "@1@" necessary for the PL/extJava environment was not set**

[Description]

PL/extJava environment was not set.

[System Processing]

Processing will be aborted.

[Action]

Set the PL/extJava environment.

## 2.62.48 16547

---

**mismatched parentheses**

[Description]

Missing parenthesis '(' or ')' in Java function definition.

[System Processing]

Processing will be aborted.

[Action]

Check the definition of Java function.

## 2.62.49 16548

---

**invalid format specification for Java function**

[Description]

Invalid format specification for Java function.

[System Processing]

Processing will be aborted.

[Action]

Check the definition of Java function.

Java function definition format is [package].[class].[method].

## 2.62.50 16549

---

### Java function cannot return type @1@

[Description]

The specified data type is not supported as Java function.

[System Processing]

Processing will be aborted.

[Action]

Check the data type of return value.

## 2.62.51 16550

---

### Java function cannot accept type @1@

[Description]

The specified data type is not supported as Java function arguments.

[System Processing]

Processing will be aborted.

[Action]

Check the data type of arguments value.

## 2.62.52 16551

---

### could not execute the Java function at the application server: HTTP status code @1@ details: "@2@"

[Description]

The application server could not execute the Java function.

[System Processing]

Processing will be aborted.

[Action]

Check the Java function of registered in application server.

Check the details.

- The classpath is not found. (plextjava\_lib\_dir=%s2)

%s2: directory

The directory that stores the Java function is not in the application server. Check the directory and register the Java function.

- The return type is different. (%s3)

%s3: data type

The return value of the Java function is not corresponding to the CREATE FUNCTION definition. Check the data type of Java function.

- The method is not found. (%s4)

%s4: data type

The Java function to which the data type is corresponding is not found. Check the data type of Java function.

- The class is not found.(%s5)

%s5: class name

The Java function to which the class name is corresponding is not found. Check the class name of Java function.

- The method is not static modifier. (%s6)

%s6: Java function name

The Java function is not defined by "Static". Check the Java function definition.

here is no executed authority. (%s7)

%s7: Java function name

The Java function is not defined by "Public". Check the Java function definition.

- Java application throws exception(%s8).

%s8: exception

The exception was generated by the Java function. Check the Java function definition.

- no message

The following causes are thought.

-There is a possibility that the container is not made. Make the container in application server.

a) There is a possibility where the number of server instances is insufficient. Add server instance (JavaVM) to the application server.

b) There is a possibility that memory shortage occurs. Check the Java application.

c) There is a possibility that the time-out is generated. Check the Java application.

d) There is a possibility that abnormality occurs by the application server. Check the following logs.

- Event log (For Windows(R))/system log (For Solaris/Linux).

- Server log of container

- JavaVM log of container

- Trace log of Web server

- Internal log of Web server

## 2.62.53 16552

---

**could not connect to application server: @1@**

[Description]

Could not connect to application server.

[System Processing]

Processing will be aborted.

[Action]

Check the plextjava.http\_port parameter in postgresql.conf.

## 2.62.54 16553

---

### could not create socket for application server connection: @1@

[Description]

Could not create socket.

[System Processing]

Processing will be aborted.

[Action]

There is possible where an open number of files that can be used with the system is insufficient. Please confirm the total of the file that can be used with the system.

## 2.62.55 16554

---

### could not send data to application server: @1@

[Description]

The application server was disconnected during execution of the Java function.

[System Processing]

Processing will be aborted.

[Action]

Check the message of application server.

## 2.62.56 16555

---

### could not receive data from application server

[Description]

The application server was disconnected during execution of the Java function.

[System Processing]

Processing will be aborted.

[Action]

Check the message of application server.

## 2.62.57 16556

---

### could not receive data from application server: @1@

[Description]

The application server was disconnected during execution of the Java function.

[System Processing]

Processing will be aborted.

[Action]

Check the message of application server.

## 2.62.58 16557

---

### could not execute PL/extJava start command

[Description]

An error occurred during executing the command specified by plextjava.start\_command parameter in postgresql.conf.

[System Processing]

Processing will be aborted.

[Action]

Check the plextjava.start\_command parameter in postgresql.conf.

## 2.62.59 16558

---

### PL/extJava start command failed with exit code @1@

[Description]

An error occurred during executing the command specified by plextjava.start\_command parameter in postgresql.conf.

[System Processing]

Processing will be aborted.

[Action]

Check the exit code and the messages that was output before this.

## 2.62.60 16559

---

### could not execute PL/extJava stop command

[Description]

An error occurred during executing the command specified by plextjava.stop\_command parameter in postgresql.conf.

[System Processing]

Processing will be aborted.

[Action]

Check the plextjava.stop\_command parameter in postgresql.conf.

## 2.62.61 16560

---

### PL/extJava stop command failed with exit code @1@

[Description]

An error occurred during executing the command specified by plextjava.stop\_command parameter in postgresql.conf.

[System Processing]

Processing will be aborted.

[Action]

Check the exit code and the messages that was output before this.

## 2.62.62 16561

---

---

### could not execute PL/extJava forcible stop command

#### [Description]

An error occurred during executing the command specified by `plextjava.forcible_stop_command` parameter in `postgresql.conf`.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the `plextjava.forcible_stop_command` parameter in `postgresql.conf`.

---

## 2.62.63 16562

---

### PL/extJava forcible stop command failed with exit code @1@

#### [Description]

An error occurred during executing the command specified by `plextjava.forcible_stop_command` parameter in `postgresql.conf`.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the exit code and the messages that was output before this.

---

## 2.62.64 16563

---

### @1@: at least one option of "@2@" must be specified

#### [Description]

Must specify at least one option.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the command-line, and re-execute the command with correct options.

---

## 2.62.65 16574

---

### @1@: could not write directory "@2@"

#### [Description]

Could not write the directory.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check that the disk of the directory has free space, and check that the abnormalities of the disk have not occurred.

---

## 2.62.66 16575

---

**@1@: cannot execute with "@2@" option in primary server****[Description]**

Do not specify the option to execute the command in primary server.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the command-line, and re-execute the command with correct options.

Restore it because PL/extJava environment may be corrupted when the server is member nodes of the cluster.

---

**2.62.67 16576**

---

**@1@: specify "@2@" option in standby server****[Description]**

Specify the option to execute the command in standby server.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the command-line, and re-execute the command with correct options.

Restore it because PL/extJava environment may be corrupted when the server is member nodes of the cluster.

---

**2.62.68 16577**

---

**Could not translate client host name "@1@" to IP address: @2@.****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

---

**2.62.69 16578**

---

**Could not resolve client IP address to a host name: @1@.****[Description]**

Supplementary information was output.

**[System Processing]**

None.

**[Action]**

Refer to this message together with the message that was output immediately beforehand.

## 2.62.70 16579

---

**SELECT target entry is named "@1@".**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.62.71 16580

---

**SELECT target entry has type @1@, but column has type @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.62.72 16581

---

**RETURNING list entry has type @1@, but column has type @2@.**

[Description]

Supplementary information was output.

[System Processing]

None.

[Action]

Refer to this message together with the message that was output immediately beforehand.

## 2.62.73 16582

---

**pg\_largeobject entry for OID @1@, page @2@ has invalid data field size @3@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.62.74 16583

---

---

### could not close directory "@1@": @2@

#### [Description]

Terminated normally but a warning was output.

#### [System Processing]

Continues processing.

#### [Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

---

## 2.62.75 16584

---

### could not create shared memory segment "@1@": @2@

#### [Description]

Could not create shared memory segment.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause

---

## 2.62.76 16585

---

### could not open shared memory segment "@1@": @2@

#### [Description]

Could not open shared memory segment.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause

---

## 2.62.77 16586

---

### could not map shared memory segment "@1@": @2@

#### [Description]

Could not map shared memory segment.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause

---

## 2.62.78 16587

---

### could not unmap shared memory segment "@1@": @2@

[Description]

Could not unmap shared memory segment.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.62.79 16588

---

### could not remove shared memory segment "@1@": @2@

[Description]

Could not remove shared memory segment.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.62.80 16589

---

### background worker "@1@": must attach to shared memory in order to request a database connection

[Description]

Could not register background worker.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.62.81 16590

---

### background worker "@1@": cannot request database access if starting at postmaster start

[Description]

Could not register background worker.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.62.82 16591

---

### background worker "@1@": invalid restart interval

[Description]

Could not register background worker.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

---

## 2.62.83 16592

---

### terminating background worker "@1@" due to administrator command

[Description]

Could not register background worker.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

---

## 2.62.84 16595

---

### dynamic shared memory is disabled

[Description]

dynamic shared memory is disabled.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

---

## 2.62.85 16596

---

### dynamic shared memory control segment is not valid

[Description]

dynamic shared memory control segment is not valid.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

---

## 2.62.86 16597

---

### too many dynamic shared memory segments

[Description]

Too many dynamic shared memory segments exist.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.62.87 16599

---

**could not stat shared memory segment "@1@": @2@**

[Description]

Could not get details about dynamic shared memory segment.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.63 Message Numbers Beginning with 16600

---

### 2.63.1 16600

---

**could not resize shared memory segment "@1@" to @2@ bytes: @3@**

[Description]

Could not resize shared memory segment.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

### 2.63.2 16601

---

**could not get shared memory segment: @1@**

[Description]

Could not get shared memory segment.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

### 2.63.3 16604

---

**cannot add more timeout reasons**

[Description]

cannot add more timeout reasons

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

---

## 2.63.4 16606

---

**aborting because lock on relation "@1@"."@2@" is not available**

[Description]

Aborting because lock on relation is not available.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.5 16607

---

**affix file contains both old-style and new-style commands**

[Description]

Affix file contains commands in both old and new format.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.6 16608

---

**aggregate cannot accept shell type @1@**

[Description]

aggregate cannot accept shell type.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.7 16609

---

**aggregate functions are not allowed in a recursive query's recursive term**

[Description]

aggregate functions are not allowed in a recursive query's recursive term.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.8 16610

---

### aggregate functions are not allowed in check constraints

[Description]

aggregate functions are not allowed in check constraints.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.9 16611

---

### aggregate functions are not allowed in DEFAULT expression

[Description]

aggregate functions are not allowed in DEFAULT expressions.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.10 16612

---

### aggregate functions are not allowed in EXECUTE parameters

[Description]

aggregate functions are not allowed in EXECUTE parameter.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.11 16613

---

### aggregate functions are not allowed in FROM clause of their own query level

[Description]

Should only be possible in a LATERAL subquery. aggregate functions are not allowed in FROM clause of their own query level.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.12 16614

---

### aggregate functions are not allowed in functions in FROM

[Description]

aggregate functions are not allowed in functions in FROM.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.13 16615

---

### aggregate functions are not allowed in index expression

[Description]

aggregate functions are not allowed in index expression.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.14 16616

---

### aggregate functions are not allowed in index predicates

[Description]

aggregate functions are not allowed in index predicates.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.15 16617

---

### aggregate functions are not allowed in JOIN conditions

[Description]

aggregate functions are not allowed in JOIN conditions.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.16 16618

---

### aggregate functions are not allowed in @1@

#### [Description]

aggregate functions are not allowed in some kinds of expressions we are parsing such as  
EXPR\_KIND\_WHERE,EXPR\_KIND\_FILTER, EXPR\_KIND\_INSERT\_TARGET,  
EXPR\_KIND\_UPDATE\_SOURCE, EXPR\_KIND\_UPDATE\_TARGET, EXPR\_KIND\_GROUP\_BY,  
EXPR\_KIND\_LIMIT, EXPR\_KIND\_OFFSET, EXPR\_KIND\_RETURNING,EXPR\_KIND\_VALUES.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.17 16620

---

### aggregate functions are not allowed in trigger WHEN conditions

#### [Description]

aggregate functions are not allowed in trigger WHEN conditions.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.18 16621

---

### aggregate functions are not allowed in window RANGE

#### [Description]

aggregate functions are not allowed in window RANGE.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.19 16622

---

### aggregate functions are not allowed in window ROWS

#### [Description]

aggregate functions are not allowed in window ROWS.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.20 16623

---

### aggregate mfinalfunc must not be specified without mstype

[Description]

aggregate mfinalfunc must not be specified without mstype.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.21 16624

---

### aggregate minitcond must not be specified without mstype

[Description]

aggregate minitcond must not be specified without mstype.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.22 16625

---

### aggregate minvfunc must be specified when mstype is specified

[Description]

aggregate minvfunc must be specified when mstype is specified. if mtransType is given, mtransfuncName and minvtransfuncName must be as well; if not, then none of the moving-aggregate options should have been given.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.23 16626

---

### aggregate minvfunc must not be specified without mstype

[Description]

aggregate minvfunc must not be specified without mstype. if mtransType is given, mtransfuncName and minvtransfuncName must be as well; if not, then none of the moving-aggregate options should have been given.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.24 16627

---

### aggregate msfunc must be specified when mstype is specified

#### [Description]

aggregate msfunc must be specified when mstype is specified. if mtransType is given, mtransfuncName and minvtransfuncName must be as well; if not, then none of the moving-aggregate options should have been given.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.25 16628

---

### aggregate msfunc must not be specified without mstype

#### [Description]

aggregate msfunc must not be specified without mstype. if mtransType is given, mtransfuncName and minvtransfuncName must be as well; if not, then none of the moving-aggregate options should have been given.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.26 16629

---

### aggregate msspace must not be specified without mstype

#### [Description]

aggregate msspace must not be specified without mstype. if mtransType is given, mtransfuncName and minvtransfuncName must be as well; if not, then none of the moving-aggregate options should have been given.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.27 16630

---

### aggregates cannot accept set arguments

#### [Description]

aggregates cannot accept set arguments.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.28 16631

---

### aggregates cannot have more than @1@ argument

#### [Description]

aggregates cannot have more than 99 argument. Aggregates can have at most `FUNC_MAX_ARGS-1` args, else the transfn and/or finalfn will be unrepresentable in `pg_proc`. We must check now to protect fixed-size arrays here and possibly in called functions.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.29 16632

---

### aggregates cannot have output arguments

#### [Description]

aggregates cannot have output arguments.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.30 16633

---

### a hypothetical-set aggregate must have direct arguments matching its aggregated arguments

#### [Description]

a hypothetical-set aggregate must have direct arguments matching its aggregated arguments.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.31 16634

---

### "All connection parameters must be supplied because no " "database connection exists"

#### [Description]

All connection parameters must be supplied because no database connection exists. We don't know the supplied connection parameters and don't want to connect to the wrong database by using defaults, so require all parameters to be specified.

#### [System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.32 16635

---

### all replication slots are in use

[Description]

all replication slots are in use.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.33 16636

---

### an aggregate with DISTINCT must have at least one argument

[Description]

an aggregate with DISTINCT must have at least one argument. Returning an empty list would cause the parsed Query to look like it didn't have DISTINCT, with results that would probably surprise the user. Note: this case is presently impossible for aggregates because of grammar restrictions, but we check anyway.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.34 16637

---

### an ordered-set aggregate with a VARIADIC direct argument must have one VARIADIC aggregated argument of the same data type

[Description]

an ordered-set aggregate with a VARIADIC direct argument must have one VARIADIC aggregated argument of the same data type.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.35 16638

---

### argument declared "anyrange" is not a range type but type @1@

[Description]

argument declared \"anyrange\" is not a range type but type format type of range\_type.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.36 16639

---

### argument list must have even number of elements

[Description]

argument list must have even number of elements.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.37 16640

---

### argument of lo\_read exceeds integer range

[Description]

argument of lo\_read exceeds integer range. Long ago, somebody thought it'd be a good idea to declare this function as taking size\_t ... but the underlying backend function only accepts a signed int32 length. So throw error if the given value overflows int32.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.38 16641

---

### argument of lo\_truncate exceeds integer range

[Description]

argument of lo\_truncate exceeds integer range. Long ago, somebody thought it'd be a good idea to declare this function as taking size\_t ... but the underlying backend function only accepts a signed int32 length. So throw error if the given value overflows int32. (A possible alternative is to automatically redirect the call to lo\_truncate64; but if the caller wanted to rely on that backend function being available, he could have called lo\_truncate64 for himself.)

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.39 16642

---

### argument of lo\_write exceeds integer range

[Description]

argument of `lo_write` exceeds integer range\n.Long ago, somebody thought it'd be a good idea to declare this function as taking `size_t` ... but the underlying backend function only accepts a signed `int32` length. So throw error if the given value overflows `int32`.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.40 16643

---

### argument of @1 @ must be an array of objects

[Description]

argument of `funcname` must be an array of objects.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.41 16644

---

### Array contents must start with "{"

[Description]

Array contents must start with `\{"`.intuit dimensions from brace structure -- it better match what we were given.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.42 16645

---

### array must be one-dimensional

[Description]

array must be one-dimensional.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.43 16646

---

### array must have even number of elements

[Description]

array must have even number of elements.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.44 16647

---

### array must have two columns

[Description]

array must have two columns.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.45 16648

---

### array must not contain nulls

[Description]

array must not contain nulls.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.46 16649

---

### Array value must start with "{" or dimension information

[Description]

Array value must start with "\" or dimension information. No array dimensions, so intuit dimensions from brace structure.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.47 16650

---

### authentication file line too long

[Description]

authentication file line too long. Line too long!

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.48 16651

---

### a variadic ordered-set aggregate must use VARIADIC type ANY

[Description]

a variadic ordered-set aggregate must use VARIADIC type ANY. An ordered-set aggregate that is VARIADIC must be VARIADIC ANY. In principle we could support regular variadic types, but it would make things much more complicated because we'd have to assemble the correct subsets of arguments into array values. Since no standard aggregates have use for such a case, we aren't bothering for now.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.49 16652

---

### a worker process died unexpectedly

[Description]

a worker process died unexpectedly.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.50 16653

---

### canceling statement due to lock timeout

[Description]

canceling statement due to lock timeout. If LOCK\_TIMEOUT and STATEMENT\_TIMEOUT indicators are both set, we prefer to report the former; but be sure to clear both.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.51 16654

---

---

### cannot extract elements from an object

[Description]

cannot extract elements from an object.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.52 16655

---

### cannot extract elements from a scalar

[Description]

cannot extract elements from a scalar.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.53 16656

---

### cannot get array length of a non-array

[Description]

cannot get array length of a non-array.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.54 16657

---

### cannot get array length of a scalar

[Description]

cannot get array length of a scalar.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.55 16658

---

### cannot have more than 2<sup>32</sup>-2 commands in a transaction

[Description]

cannot have more than  $2^{32}-2$  commands in a transaction.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.56 16659

---

### cannot insert into column "@1@" of view "@2@"

[Description]

cannot insert into column non\_updatable\_col of view RelationGetRelationName(view). This is a different error, caused by an attempt to update a non-updatable column in an otherwise updatable view.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.57 16660

---

### cannot insert into foreign table "@1@"

[Description]

cannot insert into foreign table RelationName of resultRel.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.58 16661

---

### cannot lock rows in materialized view "@1@"

[Description]

cannot lock rows in materialized view RelationName of provided rel. Allow referencing a matview, but not actual locking clauses.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.59 16662

---

### cannot move relations in to or out of pg\_global tablespace

[Description]

cannot move relations in to or out of pg\_global tablespace.Can't move shared relations in to or out of pg\_global. This is also checked by ATExecSetTableSpace, but nice to stop earlier.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.60 16663

---

### cannot perform FREEZE because of prior transaction activity

[Description]

cannot perform FREEZE because of prior transaction activity.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.61 16664

---

### cannot perform FREEZE because the table was not created or truncated in the current subtransaction

[Description]

cannot perform FREEZE because the table was not created or truncated in the current subtransaction.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.62 16665

---

### cannot refresh materialized view "@1@" concurrently

[Description]

cannot refresh materialized view matviewname concurrently.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.63 16666

---

### cannot rename inherited constraint "@1@"

[Description]

cannot rename inherited constraint oldconname.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.64 16667

---

### cannot return non-composite value from function returning composite type

[Description]

cannot return non-composite value from function returning composite type.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.65 16668

---

### cannot rewrite table "@1@" used as a catalog table

[Description]

cannot rewrite table Relation name used as a catalog table

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.66 16669

---

### cannot update column "@1@" of view "@2@"

[Description]

cannot update column non\_updatable\_col of view RelationGetRelationName(view).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.67 16670

---

### cannot update foreign table "@1@"

[Description]

cannot update foreign table resultRel relation name.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.68 16671

---

### cannot use a logical replication slot for physical replication

[Description]

Logical replication slots, similar to physical slots except that they are attached to a single database. cannot use a logical replication slot for physical replication.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.69 16672

---

### cannot use DISTINCT with WITHIN GROUP

[Description]

cannot use DISTINCT with WITHIN GROUP. The order clause for WITHIN GROUP and the one for plain-aggregate ORDER BY share a field, so we have to check here that at most one is present. We also check for DISTINCT here to give a better error location.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.70 16673

---

### cannot use expression index "@1@" as replica identity

[Description]

cannot use expression index Relation name of indexRel as replica identity. Expression indexes aren't supported.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.71 16674

---

### cannot use invalid index "@1@" as replica identity

[Description]

cannot use invalid index Relation name of indexRel as replica identity.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.72 16675

---

### cannot use ldapbasedn, ldapbinddn, ldapbindpasswd, ldapsearchattribute, or ldapurl together with ldapprefix

[Description]

cannot use ldapbasedn, ldapbinddn, ldapbindpasswd, ldapsearchattribute, or ldapurl together with ldapprefix.LDAP can operate in two modes: either with a direct bind, using ldapprefix and ldapsuffix, or using a search+bind, using ldapbasedn, ldapbinddn, ldapbindpasswd and ldapsearchattribute.Disallow mixing these parameters.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.73 16676

---

### cannot use multiple ORDER BY clauses with WITHIN GROUP

[Description]

cannot use multiple ORDER BY clauses with WITHIN GROUP.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.74 16677

---

### cannot use non-immediate index "@1@" as replica identity

[Description]

cannot use non-immediate index Relation name of indexRel as replica identity.Deferred indexes are not guaranteed to be always unique.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.75 16678

---

### cannot use non-unique index "@1@" as replica identity

[Description]

cannot use non-unique index Relation name of indexRel as replica identity. The Access Method must support uniqueness, and the index must in fact be unique.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.76 16679

---

### cannot use partial index "@1@" as replica identity

[Description]

cannot use partial index Relation name of indexRel as replica identity.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.77 16680

---

### cannot use physical replication slot for logical decoding

[Description]

cannot use physical replication slot for logical decoding.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.78 16681

---

### cannot use subquery in DEFAULT expression

[Description]

cannot use subquery in DEFAULT expression. Check to see if the sublink is in an invalid place within the query. We allow sublinks everywhere in SELECT/INSERT/UPDATE/DELETE, but generally not in utility statements.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.79 16682

---

### cannot use VARIADIC with WITHIN GROUP

[Description]

cannot use VARIADIC with WITHIN GROUP.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.80 16683

---

### check constraints for domains cannot be marked NO INHERIT

[Description]

check constraints for domains cannot be marked NO INHERIT. Check constraints are handled after domain creation, as they require the Oid of the domain; at this point we can only check that they're not marked NO INHERIT, because that would be bogus.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.81 16684

---

### CONCURRENTLY and WITH NO DATA options cannot be used together

[Description]

CONCURRENTLY and WITH NO DATA options cannot be used together. Check that conflicting options have not been specified.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.82 16685

---

### CONCURRENTLY cannot be used when the materialized view is not populated

[Description]

CONCURRENTLY cannot be used when the materialized view is not populated. Check that CONCURRENTLY is not specified if not populated.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.83 16687

---

---

### constraint "@1@" of relation "@2@" is not a foreign key or check constraint

[Description]

constraint constrName of relation RelationName(rel) is not a foreign key or check constraint.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.84 16688

---

### could not change directory to "@1@": @2@

[Description]

could not change directory to path: strerror(errno). could not change directory to orig\_wd:strerror(errno).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.85 16689

---

### could not close directory "@1@": @2@

[Description]

could not close directory ctx->directory and the corresponding error will be printed.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.86 16690

---

### could not close log file @1@: @2@

[Description]

could not close log file XLogFileNameP(ThisTimeLineID, openLogSegNo) and the reason failure also printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.87 16691

---

### could not close log segment @1@: @2@

[Description]

could not close log segment XLogFileNameP(recvFileTLI, recvSegNo) and the reason for failure also printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.88 16692

---

### could not close pipe to external command: @1@

[Description]

could not close pipe to external command and the reason for failure also printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.89 16693

---

### could not close pipe to external command: @1@

[Description]

could not close pipe to external command: strerror(errno).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.90 16694

---

### could not complete SSL handshake on renegotiation, too many failures

[Description]

could not complete SSL handshake on renegotiation, too many failures. A handshake can fail, so be prepared to retry it, but only a few times and in this case we considered maximum limit is 20 times.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.63.91 16695

---

### could not create any Unix-domain sockets

[Description]

could not create any Unix-domain sockets.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.92 16696

---

### could not create communication channels: @1@

[Description]

could not create communication channels: strerror(errno).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.93 16697

---

### could not create shared memory segment "@1@": @2@

[Description]

could not create shared memory segment name and reason for failure also printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.94 16698

---

### could not create Unix-domain socket in directory "@1@"

[Description]

could not create Unix-domain socket in one of the Unix\_socket\_directories.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.63.95 16699

---

### could not determine data type for argument @1@

[Description]

could not determine data type for argument 1. since json\_object\_agg() is declared as taking type "any", the parser will not do any type conversion on unknown-type literals (that is, undecorated strings or NULLs). Such values will arrive here as type UNKNOWN, which fortunately does not matter to us, since unknownout() works fine.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64 Message Numbers Beginning with 16700

---

### 2.64.1 16700

---

**could not determine encoding for codeset "@1@"**

[Description]

could not determine encoding for codeset cp followed by the provided unsigned integer.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.64.2 16701

---

**could not duplicate handle for "@1@": @2@**

[Description]

could not duplicate handle for handle name and the reason for failure also printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.64.3 16702

---

**could not execute command "@1@": @2@**

[Description]

could not execute command filename and reason for failure also printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.4 16703

---

### could not execute command "@1@": @2@

#### [Description]

could not execute command options->file and the strerror(errno).

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.5 16704

---

### could not fdatsync log file @1@: @2@

#### [Description]

could not fdatsync log file XLogFileNameP(ThisTimeLineID, segno) and the reason for failure also printed along with error.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.6 16705

---

### could not fork worker process: @1@

#### [Description]

could not fork worker process. The reason for failure also printed along with error.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.7 16706

---

### could not fsync log file @1@: @2@

#### [Description]

could not fsync log file XLogFileNameP(ThisTimeLineID, segno) and reason for failure also printed along with error.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.8 16707

---

### could not fsync log segment @1@: @2@

#### [Description]

could not fsync log segment XLogFileNameP(ThisTimeLineID, openLogSegNo) and reason for failure also printed along with error. XLogFileNameP(ThisTimeLineID, openLogSegNo) currently open log segment (if any). Also, if the open flag is changing, close the log file so it will be reopened (with new flag bit) at next use.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.9 16708

---

### could not fsync write-through log file @1@: @2@

#### [Description]

could not fsync write-through log file XLogFileNameP(ThisTimeLineID, segno) and the reason for failure also printed along with error.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.10 16709

---

### could not get current working directory: @1@

#### [Description]

could not get current working directory: strerror(errno).

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.11 16710

---

### could not get home directory for user ID @1@: @2@

#### [Description]

could not get home directory for user ID user\_id and strerror(errno) if errno set otherwise print \_("user does not exist").

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.12 16711

---

### could not get junction for "@1@": @2@

#### [Description]

could not get junction for path :msg.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.13 16712

---

### could not get relation name for OID @1@: @2@

#### [Description]

could not get relation name for OID te->catalogId.oid, PQerrorMessage(AH->connection).

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.14 16713

---

### could not get shared memory segment: @1@

#### [Description]

could not get shared memory segment and reason for failure also printed along with error.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.15 16714

---

### Could not identify system: got @1@ rows and @2@ fields, expected @3@ rows and @4@ or more fields

#### [Description]

Could not identify system: got res->ntups rows and res->numAttributes fields, expected 3 rows and 1 or more fields.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.16 16715

---

### could not import a module for Decimal constructor

#### [Description]

could not import a module for Decimal constructor. Try to import cdecimal. If it doesn't exist, fall back to decimal.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.17 16716

---

### could not initialize LDAP: @1@

#### [Description]

could not initialize LDAP and reason for failure also printed along with error.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.18 16717

---

### could not link file "@1@" to "@2@" (initialization of log file): @3@

#### [Description]

could not link file tmp path to path (initialization of log file) and reason for failure also printed along with error.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.19 16719

---

### could not look up local user ID @1@: @2@

#### [Description]

could not look up local user ID geteuid() and error string for the corresponding errno will be printed or if it is unknown error it will print "Unknown error".

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.20 16720

---

### could not look up local user ID @1@: @2@

#### [Description]

could not look up local user ID (long)uid and if errno is set error string for the corresponding errno will be printed otherwise "user does not exist" will be printed.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.21 16721

---

### could not map anonymous shared memory: @1@

#### [Description]

could not map anonymous shared memory and the reason for failure will be printed along with error. If errno is ENOMEM means This error usually means that PostgreSQL's request for a shared memory segment exceeded available memory, swap space, or huge pages. To reduce the request size (currently size bytes), reduce PostgreSQL's shared memory usage, perhaps by reducing shared\_buffers or max\_connections.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.22 16722

---

### could not map shared memory segment "@1@": @2@

#### [Description]

could not map shared memory segment handle name and reason for failure also printed along with error.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.23 16723

---

### could not obtain lock on relation "@1@"

#### [Description]

could not obtain lock on relation relation name. Lock relation. This will also accept any pending invalidation messages. If we got back InvalidOid, indicating not found, then there's nothing to lock, but we accept invalidation messages anyway, to flush any negative catcache entries that may be lingering.

#### [System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.24 16724

---

### could not open backend variables file "@1@": @2@

[Description]

could not open backend variables file id and stterror(errno).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.25 16725

---

### could not open configuration directory "@1@": @2@

[Description]

could not open configuration directory absolute location of includedir and the reason for failure also be printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.26 16726

---

### could not open shared memory segment "@1@": @2@

[Description]

could not open shared memory segment dsm handle name and reason for failure also printed.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.27 16727

---

### could not open transaction log file "@1@": @2@

[Description]

could not open transaction log file path and reason for failure also prined along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.28 16728

---

### could not parse file name "@1@"

[Description]

could not parse file name path name. temporary filenames from SnapBuildSerialize() include the LSN and everything but are postfixed by \$.pid.tmp. We can just remove them the same as other files because there can be none that are currently being written that are older than cutoff. We just log a message if a file doesn't fit the pattern, it's probably some editors lock/state file or similar...

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.29 16729

---

### could not parse LDAP URL "@1@": @2@

[Description]

could not parse LDAP URL val and ldap\_err2string on the return value of ldap\_url\_parse.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.30 16730

---

### could not perform initial LDAP bind for ldapbinddn "@1@" on server "@2@": @3@

[Description]

could not perform initial LDAP bind for ldapbinddn port->hba->ldapbinddn on server port->hba->ldapservers and ldap\_err2string on the return value of ldap\_simple\_bind\_s. Bind with a pre-defined username/password (if available) for searching. If none is specified, this turns into an anonymous bind.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.31 16731

---

### could not read directory "@1@": @2@

[Description]

could not read directory path and strerror(errno).

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.64.32 16732

---

**could not read file "@1@", read @2@ of @3@: @4@**

#### [Description]

could not read file path, read readBytes of (int) SnapBuildOnDiskConstantSize) and the reason for failure also printed along with error. This error can occur during reading statically sized portion of snapshot or reading SnapBuild or during restore running xacts information or during restore committed xacts information.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.64.33 16733

---

**could not read file "@1@", read @2@ of @3@: @4@**

#### [Description]

could not read file , path read readBytes of (uint32) ReplicationSlotOnDiskConstantSize) and the reason for failure also printed along with the error.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.64.34 16734

---

**could not read from backend variables file "@1@": @2@**

#### [Description]

could not read from backend variables file id and strerror(errno).

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.64.35 16735

---

**could not read from file "@1@": read @2@ instead of @3@ bytes**

#### [Description]

could not read from file path: read readBytes instead of (int32) sizeof(LogicalRewriteMappingData) bytes.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.36 16736

---

**could not read from log segment @1@, offset @2@, length @3@: @4@**

[Description]

could not read from log segment XLogFileNameP(curFileTimeLine, sendSegNo), offset sendOff, length (unsigned long) segbytes) and the reason for failure also printed along with the error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.37 16737

---

**could not read from log segment @1@, offset @2@: @3@**

[Description]

could not read from log segment fname, offset readOff and reason for failure also printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.38 16738

---

**could not read from reorderbuffer spill file: @1@**

[Description]

could not read from reorderbuffer spill file and the reason for failure also be printed along with the error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.39 16739

---

**could not read from reorderbuffer spill file: read @1@ instead of @2@ bytes**

[Description]

could not read from reorderbuffer spill file: read readBytes instead of (uint32) sizeof(ReorderBufferDiskChange) bytes.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.40 16740

---

**could not read from tuplestore temporary file: @1@**

[Description]

could not read from tuplestore temporary file and reason for failure also printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.41 16741

---

**could not read time zone file "@1@": @2@**

[Description]

could not read time zone file filename and the reason for failure also be printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.42 16742

---

**could not receive timeline history file from "the primary server: @1@**

[Description]

could not receive timeline history file from "the primary server:PQerrorMessage(streamConn).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.43 16743

---

**could not remove directory "@1@"**

[Description]

could not remove directory tmppath.If removing the directory fails, the worst thing that will happen is that the user won't be able to create a new slot with the same name until the next server restart.we crashed while a slot was being setup or deleted, clean up.If we crashed with an ephemeral slot active, don't restore but delete it.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.44 16744

---

### could not remove shared memory segment "@1@": @2@

[Description]

could not remove shared memory segment name and reason for failure also printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.45 16745

---

### could not link file "@1@" to "@2@" (initialization of log file): @3@

[Description]

could not link file tmpopath to path (initialization of log file) and reason for failure also printed along with the error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.46 16746

---

### could not resize shared memory segment "@1@" to @2@ bytes: @3@

[Description]

could not resize shared memory segment name to request\_size bytes.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.47 16747

---

### Could not resolve client IP address to a host name: @1@

[Description]

Could not resolve client IP address to a host name gai\_strerror(port->remote\_hostname\_errcode).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.48 16748

---

### could not restore file "@1@" from archive: @2@

[Description]

could not restore file xlogfname from archive: Returns a human-readable string explaining the reason a child process terminated by taking the argument as rc.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.49 16749

---

### could not search LDAP for filter "@1@" on server "@2@" : @3@

[Description]

could not search LDAP for filter filter on server port->hba->ldapservers: ldap\_err2string(return value of ldap\_search\_s).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.50 16750

---

### could not seek in log file @1@ to offset @2@: @3@

[Description]

could not seek in log file XLogFileNameP(ThisTimeLineID, openLogSegNo) to offset startoffset and reason for failure also printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.51 16751

---

### could not seek in log segment @1@ to offset @2@: @3@

[Description]

could not seek in log segment fname to offset readOff: the reason for failure also printed along with the error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.52 16752

---

### could not seek in tuplestore temporary file: @1@

[Description]

could not seek in tuplestore temporary file and the reason for failure also printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.53 16753

---

### could not seek to beginning of file "@1@": @2@

[Description]

could not seek to beginning of file path and the reason for failure also printed along with error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.54 16754

---

### could not send end-of-streaming message to primary: @1@

[Description]

could not send end-of-streaming message to primary: PQerrorMessage(streamConn).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.55 16755

---

### could not set LDAP protocol version: @1@

[Description]

could not set LDAP protocol version: ldap\_err2string(return value of ldap\_set\_option).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.56 16756

---

**could not set socket to nonblocking mode: @1@**

[Description]

could not set socket to nonblocking mode: the reason for failure also printed along with the error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.57 16757

---

**could not set socket to nonblocking mode: @1@**

[Description]

could not set socket to nonblocking mode: SOCK\_STRERROR(SOCK\_ERRNO, sebuf, sizeof(sebuf)).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.58 16758

---

**could not set variable "@1@"**

[Description]

could not set variable varname.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.59 16759

---

**could not start LDAP TLS session: @1@**

[Description]

could not start LDAP TLS session: ldap\_err2string(return value of \_ldap\_start\_tls\_sA).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.60 16760

---

---

### could not stat control file "@1@": @2@

#### [Description]

could not stat control file XLOG\_CONTROL\_FILE and reason for failure also printed along with the error.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.64.61 16761

---

### could not stat file or directory "@1@": @2@

#### [Description]

could not stat file or directory path/TABLESPACE\_VERSION\_DIRECTORY :the reason for failure printed along with the error.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.64.62 16762

---

### could not stat file "@1@": @2@

#### [Description]

could not stat file options->file, strerror(errno).

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.64.63 16763

---

### could not stat shared memory segment "@1@": @2@

#### [Description]

could not stat shared memory segment name:the reason for failure also printed along with the error.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.64.64 16764

---

### could not stat trigger file "@1@": @2@

[Description]

Check to see whether the user-specified trigger file exists and whether a promote request has arrived. If either condition holds, return true.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.65 16765

---

### Could not translate client host name "@1@" to IP address: @2@

[Description]

could not translate the client host name to ip address.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.66 16766

---

### could not truncate file "@1@" to @2@: @3@

[Description]

Truncate all data that's not guaranteed to have been safely fsynced (by previous record or by the last checkpoint).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.67 16767

---

### could not unmap shared memory segment "@1@": @2@

[Description]

could not unmap shared memory segment name: the reason for failure also printed along with the error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.68 16768

---

### could not write to COPY program: @1@

[Description]

could not write to COPY program: the reason for failure is printed along with the error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.69 16769

---

### could not write to data file for XID @1@: @2@

[Description]

could not write to data file for XID txn->xid) and the reason for failure is also printed along with the error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.70 16770

---

### could not write to file "@1@", wrote @2@ of @3@: @4@

[Description]

could not write to file src->path, wrote written of len: the reason for failure also printed along with the error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.71 16771

---

### could not write to log file @1@ at offset @2@, length @3@: @4@

[Description]

could not write to log file XLogFileNameP(ThisTimeLineID, openLogSegNo) at offset openLogOff length nbytes: the reason for failure also printed along with the error.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.72 16772

---

### could not write to log segment @1@ at offset @2@, length @3@: @4@

[Description]

if write didn't set errno, assume no disk space

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.73 16773

---

### could not write to the communication channel: @1@

[Description]

- 1.This function is executed in the worker process.It sends a message to the master on the communication channel.
- 2.This function is executed in the master process.It sends a message to a certain worker on the communication channel.If we're already aborting anyway, don't care if we succeed or not.The child might have gone already.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.74 16774

---

### could not write to tuplestore temporary file: @1@

[Description]

could not write to tuplestore temporary file

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.75 16775

---

### database connection requirement not indicated during registration

[Description]

This flag means the bgworker requires a database connection. The connection is not established automatically; the worker must establish it later.It requires that BGWORKER\_SHMEM\_ACCESS was passed too.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.76 16776

---

---

**database is not accepting commands that generate new MultiXactIds to avoid wraparound data loss in database "@1@"****[Description]**

database is not accepting commands that generate new MultiXactIds to avoid wraparound data loss in database Execute a database-wide VACUUM in that database You might also need to commit or roll back old prepared transactions

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.64.77 16777**

---

**database is not accepting commands that generate new MultiXactIds to avoid wraparound data loss in database with OID****[Description]**

Execute a database-wide VACUUM in that database. You might also need to commit or roll back old prepared transactions.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.64.78 16778**

---

**database "@1@" is used by a logical replication slot****[Description]**

Check whether there are, possibly unconnected, logical slots that refer to the to-be-dropped database. The database lock we are holding prevents the creation of new slots using the database. `ReplicationSlotsCountDBSlots -- count the number of slots that refer to the passed database oid. Returns true if there are any slots referencing the database. *nslots will be set to the absolute number of slots in the database, *nactive to ones currently active.`

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.64.79 16779**

---

**date field value out of range: @1@-@2@-@3@****[Description]**

date field value out of range Note: we'll reject zero or negative year values. Perhaps negativesshould be allowed to represent BC years?

**[System Processing]**

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.80 16780

---

### **date out of range: @1@-@2@-@3@**

[Description]

date out of rangeNote: we'll reject zero or negative year values. Perhaps negativesshould be allowed to represent BC years?

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.81 16781

---

### **DECLARE CURSOR WITH HOLD ... @1@ is not supported**

[Description]

DECLARE CURSOR WITH HOLD is not supported .FOR UPDATE and WITH HOLD are not compatible

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.82 16782

---

### **DECLARE INSENSITIVE CURSOR ... @1@ is not supported**

[Description]

DECLARE INSENSITIVE CURSOR is not supportedFOR UPDATE and INSENSITIVE are not compatible

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.83 16783

---

### **DECLARE SCROLL CURSOR ... @1@ is not supported**

[Description]

DECLARE SCROLL CURSOR is not supportedFOR UPDATE and SCROLL are not compatible

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.84 16784

---

### **ECDH: could not create key**

[Description]

ECDH: could not create key

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.85 16785

---

### **ECDH: unrecognized curve name: @1@**

[Description]

ECDH: unrecognized curve name

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.86 16786

---

### **enum label "@1@" already exists**

[Description]

Check if label is already in use. The unique index on pg\_enum would catch this anyway, but we prefer a friendlier error message, and besides we need a check to support IF NOT EXISTS.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.87 16788

---

### **error processing a parallel work item**

[Description]

error processing a parallel work itemIt looks for an idle worker process and only returns if there is one.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.88 16789

---

### error reading result of streaming command: @1@

[Description]

error reading result of streaming command

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.89 16790

---

### event trigger functions cannot have declared arguments

[Description]

event trigger functions cannot have declared arguments shouldn't be any declared arguments

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.90 16791

---

### event trigger name cannot be qualified

[Description]

event trigger name cannot be qualified The types of names handled by this function are not permitted to be schema-qualified or catalog-qualified.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.91 16792

---

### event trigger "@1@" already exists

[Description]

An event trigger of same name is already exist

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.92 16793

---

### event triggers are not supported for @1@

[Description]

Validate DDL command tags.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.93 16794

---

### event trigger "@1@" does not exist

[Description]

event trigger does not exist.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.94 16795

---

### event trigger "@1@" does not exist, skipping

[Description]

Generate a NOTICE stating that the named object was not found, and is being skipped. This is only relevant when "IF EXISTS" is used; otherwise, `get_object_address()` in `RemoveObjects` would have thrown an ERROR.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.64.95 16796

---

### event trigger with OID @1@ does not exist

[Description]

event trigger with OID does not exist

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.64.96 16797

---

**exceeded maxAllocatedDescs (@1@) while trying to execute command "@2@\**

[Description]

exceeded maxAllocatedDescs while trying to execute command

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.64.97 16798

---

**Expected 1 tuple with 2 fields, got @1@ tuples with @2@ fields.**

[Description]

Expected 1 tuple with 2 fields

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.64.98 16799

---

**Expected array element or "]", but found "@1@\**

[Description]

The context of the parser is maintained by the recursive descent mechanism, but is passed explicitly to the error reporting routine for better diagnostics.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65 Message Numbers Beginning with 16800

---

---

### 2.65.1 16800

---

**Expected a transaction log switchpoint location.**

[Description]

Expected a transaction log switchpoint location.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.2 16801

---

### Expected ":", but found "@1@"

[Description]

invalid input syntax for type json The context of the parser is maintained by the recursive descent mechanism, but is passed explicitly to the error reporting routine for better diagnostics.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.3 16802

---

### extended query protocol not supported in a replication connection

[Description]

'firstchar' specifies what kind of a forbidden message was received, and is used to construct the error message.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.4 16803

---

### fastpath function calls not supported in a replication connection

[Description]

'firstchar' specifies what kind of a forbidden message was received, and is used to construct the error message.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.5 16804

---

### field name must not be null

[Description]

If function is not marked "proisstrict" in pg\_proc, it must check for null arguments using this macro. Do not try to GETARG a null argument!

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.6 16805

---

### **FILTER is not implemented for non-aggregate window functions**

[Description]

FILTER is not yet supported with true window functions

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.7 16806

---

### **filters not supported in LDAP URLs.**

[Description]

filters not supported in LDAP URLs.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.8 16807

---

### **FILTER specified, but @1@ is not an aggregate function**

[Description]

FILTER specified, but the function is not an aggregate function

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.9 16808

---

### **filter value "@1@" not recognized for filter variable "@2@"**

[Description]

Validate DDL command tags

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.10 16809

---

### filter variable "@1@" specified more than once

[Description]

Complain about a duplicate filter variable.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.11 16810

---

### final function with extra arguments must not be declared STRICT

[Description]

When finalfnExtraArgs is specified, the finalfn will certainly be passed at least one null argument, so complain if it's strict.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.12 16811

---

### first argument of @1@ must be a row type

[Description]

Convenience function to determine whether a type OID represents a "rowtype" type --- either RECORD or a named composite type.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.13 16812

---

### FORCE NULL column "@1@" not referenced by COPY

[Description]

Convert FORCE NULL name list to per-column flags, check validity

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.14 16813

---

### foreign key referenced-columns list must not contain duplicates

[Description]

Reject duplicate appearances of columns in the referenced-columns list. Such a case is forbidden by the SQL standard, and even if we thought it useful to allow it, there would be ambiguity about how to match the list to unique indexes (in particular, it'd be unclear which index goes with which FK column).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.15 16814

---

### Foreign tables cannot have constraint triggers.

[Description]

Foreign key table does not contain constraint triggers

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.16 16815

---

### Foreign tables cannot have INSTEAD OF triggers.

[Description]

Foreign tables cannot have INSTEAD OF triggers.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.17 16816

---

### Foreign tables cannot have TRUNCATE triggers.

[Description]

Foreign tables cannot have TRUNCATE triggers.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.18 16817

---

### foreign table "@1@" does not allow deletes

[Description]

foreign table does not allow deletes

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.19 16818

---

### foreign table "@1@" does not allow inserts

[Description]

foreign table does not allow inserts

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.20 16819

---

### foreign table "@1@" does not allow updates

[Description]

foreign table \"%s\" does not allow updates

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.21 16820

---

### foreign table "@1@" does not exist, skipping

[Description]

the foreign table is not existing.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.22 16821

---

### format specifies argument 0, but arguments are numbered from 1

#### [Description]

Explicit 0 for argument index is immediately refused

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.23 16822

---

### function returning record called in context that cannot accept type record

#### [Description]

- 1.failed to determine actual type of RECORDfunction returning record called in context that cannot accept type record
- 2.get the tupdesc from the result set info - it must be a record typebecause we already checked that arg1 is a record type, or we're in ato\_record function which returns a setof record.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.24 16823

---

### function @1@ must accept VARIADIC ANY to be used in this aggregate

#### [Description]

If the agg is declared to take VARIADIC ANY, the underlying functions had better be declared that way too, else they may receive too many parameters; but func\_get\_detail would have been happy with plain ANY.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.25 16824

---

### function "@1@" must return type "event\_trigger"

#### [Description]

Find and validate the trigger function.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.26 16825

---

### hot standby is not possible because wal\_level was not set to "hot\_standby" or higher on the master server

#### [Description]

For Hot Standby, the WAL must be generated with 'hot\_standby' mode, and we must have at least as many backend slots as the primary.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.27 16826

---

### huge pages not supported on this platform

#### [Description]

huge pages not supported on this platform if the value is 1

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.28 16827

---

### huge TLB pages not supported on this platform

#### [Description]

huge pages not supported on this platform if the value is 1

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.29 16829

---

### index row size @1@ exceeds hash maximum @2@

#### [Description]

Check whether the item can fit on a hash page at all. (Eventually, we ought to try to apply TOAST methods if not.) Note that at this point, itemsz doesn't include the ItemId.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.30 16830

---

### index row size @1@ exceeds maximum @2@ for index "@3@"

#### [Description]

If the tuple would be too big to be stored, function throws a suitable error if errorTooBig is TRUE, or returns NULL if errorTooBig is FALSE.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.31 16831

---

### index "@1@" cannot be used as replica identity because column "@2@" is nullable

#### [Description]

Check index for nullable columns.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.32 16832

---

### index "@1@" contains a half-dead internal page

#### [Description]

Pre-9.4 page deletion only marked internal pages as half-dead, but now we only use that flag on leaf pages.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.33 16833

---

### interval time zone "@1@" must not include months or days

#### [Description]

##### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.34 16834

---

### interval units "@1@" not supported because months usually have fractional weeks

[Description]

default condition of the switch statement with condition val

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.35 16835

---

### invalid backup block size in record at @1 @/@2 @

[Description]

Add in the backup blocks, if any

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.36 16836

---

### invalid contrecord length @1 @ at @2 @/@3 @

[Description]

Cross-check that xlp\_rem\_len agrees with how much of the record we expect there to be left.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.37 16837

---

### invalid flags for opening a large object: @1 @

[Description]

Large object descriptor, appropriately filled in. The descriptor and subsidiary data are allocated in the specified memory context, which must be suitably long-lived for the caller's purposes.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.38 16838

---

### invalid info bits @1 @ in log segment @2 @, offset @3 @

[Description]

All defined flag bits in xlp\_info (used for validity checking of header)

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.39 16839

---

### invalid input syntax for numeric time zone: "@1@"

[Description]

Note pg\_tzset happily parses numeric input that DecodeTimezone would reject. To avoid having it accept input that would otherwise be seen as invalid, it's enough to disallow having a digit in the first position of our input string.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.40 16840

---

### invalid input syntax for type json

[Description]

Per RFC4627, these characters MUST be escaped. Since \*s isn't printable, exclude it from the context string.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.41 16841

---

### invalid input syntax for type pg\_lsn: "@1@"

[Description]

Sanity check input format.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.42 16842

---

### invalid large object write request size: @1@

[Description]

the addition in the condition can't overflow because nbytes is only int32

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.43 16843

---

### invalid line number: @1@

[Description]

validating the line number.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.44 16844

---

### invalid line specification: A and B cannot both be zero

[Description]

invalid line specification: A and B cannot both be zero

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.45 16845

---

### invalid line specification: must be two distinct points

[Description]

invalid line specification: must be two distinct points

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.46 16846

---

### invalid locale name: "@1@"

[Description]

Check that the chosen locales are valid, and get canonical spellings

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.47 16847

---

**invalid magic number @1@ in log segment @2@, offset @3@**

[Description]

invalid magic number in log segment.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.48 16848

---

**invalid message received from worker: @1@**

[Description]

Invalid message received from worker.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.49 16849

---

**invalid MultiXactId: @1@**

[Description]

No work except at first MultiXactId of a page. But beware: just after wraparound, the first MultiXactId of page zero is FirstMultiXactId.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.50 16850

---

**invalid page in block @1@ of relation @2@**

[Description]

verifying the page in block of relations

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.51 16851

---

### invalid page in block @1@ of relation @2@; zeroing out page

[Description]

invalid page in block of relation, zeroing out page

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.52 16852

---

### invalid processing mode in background worker

[Description]

it had better not gotten out of "init" mode yet

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.53 16853

---

### invalid scale in external "numeric" value

[Description]

invalid scale in external

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.54 16854

---

### invalid timeline @1@

[Description]

invalid timeline

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.55 16855

---

### invalid value for "buffering" option

[Description]

Validator for "buffering" relopion on GiST indexes. Allows "on", "off"and "auto" values.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.56 16856

---

### invalid value for "check\_option" option

[Description]

Validator for "check\_option" relopion on views. The allowed values are "local" and "cascaded".

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.57 16857

---

### invalid value for parameter "replication"

[Description]

Try to interpret value as boolean value. Valid values are: true,false, yes, no, on, off, 1, 0; as well as unique prefixes thereof.If the string parses okay, return true, else false. If okay and result is not NULL, return the value in \*result.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.58 16858

---

### invalid value for recovery parameter "recovery\_target"

[Description]

the recovery parameter name should be "recovery\_target" and the recovery parameter value should be "immediate" .

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.59 16859

---

**invalid value "@1@" for "@2@"**

[Description]

1. checking if the parsed character is greater than 0 and that parsed character is less than required.
2. check if the source is equal to init
3. if the length is not valid

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.60 16860

---

**invalid whence setting: @1@**

[Description]

Note: overflow in the additions is possible, but since we will reject negative results, we don't need any extra test for that.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.61 16861

---

**JSON does not support infinite date values.**

[Description]

XSD doesn't support infinite values. Infinity and minus infinity must be the max and min values of DateADT. We could use INT\_MIN and INT\_MAX here, but seems better to not assume that int32 == int.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.62 16862

---

**JSON does not support infinite timestamp values**

[Description]

XSD doesn't support infinite values

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.63 16863

---

### Junk after closing right brace

[Description]

only whitespace is allowed after the closing brace. We used to use `isspace()` for parsing array values, but that has undesirable results: an array value might be silently interpreted differently depending on the locale setting. Now we just hard-wire the traditional ASCII definition of `isspace()`.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.64 16864

---

### Junk view columns are not updatable

[Description]

the only updatable columns we support are those that are Vars referring to user columns of the underlying base relation. The view targetlist may contain resjunk columns (e.g., a view defined like "SELECT \* FROM t ORDER BY a +b" is auto-updatable) but such columns are not auto-updatable, and in fact should never appear in the outer query's targetlist.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.65 16865

---

### large object read request is too large

[Description]

A `result_length` calculated from `loSize` may not fit in a `size_t`. Check that the size will satisfy this and subsequently-enforced size limits.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.66 16866

---

### LIKE is not supported for creating foreign tables

[Description]

we could support LIKE in many cases, but worry about it another day

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65.67 16867

---

### lock file "@1@" is empty

[Description]

Either another server is starting, or the lock file is the remnant of a previous server startup crash.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65.68 16868

---

### logical decoding cannot be used while in recovery

[Description]

We check shared state each time only until we leave recovery mode. We can't re-enter recovery, so there's no need to keep checking after the shared variable has once been seen false. Note: We don't need a memory barrier when we're still in recovery. We might exit recovery immediately after return, so the caller can't rely on 'true' meaning that we're still in recovery anyway.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65.69 16869

---

### logical decoding requires a database connection

[Description]

Make sure the current settings & environment are capable of doing logical decoding.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65.70 16870

---

### logical decoding requires wal\_level >= logical

[Description]

Make sure the current settings & environment are capable of doing logical decoding.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.71 16871

---

### [io\\_lseek result out of range for large-object descriptor @1@](#)

[Description]

guard against result overflow

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.72 16872

---

### [io\\_tell result out of range for large-object descriptor @1@](#)

[Description]

guard against result overflow

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.73 16873

---

### [malformed range literal: "@1@"](#)

[Description]

first check for the empty range and then the rest should be whitespace. and then check if the string is not null terminated

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.74 16874

---

### [materialized views may not be defined using bound parameters](#)

[Description]

A materialized view would either need to save parameters for use in maintaining/loading the data or prohibit them entirely. The latter seems safer and more sane.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.75 16875

---

### materialized views must not use data-modifying statements in WITH

[Description]

Prohibit a data-modifying CTE in the query used to create a materialized view. It's not sufficiently clear what the user would want to happen if the MV is refreshed or incrementally maintained.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.76 16876

---

### materialized views must not use temporary tables or views

[Description]

Check whether any temporary database objects are used in the creation query. It would be hard to refresh data or incrementally maintain it if a source disappeared.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.77 16877

---

### mismatched array dimensions

[Description]

take separate key and value arrays of text to construct a json object pairwise.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.78 16878

---

### Missing array dimension value

[Description]

Missing array dimension value

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.79 16879

---

### more than one row returned for \gset

[Description]

StoreQueryTuple: assuming query result is OK, save data into variables

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.80 16880

---

### moving-aggregate implementation returns type @1@, but plain implementation returns type @2@

[Description]

check if the moving-aggregate implementation returns type is not same as that of plain implementation returns type

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.81 16881

---

### moving-aggregate transition function must not return null

[Description]

Moving-aggregate transition functions must not return null, for more see `advance_windowaggregate_base()`.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.82 16882

---

### Multidimensional arrays must have sub-arrays with matching dimensions

[Description]

Multidimensional arrays must have sub-arrays with matching dimensionsArrayCount will Determines the dimensions for an array string.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65.83 16883

---

### multiple column definition lists are not allowed for the same function

[Description]

check if the codelist and the range functions codelist ie., the multiple column definition list for the same function

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65.84 16884

---

### MultiXactId @1@ does no longer exist -- apparent wraparound

[Description]

MultiXactId does no longer exist -- apparent wraparound

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65.85 16885

---

### MultiXactId @1@ has not been created yet -- apparent wraparound

[Description]

MultiXactId has not been created yet -- apparent wraparound

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65.86 16886

---

### must be owner of event trigger @1@

[Description]

the MAX\_ACL\_KIND object types that can have privilege errors

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65.87 16887

---

### must be superuser or replication role to start walsender

[Description]

Check replication permissions needed for walsender processes.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65.88 16888

---

### must be superuser or replication role to use replication slots

[Description]

must be superuser or replication role to use replication slots

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65.89 16889

---

### must be superuser to alter settings globally

[Description]

Must be superuser to alter settings globally.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.65.90 16890

---

### must be superuser to COPY to or from an external program

[Description]

Disallow COPY to/from file or program except to superusers.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.91 16891

---

### Must be superuser to create an event trigger

[Description]

It would be nice to allow database owners or even regular users to do this, but there are obvious privilege escalation risks which would have to somehow be plugged first.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.92 16892

---

### must be superuser to execute ALTER SYSTEM command

[Description]

must be superuser to execute ALTER SYSTEM command

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.93 16894

---

### new data for "@1@" contains duplicate rows without any null columns

[Description]

Note that this ereport() is returning data to the user. Generally, we would want to make sure that the user has been granted access to this data. However, REFRESH MAT VIEW is only able to be run by the owner of the mat view (or a superuser) and therefore there is no need to check for access to data in the mat view.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.94 16895

---

### new row violates WITH CHECK OPTION for view "@1@"

[Description]

WITH CHECK OPTION checks are intended to ensure that the new tuple is visible in the view. If the view's qual evaluates to NULL, then the new tuple won't be included in the view. Therefore we need to tell ExecQual to return FALSE for NULL (the opposite of what we do above for CHECK constraints).

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.95 16896

---

### no Decimal attribute in module

[Description]

the module is not contain any Decimal attribute.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.96 16897

---

### no matching relations in tablespace "@1@" found

[Description]

there is no matching relations in tablespace.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.97 16898

---

### no rows returned for \gset

[Description]

StoreQueryTuple: assuming query result is OK, save data into variables Returns true if successful, false otherwise.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.65.98 16899

---

### not enough arguments for cursor "@1@"

[Description]

check the syntax immediately, instead of checking the final expression that may have the arguments reordered. Trailing whitespace must not be trimmed, because otherwise input of the form (param -- comment\n, param) would be translated into a form where the second parameter is commented out.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66 Message Numbers Beginning with 16900

---

### 2.66.1 16900

---

#### not enough shared memory for data structure "@1@" (@2@ bytes requested)

[Description]

If the shmem index doesn't exist, we are bootstrapping: we must be trying to init the shmem index itself. Notice that the ShmemIndexLock is released before the shmem index has been initialized. This should be OK because no other process can be accessing shared memory yet.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.66.2 16901

---

#### not enough shared memory for elements of data structure "@1@" (@2@ bytes requested)

[Description]

not enough shared memory for elements of data structure

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.66.3 16902

---

#### null value not allowed for object key

[Description]

null value not allowed for object key

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.4 16903

---

### number is out of range

#### [Description]

check if the number is coming out of range ie.,in between 0 and 9.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.5 16904

---

### number of jsonb array elements exceeds the maximum allowed (@1@)

#### [Description]

number of jsonb array elements exceeds the maximum allowed

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.6 16905

---

### number of jsonb object pairs exceeds the maximum allowed (@1@)

#### [Description]

number of jsonb object pairs exceeds the maximum allowed

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.7 16906

---

### number of parameters must be between 0 and 65535

#### [Description]

number of parameters must be between 0 and 65535

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.8 16907

---

---

### **Numeric time zones must have "-" or "+" as first character.**

#### [Description]

The starting character of the numeric time zone should not digit.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.66.9 16908**

---

### **numeric time zone "@1@" out of range**

#### [Description]

DecodeTimezone()-Interpret string as a numeric timezone. Return 0 if okay (and set \*tzip), a DTERR code if not okay.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.66.10 16909**

---

### **Object keys should be text**

#### [Description]

If function is not marked "proisstrict" in pg\_proc, it must check for null arguments using this macro. Do not try to GETARG a null argument!

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.66.11 16910**

---

### **only ordered-set aggregates can be hypothetical**

#### [Description]

Symbolic values for aggkind column. We distinguish normal aggregates from ordered-set aggregates (which have two sets of arguments, namely direct and aggregated arguments) and from hypothetical-set aggregates (which are a subclass of ordered-set aggregates in which the last direct arguments have to match up in number and datatypes with the aggregated arguments).

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.12 16911

---

### only tables, indexes, and materialized views exist in tablespaces

[Description]

only tables, indexes, and materialized views exist in tablespaces

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.13 16912

---

### operator not allowed in variable definition

[Description]

operator not allowed in variable definition

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.14 16913

---

### option --if-exists requires option -c/--clean

[Description]

option --if-exists requires option -c/--clean

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.15 16914

---

### outer-level aggregate cannot contain a lower-level variable in its direct arguments

[Description]

Now check for vars/aggs in the direct arguments, and throw error if needed. Note that we allow a Var of the agg's semantic level, but not an Agg of that level. In principle such Aggs could probably be supported, but it would create an ordering dependency among the aggregates at execution time. Since the case appears neither to be required by spec nor particularly useful, we just treat it as a nested-aggregate situation.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.16 16915

---

### out-of-sequence timeline ID @1@ (after @2@) in log segment @3@, offset @4@

#### [Description]

Since child timelines are always assigned a TLI greater than their immediate parent's TLI, we should never see TLI go backwards across successive pages of a consistent WAL sequence.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.17 16916

---

### OVER is not supported for ordered-set aggregate @1@

#### [Description]

window functions must be called with a window definition.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.18 16917

---

### page verification failed, calculated checksum @1@ but expected @2@

#### [Description]

Throw a WARNING if the checksum fails, but only after we've checked for the all-zeroes case.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.19 16918

---

### parallel backup only supported by the directory format

#### [Description]

Parallel backup only in the directory archive format so far

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.20 16919

---

### parameter "@1@" requires a temporal value

#### [Description]

parameter recovery\_min\_apply\_delay requires a temporal value

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.21 16920

---

### percentile value @1@ is not between 0 and 1

#### [Description]

percentile value should be in between 0 and 1.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.22 16921

---

### permission denied for event trigger @1@

#### [Description]

the no\_priv\_msg array object is ACL\_KIND\_EVENT\_TRIGGER

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.23 16922

---

### permission denied to change owner of event trigger "@1@"

#### [Description]

New owner must be a superuser

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.24 16923

---

---

### permission denied to create event trigger "@1@"

#### [Description]

It would be nice to allow database owners or even regular users to do this, but there are obvious privilege escalation risks which would have to somehow be plugged first.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.66.25 16924

---

### pg\_largeobject entry for OID @1@, page @2@ has invalid data field size @3@

#### [Description]

the size of the data field of pg\_largeobject entry is less than 0 or greater than LOBLKSIZE.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.66.26 16926

---

### range constructor flags argument must not be null

#### [Description]

range constructor flags argument must not be null

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.66.27 16927

---

### relation "@1@" in @2@ clause not found in FROM clause

#### [Description]

the list cell is NULL for ensuring the SQL row locking clause such as FOR UPDATE is not found in FROM clause

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.66.28 16928

---

### removing elements from multidimensional arrays is not supported

[Description]

We can't remove elements from multi-dimensional arrays, since the result might not be rectangular.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.29 16929

---

### renaming an ON SELECT rule is not allowed

[Description]

We disallow renaming ON SELECT rules, because they should always be named "\_RETURN".

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.30 16930

---

### replication slot file @1@: checksum mismatch, is @2@, should be @3@

[Description]

verify the CRCs.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.31 16931

---

### replication slot file "@1@" has corrupted length @2@

[Description]

boundary check on length

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.32 16932

---

### replication slot file "@1@" has unsupported version

[Description]

verify version

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.33 16933

---

### replication slot file "@1@" has wrong magic @2@ instead of @3@

[Description]

verify magic

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.34 16934

---

### replication slot name "@1@" contains invalid character

[Description]

Replication slot names may only contain letters, numbers, and the underscore character

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.35 16935

---

### replication slot name "@1@" is too long

[Description]

Maximum length for identifiers (e.g. table names, column names, function names). Names actually are limited to one less byte than this, because the length must include a trailing zero byte.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.36 16936

---

### replication slot name "@1@" is too short

[Description]

Check whether the passed slot name is valid and report errors at elevel.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.37 16937

---

**Replication slot names may only contain letters, numbers, and the underscore character.**

[Description]

Replication slot names may only contain letters, numbers, and the underscore character.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.38 16938

---

**replication slot "@1@" already exists**

[Description]

Check for name collision, and identify an allocatable slot. We need to hold ReplicationSlotControlLock in shared mode for this, so that nobody else can change the in\_use flags while we're looking at them.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.39 16939

---

**replication slots can only be used if max\_replication\_slots > 0.**

[Description]

replication slots can only be used if max\_replication\_slots > 0

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.40 16940

---

**replication slots can only be used if wal\_level >= archive**

[Description]

replication slots can only be used if wal\_level >= archive

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.41 16941

---

### replication slot "@1@" does not exist

[Description]

replication slot does not exist

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.42 16942

---

### replication slot "@1@" is already active

[Description]

replication slot is already active

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.43 16943

---

### replication slot "@1@" was not created in this database

[Description]

replication slot was not created in this database

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.44 16944

---

### requested character not valid for encoding: @1@

[Description]

requested character not valid for encoding

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.45 16945

---

**requested starting point @1 @/@2@ is ahead of the WAL flush position of this server @3 @/@4@**

[Description]

requested starting point is ahead of the WAL flush position of this server

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.46 16946

---

**requested starting point @1 @/@2@ on timeline @3@ is not in this server's history**

[Description]

requested starting point on timeline is not in this server's history

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.47 16947

---

**requested timeline @1 @ does not contain minimum recovery point @2 @/@3@ on timeline @4@**

[Description]

requested timeline does not contain minimum recovery point on timeline

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.48 16948

---

**requested timeline @1 @ is not a child of this server's history**

[Description]

requested timeline is not a child of this server's history

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.49 16949

---

**requested timeline @1@ is not in this server's history**

[Description]

requested timeline is not in this server's history

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.50 16950

---

**RETURNING list entry has type @1@, but column has type @2@.**

[Description]

RETURNING list entry and column are of different types.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.51 16951

---

**RETURNING must have at least one column**

[Description]

RETURNING must have at least one column.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.52 16952

---

**return type of inverse transition function @1@ is not @2@**

[Description]

return type of inverse transition function must exactly match declared mtranstype

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.53 16953

---

### row is too big: size @1 @, maximum size @2 @

[Description]

row is too big.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.54 16954

---

### ROWS FROM() with multiple functions cannot have a column definition list

[Description]

ROWS FROM() with multiple functions cannot have a column definition list

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.55 16955

---

### rules on materialized views are not supported

[Description]

rules on materialized views are not supported

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.56 16956

---

### @1 @ cannot be applied to a function

[Description]

cannot be applied to a function

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.57 16957

---

---

### @1@ cannot be applied to a join

[Description]

cannot be applied to a join

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.66.58 16958

---

### @1@ cannot be applied to a WITH query

[Description]

cannot be applied to a WITH query

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.66.59 16959

---

### @1@ cannot be applied to the nullable side of an outer join

[Description]

cannot be applied to the nullable side of an outer join

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.66.60 16960

---

### @1@ cannot be applied to VALUES

[Description]

cannot be applied to VALUES

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.66.61 16961

---

### @1@: cannot cluster specific table(s) in all databases

[Description]

cannot cluster specific table(s) in all databases

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.66.62 16962

---

**@1@: cannot reindex specific index(es) and system catalogs at the same time**

[Description]

cannot reindex specific index(es) and system catalogs at the same time

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.66.63 16963

---

**@1@: cannot reindex specific index(es) in all databases**

[Description]

cannot reindex specific index(es) in all databases

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.66.64 16964

---

**@1@: cannot reindex specific table(s) and system catalogs at the same time**

[Description]

cannot reindex specific table(s) and system catalogs at the same time

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.66.65 16965

---

**@1@: cannot reindex specific table(s) in all databases**

[Description]

cannot reindex specific table(s) in all databases

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.66 16966

---

**@1@: cannot use --create-slot or --drop-slot together with --startpos**

[Description]

cannot use create-slot or drop-slot together with startpos

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.67 16967

---

**@1@: cannot use --create-slot or --start together with --drop-slot**

[Description]

cannot use create-slot or start-slot together while doing a drop-slot

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.68 16968

---

**@1@: cannot vacuum specific table(s) in all databases**

[Description]

cannot vacuum specific table(s) in all databases

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.69 16969

---

**@1@ can only be called in a sql\_drop event trigger function**

[Description]

can only be called in a sql\_drop event trigger function

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.70 16970

---

**@1@: could not access directory "@2@": @3@**

[Description]

Trouble in accessing directory

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.71 16971

---

**@1@: could not allocate SIDs: error code @2@**

[Description]

could not allocate security identifier(SID) and displays the last error returned by GetLastError().(GetLastError() is a windows specific call which returns one of the 500 System Error Codes)

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.72 16972

---

**@1@: could not change permissions of directory "@2@": @3@**

[Description]

could not change permissions of directory

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.73 16973

---

**@1@: could not change permissions of "@2@": @3@**

[Description]

Here chmod takes the PGPATH as path and options as S\_IRUSR | S\_IWUSR

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.74 16974

---

**@1@: could not close directory "@2@": @3@**

[Description]

closedir syscall called and errno set accordingly

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.75 16975

---

**@1@: could not create archive status file "@2@": @3@**

[Description]

This open syscall takes a temporary path name and flags O\_WRONLY | O\_CREAT | PG\_BINARY and mode as S\_IRUSR | S\_IWUSR

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.76 16976

---

**@1@: could not create replication slot "@2@": got @3@ rows and @4@ fields, expected @5@ rows and @6@ fields**

[Description]

could not create replication slot as rows is not equal to 1 and fields is not greater than or equal to 4

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.77 16977

---

**@1@: could not create symbolic link "@2@": @3@**

[Description]

while creating symbolic path for a Xlog directory or tablespace path

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.78 16978

---

**@1@: could not create timeline history file "@2@": @3@**

[Description]

This open syscall takes a temporary path name and flags O\_WRONLY | O\_CREAT | PG\_BINARY and mode as S\_IRUSR | S\_IWUSR

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.79 16979

---

**@1@: could not drop replication slot "@2@": got @3@ rows and @4@ fields, expected @5@ rows and @6@ fields**

[Description]

could not drop replication slot as rows and fields are not equal to zero

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.80 16980

---

**@1@: could not fetch default options**

[Description]

The function Pqconndefaults() Constructs a default connection options array, which identifies all the available options and shows any default values that are available from the environment etc. On error (eg out of memory), NULL is returned.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.81 16981

---

**@1@: could not find own program executable**

[Description]

find\_my\_exec() finds an absolute path to a valid executable

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.82 16982

---

**@1@: could not fsync file "@2@": @3@**

[Description]

could not fsync file

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.83 16983

---

**@1@: could not fsync log file "@2@": @3@**

[Description]

could not fsync Log file.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.84 16984

---

**@1@: could not identify system: got @2@ rows and @3@ fields, expected @4@ rows and @5@ or more fields**

[Description]

Could not identify system as expected number of rows is not equal to 1 and number of fields is not greater than or equal to 3

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.85 16985

---

**@1@: could not locate my own executable path**

[Description]

find\_my\_exec() finds an absolute path to a valid executable

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.86 16986

---

**@1@: could not open directory "@2@": @3@**

[Description]

could not open directory

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.87 16987

---

**@1@: could not open file "@2@": @3@**

[Description]

could not open file

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.88 16988

---

**@1@: could not open log file "@2@": @3@**

[Description]

could not open log file

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.89 16989

---

**@1@: could not open timeline history file "@2@": @3@**

[Description]

could not open timeline history file

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.90 16990

---

**@1@: could not parse next timeline's starting point "@2@"**

[Description]

could not parse next timeline's starting point

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.91 16991

---

**@1@: could not parse start position "@2@"**

[Description]

could not parse start position

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.92 16992

---

**@1@: could not read directory "@2@": @3@**

[Description]

could not read directory

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.93 16993

---

**@1@: could not remove promote signal file "@2@": @3@**

[Description]

could not remove promote signal file

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.66.94 16994

---

---

**@1@: could not rename file "@2@" to "@3@" : @4@****[Description]**

could not rename file(Here we move the completed history file into place with its final name)

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.66.95 16995**

---

**@1@: could not send copy-end packet: @2@****[Description]**

PQputCopyEnd - send EOF indication to the backend during COPY IN. After calling this, use PQgetResult() to check command completion status. Returns 1 if successful, 0 if data could not be sent (only possible in nonblock mode), or -1 if an error occurs.

pqFlush - send any data waiting in the output buffer. Return 0 on success, -1 on failure and 1 when not all data could be sent because the socket would block and the connection is non-blocking.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.66.96 16996**

---

**@1@: could not stat file "@2@" : @3@****[Description]**

could not stat file

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.66.97 16997**

---

**@1@: could not write timeline history file "@2@" : @3@****[Description]**

This write operation happens whileWriting the history file to pg\_xlog or Writing the history file to disk

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause

## 2.66.98 16998

---

**@1@: could not write @2@ bytes to log file "@3@": @4@**

[Description]

could not write the bytes to log file

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.66.99 16999

---

**@1@: directory name too long**

[Description]

directory name too long

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67 Message Numbers Beginning with 17000

---

### 2.67.1 17000

---

**@1@: directory "@2@" does not exist**

[Description]

directory does not exist, The errno ENOENT indicates that component of path does not exist, or path is an empty string.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

### 2.67.2 17001

---

**@1@: directory "@2@" is not a database cluster directory**

[Description]

directory is not a database cluster directory

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.3 17002

---

### **SELECT rule's target entry @1@ has different column name from column "@2@"cluster directory**

#### [Description]

resname is required to represent the correct column name in non-resjunk entries of top-level SELECT targetlists, since it will be used as the column title sent to the frontend.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.4 17003

---

### **SELECT target entry has type @1@, but column has type @2@.**

#### [Description]

SELECT column does not match target entry

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.5 17004

---

### **ShmemIndex entry size is wrong for data structure "@1@": expected @2@, actual @3@**

#### [Description]

ShmemIndex entry size is wrong for data structure.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.6 17005

---

### **@1@: incompatible server version @2@; client does not support streaming from server versions newer than @3@**

#### [Description]

incompatible server version ,client does not support streaming from server .ServerMajor and maxServerMajor are calculated as follows:(serverMajor = PQserverVersion(conn) / 100 and maxServerMajor = PG\_VERSION\_NUM / 100;)where PG\_VERSION\_NUM is 90401 and PQserverVersion returns the sversion; /\* server version, e.g. 70401 for 7.4.1 \*/

#### [System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.7 17006

---

**@1@: incompatible server version @2@; client does not support streaming from server versions older than @3@**

[Description]

incompatible server version ,client does not support streaming from server .ServerMajor and minServerMajor are calculated as follows;(serverMajor = PQserverVersion(conn) / 100 and minServerMajor = 903;)where PQserverVersion returns the sversion; /\* server version, e.g. 70401 for 7.4.1 \*/

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.8 17007

---

**@1@: incompatible server version @2@**

[Description]

incompatible server version; ServerMajor and maxServerMajor are calculated as follows;(minServerMajor = 903,serverMajor = PQserverVersion(conn) / 100 and maxServerMajor = PG\_VERSION\_NUM / 100;)where PG\_VERSION\_NUM is 90401 and PQserverVersion returns the sversion; /\* server version, e.g. 70401 for 7.4.1 \*/

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.9 17008

---

**@1@: invalid --max-rate unit: "@2@"**

[Description]

after\_num is obtained by passing src string to strtod

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.10 17009

---

**@1@: invalid number of parallel jobs**

[Description]

invalid number of parallel jobs

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.11 17010

---

**@1@: invalid tablespace mapping format "@2@", must be "OLDDIR=NEWDIR"**

[Description]

invalid tablespace mapping format

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.12 17011

---

**@1@: invalid transfer rate "@2@": @3@**

[Description]

invalid transfer rate

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.13 17012

---

**@1@: invalid xlog-method option "@2@", must be "fetch" or "stream"**

[Description]

invalid xlog-method option

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.14 17013

---

**@1@ is not allowed with aggregate functions**

[Description]

The return type of function LCS\_asString is not allowed with aggregate functions. In this error case, the return type of LCS\_asString is "FOR some"

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.15 17014

---

### @1@ is not allowed with DISTINCT clause

[Description]

The return type of function LCS\_asString is not allowed with aggregate functions. In this error case, the return type of LCS\_asString is "FOR some"

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause

## 2.67.16 17015

---

### @1@ is not allowed with GROUP BY clause

[Description]

The return string of LCS\_asString() is not allowed with GROUP BY clause

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.17 17016

---

### @1@ is not allowed with HAVING clause

[Description]

The return string of LCS\_asString() is not allowed with HAVING clause

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.18 17017

---

### @1@ is not allowed with set-returning functions in the target list

[Description]

The return string of LCS\_asString() is not allowed with set-returning functions in the target list

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.19 17018

---

### @1@ is not allowed with UNION/INTERSECT/EXCEPT

[Description]

The return string of LCS\_asString() is not allowed with UNION/INTERSECT/EXCEPT

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.20 17019

---

### @1@ is not allowed with window functions

[Description]

The return string of LCS\_asString() is not allowed with window functions

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.21 17020

---

### "@1@" is not a materialized view

[Description]

The Relation that is returned by RelationGetRelationName() is not a materialized view

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.22 17021

---

### @1@ is not an ordered-set aggregate, so it cannot have WITHIN GROUP

[Description]

Normal aggregate, so it can't have WITHIN GROUP

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.23 17022

---

**"@1@" is not a table, materialized view, composite type, or foreign table**

[Description]

If the particular relation is not a table, materialized view, composite type, or foreign table

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.24 17023

---

**"@1@" is not a table, materialized view, index, or foreign table**

[Description]

The relation returned by the function RelationGetRelationName() is not a table, materialized view, index, or foreign table

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.25 17024

---

**"@1@" is not a table, materialized view, or index**

[Description]

The relation is not a table, materialized view, or index

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.26 17025

---

**"@1@" is not a table or materialized view**

[Description]

The relation is not a table or materialized view

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.27 17026

---

**"@1@" is not a table, view, materialized view, composite type, index, or foreign table**

[Description]

The relation is not a table, view, materialized view, composite type, index, or foreign table

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.28 17027

---

**"@1@" is not a table, view, materialized view, composite type, or foreign table**

[Description]

The relation is not a table, view, materialized view, composite type, or foreign table.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.29 17028

---

**"@1@" is not a table, view, materialized view, index, or TOAST table**

[Description]

The relation is not a table, view, materialized view, index, or TOAST table

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.30 17029

---

**"@1@" is not a table, view, materialized view, index, or TOAST table**

[Description]

The relation is not a table, view, materialized view, index, or TOAST table.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.31 17030

---

### "@1@" is not a table, view, materialized view, sequence, or foreign table

#### [Description]

The relation is not a table, view, materialized view, sequence, or foreign table. Note: Don't allow ALTER TABLE. SET SCHEMA on relations that can't be moved to a different schema, such as indexes and TOAST tables.

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.32 17031

---

### "@1@" is not a table, view, or foreign table

#### [Description]

The relation is not a table, view, or foreign table

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.33 17032

---

### "@1@" is not a table, view, sequence, or foreign table

#### [Description]

The relation is not a table, view, sequence, or foreign table

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.34 17033

---

### @1@ must specify unqualified relation names

#### [Description]

The return type of LCS\_asString() must specify unqualified relation names

#### [System Processing]

Processing will be aborted.

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.35 17034

---

**snapbuild state file @1@: checksum mismatch, is @2@, should be @3@**

[Description]

snapbuild state file : checksum mismatch

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.36 17035

---

**snapbuild state file "@1@" has unsupported version @2@ instead of @3@**

[Description]

snapbuild state file has unsupported version.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.37 17036

---

**snapbuild state file "@1@" has wrong magic @2@ instead of @3@**

[Description]

snapbuild state file has wrong magic number

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.38 17037

---

**@1@: new directory is not an absolute path in tablespace mapping: @2@**

[Description]

new directory is not an absolute path in tablespace mapping

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.39 17038

---

---

**@1@: no database specified****[Description]**

no database specified for the given program name

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.67.40 17039**

---

**@1@: no slot specified****[Description]**

no slot specified for the given program name

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.67.41 17040**

---

**SP-GiST inner tuple size @1@ exceeds maximum @2@****[Description]**

SPGiST leaf tuple carries a datum and a heap tuple TID. Inner tuple should be small enough to fit on a page. Values larger than a buffer page cannot be indexed.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.67.42 17041**

---

**SSL failed to renegotiate connection before limit expired****[Description]**

SSL failed to renegotiate connection before limit expired

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.67.43 17042**

---

**@1@: symlinks are not supported on this platform**

[Description]

symlinks are not supported on this platform . Note : Define to 1 if you have the `symlink' function.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.44 17043

---

### **@1@: transaction log directory location can only be specified in plain mode**

[Description]

transaction log directory location can only be specified in plain mode

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.45 17044

---

### **@1@: transaction log directory location must be an absolute path**

[Description]

transaction log directory location must be an absolute path

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.46 17045

---

### **@1@: transfer rate must be greater than zero**

[Description]

transfer rate must be greater than zero

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.47 17046

---

### **@1@: transfer rate "@2@" exceeds integer range**

[Description]

transfer rate exceeds integer range

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.48 17047

---

### @1@: transfer rate "@2@" is not a valid value

[Description]

transfer rate is not a valid value Note: The second parameter is a out - parameter.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.49 17049

---

### strictness of aggregate's forward and inverse transition functions must match

[Description]

strictness of aggregate's forward and inverse transition functions must match. Note: Insist that forward and inverse transition functions have the same strictness setting. Allowing them to differ would require handling more special cases in advance\_windowaggregate and advance\_windowaggregate\_base, for no discernible benefit. This should have been checked at agg definition time, but we must check again in case either function's strictness property has been changed.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.50 17050

---

### string too long to represent as jsonb string

[Description]

string too long to represent as jsonb string. Note :Due to an implementation restriction, jsonb strings cannot exceed 0x0FFFFFFF

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.51 17051

---

### @1@: unexpected response to TIMELINE\_HISTORY command: got @2@ rows and @3@ fields, expected @4@ rows and @5@ fields

[Description]

unexpected response to TIMELINE\_HISTORY command.Note: The response to TIMELINE\_HISTORY is a single row result set with two fields: filename and content

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.52 17052

---

**@1@: unexpected result set after end-of-timeline: got @2@ rows and @3@ fields, expected @4@ rows and @5@ fields**

[Description]

unexpected result set after end-of-timeline

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.53 17053

---

**@1@: WAL streaming can only be used in plain mode**

[Description]

WAL streaming can only be used in plain mode

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.54 17054

---

**system column "@1@" reference in check constraint is invalid**

[Description]

system column reference in check constraint is invalid

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.55 17055

---

**time field value out of range: @1@:@2@:@3@**

[Description]

time field value out of range

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.56 17056

---

### timestamp out of range: @1@-@2@-@3@ @4@:@5@:@6@

[Description]

timestamp out of range

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.57 17057

---

### too many background workers

[Description]

too many background workers

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.58 17058

---

### too many column names were specified

[Description]

too many column names were specified

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.59 17059

---

### too many dynamic shared memory segments

[Description]

too many dynamic shared memory segments

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.60 17060

---

### too many lexemes in thesaurus entry

[Description]

too many lexemes in thesaurus entry. Note: currently, tsearch\_readline can't return lines exceeding 4KB,so overflow of the word counts is impossible.But that may not always be true, so let's check.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.61 17061

---

### too many replication slots active before shutdown

[Description]

too many replication slots active before shutdown

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.62 17062

---

### total size of jsonb array elements exceeds the maximum of @1@ bytes

[Description]

Total size of jsonb array elements exceeds the maximum of 0x0FFFFFFF bytes

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.63 17063

---

### total size of jsonb object elements exceeds the maximum of @1@ bytes

[Description]

total size of jsonb object elements exceeds the maximum of 0x0FFFFFFFbytes

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.64 17064

---

**tuple to be updated was already modified by an operation triggered by the current command**

[Description]

tuple to be updated was already modified by an operation triggered by the current command

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.65 17065

---

**type modifier cannot have ORDER BY**

[Description]

type modifier cannot have ORDER BY

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.66 17066

---

**"TZ"/"tz"/"OF" format patterns are not supported in to\_date**

[Description]

format patterns are not supported in to\_date

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.67 17067

---

**\\u0000 cannot be converted to text.**

[Description]

\\u0000 cannot be converted to text. Note: The function report\_json\_context() reports a CONTEXT line for bogus JSON input.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.68 17068

---

### Unexpected array element.

[Description]

Unexpected array element.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.69 17069

---

### "TZ"/"tz"/"OF" format patterns are not supported in to\_date

[Description]

format patterns are not supported in to\_date Note:The COPY statement should look like "COPY ... FROM stdin;\n"

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.70 17070

---

### unexpected pageaddr @1@/@2@ in log segment @3@, offset @4@

[Description]

unexpected pageaddr in log segment offset

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.71 17071

---

### unexpected previous timeline ID @1@ (current timeline ID @2@) in checkpoint record

[Description]

unexpected previous timeline ID in checkpoint record

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.72 17072

---

### unexpected result after CommandComplete: @1@

[Description]

unexpected result after CommandComplete

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.73 17073

---

### unexpected result set after end-of-streaming

[Description]

unexpected result set after end-of-streaming

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.74 17074

---

### unexpected result status for \watch

[Description]

unexpected result status for \ watch

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.75 17075

---

### unexpected standby message type "@1@", after receiving CopyDone

[Description]

unexpected standby message type ,after receiving CopyDone . Note :If we already received a CopyDone from the frontend, the frontend should not send us anything until we've closed our end of the COPY.XXX: In theory, the frontend could already send the next command before receiving the CopyDone, but libpq doesn't currently allow that.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.76 17076

---

**unexpected timeline ID @1@ in checkpoint record, before reaching minimum recovery point @2@/@3@ on timeline @4@**

[Description]

unexpected timeline ID %u in checkpoint record, before reaching minimum recovery point %X/%X on timeline %u

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.77 17077

---

**unexpected timeline ID @1@ in log segment @2@, offset @3@**

[Description]

unexpected timeline ID in log segment.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.78 17078

---

**Unicode escape values cannot be used for code point values above 007F when the server encoding is not UTF8.**

[Description]

Unicode escape values cannot be used for code point values above 007F when the server encoding is not UTF8.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.79 17079

---

**Unicode high surrogate must not follow a high surrogate.**

[Description]

Unicode high surrogate must not follow a high surrogate.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.80 17080

---

### Unicode low surrogate must follow a high surrogate.

[Description]

Unicode low surrogate must follow a high surrogate.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.81 17081

---

### UNNEST() with multiple arguments cannot have a column definition list

[Description]

UNNEST() with multiple arguments cannot have a column definition list

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.82 17082

---

### unsupported LDAP URL scheme: @1@

[Description]

unsupported LDAP URL scheme

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.83 17083

---

### unsupported Unicode escape sequence

[Description]

unsupported Unicode escape sequence

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.84 17084

---

### unterminated format specifier

[Description]

unterminated format specifier

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.85 17085

---

### UTC timezone offset is out of range.

[Description]

UTC timezone offset is out of range.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.86 17086

---

### variable "@1@" shadows a previously defined variable

[Description]

shadows a previously defined variable

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.87 17087

---

### VARIADIC argument must be an array

[Description]

VARIADIC argument must be an array

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.88 17088

---

---

### **\\watch cannot be used with an empty query**

[Description]

watch cannot be used with an empty query.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.67.89 17089**

---

### **\\watch cannot be used with COPY**

[Description]

watch cannot be used with COPY

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.67.90 17090**

---

### **WHERE CURRENT OF is not supported for this table type**

[Description]

WHERE CURRENT OF is not supported for this table type

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.67.91 17091**

---

### **window functions are not allowed in check constraints**

[Description]

window functions are not allowed in check constraints.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.67.92 17092**

---

### **window functions are not allowed in DEFAULT expressions**

[Description]

window functions are not allowed in DEFAULT expressions.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.93 17093

---

### window functions are not allowed in EXECUTE parameters

[Description]

window functions are not allowed in EXECUTE parameters

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.94 17094

---

### window functions are not allowed in functions in FROM

[Description]

window functions are not allowed in functions in FROM

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.95 17095

---

### window functions are not allowed in index expressions

[Description]

window functions are not allowed in index expressions

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.67.96 17096

---

### window functions are not allowed in index predicates

[Description]

window functions are not allowed in index predicates

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.67.97 17097

---

### window functions are not allowed in JOIN conditions

[Description]

window functions are not allowed in JOIN conditions

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.67.98 17098

---

### window functions are not allowed in @1@

[Description]

window functions are not allowed in expression kind

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.67.99 17099

---

### window functions are not allowed in transform expressions

[Description]

window functions are not allowed in transform expressions

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68 Message Numbers Beginning with17100

---

---

### 2.68.1 17100

---

#### window functions are not allowed in trigger WHEN conditions

[Description]

window functions are not allowed in trigger WHEN conditions

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.2 17101

---

### window functions are not allowed in window definitions

[Description]

window functions are not allowed in window definitions

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.3 17102

---

### window function @1@ cannot have WITHIN GROUP

[Description]

window function cannot have WITHIN GROUP Note:And, per spec, WITHIN GROUP isn't allowed.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.4 17103

---

### window function @1@ requires an OVER clause

[Description]

window function requires an OVER clause. Note:True window functions must be called with a window definition.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.5 17104

---

### WITH CHECK OPTION is supported only on automatically updatable views

[Description]

WITH CHECK OPTION is supported only on automatically updatable views

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.6 17105

---

### WITH CHECK OPTION not supported on recursive views

[Description]

WITH CHECK OPTION not supported on recursive views

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.7 17106

---

### WITHIN GROUP is required for ordered-set aggregate @1@

[Description]

WITHIN GROUP is required for ordered-set aggregate

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.8 17107

---

### WITHIN GROUP specified, but @1@ is not an aggregate function

[Description]

WITHIN GROUP specified, but the function is not an aggregate function

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.9 17108

---

### WITH ORDINALITY cannot be used with a column definition list

[Description]

WITH ORDINALITY cannot be used with a column definition list

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.10 17109

---

### tablespace encryption algorithm option can not be changed

[Description]

tablespace\_encryption\_algorithm option can not be changed with alter tablespace.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.11 17110

---

### result of USING clause for column "@1@" cannot be cast automatically to type @2@

[Description]

USING clause column value cannot be typecasted automatically to new column type specified.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.12 17111

---

### could not parse contents of file "@1@"

[Description]

Postgresql auto configuration file cannot be parsed

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.13 17114

---

### must be a superuser to cancel superuser query

[Description]

Only super user can execute this function

[System Processing]

processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.14 17115

---

---

**could not change directory to "@1@": @2@****[Description]**

pg\_resetxlog process cannot change the directory

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.68.15 17116**

---

**pclose failed: @1@****[Description]**

pclose system call failed

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.68.16 17117**

---

**cannot duplicate null pointer (internal error)****[Description]**

Null pointer cannot be duplicated

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.68.17 17118**

---

**out of memory****[Description]**

Process runs out of memory

**[System Processing]**

Process aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.68.18 17119**

---

**@1@: WARNING: cannot create restricted tokens on this platform**

[Description]

Restricted Tokens cannot be created

[System Processing]

WARNING is issued

[Action]

To investigate the cause of the occurrence from the message, and remove cause for the WARNING.

## 2.68.19 17120

---

**@1@: could not open process token: error code @2@**

[Description]

Cannot open the process Token

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.20 17121

---

**@1@: could not allocate SIDs: error code @2@**

[Description]

Cannot allocate the SIDs

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.21 17122

---

**@1@: could not create restricted token: error code @2@**

[Description]

Restricted token could not be created

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.22 17123

---

**@1@: could not start process for command "@2@": error code @3@**

[Description]

Process could not be started

[System Processing]

Processing could not be initiated

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.23 17124

---

**@1@: could not re-execute with restricted token: error code @2@**

[Description]

Restricted Token cannot be re-executed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.24 17125

---

**@1@: could not get exit code from subprocess: error code @2@**

[Description]

Cannot exit from the sub process

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.25 17126

---

**user does not exist**

[Description]

user does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.26 17127

---

**user name lookup failure: error code @1@**

[Description]

user does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.27 17128

---

### command not found

[Description]

Command cannot be found

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.28 17129

---

### command not executable

[Description]

Command is not executable

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.29 17130

---

### could not determine encoding for codeset "@1@"

[Description]

Corresponding local could not found in PostgreSQL

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.30 17131

---

### could not get junction for "@1@": @2@

[Description]

could not get junction

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.31 17132

---

**could not get junction for "@1@": @2@**

[Description]

could not get junction

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.32 17133

---

**lock violation**

[Description]

Antivirus software or some other similar software has locked the database file

[System Processing]

Process trying to access the file continues and retries after every 30 seconds

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.33 17134

---

**sharing violation**

[Description]

Antivirus software or some other similar software has locked the database file

[System Processing]

Process trying to access the file continues and retries after every 30 seconds

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.34 17135

---

**could not get current working directory: @1@**

[Description]

The current working directory path cannot be found

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.35 17136

---

---

### unrecognized error @1@

[Description]

Error could not be recognized

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68.36 17138

---

### index row size @1@ exceeds maximum @2@ for index "@3@"

[Description]

The row size of the Index exceeded the maximum limit

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68.37 17139

---

### unexpected page type 0x@1@ in BRIN index "@2@" block @3@

[Description]

Unexpected page type in BRIN index

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68.38 17141

---

### invalid value for "tablespace encryption algorithm" option

[Description]

Value specified for tablespace encryption algorithm is invalid. Acceptable values are \"none\", \"AES128\" and \"AES256\".

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68.39 17142

---

### invalid value for "buffering" option

[Description]

Invalid value provided for relopion on buffering of Gist Indexes. Acceptable valid values are \"on\", \"off\", and \"auto\"

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.40 17143

---

### cannot access temporary tables during a parallel operation

[Description]

Temporary tables cannot be accessed during parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.41 17144

---

### cannot insert tuples during a parallel operation

[Description]

Tuples cannot be inserted during the parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.42 17146

---

### attempted to delete invisible tuple

[Description]

An attempt has been made to delete an invisible tuple

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.43 17147

---

### cannot update tuples during a parallel operation

[Description]

Tuples cannot be updated during the parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.44 17148

---

### attempted to update invisible tuple

[Description]

An attempt has been made to update an invisible tuple

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.45 17149

---

### could not truncate file "@1@" to @2@: @3@

[Description]

File could not be truncated due to inaccessibility of the file or file's location

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.46 17150

---

### index "@1@" contains a half-dead internal page

[Description]

Index page is corrupted. This is no harm for processes performing searches. This can be fixed by RE-INDEXING.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.47 17151

---

### sample percentage must be between 0 and 100

[Description]

Sample percentage for sample scan must be between 0 and 100

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.48 17152

---

**cannot retrieve commit timestamp for transaction @1@**

[Description]

Cannot retrieve commit timestamp for uncommitted transactions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.49 17153

---

**could not get commit timestamp data**

[Description]

Could not get commit timestamp data. "track\_commit\_timestamp" parameter must be configured

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.50 17154

---

**database is not accepting commands that generate new MultiXactIds to avoid wraparound data loss in database "@1@"**

[Description]

Database is not accepting any commands due to transaction wrap around issue. This can be fixed by vacuuming the database and committing/rolling-back the old unfinished prepared transactions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.51 17155

---

**database is not accepting commands that generate new MultiXactIds to avoid wraparound data loss in database with OID @1@**

[Description]

Database is not accepting any commands due to transaction wrap around issue. This can be fixed by vacuuming the database and committing/rolling-back the old unfinished prepared transactions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.52 17156

---

### **multixact "members" limit exceeded**

[Description]

Multixact members limit exceeded.

Execute a database-wide VACUUM in database with OID %u with reduced vacuum\_multixact\_freeze\_min\_age and vacuum\_multixact\_freeze\_table\_age settings.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.53 17157

---

### **MultiXactId @1@ does no longer exist -- apparent wraparound**

[Description]

MultiXactID does not exist. Transaction wrap around completed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.54 17158

---

### **MultiXactId @1@ has not been created yet -- apparent wraparound**

[Description]

multixactId has not been created. Possible transaction wrap around has happend.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.55 17160

---

---

### postmaster exited during a parallel transaction

[Description]

postmaster exited during a parallel transaction

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68.56 17165

---

### cannot PREPARE a transaction that has exported snapshots

[Description]

cannot PREPARE a transaction that has exported snapshots

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68.57 17166

---

### cannot commit during a parallel operation

[Description]

cannot commit during a parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68.58 17167

---

### cannot abort during a parallel operation

[Description]

cannot during during a parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68.59 17168

---

### cannot define savepoints during a parallel operation

[Description]

cannot define savepoints during a parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68.60 17169

---

### cannot release savepoints during a parallel operation

[Description]

cannot release savepoints during a parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68.61 17170

---

### cannot rollback to savepoints during a parallel operation

[Description]

cannot rollback to savepoints during a parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68.62 17171

---

### cannot start subtransactions during a parallel operation

[Description]

cannot start subtransactions during a parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.68.63 17172

---

### cannot commit subtransactions during a parallel operation

[Description]

cannot commit subtransactions during a parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.64 17173

---

**could not open transaction log file "@1@": @2@**

[Description]

could not open transaction log file. The transaction file status must be checked (Ex: file permissions, status etc)

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.65 17174

---

**new timeline @1@ forked off current database system timeline @2@ before current recovery point @3@/@4@**

[Description]

new timeline %u forked off current database system timeline %u before current recovery point %X/%X

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.66 17177

---

**parameter "@1@" requires a temporal value**

[Description]

recovery\_min\_apply\_delay parameter requires a temporal value

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.67 17178

---

**requested timeline @1@ does not contain minimum recovery point @2@/@3@ on timeline @4@**

[Description]

minimum recovery point must be part of requested timeline's history

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.68 17179

---

**This means that the backup is corrupted and you will have to use another backup for recovery.**

[Description]

This means that the backup is corrupted and you will have to use another backup for recovery

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.69 17180

---

**unexpected previous timeline ID @1@ (current timeline ID @2@) in checkpoint record**

[Description]

unexpected previous timeline ID in checkpoint record. Check that the checkpoint record agrees with the current timeline.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.70 17181

---

**unexpected timeline ID @1@ in checkpoint record, before reaching minimum recovery point @2@/@3@ on timeline @4@**

[Description]

unexpected timeline ID in checkpoint record, before reaching minimum recovery point on timeline

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.71 17182

---

**could not fsync log file @1@: @2@**

[Description]

could not fsync the log file. Check that the file exists and is available/accessible with appropriate permissions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.72 17183

---

**could not stat trigger file "@1@": @2@**

[Description]

Could not stat trigger file. Checking for the existence of trigger file. ensure that the trigger file exists with appropriate permissions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.73 17184

---

**invalid privilege type @1@ for type**

[Description]

invalid privilege type for object

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.74 17185

---

**invalid privilege type @1@ for column**

[Description]

invalid privilege type for the column

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.75 17186

---

**permission denied for event trigger @1@**

[Description]

permission denied on the trigger

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.76 17187

---

**event trigger with OID @1@ does not exist**

[Description]

Trigger being accessed does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.77 17188

---

**constant of the type "regrole" cannot be used here**

[Description]

constant of the type regrole cannot be used here

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.78 17189

---

**pg\_class index OID value not set when in binary upgrade mode**

[Description]

pg\_class index OID value not set when in binary upgrade mode

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.79 17190

---

**could not obtain lock on relation "@1@"**

[Description]

Lock on a relation could not be obtained. Check the blocking process

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.80 17191

---

### cannot create temporary tables in parallel mode

[Description]

cannot create temporary tables in parallel mode

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.81 17192

---

### role name cannot be qualified

[Description]

role name cannot be qualified

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.82 17193

---

### schema name cannot be qualified

[Description]

schema name cannot be qualified

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.83 17194

---

### language name cannot be qualified

[Description]

language name cannot be qualified

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.84 17195

---

### server name cannot be qualified

[Description]

server name cannot be qualified

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.85 17196

---

### event trigger name cannot be qualified

[Description]

event trigger name cannot be qualified

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.86 17197

---

### "@1@" is not a materialized view

[Description]

The object type being accessed is not a materialized view

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.87 17198

---

### default value for column "@1@" of relation "@2@" does not exist

[Description]

default value for column of relation does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.68.88 17199

---

---

**operator @1@ (@2@, @3@) of @4@ does not exist****[Description]**

operator does not exist

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69 Message Numbers Beginning with 17200

---

### 2.69.1 17200

---

**function @1@ (@2@, @3@) of @4@ does not exist****[Description]**

function being accessed does not exist. Check if the function is existing with appropriate permissions and search\_path settings

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

### 2.69.2 17201

---

**user mapping for user "@1@" on server "@2@" does not exist****[Description]**

user mapping for user in server does not exist. Check the mapping user while creating foreign tables

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

### 2.69.3 17202

---

**unrecognized default ACL object type @1@****[Description]**

ACL object type is unrecognized. Valid object types are "r", "S", "f", and "T"

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.4 17203

---

### default ACL for user "@1@" in schema "@2@" on @3@ does not exist

[Description]

default ACL for user in schema on does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.5 17204

---

### default ACL for user "@1@" on @2@ does not exist

[Description]

default ACL for user on does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.6 17205

---

### name or argument lists may not contain nulls

[Description]

name or argument lists may not contain nulls

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.7 17206

---

### unsupported object type "@1@"

[Description]

unsupported object type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.8 17207

---

---

### **name list length must be exactly @1@**

[Description]

name list length must be exactly 1

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.69.9 17208**

---

### **large object OID may not be null**

[Description]

large object OID may not be null

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.69.10 17210**

---

### **argument list length must be exactly @1@**

[Description]

argument list length must be exactly 1

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.69.11 17211**

---

### **name list length must be at least @1@**

[Description]

name list length must be at least 1

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.69.12 17212**

---

### **unrecognized object type "@1@"**

[Description]

unrecognized object type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.13 17213

---

### aggregates cannot have more than @1@ argument

[Description]

aggregates cannot have more than 1 argument

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.14 17215

---

### a variadic ordered-set aggregate must use VARIADIC type ANY

[Description]

a variadic ordered-set aggregate must use VARIADIC type ANY

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.15 17216

---

### a hypothetical-set aggregate must have direct arguments matching its aggregated arguments

[Description]

a hypothetical-set aggregate must have direct arguments matching its aggregated arguments

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.16 17218

---

### strictness of aggregate's forward and inverse transition functions must match

[Description]

strictness of aggregate's forward and inverse transition functions must match

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.17 17219

---

**final function with extra arguments must not be declared STRICT**

[Description]

final function with extra arguments must not be declared STRICT

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.18 17220

---

**moving-aggregate implementation returns type @1@, but plain implementation returns type @2@**

[Description]

moving-aggregate implementation returns type one type but plain implementation returns type other type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.19 17221

---

**function @1@ must accept VARIADIC ANY to be used in this aggregate**

[Description]

The function must accept VARIADIC ANY to be used in this aggregate

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.20 17222

---

**constraint "@1@" for domain "@2@" does not exist**

[Description]

The constraint for domain does not exist. Check the constraint name

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.21 17223

---

**enum label "@1@" already exists**

[Description]

enum label already exists

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.22 17224

---

**pg\_enum OID value not set when in binary upgrade mode**

[Description]

pg\_enum OID value not set when in binary upgrade mode

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.23 17225

---

**pg\_type OID value not set when in binary upgrade mode**

[Description]

pg\_type OID value not set when in binary upgrade mode

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.24 17226

---

**"@1@" is not a table or materialized view**

[Description]

The object referenced by pgstattuple utility is not a table or materialized view

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.25 17227

---

### only ordered-set aggregates can be hypothetical

[Description]

only ordered-set aggregates can be hypothetical

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.26 17228

---

### aggregate msfunc must be specified when mstype is specified

[Description]

aggregate msfunc must be specified when mstype is specified

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.27 17229

---

### aggregate minvfunc must be specified when mstype is specified

[Description]

aggregate minvfunc must be specified when mstype is specified

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.28 17230

---

### aggregate msfunc must not be specified without mstype

[Description]

aggregate msfunc must not be specified without mstype

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.29 17231

---

### aggregate minvfunc must not be specified without mstype

[Description]

aggregate minvfunc must not be specified without mstype

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.30 17232

---

### aggregate msspace must not be specified without mstype

[Description]

aggregate msspace must not be specified without mstype

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.31 17233

---

### aggregate minitcond must not be specified without mstype

[Description]

aggregate minitcond must not be specified without mstype

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.32 17234

---

### event trigger "@1@" already exists

[Description]

event trigger already exists

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.33 17236

---

---

**could not write to COPY program: @1@****[Description]**

could not write to COPY program: %m

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.69.34 17237**

---

**must be superuser to COPY to or from an external program****[Description]**

Only an external program can COPY to or from an external program

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.69.35 17238**

---

**COPY FROM not supported with row-level security****[Description]**

COPY FROM an external file is not supported when row level security is enabled. Use INSERT statements instead

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.69.36 17239**

---

**COPY force null available only in CSV mode****[Description]**

COPY force null available only in CSV mode

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.69.37 17240**

---

**COPY force null only available using COPY FROM**

[Description]

COPY force null only available using COPY FROM

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.38 17241

---

### relation referenced by COPY statement has changed

[Description]

relation referenced by COPY statement has changed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.39 17242

---

### could not close pipe to external command: @1@

[Description]

could not close pipe to external command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.40 17243

---

### program "@1@" failed

[Description]

program has failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.41 17244

---

### could not execute command "@1@": @2@

[Description]

could not execute command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.42 17245

---

**cannot copy to materialized view "@1@"**

[Description]

cannot copy to materialized view

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.43 17246

---

**cannot perform FREEZE because of prior transaction activity**

[Description]

cannot perform FREEZE because of prior transaction activity

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.44 17247

---

**cannot perform FREEZE because the table was not created or truncated in the current subtransaction**

[Description]

cannot perform FREEZE because the table was not created or truncated in the current subtransaction

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.45 17248

---

**too many column names were specified**

[Description]

too many column names were specified

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.46 17249

---

**policies not yet implemented for this command**

[Description]

policies not yet implemented for this command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.47 17250

---

**invalid locale name: "@1@"**

[Description]

Check if the locale name mentioned is correct.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.48 17251

---

**database "@1@" is used by a logical replication slot**

[Description]

The database referenced is used by a logical replication slot.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.49 17252

---

**option "@1@" cannot be specified with other options**

[Description]

When invoking alter database command option cannot be specified with other options

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.50 17253

---

### cannot disallow connections for current database

[Description]

cannot disallow connections for current database

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.51 17254

---

### permission denied to create event trigger "@1@"

[Description]

Permission denied to create event trigger. Must be superuser to create an event trigger. Check permissions on trigger

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.52 17255

---

### unrecognized event name "@1@"

[Description]

Unrecognized event name. Acceptable event name must be provided

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.53 17256

---

### unrecognized filter variable "@1@"

[Description]

unrecognized filter variable

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.54 17257

---

### function "@1@" must return type "event\_trigger"

[Description]

function must return type event\_trigger

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.55 17259

---

### event triggers are not supported for @1@

[Description]

event triggers are not supported for certain type of SQL statements

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.56 17260

---

### filter variable "@1@" specified more than once

[Description]

filter variable specified more than once

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.57 17261

---

### event trigger "@1@" does not exist

[Description]

Referenced event trigger does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.58 17262

---

---

## permission denied to change owner of event trigger "@1@"

### [Description]

permission denied to change owner of event trigger. The owner of an event trigger must be a superuser

### [System Processing]

Processing aborts

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.59 17263

---

### @1@ can only be called in a sql\_drop event trigger function

### [Description]

The function pg\_event\_trigger\_dropped\_objects() can only be called in a sql\_drop event trigger function

### [System Processing]

Processing aborts

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.60 17264

---

### @1@ can only be called in a table\_rewrite event trigger function

### [Description]

The function pg\_event\_trigger\_table\_rewrite\_oid() can only be called in a table\_rewrite event trigger function

### [System Processing]

Processing aborts

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.61 17265

---

### @1@ can only be called in an event trigger function

### [Description]

The function pg\_event\_trigger\_ddl\_commands() can only be called in a event trigger function

### [System Processing]

Processing aborts

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.62 17267

---

### aggregates cannot accept set arguments

[Description]

aggregates cannot accept set arguments

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.63 17268

---

### transform function must not be volatile

[Description]

transform function must not be volatile

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.64 17269

---

### transform function must not be an aggregate function

[Description]

transform function must not be an aggregate function

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.65 17270

---

### transform function must not be a window function

[Description]

transform function must not be a window function

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.66 17271

---

### transform function must not return a set

[Description]

transform function must not return a set

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.67 17272

---

**transform function must take one argument**

[Description]

transform function must take one argument

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.68 17273

---

**first argument of transform function must be type "internal"**

[Description]

first argument of transform function must be type internal

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.69 17274

---

**data type @1@ is a pseudo-type**

[Description]

data type referenced is a pseudo-type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.70 17275

---

**data type @1@ is a domain**

[Description]

data type is a domain

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.71 17276

---

**return data type of FROM SQL function must be "internal"**

[Description]

return data type of FROM SQL function must be internal

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.72 17277

---

**return data type of TO SQL function must be the transform data type**

[Description]

return data type of TO SQL function must be the transform data type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.73 17278

---

**transform for type @1@ language "@2@" already exists**

[Description]

transform for type language already exists

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.74 17279

---

**transform for type @1@ language "@2@" does not exist**

[Description]

transform for type language does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.75 17280

---

### operator class "@1@" does not exist for access method "@2@"

[Description]

operator class does not exist for access method

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.76 17281

---

### CONCURRENTLY cannot be used when the materialized view is not populated

[Description]

CONCURRENTLY cannot be used when the materialized view is not populated

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.77 17282

---

### CONCURRENTLY and WITH NO DATA options cannot be used together

[Description]

CONCURRENTLY and WITH NO DATA options cannot be used together

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.78 17283

---

### new data for materialized view "@1@" contains duplicate rows without any null columns

[Description]

new data for materialized view contains duplicate rows without any null columns

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.79 17284

---

---

### **WITH CHECK cannot be applied to SELECT or DELETE**

[Description]

WITH CHECK cannot be applied to SELECT or DELETE

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.69.80 17285**

---

### **only WITH CHECK expression allowed for INSERT**

[Description]

only WITH CHECK expression allowed for INSERT

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.69.81 17286**

---

### **policy "@1@" for table "@2@" already exists**

[Description]

policy attempted to create for table already exists

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.69.82 17287**

---

### **policy "@1@" for table "@2@" does not exist**

[Description]

Policy being attempted to alter does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.69.83 17288**

---

### **only USING expression allowed for SELECT, DELETE**

[Description]

only USING expression allowed for SELECT, DELETE

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.84 17289

---

### referenced relation "@1@" is not a table or foreign table

[Description]

Relation referenced by CREATE OR ALTER TABLE is not a regular table or foreign table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.85 17290

---

### materialized view "@1@" does not exist

[Description]

materialized view \"%s\" does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.86 17291

---

### Use DROP MATERIALIZED VIEW to remove a materialized view.

[Description]

Use DROP MATERIALIZED VIEW to remove a materialized view

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.87 17293

---

### inherited constraint "@1@" must be renamed in child tables too

[Description]

inherited constraint must be renamed in child tables too

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.88 17294

---

**cannot rename inherited constraint "@1@"**

[Description]

cannot rename inherited constraint

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.89 17295

---

**cannot rewrite table "@1@" used as a catalog table**

[Description]

cannot rewrite table used as a catalog table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.90 17296

---

**"@1@" is not a table, view, or foreign table**

[Description]

this is not a table, view, or foreign table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.69.91 17297

---

**"@1@" is not a table, view, materialized view, or index**

[Description]

object referenced is not a table, view, materialized view, or index

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.92 17298

---

**"@1@" is not a table, materialized view, or foreign table**

[Description]

object referenced is not of a type table, materialized view, or foreign table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.69.93 17299

---

**constraint "@1@" of relation "@2@" is not a foreign key or check constraint**

[Description]

constraint of relation is not a foreign key or check constraint

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70 Message Numbers Beginning with 17300

---

### 2.70.1 17301

---

**"@1@" is not a table, view, sequence, or foreign table**

[Description]

object type is not a table, view, sequence, or foreign table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.70.2 17302

---

**WITH CHECK OPTION is supported only on automatically updatable views**

[Description]

WITH CHECK OPTION is supported only on automatically updatable views

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.70.3 17303

---

**only tables, indexes, and materialized views exist in tablespaces**

[Description]

only tables, indexes, and materialized views exist in tablespaces

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.70.4 17304

---

**cannot move relations in to or out of pg\_global tablespace**

[Description]

cannot move relations in to or out of pg\_global tablespace

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.70.5 17305

---

**aborting because lock on relation "@1@.@2@" is not available**

[Description]

aborting because lock on relation is not available

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.70.6 17306

---

**no matching relations in tablespace "@1@" found**

[Description]

no matching relations in tablespace found

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.7 17307

---

### invalid page in block @1@ of relation @2@

[Description]

invalid page in block of relation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.8 17308

---

### cannot use non-unique index "@1@" as replica identity

[Description]

cannot use non-unique index as replica identity

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.9 17309

---

### cannot use non-immediate index "@1@" as replica identity

[Description]

cannot use non-immediate index as replica identity

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.10 17310

---

### cannot use expression index "@1@" as replica identity

[Description]

cannot use expression index as replica identity

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.11 17311

---

---

### cannot use partial index "@1@" as replica identity

[Description]

cannot use partial index \"%s\" as replica identity

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.70.12 17312

---

### cannot use invalid index "@1@" as replica identity

[Description]

cannot use invalid index as replica identity

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.70.13 17313

---

### index "@1@" cannot be used as replica identity because column "@2@" is nullable

[Description]

index \"%s\" cannot be used as replica identity because column \"%s\" is nullable

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.70.14 17319

---

### could not create an encrypted tablespace because the keystore is not open

[Description]

could not create an encrypted tablespace because the keystore is not open. Open the existing keystore, or set the master encryption key to create and open a new keystore

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.70.15 17321

---

### tablespace encryption algorithm option cannot be changed

[Description]

tablespace encryption algorithm option cannot be changed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.16 17323

---

### Foreign tables cannot have INSTEAD OF triggers.

[Description]

Foreign tables cannot have INSTEAD OF triggers.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.17 17326

---

### tuple to be updated was already modified by an operation triggered by the current command

[Description]

tuple to be updated was already modified by an operation triggered by the current command. Consider using an AFTER trigger instead of a BEFORE trigger to propagate changes to other rows

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.18 17327

---

### function @1@ should return type @2@

[Description]

function should return an acceptable type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.19 17328

---

### check constraints for domains cannot be marked NO INHERIT

[Description]

check constraints for domains cannot be marked NO INHERIT

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.20 17329

---

### range subtype cannot be @1@

[Description]

range subtype cannot be of psuedo type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.21 17330

---

### range canonical function @1@ must return range type

[Description]

range canonical function must return range type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.22 17331

---

### pg\_type array OID value not set when in binary upgrade mode

[Description]

pg\_type array OID value not set when in binary upgrade mode

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.23 17332

---

### constraint "@1@" of domain "@2@" is not a check constraint

[Description]

constraint of domain is not a check constraint

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.24 17333

---

**constraint "@1@" for domain "@2@" already exists**

[Description]

constraint for domain already exists

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.25 17334

---

**must be superuser to change bypassrls attribute**

[Description]

must be superuser to change bypassrls attribute

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.26 17335

---

**pg\_authid OID value not set when in binary upgrade mode**

[Description]

pg\_authid OID value not set when in binary upgrade mode

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.27 17336

---

**must be superuser to alter settings globally**

[Description]

must be superuser to alter settings globally

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.28 17338

---

### @1@ cannot be executed from VACUUM or ANALYZE

[Description]

commands VACUUM or ANALYZE cannot be executed from VACUUM or ANALYZE

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.29 17339

---

### invalid value for "check\_option" option

[Description]

invalid value for "check\_option" option. Valid values are "local" and "cascaded".

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.30 17340

---

### ON CONFLICT does not support deferrable unique constraints/exclusion constraints as arbiters

[Description]

ON CONFLICT does not support deferrable unique constraints/exclusion constraints as arbiters

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.31 17341

---

### cannot change materialized view "@1@"

[Description]

cannot change materialized view

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.32 17342

---

### cannot insert into foreign table "@1@"

[Description]

cannot insert into foreign table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.33 17343

---

### foreign table "@1@" does not allow inserts

[Description]

foreign table \"%s\" does not allow inserts

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.34 17344

---

### cannot update foreign table "@1@"

[Description]

cannot update foreign table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.35 17345

---

### foreign table "@1@" does not allow updates

[Description]

foreign table does not allow updates

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.36 17346

---

### cannot delete from foreign table "@1@"

[Description]

cannot delete from foreign table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.37 17347

---

### foreign table "@1@" does not allow deletes

[Description]

foreign table does not allow deletes

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.38 17348

---

### cannot lock rows in materialized view "@1@"

[Description]

cannot lock rows in materialized view

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.39 17349

---

### new row violates check option for view "@1@"

[Description]

new row violates check option for view

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.40 17350

---

---

**new row violates row-level security policy "@1@" for table "@2@"**

[Description]

new row violates row-level security policy for table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.70.41 17351

---

**new row violates row-level security policy for table "@1@"**

[Description]

new row violates row-level security policy for table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.70.42 17352

---

**new row violates row-level security policy "@1@" (USING expression) for table "@2@"**

[Description]

new row violates row-level security policy (USING expression) for table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.70.43 17353

---

**new row violates row-level security policy (USING expression) for table "@1@"**

[Description]

new row violates row-level security policy (USING expression) for table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.70.44 17354

---

**WHERE CURRENT OF is not supported for this table type**

[Description]

WHERE CURRENT OF is not supported for this table type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.45 17355

---

### materialized view "@1@" has not been populated

[Description]

materialized view has not been populated. Use the REFRESH MATERIALIZED VIEW command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.46 17356

---

### custom scan "@1@" does not support MarkPos

[Description]

custom-scan does not support MarkPos

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.47 17357

---

### lossy distance functions are not supported in index-only scans

[Description]

lossy distance functions are not supported in index-only scans

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.48 17358

---

### ON CONFLICT DO UPDATE command cannot affect row a second time

[Description]

ON CONFLICT DO UPDATE command cannot affect row a second time. Ensure that no rows proposed for insertion within the same command have duplicate constrained values

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.49 17359

---

### TABLESAMPLE parameter cannot be null

[Description]

TABLESAMPLE parameter cannot be null

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.50 17360

---

### TABLESAMPLE REPEATABLE parameter cannot be null

[Description]

TABLESAMPLE REPEATABLE parameter cannot be null

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.51 17361

---

### moving-aggregate transition function must not return null

[Description]

moving-aggregate transition function must not return null

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.52 17362

---

### could not open configuration directory "@1@": @2@

[Description]

could not open configuration directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.53 17363

---

### could not initialize LDAP: @1@

[Description]

could not initialize LDAP

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.54 17364

---

### LDAP user "@1@" does not exist

[Description]

LDAP user does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.55 17365

---

### LDAP user "@1@" is not unique

[Description]

LDAP user is not unique

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.56 17367

---

### lo\_lseek result out of range for large-object descriptor @1@

[Description]

lo\_lseek result out of range for large-object descriptor %d

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.57 17368

---

**io\_tell result out of range for large-object descriptor @1@**

[Description]

io\_tell result out of range for large-object descriptor

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.58 17369

---

**large object read request is too large**

[Description]

large object read request is too large

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.59 17370

---

**ECDH: unrecognized curve name: @1@**

[Description]

ECDH: unrecognized curve name

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.60 17371

---

**ECDH: could not create key**

[Description]

ECDH: could not create key

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.61 17372

---

### authentication file line too long

[Description]

authentication file line too long

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.62 17373

---

### could not parse LDAP URL "@1@": @2@

[Description]

could not parse LDAP URL

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.63 17374

---

### unsupported LDAP URL scheme: @1@

[Description]

unsupported LDAP URL scheme

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.64 17375

---

### filters not supported in LDAP URLs

[Description]

filters not supported in LDAP URLs

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.65 17376

---

### LDAP URLs not supported on this platform

[Description]

LDAP URLs not supported on this platform

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.66 17377

---

### unrecognized address family @1@

[Description]

unrecognized address family

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.67 17378

---

### there is no client connection

[Description]

there is no client connection

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.68 17379

---

### terminating connection because protocol synchronization was lost

[Description]

terminating connection because protocol sync was lost

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.69 17380

---

---

### @1@: out of memory

[Description]

out of memory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.70.70 17381

---

### @1@ cannot be applied to the nullable side of an outer join

[Description]

SQL row locking clause cannot be applied to the nullable side of an outer join

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.70.71 17383

---

### system columns cannot be used in an ON CONFLICT clause

[Description]

system columns cannot be used in an ON CONFLICT clause

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.70.72 17384

---

### constraint in ON CONFLICT clause has no associated index

[Description]

constraint in ON CONFLICT clause has no associated index

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.70.73 17385

---

### ON CONFLICT DO UPDATE not supported with exclusion constraints

[Description]

ON CONFLICT DO UPDATE not supported with exclusion constraints

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.74 17386

---

### there is no unique or exclusion constraint matching the ON CONFLICT specification

[Description]

there is no unique or exclusion constraint matching the ON CONFLICT specification

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.75 17387

---

### @1@ cannot be applied to VALUES

[Description]

SQL row locking cannot be applied to VALUES

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.76 17388

---

### RETURNING must have at least one column

[Description]

RETURNING must have at least one column

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.77 17389

---

### DECLARE SCROLL CURSOR ... @1@ is not supported

[Description]

DECLARE SCROLL CURSOR ... is not supported

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.78 17390

---

### materialized views must not use data-modifying statements in WITH

[Description]

materialized views must not use data-modifying statements in WITH

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.79 17391

---

### materialized views must not use temporary tables or views

[Description]

materialized views must not use temporary tables or views

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.80 17392

---

### materialized views may not be defined using bound parameters

[Description]

materialized views may not be defined using bound parameters

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.81 17393

---

### materialized views cannot be UNLOGGED

[Description]

materialized views cannot be UNLOGGED

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.82 17394

---

### @1@ is not allowed with DISTINCT clause

[Description]

SQL row locking clause such as "FOR UPDATE" is not allowed with DISTINCT clause

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.83 17395

---

### @1@ is not allowed with GROUP BY clause

[Description]

SQL row locking clause such as "FOR UPDATE" is not allowed with GROUP BY clause

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.84 17396

---

### @1@ is not allowed with HAVING clause

[Description]

SQL row locking clause such as "FOR UPDATE" is not allowed with HAVING clause

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.85 17397

---

### @1@ is not allowed with aggregate functions

[Description]

%s is not allowed with aggregate functions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.86 17398

---

### @1@ is not allowed with window functions

[Description]

SQL row locking clause such as "FOR UPDATE" is not allowed with window functions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.70.87 17399

---

### @1@ is not allowed with set-returning functions in the target list

[Description]

SQL row locking clause such as "FOR UPDATE" is not allowed with set-returning functions in the target list

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71 Message Numbers Beginning with 17400

---

### 2.71.1 17400

---

#### @1@ must specify unqualified relation names

[Description]

SQL row locking clause such as "FOR UPDATE" must specify unqualified relation names

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.71.2 17401

---

#### @1@ cannot be applied to a join

[Description]

SQL row locking clause such as "FOR UPDATE" cannot be applied to a join

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.3 17402

---

### @1@ cannot be applied to a function

[Description]

SQL row locking clause such as "FOR UPDATE" cannot be applied to a function

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.4 17403

---

### @1@ cannot be applied to a WITH query

[Description]

SQL row locking clause such as "FOR UPDATE" cannot be applied to a WITH query

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.5 17404

---

### relation "@1@" in @2@ clause not found in FROM clause

[Description]

Relation referenced by the SQL in FROM clause is not found

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.6 17405

---

### outer join operator (+) cannot be used with joined table

[Description]

outer join operator (+) cannot be used with joined table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.7 17406

---

---

### **outer join operator (+) cannot be used with subquery**

[Description]

outer join operator (+) cannot be used with subquery

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.71.8 17407**

---

### **outer join operator (+) is not allowed in operand OR or IN predicate**

[Description]

outer join operator (+) is not allowed in operand OR or IN predicate

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.71.9 17408**

---

### **incorrect specification in outer join operator(+)**

[Description]

incorrect specification in outer join operator(+)

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.71.10 17409**

---

### **outer join operator(+) cannot refer to other relations of same query level**

[Description]

outer join operator(+) cannot refer to other relations of same query level

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.71.11 17410**

---

### **a table may be outer joined to at most one other table**

[Description]

a table may be outer joined to at most one other table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.12 17411

---

### multiple outer join operators (+) cannot be specified for one table

[Description]

multiple outer join operators (+) cannot be specified for one table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.13 17412

---

### two tables cannot be outer-joined to each other

[Description]

two tables cannot be outer-joined to each other

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.14 17413

---

### invalid combination of outer join operator (+) and logical operators

[Description]

invalid combination of outer join operator (+) and logical operators

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.15 17414

---

### GROUPING must have fewer than 32 arguments

[Description]

GROUPING must have fewer than 32 arguments

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.16 17415

---

### aggregate functions are not allowed in JOIN conditions

[Description]

aggregate functions are not allowed in JOIN conditions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.17 17416

---

### grouping operations are not allowed in JOIN conditions

[Description]

grouping operations are not allowed in JOIN conditions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.18 17417

---

### aggregate functions are not allowed in FROM clause of their own query level

[Description]

aggregate functions are not allowed in FROM clause of their own query level

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.19 17418

---

### grouping operations are not allowed in FROM clause of their own query level

[Description]

grouping operations are not allowed in FROM clause of their own query level

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.20 17419

---

### aggregate functions are not allowed in functions in FROM

[Description]

aggregate functions are not allowed in functions in FROM

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.21 17420

---

### grouping operations are not allowed in functions in FROM

[Description]

grouping operations are not allowed in functions in FROM

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.22 17421

---

### aggregate functions are not allowed in policy expressions

[Description]

aggregate functions are not allowed in policy expressions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.23 17422

---

### grouping operations are not allowed in policy expressions

[Description]

grouping operations are not allowed in policy expressions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.24 17423

---

### aggregate functions are not allowed in window RANGE

[Description]

aggregate functions are not allowed in window RANGE

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.25 17424

---

### grouping operations are not allowed in window RANGE

[Description]

grouping operations are not allowed in window RANGE

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.26 17425

---

### aggregate functions are not allowed in window ROWS

[Description]

aggregate functions are not allowed in window ROWS

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.27 17426

---

### grouping operations are not allowed in window ROWS

[Description]

grouping operations are not allowed in window ROWS

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.28 17427

---

---

### grouping operations are not allowed in check constraints

[Description]

grouping operations are not allowed in check constraints

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.29 17428

---

### grouping operations are not allowed in DEFAULT expressions

[Description]

grouping operations are not allowed in DEFAULT expressions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.30 17429

---

### grouping operations are not allowed in index expressions

[Description]

grouping operations are not allowed in index expressions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.31 17430

---

### grouping operations are not allowed in index predicates

[Description]

grouping operations are not allowed in index predicates

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.32 17431

---

### grouping operations are not allowed in transform expressions

[Description]

grouping operations are not allowed in transform expressions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.33 17432

---

### grouping operations are not allowed in EXECUTE parameters

[Description]

grouping operations are not allowed in EXECUTE parameters

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.34 17433

---

### grouping operations are not allowed in trigger WHEN conditions

[Description]

grouping operations are not allowed in trigger WHEN conditions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.35 17434

---

### grouping operations are not allowed in @1@

[Description]

grouping operations are not allowed in the SQL constructs like GROUP BY

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.36 17435

---

### outer-level aggregate cannot contain a lower-level variable in its direct arguments

[Description]

outer-level aggregate cannot contain a lower-level variable in its direct arguments

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.37 17436

---

### window functions are not allowed in functions in FROM

[Description]

window functions are not allowed in functions in FROM

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.38 17437

---

### window functions are not allowed in policy expressions

[Description]

window functions are not allowed in policy expressions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.39 17438

---

### window functions are not allowed in window definitions

[Description]

window functions are not allowed in window definitions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.40 17439

---

### window functions are not allowed in DEFAULT expressions

[Description]

window functions are not allowed in DEFAULT expressions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.41 17440

---

### window functions are not allowed in index expressions

[Description]

window functions are not allowed in index expressions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.42 17441

---

### window functions are not allowed in index predicates

[Description]

window functions are not allowed in index predicates

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.43 17442

---

### window functions are not allowed in transform expressions

[Description]

window functions are not allowed in transform expressions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.44 17443

---

### window functions are not allowed in @1@

[Description]

window functions are not allowed in the SQL constructs like GROUP BY

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.45 17444

---

### aggregate functions are not allowed in a recursive query's recursive term

[Description]

aggregate functions are not allowed in a recursive query's recursive term

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.46 17445

---

### Direct arguments of an ordered-set aggregate must use only grouped columns.

[Description]

Direct arguments of an ordered-set aggregate must use only grouped columns

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.47 17446

---

### arguments to GROUPING must be grouping expressions of the associated query level

[Description]

arguments to GROUPING must be grouping expressions of the associated query level

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.48 17447

---

### multiple column definition lists are not allowed for the same function

[Description]

multiple column definition lists are not allowed for the same function

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.49 17448

---

---

### **ROWS FROM() with multiple functions cannot have a column definition list**

[Description]

ROWS FROM() with multiple functions cannot have a column definition list. Put a separate column definition list for each function inside ROWS FROM()

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.71.50 17449**

---

### **WITH ORDINALITY cannot be used with a column definition list**

[Description]

WITH ORDINALITY cannot be used with a column definition list. Put the column definition list inside ROWS FROM().

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.71.51 17450**

---

### **tablesample method @1@ does not exist**

[Description]

tablesample method does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.71.52 17451**

---

### **function @1@ must return type "tsm\_handler"**

[Description]

function must return type "tsm\_handler"

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.71.53 17452**

---

### **tablesample method @1@ does not support REPEATABLE**

[Description]

tablesample method does not support REPEATABLE

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.54 17453

---

### **TABLESAMPLE clause can only be applied to tables and materialized views**

[Description]

TABLESAMPLE clause can only be applied to tables and materialized views

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.55 17454

---

### **CUBE is limited to 12 elements**

[Description]

CUBE is limited to 12 elements

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.56 17455

---

### **Omit the parentheses in this OVER clause.**

[Description]

Omit the parentheses in this OVER clause

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.57 17456

---

### **an aggregate with DISTINCT must have at least one argument**

[Description]

an aggregate with DISTINCT must have at least one argument

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.58 17457

---

### **SELECT DISTINCT must have at least one column**

[Description]

SELECT DISTINCT must have at least one column

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.59 17458

---

### **ASC/DESC is not allowed in ON CONFLICT clause**

[Description]

ASC/DESC is not allowed in ON CONFLICT clause

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.60 17459

---

### **NULLS FIRST/LAST is not allowed in ON CONFLICT clause**

[Description]

NULLS FIRST/LAST is not allowed in ON CONFLICT clause

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.61 17460

---

### **ON CONFLICT DO UPDATE requires inference specification or constraint name**

[Description]

ON CONFLICT DO UPDATE requires inference specification or constraint name

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.62 17461

---

### ON CONFLICT is not supported with system catalog tables

[Description]

ON CONFLICT is not supported with system catalog tables

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.63 17462

---

### ON CONFLICT is not supported on table "@1@" used as a catalog table

[Description]

ON CONFLICT is not supported on table used as a catalog table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.64 17463

---

### argument of @1@ must be type @2@, not type @3@

[Description]

argument of the SQL construct must be of acceptable type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.65 17464

---

### argument declared "anyrange" is not a range type but type @1@

[Description]

argument declared \"anyrange\" is not a range type but type %s

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.66 17465

---

### column @1@.@2@ does not exist

[Description]

column does not exist.Re-check the column name referenced.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.67 17466

---

### syntax error at or near "(+)"

[Description]

syntax error at or near "(+)"

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.68 17467

---

### could not find element type for data type @1@

[Description]

could not find element type for data type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.69 17468

---

### WITHIN GROUP specified, but @1@ is not an aggregate function

[Description]

WITHIN GROUP specified, but the function is not an aggregate function

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.70 17469

---

---

### **FILTER specified, but @1@ is not an aggregate function**

[Description]

FILTER specified, but the function is not an aggregate function

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.71.71 17470**

---

### **WITHIN GROUP is required for ordered-set aggregate @1@**

[Description]

WITHIN GROUP is required for ordered-set aggregate

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.71.72 17471**

---

### **OVER is not supported for ordered-set aggregate @1@**

[Description]

OVER is not supported for ordered-set aggregate

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.71.73 17472**

---

### **@1@ is not an ordered-set aggregate, so it cannot have WITHIN GROUP**

[Description]

The function is not an ordered-set aggregate, so it cannot have WITHIN GROUP

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.71.74 17476**

---

### **VARIADIC argument must be an array**

[Description]

VARIADIC argument must be an array

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.75 17479

---

### system column "@1@" reference in check constraint is invalid

[Description]

system column reference in check constraint is invalid

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.76 17480

---

### primary key constraints are not supported on foreign tables

[Description]

primary key constraints are not supported on foreign tables

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.77 17481

---

### unique constraints are not supported on foreign tables

[Description]

unique constraints are not supported on foreign tables

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.78 17482

---

### foreign key constraints are not supported on foreign tables

[Description]

foreign key constraints are not supported on foreign tables

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.79 17483

---

### exclusion constraints are not supported on foreign tables

[Description]

exclusion constraints are not supported on foreign tables

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.80 17484

---

### LIKE is not supported for creating foreign tables

[Description]

LIKE is not supported for creating foreign tables

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.81 17485

---

### rules on materialized views are not supported

[Description]

rules on materialized views are not supported

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.82 17486

---

### poll() failed: @1@

[Description]

function call for poll() failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.83 17487

---

### huge TLB pages not supported on this platform

[Description]

huge TLB pages not supported on this platform

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.84 17488

---

### could not map anonymous shared memory: @1@

[Description]

could not map anonymous shared memory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.85 17489

---

### huge pages not supported on this platform

[Description]

huge pages not supported on this platform

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.86 17490

---

### could not create shared memory segment: error code @1@

[Description]

could not create shared memory segment

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.87 17491

---

**@1@: invalid argument: "@2@"**

[Description]

invalid argument

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.88 17492

---

**WAL archival cannot be enabled when wal\_level is "minimal"**

[Description]

WAL archival cannot be enabled when wal\_level is "minimal"

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.89 17493

---

**postmaster became multithreaded during startup**

[Description]

postmaster became multithreaded during startup

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.90 17494

---

**data directory "@1@" does not exist**

[Description]

data directory does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.71.91 17495

---

---

### performing immediate shutdown because data directory lock file is invalid

[Description]

performing immediate shutdown because data directory lock file is invalid

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.92 17497

---

### invalid processing mode in background worker

[Description]

invalid processing mode in background worker

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.93 17498

---

### could not create inherited socket: error code @1@

[Description]

could not create inherited socket

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.71.94 17499

---

### could not open backend variables file "@1@": @2@

[Description]

could not open backend variables file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72 Message Numbers Beginning with 17500

---

### 2.72.1 17500

---

**could not read from backend variables file "@1@": @2@**

[Description]

could not read from backend variables file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.72.2 17501

---

**could not map view of backend variables: error code @1@**

[Description]

could not map view of backend variables

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.72.3 17502

---

**could not unmap view of backend variables: error code @1@**

[Description]

could not unmap view of backend variables

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.72.4 17504

---

**could not write to log segment @1@ at offset @2@, length @3@: @4@**

[Description]

could not write to log segment

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.5 17505

---

**could not link file "@1@" to log segment "@2@" for initialization of log file : @3@**

[Description]

could not link file to log segment for initialization of log file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.6 17506

---

**could not rename file "@1@" to log segment "@2@" for initialization of log file : @3@**

[Description]

could not rename file to log segment for initialization of log file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.7 17507

---

**invalid timeline @1@**

[Description]

invalid timeline

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.8 17508

---

**could not stat control file "@1@" : @2@**

[Description]

could not stat control file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.9 17509

---

---

### could not find WAL file "@1@"

[Description]

could not find WAL file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.10 17510

---

### could not stat file or directory "@1@": @2@

[Description]

could not stat file or directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.11 17511

---

### file name too long for tar format: "@1@"

[Description]

file name too long for tar format

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.12 17512

---

### could not send end-of-streaming message to primary: @1@

[Description]

could not send end-of-streaming message to primary

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.13 17513

---

### error reading result of streaming command: @1@

[Description]

error reading result of streaming command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.14 17514

---

### [unexpected result after CommandComplete: @1@](#)

[Description]

unexpected result after CommandComplete

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.15 17515

---

### [could not receive timeline history file from the primary server: @1@](#)

[Description]

could not receive timeline history file from the primary server

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.16 17516

---

### [logical decoding requires wal\\_level >= logical](#)

[Description]

logical decoding requires wal\_level >= logical

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.17 17517

---

### [logical decoding requires a database connection](#)

[Description]

logical decoding requires a database connection

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.18 17518

---

### logical decoding cannot be used while in recovery

[Description]

logical decoding cannot be used while in recovery

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.19 17519

---

### cannot use physical replication slot for logical decoding

[Description]

cannot use physical replication slot for logical decoding

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.20 17520

---

### replication slot "@1@" was not created in this database

[Description]

replication slot was not created in this database

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.21 17521

---

### cannot create logical replication slot in transaction that has performed writes

[Description]

cannot create logical replication slot in transaction that has performed writes

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.22 17522

---

### must be superuser or replication role to use replication slots

[Description]

must be superuser or replication role to use replication slots

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.23 17523

---

### array must be one-dimensional

[Description]

The provided input array must be one-dimensional

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.24 17524

---

### array must not contain nulls

[Description]

The provided input array must not contain nulls

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.25 17525

---

### array must have even number of elements

[Description]

The provided input array must have even number of elements

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.26 17526

---

**logical decoding output plugin "@1@" produces binary output, but function "@2@" expects textual data**

[Description]

logical decoding output plugin produces binary output, but function expects textual data

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.27 17527

---

**only superusers can query or manipulate replication origins**

[Description]

only superusers can query or manipulate replication origins

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.28 17528

---

**cannot query or manipulate replication origin when max\_replication\_slots = 0**

[Description]

cannot query or manipulate replication origin when max\_replication\_slots = 0

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.29 17529

---

**cannot manipulate replication origins during recovery**

[Description]

cannot manipulate replication origins during recovery

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.30 17530

---

### could not find free replication origin OID

[Description]

could not find free replication origin OID

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.31 17531

---

### could not drop replication origin with OID @1@, in use by PID @2@

[Description]

could not drop replication origin with OID as it is in use by a process

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.32 17532

---

### replication checkpoint has wrong magic @1@ instead of @2@

[Description]

replication checkpoint has wrong magic number instead of a correct magic number provided

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.33 17533

---

### could not read file "@1@": read @2@ of @3@

[Description]

could not read file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.34 17534

---

---

**could not find free replication state, increase max\_replication\_slots****[Description]**

could not find free replication state, increase max\_replication\_slots

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.72.35 17535**

---

**replication slot checkpoint has wrong checksum @1@, expected @2@****[Description]**

replication slot checkpoint has wrong checksum value, expected value is shown

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.72.36 17536**

---

**replication origin with OID @1@ is already active for PID @2@****[Description]**

replication origin with OID is already active for process with PID

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.72.37 17537**

---

**could not find free replication state slot for replication origin with OID @1@****[Description]**

could not find free replication state slot for replication origin with OID %u

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.72.38 17538**

---

**replication identifier @1@ is already active for PID @2@**

[Description]

replication identifier is already active for process PID

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.39 17539

---

### no replication origin is configured

[Description]

no replication origin is configured

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.40 17540

---

### could not write to data file for XID @1@: @2@

[Description]

could not write to data file for XID

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.41 17541

---

### could not read from reorderbuffer spill file: @1@

[Description]

could not read from reorderbuffer spill file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.42 17542

---

### could not read from reorderbuffer spill file: read @1@ instead of @2@ bytes

[Description]

could not read from reorderbuffer spill file: read instead of bytes

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.43 17543

---

**could not read from file "@1@": read @2@ instead of @3@ bytes**

[Description]

could not read from file : read some bytes instead of actual bytes

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.44 17544

---

**could not read file "@1@", read @2@ of @3@: @4@**

[Description]

could not read file read some bytes instead of actual bytes

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.45 17545

---

**snapbuild state file "@1@" has wrong magic number: @2@ instead of @3@**

[Description]

snapbuild state file has wrong magic number: instead of actual magic number

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.46 17546

---

**snapbuild state file "@1@" has unsupported version: @2@ instead of @3@**

[Description]

snapbuild state file has unsupported version: instead of actual version number

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.47 17547

---

### checksum mismatch for snapbuild state file "@1@": is @2@, should be @3@

[Description]

checksum mismatch for snapbuild state file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.48 17548

---

### replication slot name "@1@" is too short

[Description]

replication slot name is too short

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.49 17549

---

### replication slot name "@1@" is too long

[Description]

replication slot name \"%s\" is too long

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.50 17550

---

### replication slot name "@1@" contains invalid character

[Description]

replication slot name \"%s\" contains invalid character

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.51 17551

---

### replication slot "@1@" already exists

[Description]

replication slot already exists invalid character

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.52 17552

---

### all replication slots are in use

[Description]

all replication slots are in use character

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.53 17553

---

### replication slot "@1@" does not exist

[Description]

replication slot does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.54 17554

---

### replication slot "@1@" is already active for PID @2@

[Description]

replication slot \"%s\" is already active for PID

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.55 17555

---

---

**could not remove directory "@1@"****[Description]**

could not remove directory

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.72.56 17556**

---

**replication slots can only be used if max\_replication\_slots > 0****[Description]**

replication slots can only be used if max\_replication\_slots > 0

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.72.57 17557**

---

**replication slots can only be used if wal\_level >= archive****[Description]**

replication slots can only be used if wal\_level >= archive

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.72.58 17558**

---

**could not read file "@1@", read @2@ of @3@: @4@****[Description]**

could not read file

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.72.59 17559**

---

**replication slot file "@1@" has wrong magic number: @2@ instead of @3@**

[Description]

replication slot file has wrong magic number

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.60 17560

---

### replication slot file "@1@" has unsupported version @2@

[Description]

replication slot file has unsupported version

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.61 17561

---

### replication slot file "@1@" has corrupted length @2@

[Description]

replication slot file has corrupted length

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.62 17562

---

### checksum mismatch for replication slot file "@1@": is @2@, should be @3@

[Description]

checksum mismatch for replication slot file \"%s\": is %u, should be %u

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.63 17563

---

### too many replication slots active before shutdown

[Description]

too many replication slots active before shutdown

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.64 17564

---

**terminating walreceiver due to timeout**

[Description]

terminating walreceiver due to timeout

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.65 17566

---

**could not seek to beginning of file "@1@": @2@**

[Description]

could not seek to beginning of file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.66 17567

---

**cannot use a logical replication slot for physical replication**

[Description]

cannot use a logical replication slot for physical replication

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.67 17568

---

**requested starting point @1@/@2@ on timeline @3@ is not in this server's history**

[Description]

While streaming WALs during standby recovery. Requested starting point on timeline is not in this server's history

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.68 17570

---

**could not convert table "@1@" to a view because it has row security enabled**

[Description]

could not convert table to a view because it has row security enabled

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.69 17571

---

**could not convert table "@1@" to a view because it has row security policies**

[Description]

could not convert table to a view because it has row security policies

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.70 17573

---

**renaming an ON SELECT rule is not allowed**

[Description]

renaming an ON SELECT rule is not allowed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.71 17574

---

**infinite recursion detected in policy for relation "@1@"**

[Description]

infinite recursion detected in policy for relation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.72 17575

---

### cannot insert into column "@1@" of view "@2@"

[Description]

cannot insert into column of view

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.73 17576

---

### cannot update column "@1@" of view "@2@"

[Description]

cannot update column of view

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.74 17577

---

### INSERT with ON CONFLICT clause cannot be used with table that has INSERT or UPDATE rules

[Description]

INSERT with ON CONFLICT clause cannot be used with table that has INSERT or UPDATE rules

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.75 17578

---

### NEW variables in ON UPDATE rules cannot reference columns that are part of a multiple assignment in the subject UPDATE command

[Description]

NEW variables in ON UPDATE rules cannot reference columns that are part of a multiple assignment in the subject UPDATE command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.76 17579

---

**exceeded maxAllocatedDescs (@1@) while trying to execute command "@2@"**

[Description]

exceeded maxAllocatedDescs while trying to execute command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.77 17580

---

**could not duplicate handle for "@1@": @2@**

[Description]

could not duplicate handle for the segment

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.78 17581

---

**invalid flags for opening a large object: @1@**

[Description]

invalid flags for opening a large object

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.79 17582

---

**invalid whence setting: @1@**

[Description]

invalid whence setting

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.80 17583

---

---

### invalid large object write request size: @1@

[Description]

invalid large object write request size

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.81 17584

---

### canceling statement due to lock timeout

[Description]

canceling statement due to lock timeout. Check the process holding the lock.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.82 17585

---

### @1@: invalid command-line argument: @2@

[Description]

invalid command-line argument

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.83 17586

---

### fastpath function calls not supported in a replication connection

[Description]

fastpath function calls not supported in a replication connection

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.84 17587

---

### extended query protocol not supported in a replication connection

[Description]

extended query protocol not supported in a replication connection

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.85 17588

---

### cannot execute @1@ during a parallel operation

[Description]

cannot execute SQL commands such as CREATE during a parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.86 17589

---

### too many lexemes in thesaurus entry

[Description]

too many lexemes in thesaurus entry

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.87 17590

---

### input data type is not an array

[Description]

input data type is not an array

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.88 17591

---

### searching for elements in multidimensional arrays is not supported

[Description]

searching for elements in multidimensional arrays is not supported

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.89 17593

---

**data type @1@ is not an array type**

[Description]

data type is not an array type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.90 17594

---

**cannot accumulate null arrays**

[Description]

cannot accumulate null arrays

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.91 17595

---

**cannot accumulate empty arrays**

[Description]

cannot accumulate empty arrays

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.72.92 17596

---

**cannot accumulate arrays of different dimensionality**

[Description]

cannot accumulate arrays of different dimensionality

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.93 17597

---

### removing elements from multidimensional arrays is not supported

[Description]

removing elements from multidimensional arrays is not supported

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.94 17598

---

### thresholds must be one-dimensional array

[Description]

thresholds must be one-dimensional array

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.72.95 17599

---

### thresholds array must not contain NULLs

[Description]

thresholds array must not contain NULLs

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73 Message Numbers Beginning with 17600

---

### 2.73.1 17600

---

#### date field value out of range: @1 @-@2 @-@3 @

[Description]

date field value out of range

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.2 17601

---

### date out of range: @1@-@2@-@3@

[Description]

date out of range

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.3 17602

---

### time field value out of range: @1@:@2@:@3@

[Description]

time field value out of range

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.4 17603

---

### time zone abbreviation "@1@" is not used in time zone "@2@"

[Description]

time zone abbreviation is not used in time zone

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.5 17608

---

### localized string format value too long

[Description]

localized string format value too long

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.6 17609

---

### invalid line specification: must be two distinct points

[Description]

invalid line specification: must be two distinct points

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.7 17610

---

### invalid line specification: A and B cannot both be zero

[Description]

invalid line specification: A and B cannot both be zero

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.8 17611

---

### function "close\_sl" not implemented

[Description]

function "close\_sl" not implemented

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.9 17612

---

### invalid input syntax for type json

[Description]

invalid input syntax for type json

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.10 17613

---

---

### **"\u" must be followed by four hexadecimal digits.**

[Description]

must be followed by four hexadecimal digits. Check the syntax

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.73.11 17614**

---

### **unsupported Unicode escape sequence**

[Description]

unsupported Unicode escape sequence

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.73.12 17615**

---

### **key value must be scalar, not array, composite, or json**

[Description]

key value must be scalar, not array, composite, or json

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.73.13 17616**

---

### **could not determine data type for argument 1**

[Description]

could not determine data type for argument 1

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.73.14 17617**

---

### **could not determine data type for argument 2**

[Description]

could not determine data type for argument 2

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.15 17618

---

### field name must not be null

[Description]

field name must not be null

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.16 17619

---

### argument list must have even number of elements

[Description]

argument list must have even number of elements

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.17 17620

---

### could not determine data type for argument @1@

[Description]

could not determine data type for argument

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.18 17621

---

### argument @1@ cannot be null

[Description]

argument cannot be null

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.19 17622

---

### array must have two columns

[Description]

array must have two columns

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.20 17623

---

### null value not allowed for object key

[Description]

null value not allowed for object key

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.21 17624

---

### mismatched array dimensions

[Description]

mismatched array dimensions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.22 17625

---

### string too long to represent as jsonb string

[Description]

string too long to represent as jsonb string

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.23 17626

---

**invalid number of arguments: object must be matched key value pairs**

[Description]

invalid number or arguments: object must be matched key value pairs

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.24 17629

---

**object keys must be strings**

[Description]

object keys must be strings

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.25 17630

---

**number of jsonb object pairs exceeds the maximum allowed (@1@)**

[Description]

number of jsonb object pairs exceeds the maximum allowed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.26 17631

---

**number of jsonb array elements exceeds the maximum allowed (@1@)**

[Description]

number of jsonb array elements exceeds the maximum allowed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.27 17632

---

### total size of jsonb array elements exceeds the maximum of @1@ bytes

[Description]

total size of jsonb array elements exceeds the maximum number of bytes

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.28 17633

---

### total size of jsonb object elements exceeds the maximum of @1@ bytes

[Description]

total size of jsonb object elements exceeds the maximum number of bytes

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.29 17634

---

### cannot call @1@ on a scalar

[Description]

cannot call this function on a scalar input

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.30 17635

---

### cannot call @1@ on an array

[Description]

cannot call this function on an array input

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.31 17636

---

---

### cannot get array length of a scalar

[Description]

cannot get array length of a scalar

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.32 17637

---

### cannot get array length of a non-array

[Description]

cannot get array length of a non-array

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.33 17639

---

### function returning record called in context that cannot accept type record

[Description]

function returning record called in context that cannot accept type record

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.34 17640

---

### cannot deconstruct an array as an object

[Description]

cannot deconstruct an array as an object

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.35 17641

---

### cannot deconstruct a scalar

[Description]

cannot deconstruct a scalar

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.36 17642

---

### cannot extract elements from a scalar

[Description]

cannot extract elements from a scalar

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.37 17643

---

### cannot extract elements from an object

[Description]

cannot extract elements from an object

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.38 17644

---

### cannot call @1@ on a non-array

[Description]

cannot call this function on a non-array input

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.39 17645

---

### first argument of @1@ must be a row type

[Description]

first argument of this function must be a row type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.40 17646

---

**argument of @1@ must be an array of objects**

[Description]

argument of must be an array of objects

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.41 17647

---

**cannot call @1@ on an object**

[Description]

cannot call this function on an object input

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.42 17648

---

**cannot delete from scalar**

[Description]

cannot delete from scalar

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.43 17649

---

**cannot delete from object using integer index**

[Description]

cannot delete from object using integer subscript

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.44 17650

---

### cannot set path in scalar

[Description]

cannot set path in scalar

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.45 17651

---

### cannot delete path in scalar

[Description]

cannot delete path in scalar

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.46 17652

---

### invalid concatenation of jsonb objects

[Description]

invalid concatenation of jsonb objects

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.47 17653

---

### argument exceeds the maximum length of @1@ bytes

[Description]

argument exceeds the maximum length of bytes

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.48 17654

---

### cannot use advisory locks during a parallel operation

[Description]

cannot use advisory locks during a parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.49 17656

---

### must be a member of the role whose query is being canceled

[Description]

must be a member of the role whose query is being canceled

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.50 17657

---

### must be a superuser to terminate superuser process

[Description]

must be a superuser to terminate superuser process

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.51 17658

---

### must be a member of the role whose process is being terminated

[Description]

must be a member of the role whose process is being terminated

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.52 17659

---

---

### cannot merge addresses from different families

[Description]

cannot merge addresses from different families

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.53 17660

---

### invalid scale in external "numeric" value

[Description]

invalid scale in external \"numeric\" value

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.54 17661

---

### start value cannot be NaN

[Description]

While generating a numeric series - start value cannot be NaN

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.55 17662

---

### stop value cannot be NaN

[Description]

stop value cannot be NaN

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.56 17663

---

### step size cannot be NaN

[Description]

step size cannot be NaN

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.57 17664

---

### percentile value @1@ is not between 0 and 1

[Description]

percentile value %g is not between 0 and 1

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.58 17665

---

### invalid input syntax for type pg\_lsn: "@1@"

[Description]

invalid input syntax for type pg\_lsn

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.59 17666

---

### function can only be called when server is in binary upgrade mode

[Description]

function can only be called when server is in binary upgrade mode

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.60 17667

---

### cannot accept a value of type event\_trigger

[Description]

cannot accept a value of type event\_trigger

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.61 17668

---

**cannot display a value of type event\_trigger**

[Description]

cannot display a value of type event\_trigger

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.62 17669

---

**cannot accept a value of type tsm\_handler**

[Description]

cannot accept a value of type tsm\_handler

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.63 17670

---

**cannot display a value of type tsm\_handler**

[Description]

cannot display a value of type tsm\_handler

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.73.64 17672

---

**cannot output a value of type @1@**

[Description]

cannot output a value of type pg\_ddl\_command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.65 17673

---

### malformed range literal: "@1@"

[Description]

malformed range literal. Check the input string format

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.66 17674

---

### invalid input syntax for numeric time zone: "@1@"

[Description]

invalid input syntax for numeric time zone

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.67 17675

---

### numeric time zone "@1@" out of range

[Description]

numeric time zone out of range

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.68 17676

---

### timestamp out of range: @1@-@2@-@3@ @4@:@5@:@6@

[Description]

timestamp out of range

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.69 17677

---

### interval units "@1@" not supported because months usually have fractional weeks

[Description]

interval units \"%s\" not supported because months usually have fractional weeks

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.70 17678

---

### invalid external txid\_snapshot data

[Description]

invalid external txid\_snapshot data

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.71 17679

---

### unterminated format specifier

[Description]

unterminated format specifier

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.72 17680

---

### number is out of range

[Description]

number is out of range

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.73 17681

---

---

### **width argument position must be ended by "\$"**

[Description]

width argument position must be ended by \"\$\"

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.73.74 17682**

---

### **type @1@ is not composite**

[Description]

type is not composite

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.73.75 17683**

---

### **keystore location "@1@" is too long**

[Description]

While configuring a keystore, the error is "keystore location mentioned is too long".

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.73.76 17684**

---

### **keystore does not exist**

[Description]

keystore does not exist. Make sure keystore\_location points to the correct location. If the setting is correct, set the master encryption key to create the keystore.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.73.77 17685**

---

### **must be superuser to manipulate keystore**

[Description]

must be superuser to manipulate keystore

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.78 17686

---

### **function "@1@" is not supported by this build**

[Description]

function \"%s\" is not supported by this build

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.79 17687

---

### **file "@1@" is not a keystore**

[Description]

file \"%s\" is not a keystore

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.80 17688

---

### **lock file "@1@" is empty**

[Description]

lock file is empty. Check if the lockfile is corrupt.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.81 17689

---

### **could not access directory "@1@" : @2@**

[Description]

could not access directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.82 17690

---

**bind\_textdomain\_codeset failed**

[Description]

bind\_textdomain\_codeset failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.83 17691

---

**parameter "@1@" requires a numeric value**

[Description]

parameter \"%s\" requires a numeric value

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.84 17692

---

**cannot set parameters during a parallel operation**

[Description]

cannot set parameters during a parallel operation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.85 17693

---

**permission denied to set parameter "@1@"**

[Description]

permission denied to set parameter

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.86 17694

---

### must be superuser to execute ALTER SYSTEM command

[Description]

must be superuser to execute ALTER SYSTEM command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.87 17696

---

### parameter "@1@" could not be set

[Description]

parameter could not be set

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.88 17698

---

### could not seek in tuplestore temporary file: @1@

[Description]

could not seek in tuplestore temporary file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.73.89 17699

---

### could not read from tuplestore temporary file: @1@

[Description]

could not read from tuplestore temporary file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74 Message Numbers Beginning with 17700

---

### 2.74.1 17700

---

**could not write to tuplestore temporary file: @1@**

[Description]

could not write to tuplestore temporary file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.74.2 17703

---

**user does not exist**

[Description]

user does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.74.3 17704

---

**@1@: could not open directory "@2@": @3@**

[Description]

could not open directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.74.4 17705

---

**@1@: could not read directory "@2@": @3@**

[Description]

could not read directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.5 17706

---

**@1@: could not stat file "@2@": @3@**

[Description]

could not stat file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.6 17707

---

**@1@: could not open file "@2@": @3@**

[Description]

could not open file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.7 17708

---

**@1@: directory name too long**

[Description]

directory name too long

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.8 17709

---

**@1@: multiple "=" signs in tablespace mapping**

[Description]

multiple signs in tablespace mapping

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.9 17710

---

---

**@1@: invalid tablespace mapping format "@2@", must be "OLDDIR=NEWDIR"****[Description]**

invalid tablespace mapping format must be OLDDIR=NEWDIR

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.74.10 17711**

---

**@1@: old directory is not an absolute path in tablespace mapping: @2@****[Description]**

old directory is not an absolute path in tablespace mapping

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.74.11 17712**

---

**@1@: new directory is not an absolute path in tablespace mapping: @2@****[Description]**

new directory is not an absolute path in tablespace mapping

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.74.12 17713**

---

**@1@: transfer rate "@2@" is not a valid value****[Description]**

backup transfer rate is not a valid value

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.74.13 17714**

---

**@1@: invalid transfer rate "@2@" : @3@**

[Description]

invalid transfer rate

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.14 17715

---

**@1@: transfer rate must be greater than zero**

[Description]

transfer rate must be greater than zero

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.15 17716

---

**@1@: invalid --max-rate unit: "@2@"**

[Description]

invalid --max-rate unit

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.16 17717

---

**@1@: transfer rate "@2@" exceeds integer range**

[Description]

Transfer rate exceeds integer range

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.17 17718

---

**@1@: transfer rate "@2@" is out of range**

[Description]

Transfer rate is out of range

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.18 17719

---

**@1@: incompatible server version @2@**

[Description]

incompatible server version

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.19 17720

---

**@1@: server returned unexpected response to BASE\_BACKUP command; got @2@ rows and @3@ fields, expected @4@ rows and @5@ fields**

[Description]

server returned unexpected response to BASE\_BACKUP command; got rows and fields, expected rows and fields

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.20 17721

---

**@1@: invalid xlog-method option "@2@", must be "fetch" or "stream"**

[Description]

invalid xlog-method option : must be fetch or stream

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.21 17722

---

**@1@: transaction log directory location can only be specified in plain mode**

[Description]

transaction log directory location can only be specified in plain mode

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.22 17723

---

**@1@: could not create symbolic link "@2@": @3@**

[Description]

could not create symbolic link

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.23 17724

---

**@1@: symlinks are not supported on this platform**

[Description]

symlinks are not supported on this platform

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.24 17725

---

**@1@: cannot use --create-slot together with --drop-slot**

[Description]

cannot use --create-slot together with --drop-slot

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.25 17726

---

**@1@: @2@ needs a slot to be specified using --slot**

[Description]

needs a slot to be specified using --slot

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.26 17727

---

**@1@: could not fsync log file "@2@": @3@**

[Description]

could not fsync log file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.27 17728

---

**@1@: could not open log file "@2@": @3@**

[Description]

could not open log file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.28 17729

---

**@1@: invalid fsync interval "@2@"**

[Description]

invalid fsync interval

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.29 17730

---

**@1@: could not parse start position "@2@"**

[Description]

could not parse start position

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.30 17731

---

### @1@: no slot specified

[Description]

no slot specified

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.31 17732

---

### @1@: no target file specified

[Description]

no target file specified

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.32 17733

---

### @1@: no database specified

[Description]

no database specified

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.33 17734

---

### @1@: at least one action needs to be specified

[Description]

at least one action needs to be specified

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.34 17735

---

---

**@1@: cannot use --create-slot or --start together with --drop-slot****[Description]**

cannot use --create-slot or --start together with --drop-slot

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.74.35 17736**

---

**@1@: cannot use --create-slot or --drop-slot together with --startpos****[Description]**

cannot use --create-slot or --drop-slot together with --startpos

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.74.36 17737**

---

**@1@: could not establish database-specific replication connection****[Description]**

could not establish database-specific replication connection

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.74.37 17738**

---

**@1@: could not create archive status file "@2@": @3@****[Description]**

could not create archive status file

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.74.38 17739**

---

**@1@: could not open timeline history file "@2@": @3@**

[Description]

could not open timeline history file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.39 17740

---

**@1@: server reported unexpected history file name for timeline @2@: @3@**

[Description]

server reported unexpected history file name for timeline

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.40 17741

---

**@1@: could not create timeline history file "@2@": @3@**

[Description]

could not create timeline history file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.41 17742

---

**@1@: could not write timeline history file "@2@": @3@**

[Description]

could not write timeline history file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.42 17743

---

**@1@: could not rename file "@2@" to "@3@": @4@**

[Description]

could not rename file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.43 17744

---

**@1@: incompatible server version @2@; client does not support streaming from server versions older than @3@**

[Description]

incompatible server version; client does not support streaming from server versions older than

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.44 17745

---

**@1@: incompatible server version @2@; client does not support streaming from server versions newer than @3@**

[Description]

incompatible server version; client does not support streaming from server versions newer than

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.45 17746

---

**@1@: starting timeline @2@ is not present in the server**

[Description]

starting timeline is not present in the server

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.46 17747

---

**@1@: server reported unexpected next timeline @2@, following timeline @3@**

[Description]

server reported unexpected next timeline, following timeline

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.47 17748

---

**@1@: server stopped streaming timeline @2@ at @3@/@4@, but reported next timeline @5@ to begin at @6@/@7@**

[Description]

server stopped streaming a timeline, but reported next timeline

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.48 17749

---

**@1@: unexpected result set after end-of-timeline: got @2@ rows and @3@ fields, expected @4@ rows and @5@ fields**

[Description]

unexpected result set after end-of-timeline: got unexpected rows and fields

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.49 17750

---

**@1@: could not parse next timeline's starting point "@2@"**

[Description]

could not parse next timeline's starting point

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.50 17751

---

**@1@: socket not open**

[Description]

socket not open

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.51 17752

---

**@1@: could not send copy-end packet: @2@**

[Description]

could not send copy-end packet

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.52 17753

---

**@1@: could not connect to server: @2@**

[Description]

could not connect to server

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.53 17754

---

**@1@: could not create replication slot "@2@": got @3@ rows and @4@ fields, expected @5@ rows and @6@ fields**

[Description]

could not create replication slot : got unexpected rows and fields

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.54 17755

---

**@1@: could not drop replication slot "@2@": got @3@ rows and @4@ fields, expected @5@ rows and @6@ fields**

[Description]

could not drop replication slot : got rows and fields mismatch with, expected rows and fields

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.55 17758

---

**@1@: WSAStartup failed: @2@**

[Description]

WSAStartup failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.56 17759

---

**could not create communication channels: @1@**

[Description]

could not create communication channels

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.57 17760

---

**could not get relation name for OID @1@: @2@**

[Description]

could not get relation name for OID

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.58 17761

---

**unrecognized command on communication channel: @1@**

[Description]

unrecognized command on communication channel

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.59 17762

---

**invalid message received from worker: @1@**

[Description]

invalid message received from worker

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.60 17763

---

**error processing a parallel work item**

[Description]

error processing a parallel work item

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.61 17764

---

**could not write to the communication channel: @1@**

[Description]

could not write to the communication channel

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.62 17765

---

**error in ListenToWorkers(): @1@**

[Description]

error in ListenToWorkers()

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.63 17766

---

### [pgpipe: could not create socket: error code @1@](#)

#### [Description]

pgpipe: could not create socket

#### [System Processing]

Processing aborts

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.64 17767

---

### [pgpipe: could not bind: error code @1@](#)

#### [Description]

pgpipe: could not bind

#### [System Processing]

Processing aborts

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.65 17768

---

### [pgpipe: could not listen: error code @1@](#)

#### [Description]

pgpipe: could not listen

#### [System Processing]

Processing aborts

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.66 17769

---

### [pgpipe: getsockname\(\) failed: error code @1@](#)

#### [Description]

pgpipe: getsockname() failed

#### [System Processing]

Processing aborts

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.67 17770

---

---

### **pgpipe: could not create second socket: error code @1@**

[Description]

pgpipe: could not create second socket

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.74.68 17771**

---

### **pgpipe: could not connect socket: error code @1@**

[Description]

pgpipe: could not connect socket

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.74.69 17772**

---

### **error during backup**

[Description]

error during backup

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.74.70 17773**

---

### **unexpected COPY statement syntax: "@1@"**

[Description]

unexpected COPY statement syntax

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.74.71 17774**

---

### **options -s/--schema-only and -a/--data-only cannot be used together**

[Description]

options `-s/--schema-only` and `-a/--data-only` cannot be used together

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.74.72 17775

---

### **options `-c/--clean` and `-a/--data-only` cannot be used together**

[Description]

options `-c/--clean` and `-a/--data-only` cannot be used together

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.74.73 17776

---

### **option `--if-exists` requires option `-c/--clean`**

[Description]

option `--if-exists` requires option `-c/--clean`

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.74.74 17777

---

### **@1@: invalid number of parallel jobs**

[Description]

%s: invalid number of parallel jobs

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.74.75 17778

---

### **parallel backup only supported by the directory format**

[Description]

parallel backup only supported by the directory format

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.74.76 17779

---

**Exported snapshots are not supported by this server version.**

[Description]

Exported snapshots are not supported by this server version

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.74.77 17780

---

**unexpected policy command type: "@1@"**

[Description]

unexpected policy command type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.74.78 17781

---

**@1@: options -g/--globals-only and -r/--roles-only cannot be used together**

[Description]

options -g/--globals-only and -r/--roles-only cannot be used together

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.74.79 17782

---

**@1@: options -g/--globals-only and -t/--tablespaces-only cannot be used together**

[Description]

options -g/--globals-only and -t/--tablespaces-only cannot be used together

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.80 17783

---

### @1 @: option --if-exists requires option -c/--clean

[Description]

option --if-exists requires option -c/--clean

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.81 17784

---

### @1 @: options -r/--roles-only and -t/--tablespaces-only cannot be used together

[Description]

options -r/--roles-only and -t/--tablespaces-only cannot be used together

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.82 17785

---

### @1 @: options -d/--dbname and -f/--file cannot be used together

[Description]

options -d/--dbname and -f/--file cannot be used together

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.83 17786

---

### @1 @: options -c/--clean and -a/--data-only cannot be used together

[Description]

options -c/--clean and -a/--data-only cannot be used together

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.84 17787

---

### @1@: cannot specify both --single-transaction and multiple jobs

[Description]

cannot specify both --single-transaction and multiple jobs

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.85 17788

---

### @1@: could not start server: @2@

[Description]

could not start server

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.86 17789

---

### @1@: could not start server: error code @2@

[Description]

could not start server: error code

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.87 17790

---

### encoding conversion error on line @1@

[Description]

encoding conversion error on line

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.88 17791

---

---

### invalid value for numeric type "@1@" on line @2@

[Description]

invalid value for numeric type on line

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.74.89 17792

---

### length of nvarchar type is not assined

[Description]

length of nvarchar type is not assined

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.74.90 17793

---

### @1@: could not locate my own executable path

[Description]

could not locate my own executable path

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.74.91 17794

---

### lookup failed for type @1@

[Description]

lookup failed for type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.74.92 17795

---

### didn't get a return item from function

[Description]

didn't get a return item from function

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.93 17796

---

### couldn't fetch \$\_TD

[Description]

couldn't fetch \$\_TD

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.94 17797

---

### didn't get a return item from trigger function

[Description]

didn't get a return item from trigger function

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.95 17798

---

### event trigger functions cannot have declared arguments

[Description]

event trigger functions cannot have declared arguments

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.74.96 17799

---

### GET STACKED DIAGNOSTICS cannot be used outside an exception handler

[Description]

GET STACKED DIAGNOSTICS cannot be used outside an exception handler

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.75 Message Numbers Beginning with 17800**

---

### **2.75.1 17800**

---

**cannot return non-composite value from function returning composite type**

[Description]

cannot return non-composite value from function returning composite type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### **2.75.2 17801**

---

**label does not exist**

[Description]

label does not exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### **2.75.3 17802**

---

**too many arguments for cursor**

[Description]

too many arguments for cursor

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### **2.75.4 17803**

---

**too many arguments for cursor**

[Description]

too many arguments for cursor

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.5 17804

---

**@1@ cannot be used as a role name here**

[Description]

Reserved name cannot be used as a role name here

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.6 17805

---

**@1@ is not allowed with UNION/INTERSECT/EXCEPT**

[Description]

Locking clause is not allowed with UNION/INTERSECT/EXCEPT

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.7 17806

---

**@1@: could not access directory "@2@": @3@**

[Description]

Failure in accessing directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.8 17807

---

**@1@: could not allocate SIDs: error code @2@**

[Description]

Failure in allocating SIDs

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.9 17808

---

**@1@: could not change permissions of "@2@": @3@**

[Description]

Failure in changing the permissions of a file/directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.10 17809

---

**@1@: could not close directory "@2@": @3@**

[Description]

Failure in closing directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.11 17810

---

**@1@: could not close directory "@2@": @3@**

[Description]

Failure in closing a directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.12 17811

---

**@1@: could not create restricted token: error code @2@**

[Description]

Failure in creating restricted token

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.13 17812

---

**@1@: could not fsync file "@2@": @3@**

[Description]

Failure in syncing the file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.14 17813

---

**@1@: could not get exit code from subprocess: error code @2@**

[Description]

Failure in getting the exit code of a child process

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.15 17814

---

**@1@: could not locate my own executable path**

[Description]

Executable path not defined

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.16 17815

---

**@1@: could not open file "@2@": @3@**

[Description]

The provided index is not a BRIN index

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.17 17816

---

---

**@1@: could not open process token: error code @2@**

[Description]

Failure in opening process token

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.75.18 17817

---

**@1@: could not open registry key "@2@": error code @3@**

[Description]

Failure in opening the registry key to check the license

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.75.19 17818

---

**@1@: could not read directory "@2@": @3@**

[Description]

Failure in reading from a directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.75.20 17819

---

**@1@: could not read file "@2@": @3@**

[Description]

Failure in reading the file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.75.21 17820

---

**@1@: could not read the value "@2@" of the registry entry: error code @3@**

[Description]

Failure in reading the registry key to check the license

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.22 17821

---

**@1@: could not re-execute with restricted token: error code @2@**

[Description]

re-executing with a restricted token is not allowed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.23 17822

---

**@1@: could not remove promote signal file "@2@": @3@**

[Description]

Failure in removing promote signal file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.24 17823

---

**@1@: could not start process for command "@2@": error code @3@**

[Description]

Process start failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.25 17824

---

**@1@: could not write @2@ bytes to log file "@3@": @4@**

[Description]

Failure in writing to a file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.26 17825

---

**@1@: directory "@2@" does not exist**

[Description]

directory doesn't exist

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.27 17826

---

**@1@: directory "@2@" is not a database cluster directory**

[Description]

directory is not a database cluster directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.28 17827

---

**@1@: invalid argument for option -f: "@2@"**

[Description]

Invalid argument

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.29 17828

---

**@1@: invalid argument for option -t: "@2@"**

[Description]

Invalid argument

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.30 17829

---

### @1@: keystore location "@2@" is too long

[Description]

keystore location is more than 1024 characters

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.31 17830

---

### @1@: oldest multitransaction ID (-m) must not be 0

[Description]

The provided oldest multitransaction ID (-m) must not be 0

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.32 17831

---

### @1@: out of memory

[Description]

out of memory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.33 17832

---

### @1@: out of memory

[Description]

out of memory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.34 17833

---

### @1@: replication connection using slot "@2@" is unexpectedly database specific

[Description]

replication connection using slot specified is unexpectedly database specific

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.35 17834

---

### @1@: the PID file "@2@" is empty

[Description]

Wrong PID file is found, it is empty

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.36 17835

---

### @1@: too many command-line arguments (first is "@2@")

[Description]

too many command-line arguments

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.37 17836

---

### @1@: transaction ID (-c) must be either 0 or greater than or equal to 2

[Description]

Provided transaction ID (-c) must be either 0 or greater than or equal to 2

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.38 17837

---

---

**@1@: unexpected response to TIMELINE\_HISTORY command: got @2@ rows and @3@ fields, expected @4@ rows and @5@ fields**

[Description]

Response from server to TIMELINE\_HISTORY command is wrong from the expected

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.75.39 17838

---

**"@1@" is a symbolic link, but symbolic links are not supported on this platform**

[Description]

Symbolic links are not supported in this platform

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.75.40 17839

---

**"@1@" is not a BRIN index**

[Description]

The provided index is not a BRIN index

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.75.41 17840

---

**"@1@" is not a directory or symbolic link**

[Description]

Specified path is not a directory or symbolic link

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.75.42 17841

---

**"@1@" is not a directory**

[Description]

The specified path is not a directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.43 17842

---

### "@1@" is not a regular file

[Description]

The specified file is not a regular file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.44 17843

---

### "@1@" is not a symbolic link

[Description]

The specified path/file is not a symbolic link

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.45 17844

---

### "@1@" is not a table, view, materialized view, sequence, or foreign table

[Description]

Object is not a table, view, materialized view, sequence, or foreign table to do the alter relation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.46 17845

---

### "@1@" : stopping truncate due to conflicting lock request

[Description]

Truncating table is stopped due to conflicting lock request by vacuum

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.75.47 17846

---

**\\watch cannot be used with an empty query**

[Description]

\\watch comamnd cannot be used with an empty query

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.75.48 17847

---

**\\watch cannot be used with COPY**

[Description]

\\watch command cannot be used along with COPY command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.75.49 17848

---

**aggregate cannot accept shell type @1@**

[Description]

Shell type is not allowed in aggregate functions

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.75.50 17849

---

**aggregates cannot have output arguments**

[Description]

Defining aggregates with output arguments is not supported

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.51 17850

---

**an ordered-set aggregate with a VARIADIC direct argument must have one VARIADIC aggregated argument of the same data type**

[Description]

an ordered-set aggregate with a VARIADIC direct argument must have one VARIADIC aggregated argument of the same data type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.52 17851

---

**argument @1 @: could not determine data type**

[Description]

Could not determine input data type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.53 17852

---

**argument @1 @: key must not be null**

[Description]

Invalid key value

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.54 17853

---

**argument of lo\_read exceeds integer range**

[Description]

The length argument of lo\_read exceeds integer range

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.55 17854

---

### argument of lo\_truncate exceeds integer range

[Description]

The length argument of lo\_truncate exceeds integer range

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.56 17855

---

### argument of lo\_write exceeds integer range

[Description]

The provided index is not a BRIN index

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.57 17856

---

### background worker "@1@": only dynamic background workers can request notification

[Description]

only dynamic background workers can request notification

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.58 17857

---

### BKPBLOCK\_HAS\_DATA not set, but data length is @1@ at @2@/@3@

[Description]

BKPBLOCK\_HAS\_DATA not set, but data length is present in WAL record

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.59 17858

---

**BKPBLOCK\_HAS\_DATA set, but no data included at @1 @/@2@**

[Description]

BKPBLOCK\_HAS\_DATA set, but no data in WAL record

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.60 17859

---

**BKPBLOCK\_SAME\_REL set but no previous rel at @1 @/@2@**

[Description]

BKPBLOCK\_SAME\_REL set but no previous rel is provided in WAL record

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.61 17860

---

**BKPIMAGE\_HAS\_HOLE not set, but hole offset @1 @ length @2@ at @3@/@4@**

[Description]

BKPIMAGE\_HAS\_HOLE not set, but hole offset is provided

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.62 17861

---

**BKPIMAGE\_HAS\_HOLE set, but hole offset @1 @ length @2@ block image length @3@ at @4@/@5@**

[Description]

BKPIMAGE\_HAS\_HOLE set, but hole offset is not provided

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.63 17862

---

### BKPIMAGE\_IS\_COMPRESSED set, but block image length @1@ at @2@/@3@

[Description]

BKPIMAGE\_IS\_COMPRESSED set, but block image length is not provided.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.64 17863

---

### cannot allocate multiple Perl interpreters on this platform

[Description]

cannot allocate multiple Perl interpreters on this platform

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.65 17864

---

### cannot alter type of a column used in a policy definition

[Description]

cannot alter type of a column used in a policy definition

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.66 17865

---

### cannot call @1@ on a non-object

[Description]

The parameter is not a Json Object

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.67 17866

---

---

**cannot change logged status of table "@1@" because it is temporary****[Description]**

Temporary table logged status cannot be changed

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.75.68 17867**

---

**cannot copy from materialized view "@1@"****[Description]**

Copy command cannot be executed on a materialized view

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.75.69 17868**

---

**cannot delete tuples during a parallel operation****[Description]**

Delete operation is not allowed in parallel mode

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.75.70 17869**

---

**cannot determine OID of function lo\_lseek64****[Description]**

lo\_lseek64 function is not defined

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.75.71 17870**

---

**cannot determine OID of function lo\_tell64**

[Description]

lo\_tell64 function is not defined

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.72 17871

---

### cannot determine OID of function lo\_truncate64

[Description]

lo\_truncate64 function is not defined

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.73 17872

---

### cannot display a value of a shell type

[Description]

Shell type cannot be displayed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.74 17873

---

### cannot duplicate null pointer (internal error)

[Description]

The given input is a null pointer

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.75 17874

---

### cannot refresh materialized view "@1@" concurrently

[Description]

Cannot refresh materialized view concurrently

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.76 17875

---

**cannot set system attribute "@1@"**

[Description]

Cannot set system attributes

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.77 17876

---

**cannot setup replication origin when one is already setup**

[Description]

replication origin is already setup

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.78 17877

---

**cannot use DISTINCT with WITHIN GROUP**

[Description]

cannot use DISTINCT with WITHIN GROUP

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.79 17878

---

**cannot use multiple ORDER BY clauses with WITHIN GROUP**

[Description]

cannot use multiple ORDER BY clauses with WITHIN GROUP sql query

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.80 17879

---

### cannot use special role specifier in DROP ROLE

[Description]

cannot use special role specifier in DROP ROLE

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.81 17880

---

### cannot use VARIADIC with WITHIN GROUP

[Description]

cannot use VARIADIC with WITHIN GROUP

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.82 17881

---

### constraint "@1@" of relation "@2@" is not a foreign key constraint

[Description]

constraint is not a foreign key constraint

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.83 17882

---

### conversion from numeric to Decimal failed

[Description]

conversion from numeric to Decimal failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.84 17883

---

### **COPY data transfer failed: @1@**

#### [Description]

Failed in data transfer of COPY command

#### [System Processing]

Processing aborts

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.85 17884

---

### **corrupted item pointer: offset = @1@, length = @2@**

#### [Description]

item pointer of a page is corrupted

#### [System Processing]

Processing aborts

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.86 17885

---

### **could not change table "@1@" to logged because it references unlogged table "@2@"**

#### [Description]

could not change table logged status because it references unlogged table

#### [System Processing]

Processing aborts

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.87 17886

---

### **could not change table "@1@" to unlogged because it references logged table "@2@"**

#### [Description]

could not change table logged status because it references logged table

#### [System Processing]

Processing aborts

#### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.88 17887

---

---

**could not close directory "@1@": @2@****[Description]**

Failure in closing a directory

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.75.89 17888**

---

**could not close directory "@1@": @2@****[Description]**

Failure in closing a directory

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.75.90 17889**

---

**could not close file "@1@": @2@****[Description]**

Failure in file close

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.75.91 17890**

---

**could not close pipe to external command: @1@****[Description]**

Failure in closing the pipe command to external command

**[System Processing]**

Processing aborts

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.75.92 17891**

---

**could not close target file "@1@": @2@**

[Description]

Failure in closing target file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.93 17892

---

### could not convert Python Unicode object to bytes

[Description]

could not convert Python Unicode object to bytes

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.94 17893

---

### could not create any Unix-domain sockets

[Description]

Failure in creating Unix-domain sockets

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.95 17894

---

### could not create directory "@1@": @2@

[Description]

Failure in creating a directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.96 17895

---

### could not create internal procedure "@1@": @2@

[Description]

could not create internal procedure

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.97 17896

---

**could not create symbolic link at "@1@": @2@**

[Description]

Failure in creating a symbolic link

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.98 17897

---

**could not execute command "@1@": @2@**

[Description]

could not execute command if it is not copy stream

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.99 17898

---

**could not import a module for Decimal constructor**

[Description]

Non decimal data found

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.75.100 17899

---

**could not initialize globals**

[Description]

could not initialize globals in pl/python function

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76 Message Numbers Beginning with 17900

---

### 2.76.1 17900

---

**could not load module "unknown": @1@**

[Description]

Failed in loading a module

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.76.2 17901

---

**could not look up effective user ID @1@: @2@**

[Description]

Getting the current user details failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.76.3 17902

---

**could not look up local user ID @1@: @2@**

[Description]

Lookup user name failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.76.4 17903

---

**could not map dynamic shared memory segment**

[Description]

Attaching to a dynamic shared memory segment failed.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.5 17904

---

**could not open directory "@1@": @2@**

[Description]

Failure in opening the directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.6 17905

---

**could not open file "@1@" for reading: @2@**

[Description]

Failure in opening a file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.7 17906

---

**could not open file "@1@" for truncation: @2@**

[Description]

Failure in opening a file for truncating it's size

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.8 17907

---

**could not open file "@1@": @2@**

[Description]

Failure in opening the file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.9 17908

---

**could not open parent table of index @1@**

[Description]

Failure in opening the parent relation of an index

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.10 17909

---

**could not open source file "@1@": @2@**

[Description]

Failure in opening a source file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.11 17910

---

**could not open target file "@1@": @2@**

[Description]

Failure in opening target file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.12 17911

---

**could not read directory "@1@": @2@**

[Description]

Failure in reading from a directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.13 17912

---

### could not read directory "@1@": @2@

[Description]

Failure in reading from a directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.14 17913

---

### could not read file "@1@": @2@

[Description]

Failure in reading a file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.15 17914

---

### could not read symbolic link "@1@": @2@

[Description]

Failure in reading a symbolic link

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.16 17915

---

### could not read time zone file "@1@": @2@

[Description]

Failure in reading timezone file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.17 17916

---

---

### could not remove directory "@1@": @2@

[Description]

Failure in removing a directory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.18 17917

---

### could not remove file "@1@": @2@

[Description]

Failure in removing a file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.19 17918

---

### could not remove symbolic link "@1@": @2@

[Description]

Failure in removing a symbolic link

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.20 17919

---

### could not seek in log file @1@ to offset @2@: @3@

[Description]

File seek operation is failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.21 17920

---

### could not seek in source file: @1@

[Description]

Failure in executing seek system call in source file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.22 17921

---

### could not seek in target file "@1@": @2@

[Description]

Failure in executing seek system call in target file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.23 17922

---

### could not set variable "@1@"

[Description]

Setting of psql variable is failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.24 17923

---

### could not split return value from trigger: @1@

[Description]

Trigger return value couldn't be splitted

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.25 17924

---

### could not stat file "@1@": @2@

[Description]

stat system call failed on a file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.26 17925

---

### could not stat file "@1@": @2@

[Description]

Failure in stat system call

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.27 17926

---

### could not truncate file "@1@" to @2@: @3@

[Description]

Failure in truncating a file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.28 17927

---

### could not write file "@1@": @2@

[Description]

Failure in writing to a file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.29 17928

---

### could not write to file "@1@", wrote @2@ of @3@: @4@

[Description]

Failure in writing to a file.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.30 17929

---

**data file "@1@" in source is not a regular file**

[Description]

The data file is not a regular file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.31 17930

---

**database connection requirement not indicated during registration**

[Description]

database connection requirement not indicated during background worker registration

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.32 17931

---

**declared name @1@ is already defined**

[Description]

declared name has been defined already

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.33 17932

---

**encoding conversion error on line @1@**

[Description]

encoding conversion error

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.34 17933

---

### event trigger functions cannot have declared arguments

[Description]

event trigger functions cannot have declared arguments

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.35 17934

---

### EVP error code @1@

[Description]

Non zero error message. The error number returned by ERR\_get\_error

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.36 17935

---

### EVP error code @1@

[Description]

EVP error code

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.37 17936

---

### FOR value should be positive integer

[Description]

FOR loop value should be positive integer

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.38 17937

---

### foreign key referenced-columns list must not contain duplicates

[Description]

The provided foreign key referenced-columns list contain duplicates

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.39 17938

---

### foreign-data wrapper "@1@" does not support IMPORT FOREIGN SCHEMA

[Description]

IMPORT FOREIGN SCHEMA doesn't supported by the foerign data wrapper

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.40 17939

---

### improper use of "\*"

[Description]

improper use of "\"\*" in the indirection reference

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.41 17940

---

### inherited relation "@1@" is not a table or foreign table

[Description]

inherited relation is not a table or foreign table

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.42 17941

---

---

### initial position must not be null

[Description]

First member of the array must not be nul

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.43 17942

---

### invalid action (CREATE) for regular file

[Description]

Regular files are created with open\_target\_file function, not with this

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.44 17943

---

### invalid block\_id @1@ at @2@/@3@

[Description]

invalid block\_id in WAL record

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.45 17944

---

### Invalid character value.

[Description]

Invalid XML character value.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.46 17945

---

### invalid compressed image at @1@/@2@, block @3@

[Description]

The provided index is not a BRIN index

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.47 17946

---

### invalid info bits @1@ in log segment @2@, offset @3@

[Description]

Invalid xlog header info in WAL record

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.48 17947

---

### invalid input syntax for type txid\_snapshot: "@1@"

[Description]

invalid input syntax for type txid\_snapshot

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.49 17948

---

### invalid line number: @1@

[Description]

Provided line number is wrong in the sql query

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.50 17949

---

### invalid magic number in dynamic shared memory segment

[Description]

Invalid dynamic shared memory segment

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.51 17950

---

**invalid MultiXactId: @1@**

[Description]

Invalid multixactid parameter

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.52 17951

---

**invalid value "@1@" for "@2@"**

[Description]

Invalid argument

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.53 17952

---

**invalid value for recovery parameter "@1@": "@2@"**

[Description]

Invalid recovery configuration parameter

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.54 17953

---

**invalid value in ECOBPG\_NCHAR on line @1@. The valid value is UTF16LE/ UTF16BE/ UTF32LE/ UTF32BE**

[Description]

Invalid ECOBPG\_NCHAR environment variable value

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.55 17954

---

**Junk view columns are not updatable.**

[Description]

Write operation Junk view columns are not updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.56 17955

---

**length of nvarchar type is not assigned**

[Description]

length of nvarchar type is not assigned

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.57 17956

---

**local user with ID @1@ does not exist**

[Description]

Lookup user name failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.58 17957

---

**lost connection to parallel worker**

[Description]

Error while reading message queue may caused the worker to be shutdown

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.59 17958

---

### Malformed declaration: missing version.

[Description]

Version number missing in xml document/content

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.60 17959

---

### Missing encoding in text declaration.

[Description]

missing encoding in xml document/content

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.61 17960

---

### more than one row returned for \gset

[Description]

more than one row returned for \gset command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.62 17961

---

### must be owner of event trigger @1@

[Description]

must be owner of the even trigger

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.63 17962

---

**national characters is not supported on non-utf8 databases.**

[Description]

national characters is not supported on non-utf8 databases.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.64 17963

---

**neither BKPIMAGE\_HAS\_HOLE nor BKPIMAGE\_IS\_COMPRESSED set, but block image length is @1@ at @2@/@3@**

[Description]

neither BKPIMAGE\_HAS\_HOLE nor BKPIMAGE\_IS\_COMPRESSED set, but block image length is provided

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.65 17964

---

**nested service specifications not supported in service file "@1@", line @2@**

[Description]

nested service specifications not supported in service file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.66 17965

---

**no Decimal attribute in module**

[Description]

no Decimal attribute in module

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.67 17966

---

### no EVP error reported

[Description]

The errorcode returned by ERR\_get\_error() function is zero.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.68 17967

---

### no rows returned for \gset

[Description]

no rows returned for \gset command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.69 17968

---

### no SSL error reported

[Description]

no SSL error reported

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.70 17969

---

### not enough arguments for cursor "@1@"

[Description]

syntax error

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.71 17970

---

---

### number of parameters must be between 0 and 65535

[Description]

number of parameters must be between 0 and 65535

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.72 17971

---

### operating system error @1@

[Description]

The error number passed to this function may be an out of range error no. So sterror function returns an empty string

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.73 17972

---

### operator not allowed in variable definition

[Description]

Only sizeof operation is allowed in variable definition

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.74 17973

---

### operator too long

[Description]

The length of the operator is more than or equal to 64 characters

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.75 17974

---

### out of memory

[Description]

out of memory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.76 17975

---

### out of memory

[Description]

out of memory

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.77 17976

---

### out-of-order block\_id @1 @ at @2 @/@3 @

[Description]

Out-of-order blocks in WAL record

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.78 17977

---

### Parsing XML declaration: '?>' expected.

[Description]

Provided XML declaration is unfinished

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.79 17978

---

### pclose failed: @1 @

[Description]

pclose system call failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.80 17979

---

**permission denied to reassign objects**

[Description]

Insufficient privileges on the object

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.81 17980

---

**pgpipe: could not accept connection: error code @1 @**

[Description]

Failure in reading a symbolic link

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.82 17981

---

**record with invalid length at @1 @/@2 @**

[Description]

record with invalid length in WAL record

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.83 17982

---

**requested character not valid for encoding: @1 @**

[Description]

Invalid character for the encoding

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.84 17983

---

**SELECT rule's target entry @1@ has different column name from column "@2@"**

[Description]

Rule target entry column doesn't match with column name in select query

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.85 17984

---

**source file list is empty**

[Description]

Source file list is empty

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.86 17985

---

**Space required.**

[Description]

Space required in the specified location of XML content.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.87 17986

---

**SPI\_execute failed: @1@**

[Description]

Failure in SPI\_execute function

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.88 17987

---

### **SPI\_execute\_plan failed: @1@**

[Description]

Failure in SPI\_execute\_plan function

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.89 17988

---

### **SSL error code @1@**

[Description]

SSL has reported some error

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.90 17989

---

### **standalone accepts only 'yes' or 'no'.**

[Description]

XML standalone accepts only 'yes' or 'no'.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.91 17990

---

### **STDIN/STDOUT not allowed with PROGRAM**

[Description]

STDIN/STDOUT not allowed with PROGRAM in copy command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.92 17991

---

---

### symbolic link "@1@" target is too long

[Description]

Symbolic link target length is more than the specified length

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.93 17992

---

### symbolic link target too long for tar format: file name "@1@", target "@2@"

[Description]

provided symbolic link target name is too long for tar format

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.94 17993

---

### tablespace method @1@ requires @2@ argument, not @3@

[Description]

Invalid number of tablespace arguments

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.95 17994

---

### tablespace name cannot be qualified

[Description]

The provided tablespace name is not valid

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.76.96 17995

---

### The server (version @1@.@2@) does not support editing function source.

[Description]

The server does not support editing function source.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.97 17996

---

### time zone "@1@" appears to use leap seconds

[Description]

The provided timezone appears to have leap seconds

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.98 17997

---

### too many arguments for cursor "@1@"

[Description]

syntax error

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.99 17998

---

### trigger's return list must have even number of elements

[Description]

Trigger can return only even number of elements

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.76.100 17999

---

### type modifier cannot have ORDER BY

[Description]

type modifier cannot have ORDER BY clause

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77 Message Numbers Beginning with 18000

---

### 2.77.1 18000

---

#### unexpected EOF while reading file "@1@"

[Description]

unexpected EOF reach while reading file

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.77.2 18001

---

#### unexpected page modification for directory or symbolic link "@1@"

[Description]

unexpected page modification for directory or symbolic link

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.77.3 18002

---

#### unexpected result set after end-of-streaming

[Description]

unexpected data after end-of-streaming

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.77.4 18003

---

#### unexpected result status for \\watch

[Description]

unexpected result status for \\watch command

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.5 18004

---

### unexpected standby message type "@1@", after receiving CopyDone

[Description]

unexpected standby message type after copyDone

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.6 18005

---

### Unix-domain socket path "@1@" is too long (maximum @2@ bytes)

[Description]

unix-domain socket path has crossed more than 100 bytes

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.7 18006

---

### UNNEST() with multiple arguments cannot have a column definition list

[Description]

UNNEST() with multiple arguments cannot have a column definition list

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.8 18007

---

### unrecognized attribute "@1@"

[Description]

Unrecognized attribute in the trigger function

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.9 18008

---

**Unrecognized libxml error code: @1@.**

[Description]

Unknown code error - the default error

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.10 18009

---

**unrecognized object type in default privileges: @1@**

[Description]

Unrecognized object type

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.11 18010

---

**unterminated /\* comment**

[Description]

unterminated /\* comment in the sql query

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.12 18011

---

**User "@1@" has an expired password.**

[Description]

user's password has been expired

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.13 18012

---

### User "@1@" has no password assigned.

[Description]

no password has assigned to user

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.14 18013

---

### user name lookup failure: error code @1@

[Description]

Lookup user name failed

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.15 18014

---

### View columns that are not columns of their base relation are not updatable.

[Description]

Write operation View columns that are not columns of their base relation are not updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.16 18015

---

### View columns that refer to system columns are not updatable.

[Description]

Write operation View columns that refer to system columns are not updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.17 18016

---

### View columns that return whole-row references are not updatable.

[Description]

Write operation View columns that return whole-row references are not updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.18 18017

---

### Views containing DISTINCT are not automatically updatable.

[Description]

Write operation Views containing DISTINCT clause are not automatically updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.19 18018

---

### Views containing GROUP BY are not automatically updatable.

[Description]

Write operation Views containing GROUP BY clause are not automatically updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.20 18019

---

### Views containing HAVING are not automatically updatable.

[Description]

Write operation Views containing HAVING clause are not automatically updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.21 18020

---

---

### Views containing LIMIT or OFFSET are not automatically updatable.

[Description]

write operation Views containing LIMIT or OFFSET are not automatically updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.77.22 18021

---

### Views containing TABLESAMPLE are not automatically updatable.

[Description]

Write operation Views containing TABLESAMPLE are not automatically updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.77.23 18022

---

### Views containing UNION, INTERSECT, or EXCEPT are not automatically updatable.

[Description]

Write operation Views containing UNION, INTERSECT, or EXCEPT are not automatically updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.77.24 18023

---

### Views containing WITH are not automatically updatable.

[Description]

Write operation Views containing WITH are not automatically updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.77.25 18024

---

### Views that do not select from a single table or view are not automatically updatable.

[Description]

Write operation Views that do not select from a single table or view are not automatically updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.26 18025

---

### Views that have no updatable columns are not automatically updatable.

[Description]

Write operation Views that have no updatable columns are not automatically updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.27 18026

---

### Views that return aggregate functions are not automatically updatable.

[Description]

Write operation Views that return aggregate functions are not automatically updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.28 18027

---

### Views that return set-returning functions are not automatically updatable.

[Description]

Write operation Views that return set-returning functions are not automatically updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.29 18028

---

### Views that return window functions are not automatically updatable.

[Description]

Write operation Views that return window functions are not automatically updatable.

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.30 18029

---

**WAL file is from different database system: incorrect XLOG\_BLCKSZ in page header**

[Description]

WAL file is from a different database not generated by these binaries because of mismatch in WAL block size

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.31 18030

---

**WAL file is from different database system: incorrect XLOG\_SEG\_SIZE in page header**

[Description]

WAL file is from a different database not generated by these binaries because of mismatch in WAL segment size

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.32 18031

---

**WHERE CURRENT OF is not supported on a view with grouping or aggregation**

[Description]

WHERE CURRENT OF syntax is not supported on view where there exists grouping or aggregation in the view query

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.33 18032

---

**WHERE CURRENT OF is not supported on a view with more than one underlying relation**

[Description]

WHERE CURRENT OF syntax is not supported on view where there are more than one underlying relation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.34 18033

---

### WHERE CURRENT OF is not supported on a view with no underlying relation

[Description]

WHERE CURRENT OF syntax is not supported on view where there is no underlying relation

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.35 18034

---

### window function @1@ cannot have WITHIN GROUP

[Description]

window function cannot have WITHIN GROUP

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.36 18035

---

### window function @1@ requires an OVER clause

[Description]

True window functions must be called with a window definition

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.37 18036

---

### WITH CHECK OPTION not supported on recursive views

[Description]

WITH CHECK OPTION not supported on recursive views

[System Processing]

Processing aborts

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.38 18037

---

**@1@: expected @2@-element float8 array**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.77.39 18038

---

**\@1@\ must be registered in shared\_preload\_libraries and session\_preload\_libraries**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.40 18039

---

**\@1@\ must be registered in shared\_preload\_libraries**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.41 18040

---

**could not stat file \@1@: @2@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.42 18041

---

---

### Aggreg found in non-Agg plan node

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.77.43 18042

---

### Cannot find merge transition function

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.77.44 18043

---

### could not find block containing chunk @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.77.45 18044

---

### duplicate lock detected

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.77.46 18045

---

### expected 2-element int8 array

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.77.47 18046

---

### expected 2-element interval array

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.77.48 18047

---

### extent check error.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.77.49 18048

---

### index \@1@\ already contains data

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.77.50 18049

---

### internal error. memory not allocated.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.51 18050

---

**internal error. unknown code.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.52 18051

---

**internal error. multiple ROS command running**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.53 18052

---

**interval out of range**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.77.54 18053

---

**last recorded ros command is fatally broken.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.55 18054

---

**max\_worker\_processes is reset to @1@ from @2@ because old value is too small**

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.77.56 18055

---

**overwrite column meta data**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.57 18056

---

**planner failed to minimize tlist of scan**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.58 18057

---

**process @1@ is trying to acquire a lock owned by @2@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.59 18058

---

**ROS has not been formatted yet.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.60 18059

---

**starts ROS command \@1 @\**

[Description]

An error occurred.

[System Processing]

Continues processing.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.61 18060

---

**finished ROS command \@1 @\ (%.03f ms)**

[Description]

An error occurred.

[System Processing]

Continues processing.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.62 18061

---

**could not read from SMC evacuating temporary file: @1 @**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.63 18062

---

**could not read from SMC evacuating temporary file: @1@**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.77.64 18063

---

**could not read from SMC evacuating temporary file: nread=@1@**

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.65 18064

---

**unterminated ROS command**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.66 18065

---

**vci\_CSFetchVirtualTuples returns @1@ num\_fetched\_rows(crid=% PRIi64 )**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.67 18066

---

---

### **vci\_index\_size requires 1 argument**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## **2.77.68 18067**

---

### **cannot alter table because the table is indexed by VCI**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.77.69 18068**

---

### **ALTER INDEX SET TABLESPACE is not supported for VCI**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.77.70 18069**

---

### **REINDEX is not supported for VCI**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.77.71 18070**

---

### **could not use VCI: local ROS size (@1@) exceeds vci.max\_local\_ros (@2@)**

[Description]

An error occurred.

[System Processing]

Continues processing.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.72 18071

---

### could not use VCI: local ROS size (@1@) exceeds half of vci.shared\_work\_mem (@2@)

[Description]

An error occurred.

[System Processing]

Continues processing.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.73 18072

---

### access method \@1@\ does not support EXCLUDE clause

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.77.74 18073

---

### access method \@1@\ does not support index on temporary table

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.77.75 18074

---

### access method \@1@\ does not support to CREATE INDEX on the expression

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.77.76 18075

---

### access method \@1@\ does not support concurrent index drop

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.77.77 18076

---

### access method \@1@\ does not support concurrent index build

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.77.78 18077

---

### access method \@1@\ does not support partial-index

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.77.79 18078

---

### access method \@1@\ does not support index on materialized view

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.77.80 18079

---

### compression buffer is full

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.77.81 18080

---

### cache lookup failed for function @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.82 18081

---

### could not unmap shared memory: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.77.83 18082

---

### incompatible VCI version: expected (@1@, @2@), stored (@3@, @4@).

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.84 18083

---

### parent @1@ of child @2@ died unexpectedly

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.85 18084

---

### System is too busy to do in a parallel execution: allocatable\_cpus = %.2f

[Description]

Terminated normally but a warning was output.

[System Processing]

Continues processing.

[Action]

Check the message text and confirm that the event indicated in supplementary information reported by the system is a planned event.

## 2.77.86 18085

---

### cache lookup failed for aggregate @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.87 18086

---

### could not open directory \@1@\: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.88 18087

---

**value for domain @1@ violates check constraint \@2@\**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.77.89 18088

---

**domain @1@ does not allow null values**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.77.90 18089

---

**unrecognized boolop: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.77.91 18090

---

**could not start background process**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.92 18091

---

---

### could not start background process : postmaster died

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.77.93 18092

---

### could not stop background process

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.77.94 18093

---

### could not register background process

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.77.95 18094

---

### could not truncate file \@1@\: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.77.96 18095

---

### could not read from file \@1@\: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.97 18096

---

### could not unlink file \@1@\: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.98 18097

---

### could not open file \@1@\: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.99 18098

---

### could not write to file \@1@\: @2@

[Description]

An error occurred during I/O processing in the database server.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.77.100 18099

---

### out of memory

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.78 Message Numbers Beginning with 18100

---

### 2.78.1 18100

---

**requested memory size 0x@1@lx overflows maximum managable memory size 0x@2@lx**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.78.2 18101

---

**a worker process died unexpectedly**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.78.3 18102

---

**could not map shared memory: @1@**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.78.4 18103

---

### could not identify a comparison function for type @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.78.5 18104

---

### aggregate @1@ needs to have compatible input type and transition type

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.78.6 18105

---

### aggregate function calls cannot be nested

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.78.7 18106

---

### cannot pass more than @1@ argument to a function

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.78.8 18107

---

---

### attribute @1@ has wrong type

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.78.9 18108

---

### value out of range: underflow

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.78.10 18109

---

### value out of range: overflow

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.78.11 18110

---

### could not read from SMC evacuating temporary file: nread=@1@

#### [Description]

An unexpected error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

Contact Fujitsu technical support.

---

## 2.78.12 18111

---

### extent check error.

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79 Message Numbers Beginning with 20000

---

### 2.79.1 20000

---

#### [listagg\\_transfn called in non-aggregate context](#)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.79.2 20001

---

#### [feature not supported](#)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.79.3 20002

---

#### [median4\\_transfn called in non-aggregate context](#)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

### 2.79.4 20003

---

#### [lock request error](#)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.5 20004

---

### event registration error

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.6 20005

---

### event name is NULL

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.7 20006

---

### feature not supported

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.8 20007

---

### not called by trigger manager

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.9 20008

---

### not called on valid event

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.10 20009

---

### SPI\_connect failed

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.11 20010

---

### not called with valid relation

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.12 20011

---

### attribute event not found

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.13 20012

---

### attribute message not found

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.14 20013

---

### SPI\_prepare failed

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.15 20014

---

### can't execute sql

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.16 20015

---

### SPI execute error

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.17 20016

---

### invalid value for @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.18 20017

---

### date out of range

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.19 20018

---

### timestamp out of range

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.20 20019

---

### invalid cursor number

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.21 20020

---

---

### failed to execute SQL statement

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.22 20021

---

### SQL is empty string

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.23 20022

---

### host variable name "@1@" is too long

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.24 20023

---

### host variable name is NULL

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.25 20024

---

### no statement parsed

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.26 20025

---

### host variable does not exist

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.27 20026

---

### invalid length for host variable name

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.28 20027

---

### invalid length for variable character string

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.29 20028

---

### not all variables bound

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.30 20029

---

**no statement execute**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.31 20030

---

**not supported data type**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.32 20031

---

**mismatch column\_value data type and define\_column data type**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.33 20032

---

**mismatch select data type and define\_column data type**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.34 20033

---

@1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.35 20034

---

invalid parameter

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.36 20035

---

null value not allowed

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.37 20036

---

invalid encoding name "@1@"

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.38 20037

---

### program limit exceeded

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.39 20038

---

### no data found

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.40 20039

---

### SPI\_prepare\_failed

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.41 20040

---

### start\_line must be positive (@1@ passed)

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.42 20041

---

---

**end\_line must be positive (@1@ passed)****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.79.43 20042**

---

**return type must be a row type****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.79.44 20043**

---

**failed to retrieve the default LC\_COLLATE value****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.79.45 20044**

---

**failed to set the requested LC\_COLLATE value [@1@]****[Description]**

An error occurred.

**[System Processing]**

Processing will be aborted.

**[Action]**

To investigate the cause of the occurrence from the message, and remove cause.

---

**2.79.46 20045**

---

**failed to set back the default LC\_COLLATE value [@1@]**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.47 20046

---

### unknown format

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.48 20047

---

### function is called from invalid context

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.49 20048

---

### argument is NULL

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.50 20049

---

### out of memory

[Description]

There was insufficient free space in the server's memory during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.79.51 20050

---

### insufficient privilege

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.52 20051

---

### datatype mismatch

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.53 20052

---

### unexpected type: @1@

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.54 20053

---

### pipe name is NULL

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.55 20054

---

### pipe creation error

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.56 20055

---

### message is NULL

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.57 20056

---

### could not determine data type of input

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.58 20057

---

### unknown equal operand for datatype

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.79.59 20058**

---

### **cannot set range to negative number**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.79.60 20059**

---

### **date is out of range**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.79.61 20060**

---

### **nonbizday registration error**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.79.62 20061**

---

### **nonbizday unregistration error**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.63 20062

---

### plvlex.tokens is not available in the built

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.64 20063

---

### too few parameters specified for template string

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.65 20064

---

### substitution is NULL

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.66 20065

---

### buffer overflow

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.67 20066

---

---

## internal error

### [Description]

An error occurred.

### [System Processing]

Processing will be aborted.

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.68 20067

---

### Limit decreased to @1@ bytes.

### [Description]

An error occurred.

### [System Processing]

Processing will be aborted.

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.69 20068

---

### Limit increased to @1@ bytes.

### [Description]

An error occurred.

### [System Processing]

Processing will be aborted.

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.70 20069

---

### unknown option '@1@'

### [Description]

An error occurred.

### [System Processing]

Processing will be aborted.

### [Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.71 20070

---

### too much large memory block request

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.72 20071

---

### corrupted pointer

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.73 20072

---

### unsafe use of string constant with Unicode escapes

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.74 20073

---

### invalid Unicode escape

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

---

## 2.79.75 20074

---

### unsafe use of \\ in a string literal

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.76 20075

---

**@1@ at end of input**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.77 20076

---

**@1@ at or near "@2@"**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.78 20077

---

**dbms\_yylex\_init() failed: @1@.**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## 2.79.79 20078

---

**invalid hexadecimal digit**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.79.80 20079**

---

### **nonstandard use of \ in a string literal**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.79.81 20080**

---

### **nonstandard use of \\ in a string literal**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.79.82 20081**

---

### **nonstandard use of escape in a string literal**

[Description]

An error occurred.

[System Processing]

Processing will be aborted.

[Action]

To investigate the cause of the occurrence from the message, and remove cause.

## **2.80 Message Numbers Beginning with 70000**

---

### **2.80.1 70001**

---

#### **Error loading default settings from driverconfig.properties**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.80.2 70002

---

**Your security policy has prevented the connection from being attempted. You probably need to grant the connect java.net.SocketPermission to the database server host and port that you wish to connect to.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.3 70003

---

**Something unusual has occurred to cause the driver to fail. Please report this exception.**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.80.4 70004

---

**Connection attempt timed out.**

[Description]

Timeout occurred during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Check the following:

- If executing SQL that outputs a large volume of search results, add a conditional expression to filter the results further.
- If numerous SQLs are being simultaneously executed, reduce the number of simultaneously executed SQLs.
- If a large volume of data is to be updated in a single transaction, modify the SQL to reduce the volume of data to be updated in a single transaction.
- If executing a complex SQL, modify it to a simple SQL.
- Check if there are any problems in the network.
- Before conducting maintenance that involves the processing of a large volume of data, use the SET statement to temporarily increase the value of maintenance\_work\_mem.

## 2.80.5 70005

---

### Interrupted while attempting to connect.

#### [Description]

The database server was disconnected during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.80.6 70006

---

### Method @1@ is not yet implemented.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.7 70007

---

### Requested CopyIn but got @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.8 70008

---

### Requested CopyOut but got @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.9 70009

---

### Copying from database failed: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.80.10 70010

---

### This copy stream is closed.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.11 70011

---

### Read from copy failed.

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- If the COMMIT process is not executed after update, add the COMMIT process.
  - If the total number of update records in a single transaction is high, split it into short transactions.
  - If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - Confirm that the database server has not stopped.
    - If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.80.12 70012

---

### Cannot write to copy a byte of value @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.13 70013

---

### A connection could not be made using the requested protocol @1@.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.14 70014

---

### Premature end of input stream, expected @1@ bytes, but only read @2@.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.15 70015

---

### Expected an EOF from server, got: @1@

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.16 70016

---

### An unexpected result was returned by a query.

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.17 70017

---

### Illegal UTF-8 sequence: byte @1@ of @2@ byte sequence is not 10xxxxxx: @3@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.18 70018

---

### Illegal UTF-8 sequence: @1@ bytes used to encode a @2@ byte value: @3@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.19 70019

---

### Illegal UTF-8 sequence: initial byte is @1@: @2@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.20 70020

---

### Illegal UTF-8 sequence: final value is out of range: @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.21 70021

---

### Illegal UTF-8 sequence: final value is a surrogate value: @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.22 70022

---

### Zero bytes may not occur in string parameters.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.23 70023

---

---

**Zero bytes may not occur in identifiers.****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.80.24 70024**

---

**Cannot convert an instance of @1@ to type @2@****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.80.25 70025**

---

**Connection refused. Check that the hostname and port are correct and that the postmaster is accepting TCP/IP connections.****[Description]**

An error occurred during execution of the application or command.

**[System Processing]**

Processing will be aborted.

**[Action]**

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

**2.80.26 70026**

---

**The connection attempt failed.****[Description]**

The database server was disconnected during execution of the application.

**[System Processing]**

Processing will be aborted.

**[Action]**

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

a) If the COMMIT process is not executed after update, add the COMMIT process.

b) If the total number of update records in a single transaction is high, split it into short transactions.

c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

a) Confirm that the database server has not stopped.

b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.80.27 70027

---

### The server does not support SSL.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.28 70028

---

### An error occurred while setting up the SSL connection.

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.29 70029

---

### Connection rejected: @1@.

#### [Description]

The database server was disconnected during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)

- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

a) If the COMMIT process is not executed after update, add the COMMIT process.

b) If the total number of update records in a single transaction is high, split it into short transactions.

c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

a) Confirm that the database server has not stopped.

b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.80.30 70030

---

**The server requested password-based authentication, but no password was provided.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.31 70031

---

**The authentication type @1@ is not supported. Check that you have configured the pg\_hba.conf file to include the client's IP address or subnet, and that it is using an authentication scheme supported by the driver.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.32 70032

---

**Protocol error. Session setup failed.**

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.33 70033

---

### Backend start-up failed: @1@.

#### [Description]

The database server was disconnected during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.80.34 70034

---

### The column index is out of range: @1@, number of columns: @2@.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.35 70035

---

### No value specified for parameter @1@.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.36 70036

---

### Expected command status BEGIN, got @1@.

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.37 70037

---

### Unexpected command status: @1@.

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.38 70038

---

### An I/O error occurred while sending to the backend.

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.39 70039

---

### Unknown Response Type @1@.

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.40 70040

---

### Ran out of memory retrieving query results.

#### [Description]

There was insufficient free space in the server's memory during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Estimate memory usage and take the following action:

- If the number of simultaneous connections from client applications is high, reduce it.
- If the number of simultaneous SQL executions is high, reduce it.

## 2.80.41 70041

---

### Unable to interpret the update count in command completion tag: @1@.

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.42 70042

---

### Copy not implemented for protocol version 2

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.43 70043

---

### SSPI authentication is not supported because it is not portable. Try configuring the server to use GSSAPI instead.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.44 70044

---

### CommandComplete expected COPY but got:

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.45 70045

---

### Tried to obtain lock while already holding it

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.46 70046

---

### Tried to break lock on database connection

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.47 70047

---

### Interrupted while waiting to obtain lock on database connection

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.48 70048

---

---

### Unable to bind parameter values for statement.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.80.49 70049

---

### Database connection failed when starting copy

#### [Description]

The database server was disconnected during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
- a) Confirm that the database server has not stopped.
  - b) If the database server is starting or stopping, re-execute the command after the database server starts.

---

## 2.80.50 70050

---

### Tried to cancel an inactive copy operation

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.51 70051

---

### Database connection failed when canceling copy operation

#### [Description]

The database server was disconnected during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.80.52 70052

---

### Missing expected error response to copy cancel request

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.53 70053

---

### Got @1@ error responses to single copy cancel request

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.54 70054

---

### Tried to end inactive copy

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.55 70055

---

### Database connection failed when ending copy

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
- b) If the total number of update records in a single transaction is high, split it into short transactions.
- c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

- a) Confirm that the database server has not stopped.
- b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.80.56 70056

---

### Tried to write to an inactive copy operation

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.57 70057

---

### Database connection failed when writing to copy

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.80.58 70058

---

### Tried to read from inactive copy

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.59 70059

---

### Database connection failed when reading from copy

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
- a) Confirm that the database server has not stopped.
  - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.80.60 70060

---

### Received CommandComplete "@1@" without an active copy operation

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.61 70061

---

### Got CopyInResponse from server during an active @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.62 70062

---

---

### Got CopyOutResponse from server during an active @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.80.63 70063

---

### Got CopyData without an active copy operation

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.80.64 70064

---

### Unexpected copydata from server for @1@

#### [Description]

An error occurred during communication between the application and the database server.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

---

## 2.80.65 70065

---

### Unexpected packet type during copy: @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.80.66 70066

---

**Bind message length @1@ too long. This can be caused by very large or incorrect length specifications on InputStream parameters.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.67 70067

---

**The server's client\_encoding parameter was changed to @1@. The JDBC driver requires client\_encoding to be UTF8 for correct operation.**

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.68 70068

---

**The server's DateStyle parameter was changed to @1@. The JDBC driver requires DateStyle to begin with ISO for correct operation.**

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.69 70069

---

**The server's standard\_conforming\_strings parameter was reported as @1@. The JDBC driver expected on or off.**

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.80.70 70070

---

**The driver currently does not support COPY operations.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.71 70071

---

**This PooledConnection has already been closed.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.72 70072

---

**Connection has been closed automatically because a new connection was opened for the same PooledConnection or the PooledConnection has been closed.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.73 70073

---

**Connection has been closed.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.74 70074

---

**Statement has been closed.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.80.75 70075

---

### Failed to setup DataSource.

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.80.76 70076

---

### DataSource has been closed.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.80.77 70077

---

### Fastpath call @1@ - No result was returned and we expected an integer.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.80.78 70078

---

### The fastpath function @1@ is unknown.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.79 70079

---

### Conversion to type @1@ failed: @2@.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.80 70080

---

### Cannot tell if path is open or closed: @1@.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.81 70081

---

### GSS Authentication failed

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.

- b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
- a) Confirm that the database server has not stopped.
  - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.80.82 70082

---

### The array index is out of range: @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.83 70083

---

### The array index is out of range: @1@, number of elements: @2@.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.84 70084

---

### Truncation of large objects is only implemented in 8.3 and later servers.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.85 70085

---

### Cannot truncate LOB to a negative length.

#### [Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.80.86 70086

---

**PostgreSQL LOBs can only index to: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.80.87 70087

---

**LOB positioning offsets start at 1.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.80.88 70088

---

**free() was called on this LOB previously**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.80.89 70089

---

**Unsupported value for stringtype parameter: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.90 70090

---

**unknownLength parameter value must be an integer**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.91 70091

---

**No results were returned by the query.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.92 70092

---

**A result was returned when none was expected.**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.80.93 70093

---

**Custom type maps are not supported.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.94 70094

---

### Failed to create object for: @1@.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.95 70095

---

### Unable to load the class @1@ responsible for the datatype @2@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.96 70096

---

### Cannot change transaction read-only property in the middle of a transaction.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.97 70097

---

### Cannot commit when autoCommit is enabled.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.80.98 70098

---

---

**This connection has been closed.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.80.99 70099**

---

**Cannot rollback when autoCommit is enabled.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## **2.81 Message Numbers Beginning with 70100**

---

### **2.81.1 70100**

---

**Cannot change transaction isolation level in the middle of a transaction.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

### **2.81.2 70101**

---

**Transaction isolation level @1@ not supported.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.81.3 70102

---

#### Unable to translate data into the desired encoding.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.81.4 70103

---

#### Unable to determine a value for MaxIndexKeys due to missing system catalog data.

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

### 2.81.5 70104

---

#### Unable to find name datatype in the system catalogs.

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

### 2.81.6 70105

---

#### Operation requires a scrollable ResultSet, but this ResultSet is FORWARD\_ONLY.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.81.7 70106

---

---

### Unexpected error while decoding character data from a large object.

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.81.8 70107

---

### Can't use relative move methods while on the insert row.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.9 70108

---

### Invalid fetch direction constant: @1@.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.10 70109

---

### Cannot call cancelRowUpdates() when on the insert row.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.11 70110

---

### Cannot call deleteRow() when on the insert row.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.12 70111

---

**Currently positioned before the start of the ResultSet. You cannot call deleteRow() here.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.13 70112

---

**Currently positioned after the end of the ResultSet. You cannot call deleteRow() here.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.14 70113

---

**There are no rows in this ResultSet.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.15 70114

---

**Not on the insert row.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.16 70115

---

**You must specify at least one column value to insert a row.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.17 70116

---

**The JVM claims not to support the encoding: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.18 70117

---

**Provided InputStream failed.**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.81.19 70118

---

**Provided Reader failed.**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.81.20 70119

---

### Can't refresh the insert row.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.21 70120

---

### Cannot call updateRow() when on the insert row.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.22 70121

---

### Cannot update the ResultSet because it is either before the start or after the end of the results.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.23 70122

---

### ResultSets with concurrency CONCUR\_READ\_ONLY cannot be updated.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.24 70123

---

**No primary key found for table @1@.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.25 70124

---

**Fetch size must be a value greater to or equal to 0.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.26 70125

---

**Invalid character data was found. This is most likely caused by stored data containing characters that are invalid for the character set the database was created in. The most common example of this is storing 8bit data in a SQL\_ASCII database.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.27 70126

---

**Bad value for type @1@ : @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.28 70127

---

**The column name @1@ was not found in this ResultSet.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.29 70128

---

**ResultSet is not updateable. The query that generated this result set must select only one table, and must select all primary keys from that table. See the JDBC 2.1 API Specification, section 5.6 for more details.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.30 70129

---

**This ResultSet is closed.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.31 70130

---

**ResultSet not positioned properly, perhaps you need to call next.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.32 70131

---

### Can't use query methods that take a query string on a PreparedStatement.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.33 70132

---

### Multiple ResultSets were returned by the query.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.34 70133

---

### A CallableStatement was executed with nothing returned.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.35 70134

---

### A CallableStatement was executed with an invalid number of parameters

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.36 70135

---

---

**A CallableStatement function was executed and the out parameter @1@ was of type @2@ however type @3@ was registered.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.37 70136

---

**Maximum number of rows must be a value greater than or equal to 0.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.38 70137

---

**Query timeout must be a value greater than or equals to 0.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.39 70138

---

**The maximum field size must be a value greater than or equal to 0.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.40 70139

---

**Unknown Types value.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.41 70140

---

### Invalid stream length @1@.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.42 70141

---

### The JVM claims not to support the @1@ encoding.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.43 70142

---

### Unknown type @1@.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.44 70143

---

### Cannot cast an instance of @1@ to type @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.45 70144

---

**Unsupported Types value: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.46 70145

---

**Can't infer the SQL type to use for an instance of @1@. Use setObject() with an explicit Types value to specify the type to use.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.47 70146

---

**This statement does not declare an OUT parameter. Use '{' ?= call ... '}' to declare one.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.48 70147

---

**wasNull cannot be call before fetching a result.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.49 70148

---

**Malformed function or procedure escape syntax at offset @1@.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.50 70149

---

**Parameter of type @1@ was registered, but call to get@2@ (sqltype=@3@) was made.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.51 70150

---

**A CallableStatement was declared, but no call to registerOutParameter(1, <some type>) was made.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.52 70151

---

**No function outputs were registered.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.53 70152

---

**Results cannot be retrieved from a CallableStatement before it is executed.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.54 70153

---

**This statement has been closed.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.55 70154

---

**Too many update results were returned.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.56 70155

---

**Batch entry @1@ @2@ was aborted. Call getNextException to see the cause.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.57 70156

---

### **Unexpected error writing large object to database.**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.81.58 70157

---

### **@1@ function takes one and only one argument.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.59 70158

---

### **@1@ function takes two and only two arguments.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.60 70159

---

### **@1@ function takes four and only four argument.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.61 70160

---

### @1@ function takes two or three arguments.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.62 70161

---

### @1@ function doesn't take any argument.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.63 70162

---

### @1@ function takes three and only three arguments.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.64 70163

---

### Interval @1@ not yet implemented

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.65 70164

---

---

**Infinite value found for timestamp/date. This cannot be represented as time.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.66 70165

---

**The class @1@ does not implement org.postgresql.util.PGobject.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.67 70166

---

**Unknown ResultSet holdability setting: @1@.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.68 70167

---

**Server versions prior to 8.0 do not support savepoints.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.69 70168

---

**Cannot establish a savepoint in auto-commit mode.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.70 70169

---

### Returning autogenerated keys is not supported.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.71 70170

---

### The parameter index is out of range: @1@, number of parameters: @2@.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.72 70171

---

### Returning autogenerated keys is only supported for 8.2 and later servers.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.73 70172

---

### Returning autogenerated keys by column index is not supported.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.74 70173

---

### Cannot reference a savepoint after it has been released.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.75 70174

---

### Cannot retrieve the id of a named savepoint.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.76 70175

---

### Cannot retrieve the name of an unnamed savepoint.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.77 70176

---

### Invalid UUID data.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.78 70177

---

### Unable to find server array type for provided name @1@.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.79 70178

---

### Failed to set ClientInfo property: @1@

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.81.80 70179

---

### ClientInfo property not supported.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.81 70180

---

### Unable to decode xml data.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.82 70181

---

**Unknown XML Source class: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.83 70182

---

**Unable to create SAXResult for SQLXML.**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.81.84 70183

---

**Unable to create StAXResult for SQLXML**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.81.85 70184

---

**Unknown XML Result class: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.81.86 70185

---

---

**This SQLXML object has already been freed.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.87 70186

---

**This SQLXML object has not been initialized, so you cannot retrieve data from it.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.88 70187

---

**Failed to convert binary xml data to encoding: @1@.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.89 70188

---

**Unable to convert DOMResult SQLXML data to a string.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.90 70189

---

**This SQLXML object has already been initialized, so you cannot manipulate it further.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.91 70190

---

### Failed to initialize LargeObject API

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.81.92 70191

---

### Large Objects may not be used in auto-commit mode.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.93 70192

---

### The SSLSocketFactory class provided @1@ could not be instantiated.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.94 70193

---

### Conversion of interval failed

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.95 70194

---

### Conversion of money failed.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.96 70195

---

### Transaction control methods setAutoCommit(true), commit, rollback and setSavePoint not allowed while an XA transaction is active.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.97 70196

---

### Invalid flags

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.81.98 70197

---

### xid must not be null

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## **2.81.99 70198**

---

### **Connection is busy with another transaction**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## **2.81.100 70199**

---

### **suspend/resume not implemented**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## **2.82 Message Numbers Beginning with 70200**

---

### **2.82.1 70200**

---

#### **Transaction interleaving not implemented**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### **2.82.2 70201**

---

#### **Error disabling autocommit**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

### 2.82.3 70202

---

**tried to call end without corresponding start call**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.82.4 70203

---

**Not implemented: Prepare must be issued using the same connection that started the transaction**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.82.5 70204

---

**Prepare called before end**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.82.6 70205

---

**Server versions prior to 8.1 do not support two-phase commit.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.82.7 70206

---

### Error preparing transaction

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.82.8 70207

---

### Invalid flag

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.82.9 70208

---

### Error during recover

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

---

## 2.82.10 70209

---

### Error rolling back prepared transaction

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.82.11 70210

---

**Not implemented: one-phase commit must be issued using the same connection that was used to start it**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.82.12 70211

---

**commit called before end**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.82.13 70212

---

**Error during one-phase commit**

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.82.14 70213

---

**Not implemented: 2nd phase commit must be issued using an idle connection**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.82.15 70214

---

### Error committing prepared transaction

[Description]

An unexpected error occurred.

[System Processing]

Processing will be aborted.

[Action]

Contact Fujitsu technical support.

## 2.82.16 70215

---

### Heuristic commit/rollback not supported

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.82.17 70216

---

### Invalid definition statement format in connection configuration file. line number: @1@

[Description]

The format of a parameter definition statement in the connection configuration file is invalid.

[System Processing]

Processing is aborted.

[Action]

This messages is output in the case of HA Database Ready.

Correct the connection configuration file and restart the application.

## 2.82.18 70217

---

### The same server name is specified by two or more SERVER parameters in the connection configuration file.

[Description]

The same server name is specified in multiple SERVER parameters in the connection configuration file.

[System Processing]

Processing is aborted.

[Action]

This messages is output in the case of HA Database Ready.

Correct the server name specified in the SERVER parameter of the connection configuration file, and restart the application.

## 2.82.19 70218

---

### The connection configuration file cannot be opened. detail: "@1@"

[Description]

The process to open the connection configuration file failed.

[System Processing]

Processing is aborted.

[Action]

This messages is output in the case of HA Database Ready.

Check the state of the connection configuration file, remove the cause of the error, and restart the application.

## 2.82.20 70219

---

### I/O error occurred during the reading of connection configuration file. file name: "@1@" detail: "@2@"

[Description]

An I/O error occurred during loading of the connection configuration file.

[System Processing]

Processing is aborted.

[Action]

This messages is output in the case of HA Database Ready.

Check the state of the connection configuration file, remove the cause of the error, and restart the application.

## 2.82.21 70220

---

### server does not support auto connection switching

[Description]

The server does not support auto connection switching.

[System Processing]

Processing is aborted.

[Action]

Specify servers that support auto connection switching.

## 2.82.22 70221

---

### could not find a suitable target server

[Description]

Could not find a suitable target server.

[System Processing]

Processing is aborted.

[Action]

Check following settings (host, IP address, port number, or targetServer):

- Connection string
- Connection service file
- Data source of JDBC or ODBC
- Environment variables for default connection parameter values (ex. PGHOST)
- Arguments of functions of libpq
- Options of command

## 2.82.23 70222

---

### Invalid timeout (@1@<0).

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.82.24 70225

---

### invalid value for targetserver: @1@

[Description]

value of targetserver is invalid.

[System Processing]

Processing is aborted.

[Action]

Set one of the following:

- primary
- standby
- prefer\_standby
- any (can be specified only JDBC)

## 2.82.25 70226

---

### The sslservercertcn @1@ could not be verified.

[Description]

value of sslservercertcn is different from common name in the server certificate.

[System Processing]

Processing is aborted.

[Action]

Set SSL certificate's common name to sslservercertcn.

## 2.82.26 70227

---

### The sslservercertcn @1@ could not be verified by hostnameverifier @2@.

[Description]

value of sslservercertcn is different from common name in the server certificate.

[System Processing]

Processing is aborted.

[Action]

- Set SSL certificate's common name to sslservercertcn.
- Check the program of class specified by hostnameverifier.

## 2.83 Message Numbers Beginning with 80000

---

### 2.83.1 80001

---

#### The connection configuration file cannot be opened. detail: '@1@'

[Description]

The process to open the connection configuration file failed.

[System Processing]

Processing is aborted.

[Action]

This messages is output in the case of HA Database Ready.

Check the state of the connection configuration file, remove the cause of the error, and restart the application.

### 2.83.2 80002

---

#### Invalid definition statement format in connection configuration file. line number: @1@

[Description]

The format of a parameter definition statement in the connection configuration file is invalid.

[System Processing]

Processing is aborted.

[Action]

This messages is output in the case of HA Database Ready.

Correct the connection configuration file and restart the application.

### 2.83.3 80003

---

**The same server name is specified by two or more SERVER parameters in the connection configuration file.**

[Description]

The same server name is specified in multiple SERVER parameters in the connection configuration file.

[System Processing]

Processing is aborted.

[Action]

This messages is output in the case of HA Database Ready.

Correct the server name specified in the SERVER parameter of the connection configuration file, and restart the application.

### 2.83.4 80004

---

**I/O error occurred during the reading of connection configuration file. file name: '@1@' detail: '@2@'**

[Description]

An I/O error occurred during loading of the connection configuration file.

[System Processing]

Processing is aborted.

[Action]

This messages is output in the case of HA Database Ready.

Check the state of the connection configuration file, remove the cause of the error, and restart the application.

### 2.83.5 80005

---

**CommandTimeout can't be less than zero.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

### 2.83.6 80006

---

**The Connection is broken.**

[Description]

The database server was disconnected during execution of the application.

[System Processing]

Processing will be aborted.

[Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

- a) If the COMMIT process is not executed after update, add the COMMIT process.
  - b) If the total number of update records in a single transaction is high, split it into short transactions.
  - c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.
- If none of the above situations applies, perform the following:
    - a) Confirm that the database server has not stopped.
    - b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.83.7 80007

---

### The Connection is not open.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.8 80008

---

### Parameter @1@ not found in query.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.9 80009

---

### The Connection property can't be changed with an uncommitted transaction.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.10 80010

---

**There is already an open DataReader associated with this Command which must be closed first.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.11 80011

---

**@1@ does not exist in pg\_proc**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.12 80012

---

**Invalid parameter type: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.13 80013

---

**Connection is not open**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.14 80014

---

**Connection already open**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.15 80015

---

**Invalid database name: @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.16 80016

---

**Connection string argument missing!**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.17 80017

---

**Nested/Concurrent transactions aren't supported.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.18 80018

---

**numeric value @1@ in SqlConnection exceeds maximum value @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.19 80019

---

**numeric value @1@ in SqlConnection is below minimum value @2@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.20 80020

---

**expecting @1@[True/False] value in SqlConnection**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.21 80021

---

**expecting @1@[Numeric] value in SqlConnection**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.22 80022

---

### expecting @1 @=[Protocol Version] value in ConnectionString

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.23 80023

---

### key=value argument incorrect in ConnectionString

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.24 80024

---

### Attempt to set compatibility with version @1@ when using version @2@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.25 80025

---

### There is already an open DataReader associated with this Command which must be closed first.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.26 80026

---

### ApplicationName not supported.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.27 80027

---

### Timeout while getting a connection from pool.

#### [Description]

Timeout occurred during execution of the application.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the following:

- If executing SQL that outputs a large volume of search results, add a conditional expression to filter the results further.
- If numerous SQLs are being simultaneously executed, reduce the number of simultaneously executed SQLs.
- If a large volume of data is to be updated in a single transaction, modify the SQL to reduce the volume of data to be updated in a single transaction.
- If executing a complex SQL, modify it to a simple SQL.
- Check if there are any problems in the network.
- Before conducting maintenance that involves the processing of a large volume of data, use the SET statement to temporarily increase the value of maintenance\_work\_mem.

## 2.83.28 80028

---

### Connection pool exceeds maximum size.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.29 80029

---

### Not a COPY IN query: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.30 80030

---

### Copy can only start in Ready state, not in @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.31 80031

---

### Tried to set Position of network stream @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.32 80032

---

### Tried to read non-readable @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.33 80033

---

### Tried to seek non-seekable @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.34 80034

---

### Tried to set length of network stream @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.35 80035

---

### Not a COPY OUT query, not in @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.36 80036

---

### Copy can only start in Ready state, not in @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.37 80037

---

### Tried to set Position of network stream @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.38 80038

---

**Tried to write non-writable @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.39 80039

---

**Tried to flush read-only @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.40 80040

---

**Tried to seek non-seekable @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.41 80041

---

**Tried to set length of network stream @1@**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.42 80042

---

### Do not change stream of an active @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.43 80043

---

### Do not change delimiter of an active @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.44 80044

---

### Do not change separator of an active @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.45 80045

---

### Do not change escape symbol of an active @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.46 80046

---

---

### Do not change null symbol of an active @1@

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.47 80047

---

### Tried to add too many fields to a copy record with @1@ fields

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.48 80048

---

### Invalid attempt to read when no data is present.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.49 80049

---

### Column index out of range

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.50 80050

---

### could not find a suitable target server

[Description]

Could not find a suitable target server.

[System Processing]

Processing is aborted.

[Action]

Check following settings (host, IP address, port number, or targetServer):

- Connection string
- Connection service file
- Data source of JDBC or ODBC
- Environment variables for default connection parameter values(ex. PGHOST)
- Arguments of functions of libpq
- Options of command

## 2.83.51 80051

---

### server does not support auto connection switching

[Description]

The server does not support auto connection switching.

[System Processing]

Processing is aborted.

[Action]

Specify servers that support auto connection switching.

## 2.83.52 80052

---

### Only AuthenticationClearTextPassword and AuthenticationMD5Password supported for now. Received: @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.53 80053

---

### A timeout has occurred. If you were establishing a connection, increase Timeout value in ConnectionString. If you were executing a command, increase the CommandTimeout value in ConnectionString or in your NpgsqlCommand object.

[Description]

Timeout occurred during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Check the following:

- If executing SQL that outputs a large volume of search results, add a conditional expression to filter the results further.
- If numerous SQLs are being simultaneously executed, reduce the number of simultaneously executed SQLs.
- If a large volume of data is to be updated in a single transaction, modify the SQL to reduce the volume of data to be updated in a single transaction.
- If executing a complex SQL, modify it to a simple SQL.
- Check if there are any problems in the network.
- Before conducting maintenance that involves the processing of a large volume of data, use the SET statement to temporarily increase the value of maintenance\_work\_mem.

## 2.83.54 80054

---

### Connection establishment timeout. Increase Timeout value in ConnectionString.

### [Description]

Timeout occurred during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Check the following:

- If executing SQL that outputs a large volume of search results, add a conditional expression to filter the results further.
- If numerous SQLs are being simultaneously executed, reduce the number of simultaneously executed SQLs.
- If a large volume of data is to be updated in a single transaction, modify the SQL to reduce the volume of data to be updated in a single transaction.
- If executing a complex SQL, modify it to a simple SQL.
- Check if there are any problems in the network.
- Before conducting maintenance that involves the processing of a large volume of data, use the SET statement to temporarily increase the value of maintenance\_work\_mem.

## 2.83.55 80055

---

### Failed to establish a connection to '@1@'.

### [Description]

The database server was disconnected during execution of the application.

### [System Processing]

Processing will be aborted.

### [Action]

Communication may have been disconnected for the following reasons:

- An error occurred in the communication line (TCP/IP etc.)
- The database server terminated abnormally.

Take the following actions:

- Eliminate the cause of the communication disconnection.

Examine the application and check whether the transaction for implementing update is a long transaction. Judge whether it is a long transaction from the following viewpoints and modify the application.

a) If the COMMIT process is not executed after update, add the COMMIT process.

b) If the total number of update records in a single transaction is high, split it into short transactions.

c) If search was conducted for a long period of time after update, execute COMMIT after update or review the search SQL statement.

- If none of the above situations applies, perform the following:

a) Confirm that the database server has not stopped.

b) If the database server is starting or stopping, re-execute the command after the database server starts.

## 2.83.56 80056

---

**Ssl connection requested. No Ssl enabled connection from this host is configured.**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.57 80057

---

**Backend sent unrecognized response type: @1@**

[Description]

An error occurred during communication between the application and the database server.

[System Processing]

Processing will be aborted.

[Action]

Check if there are any problems in the network, eliminate the cause of any error and re-execute the command.

## 2.83.58 80058

---

**Store does not support specified edm type**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.59 80059

---

### Can't cast @1@ into any valid DbType.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.60 80060

---

### Cannot set NpgsqlDbType to just Array, Binary-Or with the element type (e.g. Array of Box is NpgsqlDbType.Array | NpgsqlDbType.Box).

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.61 80061

---

### Can't cast @1@ into NpgsqlParameter

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.62 80062

---

### Invalid attempt to read from column ordinal '@1@'. With CommandBehavior.SequentialAccess, you may only read from column ordinal '@2@' or greater.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.63 80063

---

### this[] index value

#### [Description]

An unexpected error occurred.

#### [System Processing]

Processing will be aborted.

#### [Action]

Contact Fujitsu technical support.

## 2.83.64 80064

---

### Field not found

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.65 80065

---

### No transaction in progress.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.66 80066

---

### Savepoint is not supported by backend.

#### [Description]

An error occurred during execution of the application or command.

#### [System Processing]

Processing will be aborted.

#### [Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## 2.83.67 80067

---

---

### Savepoint name cannot have semicolon.

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.68 80068

---

### The collection is read-only

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.69 80069

---

### NotSupported @1@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.70 80070

---

### Require primitive EdmType

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

---

## 2.83.71 80071

---

### NotSupported: @1@ @2@

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## **2.83.72 80072**

---

### **The authData parameter can only be null at the first call to continue!**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

## **2.83.73 80073**

---

### **SSPI returned invalid number of output buffers**

[Description]

An error occurred during execution of the application or command.

[System Processing]

Processing will be aborted.

[Action]

Check the message text and confirm that the application is written correctly and the command is being used correctly.

# Chapter 3 Mirroring Controller Messages

This chapter explains messages output by Mirroring Controller.

## 3.1 Message Numbers Beginning with MCA00000

### 3.1.1 MCA00001

**"could not read file "{0}": exception={1}: {2}"**

[Description]

Could not read the file.

[Parameters]

{0}: file name

{1}: exception type

{2}: exception detail

[System Processing]

Processing will be aborted.

[Action]

Identify the cause according to the message, and then remove it.

### 3.1.2 MCA00002

**{0}: "wrong number of server ID in definition file "{1}""**

[Description]

Invalid descriptions were found in definition file.

[Parameters]

{0}: command name

{1}: file name

[System Processing]

Processing will be aborted.

[Action]

Correct the definition file according to the message and parameter description of "Cluster Operation Guide".

### 3.1.3 MCA00003

**{0}: "server ID not found in definition file "{1}" line {2}"**

[Description]

Invalid descriptions were found in definition file.

[Parameters]

{0}: command name

{1}: file name

{2}: line number

[System Processing]

Processing will be aborted.

[Action]

Correct the definition file according to the message and parameter description of "Cluster Operation Guide".

### 3.1.4 MCA00004

---

**{0}: "server ID specified in definition file "{1}" too long (max {2} bytes) line {3}"**

[Description]

Invalid descriptions were found in definition file.

[Parameters]

{0}: command name

{1}: file name

{2}: max length of server ID

{3}: line number

[System Processing]

Processing will be aborted.

[Action]

Correct the definition file according to the message and parameter description of "Cluster Operation Guide".

### 3.1.5 MCA00005

---

**"invalid host name or IP address "{1}" in definition file "{0}"**

[Description]

Invalid descriptions were found in definition file.

[Parameters]

{0}: file name

{1}: host name or IP address

[System Processing]

Processing will be aborted.

[Action]

Correct the definition file according to the message and parameter description of "Cluster Operation Guide".

### 3.1.6 MCA00006

---

**{0}: "invalid port number in definition file "{1}" line {2}"**

[Description]

Invalid descriptions were found in definition file.

[Parameters]

{0}: command name

{1}: file name

{2}: line number

[System Processing]

Processing will be aborted.

[Action]

Correct the definition file according to the message and parameter description of "Cluster Operation Guide".

### 3.1.7 MCA00007

---

**{0}: "invalid format specified in definition file "{1}" line {2}"**

[Description]

Invalid descriptions were found in definition file.

[Parameters]

{0}: command name

{1}: file name

{2}: line number

[System Processing]

Processing will be aborted.

[Action]

Correct the definition file according to the message and parameter description of "Cluster Operation Guide".

### 3.1.8 MCA00008

---

**{0}: "invalid value for parameter "{2}" in definition file "{1}"**

[Description]

Invalid parameter was found in definition file.

[Parameters]

{0}: command name

{1}: file name

{2}: parameter name

[System Processing]

Processing will be aborted.

[Action]

Correct the definition file according to the message and parameter description of "Cluster Operation Guide".

### 3.1.9 MCA00009

---

**{0}: "no value for parameter "{2}" specified in definition file "{1}"**

[Description]

Invalid parameter was found in definition file.

[Parameters]

{0}: command name

{1}: file name

{2}: parameter name

[System Processing]

Processing will be aborted.

[Action]

Correct the definition file according to the message and parameter description of "Cluster Operation Guide".

### 3.1.10 MCA00010

---

**{0}: "unrecognized parameter "{2}" in definition file "{1}"**

[Description]

Unrecognized parameter was found in definition file.

[Parameters]

{0}: file name

{1}: command name

{2}: parameter name

[System Processing]

Processing will be aborted.

[Action]

Correct the definition file according to the message and parameter description of "Cluster Operation Guide".

### 3.1.11 MCA00011

---

**%s: no operation mode specified**

[Description]

No operation mode was specified.

[Parameters]

%s: command name

[System Processing]

Processing will be aborted.

[Action]

Re-execute after specifying operation modes.

### 3.1.12 MCA00012

---

**%s: unrecognized operation mode "%s"**

[Description]

Unrecognized operation mode was specified.

[Parameters]

%s: command name

%s: operation mode

[System Processing]

Processing will be aborted.

[Action]

Re-execute after specifying operation modes.

### 3.1.13 MCA00013

---

**%s: option "%s" duplicated**

[Description]

Certain option is duplicated.

[Parameters]

%s: command

%s: option

[System Processing]

Processing will be aborted.

[Action]

Re-execute after correcting options.

### 3.1.14 MCA00014

---

**%s: "%s" option conflicts with "%s" option**

[Description]

Options are conflicting.

[Parameters]

%s: command

%s: option

%s: option

[System Processing]

Processing will be aborted.

[Action]

Re-execute after correcting options.

### 3.1.15 MCA00015

---

**%s: option requires an argument -- %s**

[Description]

No argument specified for the option.

[Parameters]

%s: command

%s: option

[System Processing]

Processing will be aborted.

[Action]

Re-execute after correcting options.

### 3.1.16 MCA00016

---

**%s: neither "%s" option nor environment variable "%s" specified**

[Description]

Both of required option and equivalent environment variable were not specified.

[Parameters]

%s: command

%s: option

%s: environment variable

[System Processing]

Processing will be aborted.

[Action]

Re-execute after specifying required option or equivalent environment variable.

### 3.1.17 MCA00017

---

**%s: out of memory**

[Description]

Out of memory error occurred.

[Parameters]

%s: command

[System Processing]

Processing will be aborted.

[Action]

Obtain free memory space by stopping unnecessary processes or changing system settings.

### 3.1.18 MCA00018

---

**out of memory**

[Description]

Out of memory error occurred.

[System Processing]

Processing will be aborted.

[Action]

Obtain free memory space by stopping unnecessary processes or changing system settings.

### 3.1.19 MCA00019

---

**detected an error on the monitored object "{0}({1})": {2}**

[Description]

An error was detected on the monitored object.

[Parameters]

{0}: monitored object (server, database process, data storage destination directory, transaction log storage destination directory, tablespace directory)

{1}: object name (host name, database process name, directory path)

{2}: error detail ("no response:", "read/write error:" and detailed information)

[System Processing]

Perform failover or detaching.

If failover or detaching is already performed, these functions would be disabled.

[Action]

Refer to the description about workaround for failure of "Cluster Operation Guide".

### 3.1.20 MCA00020

---

**unexpected error occurred in the monitoring process: {0}**

[Description]

Monitoring process cannot continue because an unexpected error was occurred during its processing.

[Parameters]

{0}: error detail

[System Processing]

Continues processing.

[Action]

Refer to the description about workaround for failure of "Cluster Operation Guide".

### 3.1.21 MCA00021

---

**starting to {2} from {0} to {1}.**

[Description]

Switching standby server to primary server.

[Parameters]

{0}: server ID of primary server

{1}: server ID of standby server

{2}: "fail over" or "switch over"

[Action]

If Mirroring Controller executed switching automatically, find the message output before this message from system log or event log to identify the cause of switching, and then work around according to the Action of the message.

### 3.1.22 MCA00022

---

#### **{2} completed.switched from {0} to {1}**

##### [Description]

Switching standby server to primary server was completed.

##### [Parameters]

{0}: server ID of primary server

{1}: server ID of standby server

{2}: "fail over"or"switch over"

### 3.1.23 MCA00023

---

#### **failed to {2} from {0} to {1}**

##### [Description]

Failed to switch to primary server because of unexpected failure.

##### [Parameters]

{0}: server ID of primary server

{1}: server ID of standby server

{2}: "fail over"or"switch over"

##### [System Processing]

Processing of switching will be aborted.

##### [Action]

Find the message output before this message from display, system log or event log, and then work around according to the Action of the message.

### 3.1.24 MCA00024

---

#### **starting to detach standby server "{0}" {1}**

##### [Description]

Detaching standby server because of failure detected on standby server.

##### [Parameters]

{0}: server ID

{1}: "automatically" or none

##### [Action]

If Mirroring Controller executed detaching automatically, find the message output before this message from system log or event log to identify the cause of detaching, and then work around according to the Action of the message.

### 3.1.25 MCA00025

---

#### **detach standby server "{0}" completed {1}**

##### [Description]

Detached standby server.

##### [Parameters]

{0}: server ID

{1}: "automatically" or none

### 3.1.26 MCA00026

---

#### failed to {2} standby server "{0}" {1}

##### [Description]

Failed to detach standby server.

##### [Parameters]

{0}: server ID

{1}: "automatically" or none

{2}: "detach"

##### [System Processing]

Processing of detaching will be aborted.

##### [Action]

Refer to the description about workaround for failure of "Cluster Operation Guide".

### 3.1.27 MCA00027

---

#### another "{0}" command is running

##### [Description]

Cannot execute command with this operation mode because another command is running on the same or another server.

##### [Parameters]

{0}: command name

##### [System Processing]

Processing will be aborted.

##### [Action]

There is a case executing another command. Wait for completion of another command on the same or another server, and then re-execute.

In addition, there are the following cases when using mc\_ctl command.

There is a case under processing of a failover and an automatic detach by Mirroring Controller. Wait for completion of the processing under operation, and re-execute.

If any of the following cases occurs, there is a possibility that the processing of Mirroring Controller interrupts. Re-execute the mc\_ctl command after restarting Mirroring Controller.

- When abnormality occurs in the network
- When another server is downed
- When Mirroring Controller is stopped forcibly

### 3.1.28 MCA00028

---

#### communication timeout of Mirroring Controller occurred server:"{0}"

##### [Description]

Either of the followings has occurred.

- communication timeout between mc\_ctl command and Mirroring Controller process has occurred.
- communication timeout between Mirroring Controller processes have occurred.
- Terminating database instance was not completed in the specified time.

[Parameters]

{0}: server ("localhost" or server ID)

[System Processing]

Processing will be aborted.

[Action]

Completion synchronization for terminating database instance might have timed out, because connections remained. Disconnect all connections, and re-execute it.

Reduce CPU or network load caused by the other processes. If could not reduce it, extend remote\_call\_timeout in "server identifier".conf.

### 3.1.29 MCA00029

---

**could not create PID file of Mirroring Controller detail of cause:"{0}"**

[Description]

Could not create PID file of Mirroring Controller.

[Parameters]

{0}: detail of cause

[System Processing]

Processing will be aborted.

[Action]

Identify the cause according to the message, and then remove it.

### 3.1.30 MCA00030

---

**could not remove PID file of Mirroring Controller detail of cause:"%s"**

[Description]

Could not remove PID file of Mirroring Controller.

[Parameters]

{0}: detail of cause

[Action]

Identify the cause according to the message, and then remove it.

### 3.1.31 MCA00031

---

**could not read PID file of Mirroring Controller detail of cause:"%s"**

[Description]

Could not read PID file of Mirroring Controller.

[Parameters]

{0}: detail of cause

[Action]

Identify the cause according to the message, and then remove it.

### 3.1.32 MCA00032

---

#### invalid contents of PID file "%s" of Mirroring Controller

[Description]

The contents of PID file of Mirroring Controller is invalid.

[Parameters]

{0}: file name

[System Processing]

Processing will be aborted.

[Action]

The following causes could be considered.

- The file was stored or replaced by mistake
- The file was corrupted

When starting Mirroring Controller, move or remove the file shown in the message.

When stopped Mirroring Controller, find ID of process named "mcagent" and terminate forcibly by using OS command.

### 3.1.33 MCA00033

---

#### Mirroring Controller is already running

[Description]

Mirroring Controller is already running.

[System Processing]

Processing will be aborted.

[Action]

If needed, stop Mirroring Controller, and re-execute.

### 3.1.34 MCA00034

---

#### cannot execute %s command because Mirroring Controller is not running

[Description]

Cannot execute Mirroring Controller command because Mirroring Controller process is not running.

[Parameters]

{0}: command name

[System Processing]

Processing will be aborted.

[Action]

Start Mirroring Controller, and re-execute.

### 3.1.35 MCA00035

---

#### failed to start database instance

[Description]

Failed to start database instance.

[System Processing]

Processing will be aborted.

[Action]

Find the database message output in the log files of database output before this message, and then work around according to the Action of the message.

### 3.1.36 MCA00036

---

#### failed to stop database instance target server:"{0}"

[Description]

Failed to stop database instance.

[Parameters]

{0}: target server ("localhost" or server ID)

[System Processing]

Processing will be aborted.

[Action]

Find the database message output in the log files of database on the target server output before this message, and then work around according to the Action of the message.

### 3.1.37 MCA00037

---

#### Mirroring Controller option is not installed

[Description]

This functionality is enabled by installing Mirroring Controller option.

[Parameters]

{0}: target server ("localhost" or server ID)

[System Processing]

Processing will be aborted.

[Action]

To use this functionality, install Mirroring Controller option, and then re-execute.

### 3.1.38 MCA00038

---

#### starting Mirroring Controller

[Description]

Starting Mirroring Controller.

### 3.1.39 MCA00039

---

#### Mirroring Controller started

[Description]

Mirroring Controller started.

### 3.1.40 MCA00040

---

#### failed to start Mirroring Controller

[Description]

Failed to start Mirroring Controller.

[System Processing]

Processing will be aborted.

[Action]

Work around according to the Action of the message output before this message.

On Windows, if there is no message outputted before this message, please refer to the message outputted to an event log.

### 3.1.41 MCA00041

---

#### stopping Mirroring Controller

[Description]

Stopping Mirroring Controller.

### 3.1.42 MCA00042

---

#### Mirroring Controller stopped target server:"{0}"

[Description]

Mirroring Controller stopped.

[Parameters]

{0}: target server ("localhost" or server ID)

### 3.1.43 MCA00043

---

#### failed to stop Mirroring Controller target server:"{0}"

[Description]

Failed to stop Mirroring Controller.

[Parameters]

{0}: target server ("localhost" or server ID)

[System Processing]

Processing will be aborted.

[Action]

Identify the cause from system log or event log on the target server, and work around.

### 3.1.44 MCA00044

---

#### stopping Mirroring Controller forcibly

[Description]

Stopping Mirroring Controller forcibly.

### 3.1.45 MCA00045

---

#### stopped Mirroring Controller forcibly

[Description]

Mirroring Controller stopped forcibly.

### 3.1.46 MCA00046

---

#### enabled failover target server:"{0}"

[Description]

Enabled failover and automatic detach.

### 3.1.47 MCA00047

---

#### failed to enable failover target server:"{0}"

[Description]

Failed to enable failover and automatic detach.

[System Processing]

Processing will be aborted.

[Action]

Identify the cause from messages on system log or event log, and work around.

### 3.1.48 MCA00048

---

#### disabled failover target server:"{0}"

[Description]

Disabled failover and automatic detach.

### 3.1.49 MCA00049

---

#### failed to disable failover target server:"{0}"

[Description]

Failed to disable failover and automatic detach.

[System Processing]

Processing will be aborted.

[Action]

Identify the cause from messages on system log or event log, and work around.

### 3.1.50 MCA00050

---

**{0}: "server ID "{2}" specified with option "{1}" does not exist in definition file "{3}"**

[Description]

server ID specified with the option does not exist in definition file.

[Parameters]

{0}: command name

{1}: option

{2}: server ID

{3}: file name

[System Processing]

Processing will be aborted.

[Action]

Re-execute after correcting options or definition file.

### 3.1.51 MCA00051

---

**{0}: "IP address of the command execution server is not specified in definition file "{1}"**

[Description]

IP address of the command execution server is not specified in definition file.

[Parameters]

{0}: command name

{1}: file name

[System Processing]

Processing will be aborted.

[Action]

Correct the definition file according to the message and parameter descriptions of "Cluster Operation Guide".

### 3.1.52 MCA00052

---

**{0}: "wrong server ID "{2}" in definition file "{1}"**

[Description]

Invalid descriptions were found in definition file.

[Parameters]

{0}: command name

{1}: file name

{2}: server ID

[System Processing]

Processing will be aborted.

[Action]

Correct the definition file according to the message and parameter descriptions of "Cluster Operation Guide".

### 3.1.53 MCA00054

---

#### "could not write to file "{0}": exception={1}: {2}"

##### [Description]

Failed to detach or synchronize standby server because could not write to the file.

##### [Parameters]

{0}: file name

{1}: exception type

{2}: exception detail

##### [System Processing]

Processing will be aborted.

##### [Action]

Check the error detail and eliminate causes, and detach or synchronize standby server according to "Actions when an Error Occurs" of "Cluster Operation Guide".

### 3.1.54 MCA00055

---

#### unexpected error occurred in the monitoring process: {0}

##### [Description]

Monitoring process could not continue because the unexpected error occurred.

##### [Parameters]

{0}: detail of cause

##### [System Processing]

Continues monitoring.

##### [Action]

Check the error detail and eliminate causes.

If you cannot clear the problem, contact Fujitsu technical support.

### 3.1.55 MCA00056

---

#### unexpected error occurred: {0}

##### [Description]

An unexpected error occurred.

##### [Parameters]

{0}: detail of cause

##### [System Processing]

Processing will be aborted.

##### [Action]

Check the error detail and eliminate cause.

If you cannot clear the problem, contact Fujitsu technical support.

### 3.1.56 MCA00057

---

#### failed to stop Mirroring Controller forcibly

[Description]

Failed to stop Mirroring Controller forcibly.

[System Processing]

Processing will be aborted.

[Action]

Check [Action] of the message output before this message, and re-execute.

If re-execution fails, terminate forcibly mc\_agent process with OS command.

### 3.1.57 MCA00058

---

#### could not access path "%s" specified as a directory for Mirroring Controller detail of cause: "%s"

[Description]

could not access path specified as a directory for Mirroring Controller.

[Parameters]

%s: path name

%s: detail of cause

[System Processing]

Processing will be aborted.

[Action]

Check the error detail and eliminate causes.

### 3.1.58 MCA00059

---

#### system call error occurred: "%s" detail of cause: "%s"

[Description]

System call error occurred.

[Parameters]

%s: system call name

%s: detail of cause

[System Processing]

Processing will be aborted.

[Action]

Check the error detail and eliminate causes.

### 3.1.59 MCA00060

---

#### could not get installation path

[Description]

Enterprise Postgres may not be installed.

[System Processing]

Processing will be aborted.

[Action]

Re-install Enterprise Postgres.

### 3.1.60 MCA00061

---

**could not access path "%1\$s" for parameter "%2\$s" in definition file "%3\$s" detail of cause:"%4\$s"**

[Description]

could not access path for parameter in definition file.

[Parameters]

%3\$s: file name

%2\$s: parameter name

%1\$s: path name

%4\$s: detail of cause

[System Processing]

Processing will be aborted.

[Action]

Check the error detail and eliminate causes.

### 3.1.61 MCA00062

---

**promotion processing completed**

[Description]

Promotion processing completed.

### 3.1.62 MCA00063

---

**promotion processing failed**

[Description]

Promotion processing failed.

[System Processing]

Processing will be aborted.

[Action]

Clear the problem according to [Action] of the message which was output before this message in system log or in database server log.

### 3.1.63 MCA00064

---

**stopped database instance forcibly**

[Description]

Database instance stopped forcibly.

### 3.1.64 MCA00065

---

#### failed to stop database instance forcibly

[Description]

Failed to stop database instance forcibly.

[System Processing]

Processing will be aborted.

[Action]

Clear the problem according to [Action] of the message which was output before this message in system log or in database server log.

### 3.1.65 MCA00067

---

#### did not switch during a degeneration use

[Description]

Did not switch during a degeneration use.

[System Processing]

Processing will be aborted.

[Action]

If Mirroring Controller executed switching automatically, find the message output before this message from system log or event log to identify the cause of degeneration, and then eliminate causes according to [Action] of the message and try to switch with command.

### 3.1.66 MCA00068

---

#### {0}: "users other than an instance administrator have the access privileges for definition file "{1}"

[Description]

users other than an instance administrator have the access privileges for definition file.

[Parameters]

{0}: command name

{1}: file name

[System Processing]

Processing will be aborted.

[Action]

Revoke all the access privileges for users other than an instance administrator.

MCA00069

could not execute because Mirroring Controller of the server "{0}" is not running

[Description]

Could not execute because Mirroring Controller is not running.

[Parameters]

{0}: server ID

[System Processing]

Processing will be aborted.

[Action]

Start Mirroring Controller, and try to switch with command.

### 3.1.67 MCA00070

---

[Try "%s --help" for more information.\n](#)

[Description]

--help option can show more additional information.

[Parameters]

%s: command name

[System Processing]

None.

[Action]

Check the message output before this message, and refer to descriptions shown by '--help' option.

### 3.1.68 MCA00071

---

[starting to {0}](#)

[Description]

Switching standby server to primary server.

[Parameters]

{0}: "switch over"

### 3.1.69 MCA00072

---

[failed to {0}](#)

[Description]

Failed to switch to primary server because of an unexpected failure.

[Parameters]

{0}: "switch over"

[System Processing]

Processing of switching will be aborted.

[Action]

Find the message output before this message from display, system log or event log, and then eliminate causes according to [Action] of the message.

### 3.1.70 MCA00073

---

#### error detected in handling of the database instance detail of cause:"{0}"

##### [Description]

Error detected in handling of the database instance for the following purposes.

- Obtain the port number of database instance
- Access to the data storage destination directory

##### [Parameters]

{0}: detail of cause

##### [System Processing]

Processing will be aborted.

##### [Action]

Check the error detail and eliminate causes.

### 3.1.71 MCA00074

---

#### could not read PID file of Mirroring Controller detail of cause:"{0}"

##### [Description]

Could not read PID file of Mirroring Controller.

##### [Parameters]

{0}: detail of cause

##### [Action]

Identify the cause according to the message, and then remove it.

### 3.1.72 MCA00075

---

#### invalid contents of PID file "{0}" of Mirroring Controller

##### [Description]

The contents of PID file of Mirroring Controller is invalid.

##### [Parameters]

{0}: file name

##### [System Processing]

Processing will be aborted.

##### [Action]

The following causes could be considered.

- The file was stored or replaced by mistake
- The file was corrupted

When starting Mirroring Controller, move or remove the file shown in the message.

When stopped Mirroring Controller, find ID of process named "mcagent" and terminate forcibly by using OS command.

### 3.1.73 MCA00076

---

---

### cannot execute "{0}" command because Mirroring Controller is not running

#### [Description]

Cannot execute Mirroring Controller command because Mirroring Controller process is not running.

#### [Parameters]

{0}: command name

#### [System Processing]

Processing will be aborted.

#### [Action]

Start Mirroring Controller, and re-execute.

---

## 3.1.74 MCA00077

---

### %s: argument of option "%s" is too long

#### [Description]

Argument of option is too long.

#### [Parameters]

%s: command name

%s: option

#### [System Processing]

Processing will be aborted.

#### [Action]

Re-execute after correcting options.

---

## 3.1.75 MCA00078

---

### %s: invalid option -- %s

#### [Description]

Invalid option.

#### [Parameters]

%s: command name

%s: option

#### [System Processing]

Processing will be aborted.

#### [Action]

Re-execute after correcting options.

---

## 3.1.76 MCA00079

---

### %s: unnecessary operand "%s"

#### [Description]

Unnecessary operand.

[Parameters]

%s: command name

%s: operand

[System Processing]

Processing will be aborted.

[Action]

Re-execute after correcting operand.

### 3.1.77 MCA00080

---

**%s: unrecognized operation mode or no operation mode specified**

[Description]

Unrecognized operation mode or no operation mode specified.

[Parameters]

%s: command name

[System Processing]

Processing will be aborted.

[Action]

Re-execute after correcting or specifying operation mode.

### 3.1.78 MCA00081

---

**start to enable the parameter "{1}" required to build in the standby server "{0}"**

[Description]

Start to enable the parameter required to build in the standby server.

[Parameters]

{0}: server ID

{1}: parameter name

### 3.1.79 MCA00082

---

**enabling the parameter "{1}" required to build in the standby server "{0}" completed**

[Description]

Enabling the parameter required to build in the standby server completed.

[Parameters]

{0}: server ID

{1}: parameter name

### 3.1.80 MCA00083

---

**failed to enable the parameter "{1}" required to build in the standby server "{0}"**

[Description]

Failed to enable the parameter required to build in the standby server.

The following causes could be considered.

- another command is running
- can not access definition file
- parameter does not exist

[Parameters]

{0}: server ID

{1}: parameter name

[System Processing]

Processing will be aborted.

[Action]

- If the parameter is not set

On the primary server, set the parameter of postgresql.conf file according to "parameter" description of "Cluster Operation Guide" and execute pg\_ctl command with reload mode.

- Otherwise

Find the message output before this message from display, system log or event log, and then eliminate causes according to [Action] of the message. Then, on the primary server, set the parameter of postgresql.conf file according to "parameter" description of "Cluster Operation Guide" and execute pg\_ctl command with reload mode.

### 3.1.81 MCA00084

---

#### primary server is already running

[Description]

Primary server is already running.

[System Processing]

Processing will be aborted.

[Action]

The standby server might be running without creating recovery.conf. Create recovery.conf, and re-execute.

### 3.1.82 MCA00085

---

#### cannot start Mirroring Controller because database instance is not running

[Description]

Cannot start Mirroring Controller because database instance is not running.

[System Processing]

Processing will be aborted.

[Action]

Start database instance, and re-execute.

### 3.1.83 MCA00086

---

#### could not get state of database instance detail of cause: "{0}"

[Description]

Could not get state of database instance.

[Parameters]

{0}: detail of cause

[System Processing]

Processing will be aborted.

[Action]

Check the error detail and eliminate causes.

### 3.1.84 MCA00087

---

#### unusable character is included in path "%s" specified as a directory for Mirroring Controller

[Description]

Unusable character is included in path specified as a directory for Mirroring Controller.

[Parameters]

%s: path name

[System Processing]

Processing will be aborted.

[Action]

Correct the path specified as a directory for Mirroring Controller according to the message and mc\_ctl command descriptions of "Reference".

### 3.1.85 MCA00088

---

#### %1\$s: unusable character is included in server ID "%3\$s" specified with option "%2\$s"

[Description]

Unusable character is included in server ID specified with option.

[Parameters]

%1\$s: command name

%2\$s: option

%3\$s: server ID

[System Processing]

Processing will be aborted.

[Action]

Correct the server ID specified with option according to the message and mc\_ctl command descriptions of "Reference".

### 3.1.86 MCA00089

---

#### only instance administrator can execute this command

[Description]

Only instance administrator who created the directory for Mirroring Controller can execute this command.

[System Processing]

Processing will be aborted.

[Action]

Re-execute the command by the instance administrator who created the directory for Mirroring Controller.

### 3.1.87 MCA00090

---

**could not read file "{0}": Permission denied**

[Description]

No read permissions for the file.

[System Processing]

Processing will be aborted.

[Action]

Re-execute the command, after granting the read permissions to the file.

### 3.1.88 MCA00091

---

**"host name or IP address "{1}" of the primary server and the standby server in definition file "{0}" are same, but the --local-server option was not specified"**

[Description]

Host name or IP address of the primary server and the standby server in definition file are same, but the --local-server option was not specified.

[Parameters]

{0}: file name

{1}: host name or IP address

[System Processing]

Processing will be aborted.

[Action]

If the primary server and the standby server are built in the same server, execute the mc\_ctl command with the --local-server option.

If the primary server and the standby server are built in the different server, correct host name or IP address in the definition file.

### 3.1.89 MCA00092

---

**this feature is not available in this edition**

[Description]

This feature is not available in this edition.

[System Processing]

Processing will be aborted

[Action]

Please install the right edition for this feature.

### 3.1.90 MCA00093

---

#### installation environment is destroyed

[Description]

Enterprise Postgres may not be installed correctly or may be destroyed.

[System Processing]

Processing will be aborted.

[Action]

Re-install Enterprise Postgres.

### 3.1.91 MCA00094

---

#### %s: invalid argument for option %s

[Description]

Invalid argument for option.

[Parameters]

%s: command name

%s: option

[System Processing]

Processing will be aborted.

[Action]

Re-execute after correcting options.

### 3.1.92 MCA00095

---

#### could not remove file or directory "{0}"

[Description]

Could not remove the file or the directory.

[Parameters]

{0}: file name or directory name

[System Processing]

Processing will be aborted.

[Action]

Check the status of the file or the directory and eliminate causes, and then remove it.

### 3.1.93 MCA00096

---

#### "could not write file "{0}": exception={1}: {2}"

[Description]

Could not write the file.

[Parameters]

{0}: file name

{1}: exception type  
{2}: exception detail

[System Processing]

Processing will be aborted.

[Action]

Identify the cause according to the message, and then remove it.

---

### 3.1.94 MCA00097

---

#### setup of standby server completed

[Description]

Setup of standby server completed.

---

### 3.1.95 MCA00098

---

#### setup of standby server failed

[Description]

Setup of standby server failed.

[System Processing]

Processing will be aborted.

[Action]

Find the message output before this message from display, system log or event log, and then eliminate causes according to [Action] of the message.

---

### 3.1.96 MCA00099

---

#### {0}: server "{1}" is running as a standby server

[Description]

Could not continue processing because database instance to be duplicated is not running as a primary server.

[Parameters]

{0}: command name  
{1}: server ID

[System Processing]

Processing will be aborted.

[Action]

Re-execute this command on the standby server to be set up.

---

## 3.2 Message Numbers Beginning with MCA00100

---

---

### 3.2.1 MCA00100

---

#### cannot execute {0} command because Mirroring Controller is running

[Description]

Cannot execute this command because Mirroring Controller is running on the server to be set up.

[Parameters]

{0}: command name

[System Processing]

Processing will be aborted.

[Action]

Execute this command on server where primary server is not running. If execute it on the right server, stop Mirroring Controller and then re-execute it.

### 3.2.2 MCA00101

---

#### cannot execute {0} command because database instance is running

[Description]

Cannot execute this command because database instance is running on the server to be set up.

[Parameters]

{0}: command name

[System Processing]

Processing will be aborted.

[Action]

Execute this command on server where primary server is not running. If execute it on the right server, stop database instance and then re-execute it.

### 3.2.3 MCA00102

---

#### {0}: invalid argument value {2} for option {1}

[Description]

Invalid argument for option.

[Parameters]

{0}: command name

{1}: option

{2}: argument value

[System Processing]

Processing will be aborted.

[Action]

Re-execute after correcting argument value for the option.

### 3.2.4 MCA00103

---

#### could not move file or directory from {0} to {1}

[Description]

Could not move the file or the directory.

[Parameters]

{0}: source file or directory

{1}: target file or directory

[System Processing]

Processing will be aborted.

[Action]

Check the status of the file or the directory and eliminate causes, and then remove it.

### 3.2.5 MCA00104

---

#### could not create directory {0}

[Description]

Could not create the directory.

[Parameters]

{0}: target directory

[System Processing]

Processing will be aborted.

[Action]

Check the status of the directory and eliminate causes, and then remove it.

### 3.2.6 MCA00105

---

#### could not read the access privileges of {0}

[Description]

Could not read the access privileges.

[Parameters]

{0}: target directory

[System Processing]

Processing will be aborted.

[Action]

Check the status of the directory and eliminate causes, and then remove it.

### 3.2.7 MCA00106

---

#### failed to set the access privileges of {0}

[Description]

Failed to set the access privileges.

[Parameters]

{0}: target directory

[System Processing]

Processing will be aborted.

[Action]

Check the status of the directory and eliminate causes, and then remove it.

### 3.2.8 MCA00107

---

**service "{0}" is not registered**

[Description]

Service is not registered.

[Parameters]

{0}: Service name

[System Processing]

Processing will be aborted.

[Action]

Register service, and re-execute.

### 3.2.9 MCA00108

---

**could not start service "{0}" detail of cause:"{1}"**

[Description]

Could not start service.

[Parameters]

{0}: Service name

{1}: detail of cause

[System Processing]

Processing will be aborted.

[Action]

Check the error detail and eliminate causes.

### 3.2.10 MCA00109

---

**could not start service "%s" detail of cause:"%s"**

[Description]

Could not start service.

[Parameters]

%s: Service name

%s: detail of cause

[System Processing]

Processing will be aborted.

[Action]

Check the error detail and eliminate causes.

### 3.2.11 MCA00110

---

#### service "%s" is not registered

[Description]

Service is not registered.

[Parameters]

%s: Service name

[System Processing]

Processing will be aborted.

[Action]

Register service, and re-execute.

### 3.2.12 MCA00111

---

#### Mirroring Controller service "%s" has been registered

[Description]

Mirroring Controller service has been registered with Windows Service.

[Parameters]

%s: Service name

### 3.2.13 MCA00112

---

#### Mirroring Controller service "%s" has been unregistered

[Description]

Mirroring Controller service has been unregistered from Windows Service.

[Parameters]

%s: Service name

### 3.2.14 MCA00113

---

#### service name "%s" is already in use

[Description]

Service name is already in use.

[Parameters]

%s: Service name

[System Processing]

Processing will be aborted.

[Action]

Check the service name, and re-execute.

### 3.2.15 MCA00114

---

#### could not register service "%s" detail of cause: "%s"

[Description]

An error occurred during registration of service.

[Parameters]

%s: Service name

%s: detail of cause

[System Processing]

Processing will be aborted.

[Action]

Check the error detail and eliminate causes.

### 3.2.16 MCA00115

---

#### could not unregister service "%s" detail of cause: "%s"

[Description]

An error occurred during deregistration of service.

[Parameters]

%s: Service name

%s: detail of cause

[System Processing]

Processing will be aborted.

[Action]

Check the error detail and eliminate causes.

### 3.2.17 MCA00116

---

#### %s: option "%s" is required

[Description]

A required option is not specified.

[Parameters]

%s: command name

%s: option

[System Processing]

Processing will be aborted.

[Action]

Specify the required option, and re-execute.

### 3.2.18 MCA00117

---

#### no authority to execute this command

[Description]

Only the administrative user can run this command.

[System Processing]

Processing will be aborted.

[Action]

Invoke the administrator's prompt, and re-execute this command.

### 3.2.19 MCA00119

---

#### could not receive respons from {0} server({1})

[Description]

An error was detected on the server.

[Parameters]

{0}: monitored object (server)

{1}: server type (primary, standby)

[System Processing]

Perform failover or disconnection.

If failover or disconnection has already been performed, then these options will be disabled.

[Action]

Refer to the description about workaround for failure of "Cluster Operation Guide".

### 3.2.20 MCA00120

---

#### detected streaming replication error in {0} server({1})

[Description]

A streaming replication error was detected.

[Parameters]

{0}: monitored object (database process)

{1}: server type (primary, standby)

[System Processing]

Perform failover or disconnection .

If failover or disconnection has already been performed, then these options will be disabled.

[Action]

Refer to the description about workaround for failure of "Cluster Operation Guide".

### 3.2.21 MCA00121

---

#### disk drives are available

[Description]

Database where data storage, transaction log storage and tablespaces are saved is working correctly.

### 3.2.22 MCA00122

---

#### a {0} server({1}) is running normally

[Description]

The server is running normally.

[Parameters]

{0}: server type (primary, standby)

{1}: monitored object (server)

### 3.2.23 MCA00123

---

#### Streaming Replication has started

[Description]

Streaming Replication has started

### 3.2.24 MCA00124

---

#### postmaster is running in {0} server({1})

[Description]

Postmaster is running

[Parameters]

{0}: server type (primary, standby)

{1}: monitored object (server)

### 3.2.25 MCA00125

---

#### failed to get the standby server information

[Description]

Failed to get the standby server information

[System Processing]

Perform failover or disconnection.

If failover or disconnection has already been performed, then these options will be disabled.

[Action]

Refer to the description about workaround for failure of "Cluster Operation Guide".

### 3.2.26 MCA00126

---

#### {0} server({1}) was downed

[Description]

The database server has stopped.

[Parameters]

{0}: server type (primary, standby)

{1}: monitored object (server)

[System Processing]

Perform failover or disconnection.

If failover or disconnection has already been performed, then these options will be disabled.

[Action]

Refer to the description about workaround for failure of "Cluster Operation Guide".

### 3.2.27 MCA00127

---

#### You can promote the standby server

[Description]

You can promote the standby server

### 3.2.28 MCA00128

---

#### You cannot promote the standby server

[Description]

You cannot promote the standby server

### 3.2.29 MCA00129

---

#### detected a disk I/O error in {0} server({1})

[Description]

A disk I/O error was detected.

[Parameters]

{0}: server type (primary, standby)

{1}: monitored object (server)

[System Processing]

Perform failover or disconnection.

If failover or disconnection has already been performed, then these options will be disabled.

[Action]

Refer to the description about workaround for failure of "Cluster Operation Guide".

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# FUJITSU Enterprise Postgres 9.5



## FJQSS User Guide (Information Collection Tool)

Solaris/Linux

J2S2-1625-01ENZO(00)  
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# Preface

---

This manual describes information to use the outline and the tool of FJQSS (Information Collection Tool).

## Purpose of this Manual

The purpose of this manual is to be able to gather the collected information by using FJQSS (Information Collection Tool) when trouble occurs.

## Reader of this Manual

This manual is targeted at the user who gathers the collected information when the trouble occurs.

You can obtain information on the method of gathering the function and the collected information of FJQSS (Information Collection Tool) obtain by referring to this manual.

## Structure of this Manual

The structure of this manual is as follows:

Chapter 1 outline

Chapter 2 FJQSS (Information Collection Tool)

Appendix A Messages and error codes

## Notations

The following notations are used in this manual;

### Symbols used in this manual

The following symbols are used in this manual.

Example:[Enter]key

### Symbols used in command

This subsection describes the symbols used in the examples of commands.

Example:

```
fjqss_collect [-s]
```

### Meaning of Symbols

| Symbol | Meaning   |
|--------|---|
| []     | The item enclosed with this sign is shown and omissible is shown. |

## Abbreviations

The following abbreviations are used in this manual:

### Operating Systems

| Full Name                                | Abbreviations  |
|--|----------------|
| Oracle Solaris 9                         | Solaris 9      |
| Oracle Solaris 10                        | Solaris 10     |
| Oracle Solaris 11                        | Solaris 11     |
| Oracle Solaris                           | Solaris        |
| Red Hat Enterprise Linux 6 (for x86)     | RHEL6(x86)     |
| Red Hat Enterprise Linux 6 (for Intel64) | RHEL6(Intel64) |
| Red Hat Enterprise Linux 5 (for x86)     | RHEL5(x86)     |
| Red Hat Enterprise Linux 5 (for Intel64) | RHEL5(Intel64) |

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# Chapter 1 Outline

This chapter explains the outline of FJQSS (Information Collection Tool).

## 1.1 FJQSS (Information Collection Tool)

---

This appendix explains FJQSS (Information Collection Tool) that archives the information for investigation (middleware logs and operation system logs) with an easy operation. Executing FJQSS right after a problem occurs makes a rapid investigating of the causes.

# Chapter 2 Collecting the information

This chapter explains the method of gathering the survey material, the confirm method of the survey material, and notes.

## 2.1 Collection method

This section explains the operating procedure of FJQSS (Information Collection Tool).

Collecting information can do by using the command. You can operate the Collection by the method that shows the product selection menu, or the method that does not show such the menu.

- [2.1.1 Collecting with showing menu](#)
- [2.1.2 Collecting without showing menu](#)

### 2.1.1 Collecting with showing menu

This subsection explains the operating procedure of FJQSS (Information Collection Tool) with showing the product selection menu.

#### Authority to execute

User Authority of the root user is necessary.

#### Prior confirmation

Set the output directory of the collected information if necessary. The output directory of default is the tmp directory (/tmp). See [\[2.3 Changing a path of the output directory\]](#) for details of changing the output directory.

#### Synopsis

If you execute the command specifying the output directory by the parameter:

```
fjqss_collect output_directory
```

If you execute the command specifying the output directory by the environment variable or the environmental configuration file:

```
fjqss_collect
```

#### Path to this command

```
/opt/FJSVqst1
```

#### Notes in executing the command

- Do not put fjqss\_collect or its copy into any other directory. They work only if they are in the path shown above in [Path to this command].
- Execute this command immediately after the problem occurs.
- Multiple execution of this command is not available. If you do that, the following error message appears:

```
FJQSS is already started. Please restart FJQSS after the executing one ends.
```

#### Operating procedure

This part explains the operating procedure of FJQSS (Information Collection Tool).

1. Log on to the server, open the console window and execute the information collection command in the console window.

Hereafter, it explains by the example when outputting the information to the default output directory(/tmp):

```
> cd /opt/FJSVqst1
> ./fjqss_collect
```

2. The product selection menu appears. It shows the list of the products whose information can be collected.
3. Put the number of the product of which you want to collect the information:

```

-----
FJQSS Product Selection
-----

  1.MW Product B (Server Side)
  2.MW Product B (Client Side)

Please input a number of the product
of which you want to collect the information.>>1

```

4. Check the indicated name(s) of the middleware (s) whose investigation information are to be collected, then press the [Y] key to start.

Collection starts and the following indicator appear in the command prompt:

```

The following product information is collected.
    MW Product B (Server Side)

Input 'Y-key' to collect data, or 'N-key' to stop.(default=N):y
preparing:          ##### 100% [00:01]

```

The time and the disk space required for the collection depend on the condition of the target system.

5. Check the contents of the output directory.

After the FJQSS (Information Collection Tool) has completed the collection, the following prompt appears. Verify that the information have been collected in the directory whose name is indicated in the prompt:

```

The following product information is collected.
    MW Product B (Server Side)

Input 'Y-key' to collect data, or 'N-key' to stop.(default=N):y
preparing:          ##### 100% [00:01]
collecting:         ##### 100% [00:01]
archiving:          ##### 100% [00:01]
compress:           ##### 100% [00:15]
Completed.
Gathered investigation informations archived to
    /tmp/ezcollect20121018172939/result20121018172939.tar.gz (206KB)

```

The following files are created in the output directory (ezcollectYYYYMMDDHHMMSS: YYYYMMDDHHMMSS indicates the time (year, month, day, hours, minutes and seconds) that the collection started). See [\[2.2 Checking the collected information\]](#) for the output directory:

- resultYYYYMMDDHHMMSS.tar.gz

The collected information.

- result.txt

The result log is a text file to indicate if the collection of information has succeeded.

This file indicates the names and the results of collection (OK/NG) of each material.

- ez.log

The activity log of the FJQSS (Information Collection Tool).

### Aborting FJQSS (Information Collection Tool)

This subsection explains how to abort running FJQSS (Information Collection Tool).

Although it is recommended that you wait until the collection ends, you can press [CTRL] + [C] key combination to abort the execution if it is necessary. The following prompt appears if [CTRL] + [C] is pressed and the execution is aborted.

```
The following product information is collected.
      MW Product B (Server Side)

Input 'Y-key' to collect data, or 'N-key' to stop.(default=N):y
preparing:          ##### 40% [00:01]
Stopped FJQSS process.
```

The output directory that has been made in the collecting might remain when the executing is aborted. There is no influence in the operation of FJQSS because the output directory will be newly made when FJQSS is executed again.

Moreover, there is no influence in the operation of FJQSS even if the remaining output directory was deleted.



Do not close the command prompt before the collection ends. if you do so, the temporary directories might remain in the work directory. Please delete the following directories if they remain in the work directory.

- ezcollectYYYYMMDDHHMMSS
- ezworkYYYYMMDDHHMMSS

See [2.3 Changing a path of the output directory](#)] for details of the work directory.

## 2.1.2 Collecting without showing menu

This subsection explains the operating procedure of FJQSS (Information Collection Tool) without showing the product selection menu.

You can use the procedure in the shell script.

### Authority to execute

User Authority of the root user is necessary.

### Prior confirmation

Verify the product identification name of the product of which you collect the information by the product information showing command. See [2.1.3 Getting the product identification name](#)] for details.

Set the output directory of the collected information if necessary. The output directory of default is the tmp directory (/tmp). See [\[2.3 Changing a path of the output directory\]](#) for details of changing the output directory.

### Synopsis

The specification of product identification name by "-pr <product identification name>" is necessary if you specify the silent mode option by "-s".

If you execute the command specifying the output directory by the parameter:

```
fjqss_collect -pr <product identification name> [-s] output_directory
```

If you execute the command specifying the output directory by the environment variable or the environmental configuration file:

```
fjqss_collect -pr <product identification name> [-s]
```

### Description

The fjqss\_collect command collects the information required for the investigation.

### Option

-pr

This option specifies the product identification name of the product of which you collect the information.

-s

The command runs without asking to the operator. (It runs in silent mode.)

### Path to this command

```
/opt/FJSVqst1
```

### Notes in executing the command

- Do not put fjqss\_collect or its copy into any other directory. They work only if they are in the path shown above in [Path to this command].
- Execute this command immediately after the problem occurs.
- Multiple execution of this command is not available. If you do that, the following error message appears:

```
FJQSS is already started. Please restart FJQSS after the executing one ends.
```

## 2.1.3 Getting the product identification name

This subsection explains how to get the product identification name which you specify when collecting the information without showing Product Selection Menu.

The product identification name can be got by executing the product information showing command.

### Authority to execute

User Authority of the root user is necessary.

### Synopsis

```
fjqss_mwpinfolist
```

### Description

This command shows the list of the information of products of which the information collection is available.

Each product's information is shown in one line.

The product's Information is shown in order of "No." (number), "KEY" (product identification name), "DispName" (product name) and "Path" (destination directory of the information)

Example of the result of executing the product information showing command:

```
MW Product List
No. KEY      DispName      Path
-----
1.  PRODUCTA  MW PRODUCT A  /opt/FJSVPRDA/server/fjqss_tool1
2.  PRODUCTB  MW PRODUCT B  /opt/FJSVPRDB/server/fjqss_tool1
3.  PRODUCTC  MW PRODUCT C  /opt/FJSVPRDC/server/fjqss_tool1
```

If you collect the information of the product No.1, specify the product identification name "PRODUCTA" as the parameter to collect the information of the "MW PRODUCT A" by the procedure of [2.1.2 Collecting without showing menu](#)].

### Path to this command

```
/opt/FJSVqst1
```

## 2.2 Checking the collected information

The collected information are created in the output directory (ezcollectYYYYMMDDHHMMSS) as file "resultYYYYMMDDHHMMSS.tar.gz".

The output directory is created at the output specified for an environmental configuration file destination at the output destination. If no destination is specified, then the output directory is created at the tmp directory (/tmp).

You can specify a path of the output directory if you execute the information collecting command in the console window. See [2.3 Changing a path of the output directory].for details of the environmental configuration file ant the output destination.

Verify that the following file and directory exist:

- Result log (result.txt)  
The result log is a text file to indicate if the collection of information has succeeded.  
This file indicates the names and the results of collection (OK/NG) of each material.
- Collected information (resultYYYYMMDDHHMMSS.tar.gz)

## 2.3 Changing a path of the output directory

You can change a path of the output directory by two methods below.

- Specifying a path of the output directory in the option of the information collecting command.
- Specifying a path of the output directory by setting the environment variable.
- Specifying a path of the output directory by updating the environmental configuration file.

The method of specifying in the option of the command explains in 2.1.1 Collecting with showing menu and 2.1.2 Collecting without showing menu]. Hereafter, the method of specifying by the environment variable and by the environmental configuration file will be explained.

-

### Specifying a path of the output directory by setting the environment variable

You can specify the directory where the output directory will be created by setting the environment variable %EZ\_OUTPUTDIR% before executing this command.

#### Description format:

```
EZ_OUTPUTDIR="the directory path where the output directory will be created"
output EZ_OUTPUTDIR
```

#### Example:

If “/etc/work” is specified to %EZ\_OUTPUTDIR%:

```
EZ_OUTPUTDIR=/etc/work
export EZ_OUTPUTDIR
```

Then the directory below will be created as the output directory:

```
/etc/work/ezcollectYYYYMMDDHHMMSS
```

### Specifying a path of the output directory by updating the environmental configuration file

Environmental configuration file (FJQSSconf.txt) is a file that defines the operating environment of FJQSS.

It exists in following directory.

```
<Directory where the product is installed>/fjqss_tooln (n=1,2,...,9)
```

The items that can be specified for environmental configuration file are shown below.

| Item      | Outline   | Omission      |
|-----------|---|---------------|
| OutputDir | The directory path where the output directory will be created (*3). | Possible (*2) |

| Item    | Outline   | Omission     |
|---------|---|--------------|
| WorkDir | The directory path where the work directory (*1) will be created by FJQSS execution (*3). | Possible(*2) |

(\*1)The work directory is a directory that temporarily stores information necessary for the execution of FJQSS. When FJQSS ends, stored information is automatically deleted.

(\*2) If the specification is wrong or omitted, the tmp directory (/tmp) is used.

(\*3) You can specify the directory by the relative path from an absolute path or environmental configuration file.

The format of environmental configuration file is shown below.

**Description format:**

```
OutputDir="the directory path where the output directory will be created"
WorkDir=" work directory"
```

**Example:**

If “/etc/work” is specified to OutputDir, “/etc/tmp” is specified to WorkDir.

```
OutputDir=/etc/work
WorkDir=/etc/tmp
```

Then the directory below will be created as the output directory:

```
/etc/work/ezcollectYYYYMMDDHHMMSS
```

And the directory below will be created as the work directory:

```
/etc/tmp/ezworkYYYYMMDDHHMMSS
```

 **Note**

If the plural specifications of the output directory is done, then the specification becomes effective in the following order by priority:

1. Specification in the option of the information collecting command.
2. Specification by setting the environment variable.
3. Specification by updating the environmental configuration file.

# Appendix A Messages and error codes

## A.1 Error Messages

The message which FJQSS outputs can have an error code. See [A.2 Error Codes]. for detail of error codes.

| Look for   | What to do   |
|--|--|
| FJQSS is already started.<br>Please restart FJQSS after the executing one ends.  | Check if FJQSS is running. Multiple execution of it is not available.  |
| The file used with FJQSS is not found.<br>Please contact a Fujitsu technological member.<br>(product= PRODUCT_IDENTIFICATION_NAME, errcode= ERROR_CODE)  | Please contact the Fujitsu engineer, and pass on the PRODUCT_IDENTIFICATION_NAME, PATH_NAME and ERROR_CODE in the message. About detail meanings of the ERROR_CODE, see [A.2 Error Codes]. |
| Failed in the copy of materials used with FJQSS to the work directory.<br>Please contact a Fujitsu technological member.<br>(PATH= PATH_NAME, errcode= ERROR_CODE)   |  |
| Failed in the access of the file used with FJQSS.<br>Please contact a Fujitsu technological member.<br>(errcode= ERROR_CODE)   |  |
| The file used with FJQSS is not found or broken.<br>Please contact a Fujitsu technological member.<br>(PATH= PATH_NAME)  |  |
| Failed in the access of the directory used with FJQSS.<br>Please contact a Fujitsu technological member.<br>(PATH= PATH_NAME)  |  |
| Failed in the current directory change to the work directory.<br>Please contact a Fujitsu technological member.<br>(PATH= PATH_NAME)   |  |
| Failed to execute FJQSS. Please contact Fujitsu technical staff.   |  |
| There is a wrong option in the command line.<br>Please restart FJQSS with the correct option.  | Execute FJQSS again after removing the cause according to the left messages. About Environmental configuration file, see [2.3 Changing a path of the output directory].                    |
| Not super-user.<br>Please restart FJQSS by super-user  |  |
| A memory is insufficient.<br>Please stop unnecessary applications and restart FJQSS.   |  |
| The product specified by the -pr option is not found.<br>Please restart FJQSS with the correct option.<br>(product= PRODUCT_IDENTIFICATION_NAME)   |  |
| Japanese characters are included in the directory name at the 'OutputDir' of environmental file. Japanese characters cannot be used.<br>Please correct environmental file and restart FJQSS.<br>(environmental file=PATH_NAME) |  |

| Look for   | What to do |                                     |
|--|------------|-------------------------------------|
| <p>Japanese characters are included in the directory name at the 'WorkDir' of environmental file. Japanese characters cannot be used.</p> <p>Please correct environmental file and restart FJQSS.</p> <p>(environmental file=PATH_NAME)</p>  |            |                                     |
| <p>Failed in making the output directory.</p> <p>Please confirm the following.</p> <ul style="list-style-type: none"> <li>-There must be an authority to make the folder.</li> <li>-Passing in xx bytes or less must be specified.</li> <li>-The length of each directory name must be 255 bytes or less.</li> </ul> |            |                                     |
| <p>Failed in making the work directory.</p> <p>Please confirm the following.</p> <ul style="list-style-type: none"> <li>-There must be an authority to make the folder.</li> <li>-Passing in xx bytes or less must be specified.</li> <li>-The length of each directory name must be 255 bytes or less.</li> </ul>   |            |                                     |
| <p>Output directory is too long at the 'OutputDir' of environmental file.Please adjust the output directory to xx bytes or less and restart FJQSS</p> <p>(environmental file= PATH_NAME)</p>   |            |                                     |
| <p>Work directory is too long at the 'WorkDir' of environmental file.</p> <p>Please adjust the output directory to xx bytes or less and restart FJQSS</p> <p>(environmental file= PATH_NAME)</p>   |            |                                     |
| <p>The output directory is too long specified in the option.</p> <p>Please adjust the output directory to %s bytes or less and restart FJQSS.</p>  |            |                                     |
| <p>Japanese characters are included in the output directory specified in the option. Japanese characters cannot be used.</p> <p>Please correct the output directory and restart FJQSS.</p>   |            |                                     |
| <p>The output directory is too long specified with the environment variable:EZ_OUTPUTDIR.</p> <p>Please adjust environment variable:EZ_OUTPUTDIR to xx byte or less.</p>   |            |                                     |
| <p>Failed to create log.(PATH=PATH_NAME)</p> <p>Take action indicated the following items:</p> <ul style="list-style-type: none"> <li>- Create the output folder if it doesn't exist.</li> <li>- Set the role to the output folder.</li> </ul>   |            |                                     |
| <p>Products are not installed.Please make sure that the products that are installed.</p>   |            |                                     |
| <p>The is no installed product of which FJQSS can collect the information. FJQSS ends.</p>   |            |                                     |
| <p>Stopped FJQSS process.</p>  |            | <p>No user action is necessary.</p> |

## A.2 Error Codes

| Error Code | Cause     |
|------------|-----------|
| 0          | No error. |

| <b>Error Code</b> | <b>Cause</b>  |
|-------------------|---|
| 1                 | Command operand error   |
| 2                 | Insufficient memory   |
| 3                 | Failed to execute without administrator permissions   |
| 5                 | Though "-s" option exists, "-pr" option does not exist  |
| 6                 | FJQSS common component has been already done  |
| 10                | Middleware products' list file does not exist   |
| 11                | Middleware product specified with -pr option does not exist   |
| 13                | The built-in directory of the target middleware product of collecting information does not exist          |
| 15                | Japanese characters are included in the directory name at the output directory of environmental file      |
| 16                | Japanese characters are included in the directory name at the work directory of environmental file        |
| 17                | Too long path name is specified in the directory name at the output directory of environmental file       |
| 18                | Too long path name is specified in the directory name at the work directory of environmental file         |
| 19                | Failed to create the output directory   |
| 20                | Failed to create the work directory   |
| 21                | Failed to access the directory  |
| 22                | Failed to copy the common materials and built-in materials of the product directory to the work directory |
| 23                | Failed to show the information of the product to collect its information materials                        |
| 24                | Failed to change the current directory to the work directory  |
| 25                | Too long path name is specified to the parameter that specifies the output directory                      |
| 26                | Japanese characters are included in the parameter that specifies the output directory                     |
| 27                | Products of which collecting information is available are not installed                                   |
| 28                | Failed to execute FJQSS   |