

## **Fujitsu Enterprise Postgres 16**

## Installation and Setup Guide

Windows/Linux



## **Fujitsu Enterprise Postgres 16**

# Installation and Setup Guide for Server

Linux

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## **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 Recommended WebAdmin Environments

Describes the recommended WebAdmin environment.

#### Appendix B Setting Up and Removing WebAdmin

Describes how to set up and remove WebAdmin

#### Appendix C WebAdmin Disallow User Inputs Containing Hazardous Characters

Describes characters that are not allowed in WebAdmin.

#### Appendix D Configuring Parameters

Describes Fujitsu Enterprise Postgres parameters.

#### Appendix E Estimating Database Disk Space Requirements

Describes how to estimate database disk space requirements

#### Appendix F Estimating Memory Requirements

Describes the formulas for estimating memory requirements

#### Appendix G Quantitative Limits

Describes the quantity range

#### Appendix H Configuring Kernel Parameters

Describes the settings for kernel parameters

#### Appendix I Determining the Preferred WebAdmin Configuration

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

#### Appendix J System Configuration when using Pgpool-II

Describes the system configuration when using Pgpool-II.

#### Appendix K Supported contrib Modules and Extensions Provided by External Projects

Lists the PostgreSQL contrib modules and the extensions provided by external projects supported by Fujitsu Enterprise Postgres.

#### Appendix L Procedure when Modifying the JRE Installation

Describes the procedures to follow when modifying the JRE installation.

#### Appendix M Access to Key Management System Using Plug-in

Describes how to access key management systems using plug-ins.

#### Appendix N Deploying Virtual Machines by Cloning

Describes installing Fujitsu Enterprise Postgres on a virtual machine, cloning the virtual machine, and deploying a new virtual machine.

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## **Contents**

Chapter 1 Overview of Installation	1
1.1 Features that can be Installed.	1
1.2 Installation Types.	1
1.2.1 New Installation	1
1.2.2 Reinstallation	1
1.2.3 Multi-Version Installation.	1
1.3 Installation Procedure.	1
1.3.1 Installation in Interactive Mode	2
1.3.2 Installation in Silent Mode	2
1.4 Uninstallation	2
	_
Chapter 2 Operating Environment	
2.1 Required Operating System.	
2.2 Related Software	
2.3 Excluded Software	
2.4 Required Patches	
2.5 Hardware Environment.	
2.6 Disk Space Required for Installation	
2.7 Supported System Environment	
2.7.1 TCP/IP Protocol	
2.7.2 File System	
2.8 PostgreSQL Version Used for Fujitsu Enterprise Postgres	
2.9 Notes on Using Streaming Replication	
2.10 Key Management System Requirements	
2.10.1 To Connect to a key Management System Using the KMIP Protocol	
2.10.2 To Connect to a Key Management System Using a Plug-in	11
Chapter 3 Installation.	10
3.1 Pre-installation Tasks.	
3.2 Installation in Interactive Mode	
3.3 Installation in Silent Mode	
Chapter 4 Setup	18
4.1 Operating Method Types and Selection	
4.2 Preparations for Setup	19
4.2.1 Creating an Instance Administrator	19
4.2.2 Preparing Directories for Resource Deployment	19
4.2.3 Estimating Resources	22
4.2.4 Configuring Corefile Names.	22
4.3 Creating Instances	23
4.3.1 Using WebAdmin	23
4.3.1.1 Before Using WebAdmin	23
4.3.1.2 Logging in to WebAdmin	24
4.3.1.3 Creating an Instance	24
4.3.1.4 Changing Instance Settings.	25
4.3.1.4.1 Instance configuration	26
4.3.1.4.2 Changing client authentication information.	
4.3.1.4.3 Editing instance information.	27
4.3.1.5 Importing Instances	27
4.3.2 Using the initdb Command	28
4.3.2.1 Editing Kernel Parameters.	
4.3.2.2 Creating an Instance	28
4.4 Configuring Remote Connections	31
4.4.1 When an Instance was Created with WebAdmin.	31
4.4.2 When an Instance was Created with the initdb Command	31
4.5 Other Settings	30

4.5.1 Error Log Settings	
4.5.2 Configuring Automatic Start and Stop of an Instance	33
4.5.3 Settings when Using the Features Compatible with Oracle Databases	34
4.5.4 LDAP Authentication File Settings	34
4.5.5 Setting the server keytab file for GSSAPI authentication	
4.5.6 Settings for Using Legacy OpenSSL Providers	35
4.6 Integration with Message-Monitoring Software	35
4.7 Setting Up and Removing OSS	36
4.7.1 oracle_fdw	36
4.7.1.1 Setting Up oracle_fdw	36
4.7.1.2 Removing oracle_fdw	37
4.7.2 pg_bigm	37
4.7.2.1 Setting Up pg_bigm.	37
4.7.2.2 Removing pg_bigm	37
4.7.3 pg_hint_plan	
4.7.3.1 Setting Up pg_hint_plan	
4.7.3.2 Removing pg_hint_plan	
4.7.4 pg_dbms_stats	39
4.7.4.1 Setting Up pg_dbms_stats	
4.7.4.2 Removing pg_dbms_stats	
4.7.5 pg_repack	
4.7.5.1 Setting Up pg_repack	
4.7.5.2 Removing pg_repack	
4.7.6 pg_rman	
4.7.6.1 Setting Up pg_rman	
4.7.6.2 Removing pg_rman	
4.7.7 pg_statsinfo	
4.7.7.1 Setting Up pg_statsinfo	
4.7.7.2 Removing pg_statsinfo	
4.7.8 pgBadger	
4.7.8.1 Setting Up pgBadger	
4.7.8.2 Removing pgBadger.	
4.7.9 Pgpool-II	
4.7.9.1 Setting Up Pgpool-II.	
4.7.9.2 Removing Pgpool-II.	
4.7.10 pgBackRest	
4.7.10.1 Setting Up pgBackRest	
4.7.10.2 Removing pgBackRest	
4.7.10.5 Servers to which pgBackRest can connect	
4.7.11.1 Using the Default Version of Ilvm.	
4.7.11.1 Using a Non-Default Version of Ilvm.	
4.7.11.3 Without Ilvm	
4.7.11.4 Setting DT_RUNPATH	
4.7.12 Build without PGXS.	
4.8 Deleting Instances.	
4.8.1 Using WebAdmin	
4.8.2 Using Server Commands.	
Chapter 5 Uninstallation	48
5.1 Uninstallation in Interactive Mode	48
5.2 Uninstallation in Silent Mode	50
Appendix A Recommended WebAdmin Environments	
A.1 Recommended Browser Settings	
A.2 How to Set Up the Pop-up Blocker	52
Appendix B Setting Up and Removing WebAdmin	53

B.1 Setting Up WebAdmin	
B.1.1 Setting Up WebAdmin	
B.1.2 Starting the Web Server Feature of WebAdmin.	
B.1.3 Stopping the Web Server Feature of WebAdmin	
B.2 Removing WebAdmin	
B.3 Using an External Repository for WebAdmin	
B.4 Using the WebAdmin Auto-Refresh Feature	56
Appendix C WebAdmin Disallow User Inputs Containing Hazardous Characters	57
Appendix D Configuring Parameters	58
Appendix E Estimating Database Disk Space Requirements	
E.1 Estimating Table Size Requirements	
E.2 Estimating Index Size Requirements	
E.3 Sizes of Data Types	
E.3.1 Sizes of Fixed-Length Data Types	
E.3.2 Sizes of Variable-Length Data Types	
E.3.3 Sizes of Array Data Types	
E.3.4 Number of Bytes per Character	
E.4 Estimating Transaction Log Space Requirements	
E.5 Estimating Archive Log Space Requirements	
E.6 Estimating Backup Disk Space Requirements	
E.7 Estimating VCI Disk Space Requirements	66
Appendix F Estimating Memory Requirements	
F.1 Fujitsu Enterprise Postgres Memory Requirements	
F.2 Database Multiplexing Memory Requirements	70
F.3 VCI Memory Requirements	
F.4 High-Speed Data Load Memory Requirements	
F.5 Global Meta Cache Memory Requirements	72
Appendix G Quantitative Limits	73
Appendix H Configuring Kernel Parameters	78
Appendix I Determining the Preferred WebAdmin Configuration	79
I.1 WebAdmin Configurations	
I.1.1 Single-Server Configuration.	79
I.1.2 Multiserver Configuration.	79
I.2 Installing WebAdmin in a Single-Server Configuration.	80
I.3 Installing WebAdmin in a Multiserver Configuration	81
Appendix J System Configuration when using Pgpool-II	82
J.1 Pgpool-II Configuration	82
J.1.1 Single-Machine Configuration	
J.1.2 Two-Machine Configuration	
J.1.3 Three-Machine Configuration.	
J.2 Installing Pgpool-II	
J.3 Pgpool-II Setup	84
J.3.1 Setting Environment Variables	84
J.3.2 Configuration file	
J.3.2.1 Configuring pgpool.conf	
J.3.2.2 Using Configuration Files.	
Appendix K Supported contrib Modules and Extensions Provided by External Projects	85
Appendix L Procedure when Modifying the JRE Installation	
L.1 When Using WebAdmin	86
L.2 When Performing Database Multiplexing	86

Appendix M Access to Key Management System Using Plug-in	88
M.1 What to do with Plug-ins	88
M.2 Where the Plug-in is Stored	88
M.3 Invoking the Plug-in	88
M.4 Passing Confidential Information to Plug-ins.	88
M.5 Calling Convention	88
M.5.1 Key Verification.	88
M.5.2 Encryption	89
M.5.2 Encryption	90
Appendix N Deploying Virtual Machines by Cloning	92
N.1 If you are installing only	92
N.2 If you are creating an instance	92
Index	93

## 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

## 1.2 Installation Types

The following 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 Multi-Version Installation

Fujitsu Enterprise Postgres products can be installed on the same server if the product version (indicated by "x" in "x SPz") is different from that of any version of the product that is already installed.

#### 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 below is required in order to use Fujitsu Enterprise Postgres.

- RHEL8.2 or later minor version
- RHEL9.2 or later minor version
- SLES 15 SP3 or later minor version



SLES cannot be used if performing failover operation integrated with PRIMECLUSTER.



- The following packages are required for operations on RHEL8.

Package name	Remarks		
alsa-lib	-		
audit-libs	-		
bzip2-libs	Required when using pgBackRest.		
cyrus-sasl-lib	-		
gdb	Required to run FJQSS.		
pcp-system-tools	Required when using parallel scan.		
glibc	-		
glibc.i686	-		
iputils	Required for Mirroring Controller.		
libnsl2	-		
libicu	Provides collation support.		
libicu	Install 60.x.		
libgcc	-		
libmemcached	Required when using Pgpool-II.		
libselinux	Required for sepgsql.		
libstdc++	-		
libtool-ltdl	Required when using ODBC drivers.		
libzstd	-		

Package name	Remarks	
llvm	Versions 17.0.x, 16.0.x, 15.0.x, 14.0.x, 13.0.x, 12.0.x, 11.0.x, 10.0.x, or 9.0.x of llvm is required to run SQL with runtime compilation (just-in-time compilation).	
	Install the package that contains libLLVM-17.so, llibLLVM-16.so, llibLLVM-15.so, llibLLVM-14.so, libLLVM-13.so, libLLVM-11.so. libLLVM-10.so, or libLLVM-9.so.	
	For example, version 17.0.x of "llvm-libs" published with Application Streams includes libLLVM-17.so.	
	By default, version 17.0.x is used.	
	If you use a version other than 17.0.x, specify the version you want to use in the jit_provider parameter in postgresql.conf.	
	For example, use llvmjit-vsn16 when using version 16.0.x. Fujitsu Enterprise Postgres uses runtime compilation by default. If you do not want to use runtime compilation, turn off the jit parameter in postgresql.conf. You do not need to install llvm if you turn off the jit parameter.	
	If the jit parameter is on and llvm is not installed, an error may occur during SQL execution. For more information about runtime compilation, see "Just-in-Time Compilation (JIT)" in "PostgreSQL Documentation".	
libcgroup-tools	Required when using parallel scan.	
lz4-libs	-	
ncurses-libs	-	
net-tools	-	
nss-softokn-freebl	-	
pam	Required when using PAM authentication.	
perl-libs	Required when using PL/Perl. Install 5.26.	
protobuf-c	Required if using the Transparent Data Encryption feature when using a key management system as a keystore.  Install 1.3.0.	
python3	Required when using PL/Python based on Python 3. Install 3.6.x.	
redhat-lsb	-	
rsync	Required when using Pgpool-II.	
sudo	-	
sysstat	Required when using FJQSS. Set up the sar command after installation.	
tcl	Required when using PL/Tcl. Install 8.6.	
unzip	-	
xz-libs	-	
zlib	-	

<sup>-</sup> The following packages are required for operations on RHEL9.

Package name	Remarks
alsa-lib	-
audit-libs	-
bzip2-libs	Required when using pgBackRest.
cyrus-sasl-lib	-
gdb	Required to run FJQSS.
pcp-system-tools	Required when using parallel scan.
glibc	-
glibc.i686	-
iputils	Required for Mirroring Controller.
libnsl2	-
191 -	Provides collation support.
libicu	Install 67.x.
libgcc	-
libmemcached-awesome	Required when using Pgpool-II.
libselinux	Required for sepgsql.
libstdc++	-
libtool-ltdl	Required when using ODBC drivers.
libzstd	-
llvm	Versions 17.0.x, 16.0.x, or 15.0.x of llvm is required to run SQL with runtime compilation (just-in-time compilation).
	Install the package that contains libLLVM-17.so, llibLLVM-16.so, or llibLLVM-15.so.
	For example, version 17.0.x of "llvm-libs " published with Application Streams includes libLLVM-17.so.
	By default, version 17.0.x is used.
	If you use a version other than 17.0.x, specify the version you want to use in the jit_provider parameter in postgresql.conf.
	For example, use llvmjit-vsn16 when using version 16.0.x.
	Fujitsu Enterprise Postgres is configured to use runtime compilation by default. If you do not want to use runtime compilation, turn off the jit parameter in postgresql.conf. If you turn off the jit parameter, you do not need to install llvm.
	If the jit parameter is on and llvm is not installed, an error may occur during SQL execution. For more information about runtime compilation, see "Just-in-Time Compilation (JIT) " in the PostgreSQL Documentation.
lz4-libs	-
ncurses-libs	-
net-tools	-
nss-softokn-freebl	-
pam	Required when using PAM authentication.

Package name	Remarks		
perl-libs	Required when using PL/Perl. Install 5.32.		
protobuf-c	Required if using the Transparent Data Encryption feature when using a key management system as a keystore.  Install 1.3.3.		
python3	Required when using PL/Python based on Python 3. Install 3.9.x .		
rsync	Required when using Pgpool-II.		
sudo	-		
sysstat	Required when using FJQSS. Set up the sar command after installation.		
tcl	Required when using PL/Tcl. Install 8.6.		
unzip	-		
xz-libs	-		
zlib	-		

- The following packages are required for operations on SLES 15.

Package name	Remarks		
dstat	Required when using parallel scan.		
gdb	-		
glibc	-		
glibc-32bit	-		
iputils	Required for Mirroring Controller.		
JRE 8	Required when using the installer, database multiplexing, and WebAdmin. The following JREs are available:  - Oracle JRE  Use update 31 or later of the 64-bit version.		
	- OpenJDK Past the Java TCK (Technology Compatibility Kit)		
libasound2	-		
libaudit1	-		
libbz2-1	Required when using pgBackRest.		
libfreebl3	-		
libicu	Provides collation support. Install 65.		
libgcc	-		
libltdl7	Required when using ODBC drivers.		
liblz4-1	-		
liblzma5	-		
libmemcached	Required when using Pgpool-II.		
libncurses5	-		

Package name Remarks				
libstdc++	-			
libz1	-			
libzstd1	-			
llvm	Version 7.0.x of llvm is required to run SQL with runtime compilation (just-in-time compilation). Install the package that contains libLLVM.so.7. For example, the "libLLVM7" published in SLE-Module-Basesystem15-SP3-Updates includes libLLVM.so.7.			
	Fujitsu Enterprise Postgres uses runtime compilation by default.If you do not want to use runtime compilation, turn off the jit parameter in postgresql.conf. You do not need to install llvm if you turn off the jit parameter.			
	If the jit parameter is on and llvm is not installed, an error may occur during SQL execution. For more information about runtime compilation, see "Just-in-Time Compilation (JIT)" in "PostgreSQL Documentation".			
LLVM-libs	Install version 5.0.2 or later.			
net-tools	-			
pam	Required when using PAM authentication.			
perl	Required when using PL/Perl. Install 5.26.			
protobuf-c	Required if using the Transparent Data Encryption feature when using a key management system as a keystore. Install 1.3.2.			
python3	Required when using PL/Python based on Python 3. Install 3.6.x.			
rsync	Required when using Pgpool-II.			
sudo	-			
sysstat	Set up the sar command after installation.			
tcl	Required when using PL/Tcl. Install 8.6.			
unzip	-			

## 2.2 Related Software

The following table lists the software required to use Fujitsu Enterprise Postgres.

Table 2.1 Related software

No.	Product name	Version	Fujitsu Enterprise Postgres product name		Remarks	
			AE	SE		
1	PRIMECLUSTER (*1)	4.5A10 (*1)	Y	Y	Mandatory when performing failover operation integrated with PRIMECLUSTER.	

- \*1: The applicable products are shown below:
- PRIMECLUSTER Enterprise Edition
- PRIMECLUSTER HA Server

The following table lists client that can be connected to the Fujitsu Enterprise Postgres server feature.

#### Table 2.2 Connectable client

os	Product name
Windows	Fujitsu Enterprise Postgres Client 16 or later
Linux	

The following table lists server assistant that can be connected to the Fujitsu Enterprise Postgres server feature.

#### Table 2.3 Connectable server assistant

os	Product name
Linux	Fujitsu Enterprise Postgres Server Assistant 16 or later
Windows	

## 2.3 Excluded Software

This section describes excluded software.

#### Fujitsu Enterprise Postgres

Fujitsu Enterprise Postgres cannot be installed if all the following conditions are met:

- The product version (indicated by "x" in "x SPz") of the product to be installed is the same as that of the installed product
- The editions are different

#### Example

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

- The installed product is Fujitsu Enterprise Postgres Standard Edition (64bit) 16
- The product to be installed is Fujitsu Enterprise Postgres Advanced Edition (64bit) 16

#### 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.

#### **RHEL**

Directory	Required disk space (Unit: MB)
/etc	1+1(*1)
/var	1 + 2 (*1) +1 (*2)
/opt	300 (*1) +1 (*2)
Installation destination of the server	1120
Installation destination of WebAdmin	800
Installation destination of the client (64-bit)	180
Installation destination of Pgpool-II	35
Installation destination of pgBackRest	40

<sup>\*1:</sup> Required for the installation of the Uninstall (middleware) tool.

#### **SLES**

Directory	Required disk space (Unit: MB)
/etc	1 + 1 (*1)
/var	1 + 2 (*1) +1 (*2)
/opt	300 (*1) +1 (*2)
Installation destination of the server	260
Installation destination of WebAdmin	390
Installation destination of the client (64-bit)	180
Installation destination of Pgpool-II	35
Installation destination of pgBackRest	40

<sup>\*1:</sup> Required for the installation of the Uninstall (middleware) tool.

## 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.

<sup>\*2:</sup> Required for the installation of FJQSS.

<sup>\*2:</sup> Required for the installation of FJQSS.

## 2.8 PostgreSQL Version Used for Fujitsu Enterprise Postgres

Fujitsu Enterprise Postgres is based on PostgreSQL 16.

## 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 SPz".



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

## 2.10 Key Management System Requirements

Describes the requirements for a key management system.

## 2.10.1 To Connect to a key Management System Using the KMIP Protocol

If you use a key management system as a keystore to use the Transparent Data Encryption feature, the following conditions must be met.

#### **Protocol**

Key management systems must use the Key Management Interoperability Protocol (KMIP) Version 1.4 protocol.

#### **Encryption Key**

The encryption key used must be able to be created or brought into the KMIP server under the following conditions.

- AES 256 bit symmetric key

A Managed Object that meets the following criteria:

- Cryptographic Algorithm : AES

- Cryptographic Length: 256

- Key not wrapped

#### Operation

The following operations using the KMIP protocol must be supported:

- Get operation

Encryption keys can be returned in Key Format Type: Raw format.

#### Client authentication

You must be able to authenticate and authorize clients in the following ways:

- The registered client certificate can authenticate the client and authorize access to the encryption key.

#### **Quantitative Limits**

Fujitsu Enterprise Postgres can receive a maximum response size of 8192 bytes from a key management system. Any further response results in an error.

If the private key file used for the client certificate is encrypted, the maximum length of the passphrase used for encryption is 1023 bytes.

## 2.10.2 To Connect to a Key Management System Using a Plug-in

If you are using a key management system that requires a connection using a protocol other than KMIP, you will need an adapter that converts the request from the Fujitsu Enterprise Postgres into a request format that the key management system can accept.

By preparing the adapter and registering it as a plug-in to the Fujitsu Enterprise Postgres, you can use the key management system as a keystore.

The adapter must be implemented to meet the requirements specified by the Fujitsu Enterprise Postgres.

The key management system must be capable of meeting the requirements of the adapter.

See "Appendix M Access to Key Management System Using Plug-in" for adapter requirements.

#### **Quantitative Limits**

The maximum length of the secret, used for example to pass passwords and other information to plug-ins, is 4095 bytes.

## 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.

#### 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.

#### Set JAVA\_HOME (SLES only)

Ensure that JRE 8 is installed, and export the JAVA\_HOME environment variable.

```
#export JAVA_HOME="Jre8InstallDir"
```

Refer to "Appendix L Procedure when Modifying the JRE Installation" for information on modifying JRE after installation.

#### **Executable Users**

Installation and uninstallation is performed by superuser.

On the system, run the following command to become superuser.

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

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

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

#### Example

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

Currently installed products
1. productName
2. productName
3. productName
4. productName
5: productName
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:

# /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.

# /opt/FJSVfupde/bin/uam remove -i update-number



If the installation directory/lib is set in the environment variable LD\_LIBRARY\_PATH for the running user, remove the installation directory/lib from LD\_LIBRARY\_PATH.

#### Determine the preferred WebAdmin configuration

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

- Single-server
- Multiserver



See

Refer to "Appendix I Determining the Preferred WebAdmin Configuration" for details.

#### **Determining the Pgpool-II System Configuration**

The system configuration when using Pgpool-II is as follows:

- Place on database server
- Place on application server
- Place on dedicated server



Refer to "Appendix J System Configuration when using Pgpool-II".

## 3.2 Installation in Interactive Mode

Install according to the following procedure:



- The following characters can be used as input values:

Alphanumeric characters, hyphens, commas and forward slashes

- When reinstalling the product, back up the following folder in which the WebAdmin instance management information is stored:

.....

webAdminInstallFolder/data/fepwa

Follow the procedure below to perform the backup.

- 1. Stop the WebAdmin server. Refer to "B.1.3 Stopping the Web Server Feature of WebAdmin" for details.
- 2. Back up the following folder:

webAdminInstallFolder/data/fepwa

Replace the above folder with the backed up folder when the reinstallation is complete.



For installation in interactive mode, default values are set for the installation information. The following settings can be changed for a new installation or a multi-version installation:

- Installation directory
- WebAdmin setup information, if WebAdmin is selected

To change the port number, confirm that it is an unused port number between 1024 and 32767.

#### 1. Stop applications and programs

If the installation method is the following, all applications and programs that use the product must be stopped:

- Reinstallation

Before starting the installation, stop the following:

- Applications that use the product
- Connection Manager
- Instance
- Web server feature of WebAdmin

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

#### Example

If WebAdmin is installed in /opt/fsepv<*x*>webadmin:

- # cd /opt/fsepv<x>webadmin/sbin
- # ./WebAdminStop
- Mirroring Controller

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

#### Example

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

- pgBadger
- Pgpool-II
- pgBackRest

#### 2. Mount the DVD drive

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

#### Example

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

Here /dev/dvd is the device name for the DVD drive (which may vary depending on your environment), and /media/dvd is the mount point (which may need to be created 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. Run the installation

Execute the following command:

#### Example

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

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

#### 4. Select the product for installation

The list of installation target products is displayed.

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



- The Fujitsu Enterprise Postgres server component and WebAdmin can be installed on the same machine by selecting the "Fujitsu Enterprise Postgres server component" and the "WebAdmin component".
- Pgpool-II to be installed on the same server as the database server, you can install it on the same machine by selecting "Fujitsu Enterprise Postgres Server Component" and "Pgpool-II component". Pgpool-II to be installed on the same server as the application server, or on a dedicated server that is different from the database server and application server, see "Appendix J System Configuration when using Pgpool-II".
- If the selected product has been installed, a window for selecting reinstallation or multi-version installation is displayed for each product. Follow the on-screen instructions to select the installation method.

#### 5. Check the settings

The window for checking the installation information is displayed.

Type "y" and press Enter to start the installation.

To change the settings, type "c", press Enter, and follow the on-screen instructions. This option is not displayed if there is no information that can be modified.

If you have not set up WebAdmin during installation, refer to "Appendix B Setting Up and Removing WebAdmin" for details.

#### 6. Check the changed settings

If the installation information has been modified, the new installation information is displayed.

Type "y" and press Enter to start the installation.

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

#### 7. Display the installation status

When the installation is started, the installation status is displayed.

Note that even if WebAdmin setup fails, the process will continue.

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

Refer to "B.1 Setting Up WebAdmin" for information on the WebAdmin setup procedure.

Starting setup.

Setting up WebAdmin.

ERROR: WebAdmin setup failed.

#### 8. Finish the installation

When the installation is complete, 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



See

Refer to the Fujitsu Enterprise Postgres product website for information on installation in silent mode, such as the installation parameters and error messages.

The installation procedure is described below.

#### 1. Mount the DVD drive

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

Example

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

Here /dev/dvd is the device name for the DVD drive (which may vary depending on your environment), and /media/dvd is the mount point (which may need to be created 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.

#### 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.

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



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

#### 3. 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.

## 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.

- 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.

- Advanced operation management using server commands

Operations that use Fujitsu Enterprise Postgres or PostgreSQL server commands or server applications.

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.

Refer to Reference and the PostgreSQL Documentation for information on server commands and server applications.

Select one that suits your purposes.

#### **How WebAdmin and Server Commands Work**

Here are the differences between using WebAdmin and server commands:

O	peration	Operation with the WebAdmin	Operation with commands
Setup	Creating an instance	WebAdmin is used. The server machine capacity, and the optimum parameter for operations using WebAdmin, are set automatically.	The configuration file is edited directly using the initdb command.
		Instances that you create and manage in WebAdmin are registered in the WebAdmin administrative information, so you must delete the instance from WebAdmin.	
	Creating a standby instance	WebAdmin is used.  WebAdmin performs a base backup of the source instance and creates a standby instance.	A standby instance is created using the pg_basebackup command.
	Changing the configuration files	You can change the values in the configuration file on the WebAdmin screen.	The configuration file is edited directly.
Starting and stopping an instance		You can start and stop with one click from the WebAdmin screen.	The pg_ctl command is used.
Creating a database		This is defined using pgAdmin of the O the application after specifying the DI	GUI tool, or using the psql command or DL statement.
Backing up the database		WebAdmin, or the pgx_dmpall command, is used.  It cannot be used interchangeably with operation using server	It is recommended that the pgx_dmpall command be used. Recovery to the latest database can be performed.

Operation		Operation with the WebAdmin	Operation with commands
		commands or server applications. If used, WebAdmin will not be able to properly manage the instance.	
		If you are backing up by using the copy command with the pgx_dmpall command, select the command operation method.	
Database recover	у	You can recover using a backup taken with WebAdmin or the pgx_dmpall command.	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.	

<sup>\*1:</sup> 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).

When operating with WebAdmin, if you change the password for the OS user account, use ALTER ROLE WITH PASSWORD to change the instance administrator password as well.

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

#### Example

# useradd fsepuser
# passwd fsepuser

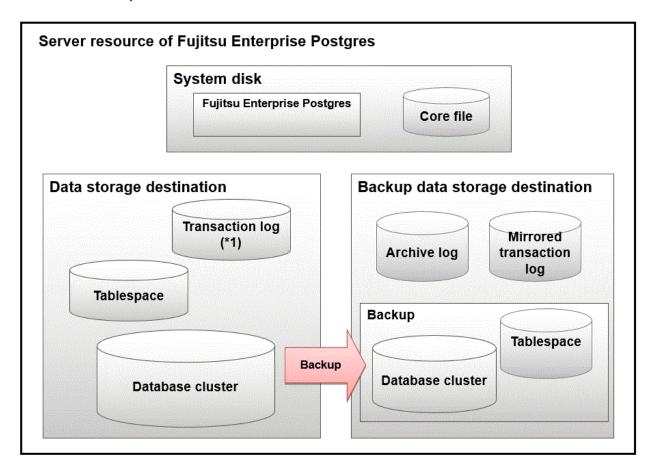
## 4.2.2 Preparing Directories for Resource Deployment

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.



\*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.
	Specify a space other than that under the database cluster.
Transaction log	Stores log information in preparation for a crash recovery or rollback.
	This is the same as the WAL (Write Ahead Log).
Archive log	Stores log information for recovery

Resource	Role
Mirrored transaction log (mirrored WAL)	Enables a database cluster to be restored to the state immediately before an error even if both the database cluster and transaction log fail when performing backup/recovery operations using the pgx_dmpall command or WebAdmin.
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

#### **Preparing directories**

You cannot use directories mounted over the network.

Examples include NFS (Network File System) and CIFS (Common Internet File System).

Do not use these directories unless you are creating tablespaces on a storage device on your network.

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

#### Using WebAdmin

For WebAdmin, WebAdmin automatically creates the directory during instance creation.

Directory	Description
Data storage destination	Specify in the GUI.
Backup data storage destination	Specify in the GUI. Place them on a disk different from the data storage destination.
Transaction log storage destination	Specify in the GUI.  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
Corefile output destination	WebAdmin generates it automatically, so no specification is required. For more information about directories, refer to "Directory for Core File Output when Using WebAdmin".

Directory for Core File Output when Using WebAdmin

The corefile path is as follows:

var/tmp/fsep\_productVersion\_WA\_architecture/instanceAdminUser\_instanceNamePortNumber/core/

#### product version

Contains the version of the [Server Product Type] that WebAdmin specifies when creating an instance.

If you manage multiple versions, the fsep\_version directory is created for as many versions as you manage.

#### instanceAdminUser

Contains the user name of the OS.

#### PortNumber

Contains the port number of the database server specified when the instance was created.

#### Example:

/var/tmp/fsep\_160\_WA\_64/naomi\_myinst27599/core

To change the output destination, configure the core\_directory and the core\_contents parameters in postgresql.conf. Refer to "Parameters" in the Operation Guide for information on the settings for these parameters.



Note that resources placed in /var/tmp that have not been accessed for 30 days or more will be deleted by the default settings of the operating system. Consider excluding them from deletion targets or changing the output destination in the operating system settings.

#### Using the initdb Command

For the inidb command, prepare the directory in advance.

The directories to prepare in advance are:

Directory to be prepared	Required / Optional
Data storage destination	Required
Backup data storage destination	Optional
Transaction log storage destination	Optional
Corefile output destination	Optional

## 4.2.3 Estimating Resources

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

Refer to "Appendix E 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 F 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 postgresql.conf.

If you specify systemd-coredump as the core\_pattern, the core file is not placed in the location specified by the core\_directory parameter. See the systemd-coredump (8) man page for the location of core files.

Use coredumpctl to retrieve core files. For more information about using coredumpctl, see the coredumpctl (1) man page.

## 4.3 Creating Instances

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

- 4.3.1 Using WebAdmin
- 4.3.2 Using the initdb Command

## 4.3.1 Using WebAdmin

This section describes how to create an instance using WebAdmin.

WebAdmin must be set up correctly before it can be used. Refer to "B.1 Setting Up WebAdmin" for details. Additionally, if WebAdmin needs to be configured to use an external repository database, refer to "B.3 Using an External Repository for WebAdmin" for details.

#### 4.3.1.1 Before Using WebAdmin

Learn what you need to know before using WebAdmin.

#### **Recommended Browser**

- Microsoft Edge (Build41 or later)

WebAdmin will work with other browsers, such as Firefox and Chrome, however, the look and feel may be different.

Configure your browser to allow cookies and pop-up requests from the server on which Fujitsu Enterprise Postgres is installed. Refer to "Appendix A Recommended WebAdmin Environments" for information on how to change the pop-up request settings and other recommended settings.

#### Notes on operations

- It will not work correctly if you operate the same instance from multiple WebAdmin screens at the same time.
- If you want to manage multiple versions of an instance, operate with the latest version of WebAdmin.
- It is recommended not to use the browser [Back] and [Forward] navigation buttons, the [Refresh] button, and context-sensitive menus, including equivalent keyboard shortcuts.
- Do not copy and paste or bookmark the URL of the WebAdmin login screen and skip directly.

#### **Considerations for Using Transparent Data Encryption**

After you create an instance in WebAdmin, follow the documentation for each feature in the Operation Guide for additional setup tasks.

#### About the PostgreSQL Configuration File Relationship

When creating or importing an instance in WebAdmin, set the log\_directory parameter in postgresql.conf to '/var/tmp/fsep\_version/instanceAdminUser\_instanceNamePortNumber/log'.



Note that resources placed in /var/tmp that have not been accessed for 30 days or more will be deleted by the default settings of the operating system. Therefore, consider excluding instances created using WebAdmin from deletion targets in the operating system settings if you need to stop those instances for a long time.

#### 4.3.1.2 Logging in to WebAdmin

This section describes how to log in to WebAdmin.

#### Startup URL for WebAdmin

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

http://hostNameOrIpAddress:portNumber/

- hostNameOrIpAddress: Host name or IP address of the server where WebAdmin is installed.
- portNumber. Port number of WebAdmin. The default port number is 27515.
- You cannot specify https for the protocol. Only http can be specified.

The startup screen is displayed. From this window you can log in to WebAdmin or access the product documentation.

#### Logging in to WebAdmin

Click [Launch WebAdmin] in the startup URL window to start WebAdmin and display the login window. Enter the instance administrator user ID (operating system user account name) and password, and log in to WebAdmin. User credential (instance administrator user ID and password) should not contain hazardous characters. Refer to "Appendix C WebAdmin Disallow User Inputs Containing Hazardous Characters".

#### 4.3.1.3 Creating an Instance

This section describes how to create an instance.



- WebAdmin creates an instance configuration file, postgresql.conf, and sets kernel parameters to the optimal values for this configuration. Refer to "Appendix D Configuring Parameters" and "Appendix H Configuring Kernel Parameters" for more information.
- WebAdmin automatically sets the memory usage assuming you create one instance per machine. If you are creating multiple instances on a single machine, refer to "Parameters automatically set by WebAdmin according to the amount of memory" to adjust the memory usage after the instance is created.
- 1. Start 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:

[Host name] and [Operating system credential] should not contain hazardous characters. Refer to "Appendix C WebAdmin Disallow User Inputs Containing Hazardous Characters".

- [Configuration type]: Whether to create a standalone instance or an instance that is part of a cluster.
- [Server product type]: Sets which of the following instances to create:
  - Fujitsu Enterprise Postgres 9.5 Instances
  - Fujitsu Enterprise Postgres 9.6 Instances
  - Fujitsu Enterprise Postgres 10 Instances
  - Fujitsu Enterprise Postgres 11 Instances
  - Fujitsu Enterprise Postgres 12 Instances
  - Fujitsu Enterprise Postgres 13 Instances

- Fujitsu Enterprise Postgres 14 Instances
- Fujitsu Enterprise Postgres 15 Instances
- Fujitsu Enterprise Postgres 16 Instances

The default is "Fujitsu Enterprise Postgres 16".

- [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]: Whether to enable or disable the WebAdmin backup feature. The default is "Enabled". Select "Disabled" to disable all backup and restore functionality for the instance. If "Enabled" is selected, enter the following item:
  - [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
- [WAL file size]: Allow the WAL file size to be set when creating an instance. The default is 16 MB if the field is blank. The size specified must be a power of 2 between 1 and 1024. This option is not available for standby instances.

If "Remote" is selected for [Location], enter the following additional items:

- [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
- 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.

- a. Stop the WebAdmin server. Refer to "B.1.3 Stopping the Web Server Feature of WebAdmin" for details.
- b. Back up the following directory:

webAdminInstallDir/data/fepwa

Note that if you are using an external database as your WebAdmin repository, you must also back up the following:

- webAdminInstallDir/data/remotemetadb.conf
- Use the database features to back up external databases (if they are created on the system disk).

## 4.3.1.4 Changing Instance Settings

You can change the information that is set when an instance is created.

Change the following settings to suit the operating and management environment for Fujitsu Enterprise Postgres.

Note that this cannot be changed for instances of FUJITSU Enterprise Postgres 9.5.

- Instance configuration
  - Character encoding
  - Communication
  - SQL options
  - Memory
  - Streaming replication
- Changing client authentication information
- Editing instance 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
- When [Instance name] or [Instance port] is modified, the log\_directory and core\_directory parameters in postgresql.conf are updated. Also, the specified directories are created if they do not exist. Refer to "4.3.1.5 Importing Instances" for information on the format of these directories.

#### 4.3.1.4.1 Instance configuration

- 1. Start WebAdmin and log in to the database server.
- 2. In the [Instances] tab, click
- 3. Click to change the configuration.
- 4. Click to save your changes.



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

#### 4.3.1.4.2 Changing client authentication information

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

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 iii.

Notes on changing client authentication information

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

#### 4.3.1.4.3 Editing instance information

Use the [Edit instance] page to modify the following items for an instance:

- Instance name
- Port number
- Backup storage path
- 1. In the [Instances] tab, click . The [Edit instance] page is displayed.
- 2. Modify the relevant items.

If [Backup storage path] is changed, [Backup management] is enabled. Select the required option:

- Retain existing backup: Create a backup in [Backup storage path] and retain the existing backup in its original location.
- Copy existing backup to new path: Copy the existing backup to [Backup storage path]. A new backup will not be created. The existing backup will be retained in its original location.
- Move existing backup to new path: Move the existing backup to [Backup storage path]. A new backup will not be created.
- Remove existing backup: Create a backup in [Backup storage path]. The existing backup will be removed.
- 3. Click to save your changes.

#### 4.3.1.5 Importing Instances

Instances can be created using WebAdmin, or via the command line using the initdb command. Instances created using the initdb command (command line instances) can be managed using WebAdmin, however, they must first be imported into WebAdmin.

You cannot import instances that use the Mirroring Controller.

#### **Advance Preparation**

- If the following file contains records that span multiple lines, change the record to a single line before importing.
  - pg\_hba.conf
  - pg\_ident.conf
- You must make the following changes to the parameters in postgresql.conf prior to importing the instance in WebAdmin.

Parameter	Requirements
port	The port parameter should be uncommented.

- Delete the values specified for the following parameters. Also, if you have changed the value of the parameter (where the file is stored) from the default, move the file to the data storage directory before importing it.
  - hba\_file parameter (pg\_hba.conf)
  - ident\_file parameter (pg\_ident.conf)

#### **Import**

This section explains how to import command line instances into WebAdmin.

1. In the [Instances] tab, click . The [Import instance] page is displayed.

- 2. Enter the information for the instance being imported. Refer to "4.3.1.3 Creating an Instance" for information on the items that need to be entered.
- 3. Click **v** to import the instance.



The log\_directory and core\_directory parameters in postgresql.conf are updated during import. Also, the specified directories are created if they do not exist.

The format of these directories is as follows:

```
log_directory: '/var/tmp/fsep_version/instanceAdminUser_instanceNamePortNumber/log'
core_directory: '/var/tmp/fsep_version/instanceAdminUser_instanceNamePortNumber/core'
```

```
version: product version_WA_architecture
instanceAdminUser: operating system user name
PortNumber: port number specified when creating the instance
```

#### Examples:

log\_directory: '/var/tmp/fsep\_160\_WA\_64/naomi\_myinst27599/log' core\_directory: '/var/tmp/fsep\_160\_WA\_64/naomi\_myinst27599/core'

## 4.3.2 Using the initdb Command

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



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 H 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.



- Instances created using the initdb command (command line instances) can be managed using WebAdmin, however, they must first be imported into WebAdmin. Refer to "4.3.1.5 Importing Instances" for details.
- If creating multiple instances, ensure that there is no duplication of port numbers or the directories that store database clusters.



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".

#### Example

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

Note that "<x>" indicates the product version.

#### sh, bash

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

#### csh, tcsh

```
$ setenv PATH /opt/fsepv<x>server64/bin:$PATH
$ setenv MANPATH /opt/fsepv<x>server64/share/man:$MANPATH
```

#### 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/instl --waldir=/transaction/instl --lc-collate="C" --lc-ctype="C" --encoding=UTF8
```



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



- 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.



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.

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 without 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 -D /database/inst1



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



If the -W option is specified, the command will return without waiting for the instance to start. Therefore, it may be unclear as to whether instance startup was successful or failed.

## 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 modify the default behavior.

Refer to "Appendix D Configuring Parameters" for 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.	

Parameter name	Parameter description
max_connections	Set the value as:
	<pre>numberOfSimultaneousConnectionsToInstance + superuser_reserved_connections</pre>

#### 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.



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.



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 log directory in the database cluster.	restart option of the pg_ctl mode
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.	reload option of the pg_ctl mode
	You can output the SQLSTATE value, output time, executing host, application name, and user ID.	

Parameter name	Parameter description	How to enable the settings
	Refer to "What To Log" in the PostgreSQL Documentation for details.	
	Example: log_line_prefix = '%e: %t [%p]: [%l-1] user = %u,db = %d,remote = %r app = %a '	



- 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 started 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 (Database Multiplexing).

Note that "<x>" in paths indicates the product version.



You should wait for time correction, network setup, and so on.

#### 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<x>server64", and the instance name is "inst1".

# cp /opt/fsepv<x>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 instanceName	Specifies the feature overview.  Specifies the name of the target instance. (*1)
Service	ExecStart	/bin/bash -c ' <u>installDir</u> /bin/pgx_symstd start <u>installDir dataStorageDestinationDir</u>	Command to be executed when the service is started.
	ExecStop	/bin/bash -c ' <i>installDir</i> 'bin/pgx_symstd stop <i>installDir dataStorageDestinationDir</i> '	Command to be executed when the service is stopped.
	ExecReload	/bin/bash -c ' <i>installDir</i> /bin/pgx_symstd reload <i>installDir dataStorageDestinationDir</i> '	Command to be executed when the service is reloaded

Section	Option	Specified value	Description
	User	<u>User</u>	OS user account of the instance administrator.
	Group	Group	Group to which the instance administrator user belongs.

<sup>\*1:</sup> 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\_instl.service

## 4.5.3 Settings when Using the Features Compatible with Oracle Databases

To use the features compatible with Oracle databases, create a new instance and execute the following command for the "postgres" and "template1" databases:

CREATE EXTENSION oracle\_compatible;

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.

There are also considerations for use the features compatible with Oracle databases. Refer to "Precautions when Using the Features Compatible with Oracle Databases" in the Application Development Guide for details.

# 4.5.4 LDAP Authentication File Settings

The LDAP authentication file refers to the following OS standard default file

/etc/openldap/ldap.conf

If you wish to use a different file, specify the LDAP authentication file you wish to set in an environment variable such as LDAPCONF, and then restart the Postgres instance. Please refer to the OpenLDAP documentation for detailed configuration details.

# 4.5.5 Setting the server keytab file for GSSAPI authentication

When setting the server keytab file for GSSAPI authentication, be sure to set the "krb\_server\_keyfile" parameter in postgresql.cocnf.



The description of the "krb\_server\_keyfile" parameter in the "PostgreSQL Documentation" states that the default value is "FILE The default value is "FILE:/usr/local/pgsql/etc/krb5.keytab" in the "PostgreSQL Documentation", but the default value is invalid for Fujitsu Enterprise Postgres.

## 4.5.6 Settings for Using Legacy OpenSSL Providers

If you use a legacy OpenSSL provider, create an OpenSSL configuration file and set the parameters in postgresql.conf.

OpenSSL configuration file

Create an OpenSSL configuration file in any directory for legacy providers to use.

#### Example

```
openssl_conf = openssl_init

[openssl_init]
providers = provider_sect

[provider_sect]
default = default_sect
legacy = legacy_sect

[default_sect]
activate = 1

[legacy_sect]
activate = 1
```

#### **Parameters**

- openssl\_conf

Specify the OpenSSL configuration file created above.

#### Example

```
openssl_conf = '/path/to/openssl.conf'
```

- openssl\_modules

Specifies the installation directory for the server product that contains the additional OpenSSL modules.

#### Example

```
openssl_modules = '/opt/fsepv<x>server64/lib/ossl-modules'
```

<sup>&</sup>quot;< x >" indicates the product version.



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

# 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 Setting Up and Removing OSS

This section explains how to set up OSS supported by Fujitsu Enterprise Postgres.

If you want to use OSS supported by Fujitsu Enterprise Postgres, follow the setup procedure.

If you decide not to use the OSS supported by Fujitsu Enterprise Postgres, follow the removing procedure.

To build and use OSS obtained from the web, etc., instead of OSS supported by Fujitsu Enterprise Postgres, see "4.7.11 Build with PGXS".



- In this section, the applicable database that enables the features of each OSS is described as "postgres".
- Execute CREATE EXTENSION for the "template1" database also, so that each OSS can be used by default when creating a new database.

Refer to "OSS Supported by Fujitsu Enterprise Postgres" in the General Description for information on OSS other than those described below.

## 4.7.1 oracle\_fdw

## 4.7.1.1 Setting Up oracle\_fdw

- 1. Add the path of the OCI library to the environment variable. The available version of the OCI library is 11.2 or later. Add the installation path of the OCI library to the LD\_LIBRARY\_PATH environment variable.
- 2. As superuser, run the following command:

```
$ su -
Password:*****
# cp -r /opt/fsepv<x>server64/OSS/oracle_fdw/* /opt/fsepv<x>server64
```

3. If a file named libclntsh.so.11.1 does not exist in your OCI library, create a symbolic link with the name libclntsh.so.11.1 to libclntsh.so.xx.1 (xx is the version of the OCI library).

```
# ln -s libclntsh.so.12.1 libclntsh.so.11.1
```

- 4. Restart Fujitsu Enterprise Postgres.
- 5. Execute CREATE EXTENSION for the database that will use this feature. Use the psql command to connect to the "postgres" database.

```
postgres=# CREATE EXTENSION oracle_fdw;
CREATE EXTENSION
```

# **Information**

- If the OCI library is not installed on the server, install it using the Oracle client or Oracle Instant Client. Refer to the relevant Oracle manual for information on the installation procedure.
- If the version of the OCI library is updated, change the path of the OCI library in the LD\_LIBRARY\_PATH environment variable to the updated path. Also, re-create the symbolic link named libclntsh.so.11.1 if necessary.



This feature cannot be used on instances created in WebAdmin. It can only be used via server commands.

-----

## 4.7.1.2 Removing oracle\_fdw

1. Execute DROP EXTENSION for the database that will use this feature. Use the psql command to connect to the "postgres" database.

```
postgres=# DROP EXTENSION oracle_fdw CASCADE;
DROP EXTENSION
```

2. As superuser, run the following command:

```
$ su -
Password:*****
# rm -rf /opt/fsepv<x>server64/filesCopiedDuringSetup
```



The files copied during setup can be checked below.

```
# find /opt/fsepv<x>server64/OSS/oracle_fdw
```

# 4.7.2 pg\_bigm

## 4.7.2.1 Setting Up pg\_bigm

- Set the postgresql.conf file parameters.
   Add "pg\_bigm" to the shared\_preload\_libraries parameter.
- 2. As superuser, run the following command:

```
$ su -
Password:*****
# cp -r /opt/fsepv<x>server64/OSS/pg_bigm/* /opt/fsepv<x>server64
```

- 3. Restart Fujitsu Enterprise Postgres.
- 4. Execute CREATE EXTENSION for the database that will use this feature. Use the psql command to connect to the "postgres" database.

```
postgres=# CREATE EXTENSION pg_bigm;
CREATE EXTENSION
```

## 4.7.2.2 Removing pg\_bigm

1. Execute DROP EXTENSION for the database that will use this feature. Use the psql command to connect to the "postgres" database.

```
postgres=# DROP EXTENSION pg_bigm CASCADE;
DROP EXTENSION
```

2. As superuser, run the following command:

```
$ su -
Password:*****
# rm -rf /opt/fsepv<x>server64/filesCopiedDuringSetup
```



# find /opt/fsepv<x>server64/OSS/pg\_bigm

Set the postgresql.conf file parameters.Delete "pg\_bigm" to the shared\_preload\_libraries parameter.

4. Restart Fujitsu Enterprise Postgres.

## 4.7.3 pg\_hint\_plan

## 4.7.3.1 Setting Up pg\_hint\_plan

- Set the postgresql.conf file parameters.
   Add "pg\_hint\_plan" to the "shared\_preload\_libraries" parameter.
- 2. As superuser, run the following command:

```
$ su -
Password:*****
# cp -r /opt/fsepv<x>server64/OSS/pg_hint_plan/* /opt/fsepv<x>server64
```

- 3. Restart Fujitsu Enterprise Postgres.
- 4. 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.

```
postgres=# CREATE EXTENSION pg_hint_plan;
CREATE EXTENSION
```



Refer to "Enhanced Query Plan Stability" in the Operation Guide for details.

## 4.7.3.2 Removing pg\_hint\_plan



Unsetting pg\_hint\_plan will cause hints registered in the hint\_plan.hints table to be lost. Therefore, it is recommended that pg\_dump back up the hint\_plan.hints table for each database if it is likely that pg\_hint\_plan will be used again later.

Execute DROP EXTENSION for the database that will use this feature.
 Use the psql command to connect to the "postgres" database.

```
postgres=# DROP EXTENSION pg_hint_plan CASCADE;
DROP EXTENSION
```

2. As superuser, run the following command:

```
$ su -
Password:*****
# rm -rf /opt/fsepv<x>server64/filesCopiedDuringSetup
```



# find /opt/fsepv<x>server64/OSS/pg\_hint\_plan

- Set the postgresql.conf file parameters.
   Delete "pg\_hint\_plan" to the shared\_preload\_libraries parameter.
- 4. Restart Fujitsu Enterprise Postgres.

# 4.7.4 pg\_dbms\_stats

## 4.7.4.1 Setting Up pg\_dbms\_stats

- Set the postgresql.conf file parameter.
   Add "pg\_dbms\_stats" to the "shared\_preload\_libraries" parameter.
- 2. As superuser, run the following command:

```
$ su -
Password:*****
# cp -r /opt/fsepv<x>server64/OSS/pg_dbms_stats/* /opt/fsepv<x>server64
```

- 3. Restart Fujitsu Enterprise Postgres.
- 4. 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.

postgres=# CREATE EXTENSION pg\_dbms\_stats;
CREATE EXTENSION



Refer to "Enhanced Query Plan Stability" in the Operation Guide for details.

## 4.7.4.2 Removing pg\_dbms\_stats



Unsetting pg\_dbms\_stats causes statistics managed by pg\_dbms\_stats to be lost. Therefore, it is recommended that you back up each table in the dbms\_stats folder of each database in binary format if you may want to use pg\_dbms\_stats again later.

postgres > # COPY <dbms\_stats Schema's table name> TO '<Filename>' FORMAT binary;

1. Execute DROP EXTENSION for the database that will use this feature. Use the psql command to connect to the "postgres" database.

postgres=# DROP EXTENSION pg\_dbms\_stats CASCADE; DROP EXTENSION

2. As superuser, run the following command:

\$ su Password:\*\*\*\*\*
# rm -rf /opt/fsepv<x>server64/filesCopiedDuringSetup



```
# find /opt/fsepv<x>server64/OSS/pg_dbms_stats
```

- Set the postgresql.conf file parameters.
   Delete "pg\_dbms\_stats" to the shared\_preload\_libraries parameter.
- 4. Restart Fujitsu Enterprise Postgres.

## 4.7.5 pg\_repack

## 4.7.5.1 Setting Up pg\_repack

1. As superuser, run the following command:

```
$ su -
Password:*****
# cp -r /opt/fsepv<x>server64/OSS/pg_repack/* /opt/fsepv<x>server64
```

2. Execute CREATE EXTENSION for the database that will use this feature.

Use the psql command to connect to the "postgres" database.

```
postgres=# CREATE EXTENSION pg_repack;
CREATE EXTENSION
```

## 4.7.5.2 Removing pg\_repack

1. Execute DROP EXTENSION for the database that will use this feature. Use the psql command to connect to the "postgres" database.

```
postgres=# DROP EXTENSION pg_repack CASCADE;
DROP EXTENSION
```

2. As superuser, run the following command:

```
$ su -
Password:*****
# rm -rf /opt/fsepv<x>server64/filesCopiedDuringSetup
```



The files copied during setup can be checked below.

```
# find /opt/fsepv<x>server64/OSS/pg_repack
```

## 4.7.6 pg\_rman

## 4.7.6.1 Setting Up pg\_rman

1. As superuser, run the following command:

```
$ su -
Password:*****
# cp -r /opt/fsepv<x>server64/OSS/pg_rman/* /opt/fsepv<x>server64
```

2. Restart Fujitsu Enterprise Postgres.

# **Information**

Before initialization of the backup catalog, it is recommended to set the parameters below in postgresql.conf. Refer to the pg\_rman manual (http://ossc-db.github.io/pg\_rman/index-ja.html) for details.

- log\_directory
- archive\_mode
- archive\_command



This feature cannot be used on instances created in WebAdmin. It can only be used via server commands.

## 4.7.6.2 Removing pg\_rman

1. As superuser, run the following command:

\$ su Password:\*\*\*\*\*
# rm -rf /opt/fsepv<x>server64/filesCopiedDuringSetup



The files copied during setup can be checked below.

# find /opt/fsepv<x>server64/OSS/pg\_rman

2. Restart Fujitsu Enterprise Postgres.

## 4.7.7 pg\_statsinfo

## 4.7.7.1 Setting Up pg\_statsinfo

- 1. Set the postgresql.conf file parameters.
  - Add "pg\_statsinfo" to the shared\_preload\_libraries parameter.
  - Specify the log file name for the log\_filename parameter.
  - Specify "on" to the logging\_collecto parameter.
  - Add "csvlog" to the log\_destination parameter.
  - Delete "stderr" to the log\_destination parameter.

For the parameters "logging\_collector" and "log\_destination", pg\_statsinfo will change the settings in the postmaster process as above without rewriting postgresql.conf, even if you do not make the above changes.

Explicit rewriting is recommended because the configuration file and behavior will not match.

2. Perform the following setup as a superuser:

Install the pg\_statsinfo module:

```
# cp -r /opt/fsepv<x>server64/OSS/pg_statsinfo/* /opt/fsepv<x>server64
```

Create the directories needed for pg\_statsinfo to work.

This directory is where the files for managing process IDs for pg\_statsinfo processes are stored.

The minimum required permissions for the directory are 700.

Set the owner of the directory to the instance administrator user.

This example sets the OS user "fsepuser" as the instance administrator.

```
# mkdir /run/pg_statsinfo
# chmod 700 /run/pg_statsinfo
# chown fsepuser:fsepuser /run/pg_statsinfo
```

The directory created above is deleted when the OS stops.

You can configure the above directories to be created automatically on reboot by running the following command:

```
# cat << EOF > /usr/lib/tmpfiles.d/pg_statsinfo-16.conf
d /run/pg_statsinfo 0755 fsepuser fsepuser -
EOF
```

3. Restart Fujitsu Enterprise Postgres.



There are the following differences in postgresql.conf parameter settings required for statistics collection between OSS pg\_statsinfo v16 and pg\_statsinfo shipped with Fujitsu Enterprise Postgres:

OSS: You must specify "C" for the lc\_messages parameter.

Fujitsu Enterprise Postgres: The lc\_messages parameter can be any message locale supported by PostgreSQL.



This feature cannot be used on instances created in WebAdmin. It can only be used via server commands.

## 4.7.7.2 Removing pg\_statsinfo

1. As superuser, run the following command:

```
$ su -
Password:*****
# rm -rf /opt/fsepv<x>server64/filesCopiedDuringSetup
# rm -rf /run/pg_statsinfo
# rm -rf /usr/lib/tmpfiles.d/pg_statsinfo-16.conf
```



The files copied during setup can be checked below.

# find /opt/fsepv<x>server64/OSS/pg\_statsinfo

- 2. Set the postgresql.conf file parameters.
  - Delete "pg\_statsinfo" to the shared\_preload\_libraries parameter.
  - Delete the log file name for the log\_filename parameter.
  - Specify "off" to the logging\_collecto parameter.
  - Delete "csvlog" to the log\_destination parameter.
  - Add "stderr" to the log\_destination parameter.
- 3. Restart Fujitsu Enterprise Postgres.

## 4.7.8 pgBadger

# 4.7.8.1 Setting Up pgBadger

1. Set the postgresql.conf file parameters.

Set the parameters so that the information required for analysis is output to the server log.

Refer to "Documentation" in the pgBadger website (https://pgbadger.darold.net/) for details.

The pgBadger material is stored under /opt/fsepv<x>server64/OSS/pgbadger.

2. Restart Fujitsu Enterprise Postgres.

## 4.7.8.2 Removing pgBadger

- Set the postgresql.conf file parameters.
   Restores information you specified during Setup.
- 2. Restart Fujitsu Enterprise Postgres.

## 4.7.9 Pgpool-II

## 4.7.9.1 Setting Up Pgpool-II

1. As superuser, run the following command:

```
$ su -
Password:*****
# cp -r /opt/fsepv<x>server64/OSS/Pgpool-II/* /opt/fsepv<x>server64
```

2. Execute CREATE EXTENSION for the database that will use this feature.

Use the psql command to connect to the "postgres" database.

```
postgres=# CREATE EXTENSION pgpool_recovery;
CREATE EXTENSION
```

- 3. Set the postgresql.conf file parameters.

  Specify the path to pg\_ctl for the pgpool.pg\_ctl parameter.
- 4. Restart Fujitsu Enterprise Postgres.



The online recovery feature of Pgpool-II cannot be used on instances created in WebAdmin. It can only be used via server commands.

## 4.7.9.2 Removing Pgpool-II

Execute DROP EXTENSION for the database that will use this feature.
 Use the psql command to connect to the "postgres" database.

```
postgres=# DROP EXTENSION pgpool_recovery CASCADE;
DROP EXTENSION
```

2. As superuser, run the following command:

```
$ su -
Password:*****
# rm -rf /opt/fsepv<x>server64/filesCopiedDuringSetup
```



# find /opt/fsepv<x>server64/OSS/Pgpool-II

Set the postgresql.conf file parameters.Delete the pg\_ctl path for the pgpool.pg\_ctl parameter.

4. Restart Fujitsu Enterprise Postgres.

## 4.7.10 pgBackRest

## 4.7.10.1 Setting Up pgBackRest

1. Install pgBackRest.

To use the pgbackrest command on the same host as the Fujitsu Enterprise Postgres server, install pgBackRest using the server program DVD. If you want to use the pgbackrest command on a different host than the Fujitsu Enterprise Postgres server, install pgBackRest using the client program DVD.

2. Set the environment variable PATH for pgBackRest.

The pgBackRest material is stored under /opt/fsepv<x>pgbackrest. Set the environment variable PATH to the storage location/bin of the pgBackRest material to be used.

\$ export PATH=/opt/fsepv<x>pgbackrest/bin:\$PATH

3. Perform pgBackRest setup.

Refer to "User Guides" in the pgBackRest website (https://pgbackrest.org/) for details.



- This feature is not available for instances created with WebAdmin. It is available only for operation using server commands.
- The pg\_rman, pgx\_dmpall, and pgx\_rcvall commands cannot be used when using pgBackRest because of conflicting shell commands to set archive\_command.

## 4.7.10.2 Removing pgBackRest

1. Sets parameters in the postgresql.conf file.

Reverses the information specified during setup

- 2. Restart Fujitsu Enterprise Postgres.
- 3. If it was set to perform periodic backups, unset it.

## 4.7.10.3 Servers to which pgBackRest can connect

The following table lists server that pgBackRest can connected to.

Table 4.1 Connectable server

os	Product name
Linux	- Fujitsu Enterprise Postgres Advanced Edition 16
	- Fujitsu Enterprise Postgres Standard Edition 16

#### 4.7.11 Build with PGXS

Many PostgreSQL extensions are built using a build base for extensions called PGXS. Building with PGXS also generates files related to llvm. Depending on which version of llvm you are using, follow these steps:

PGXS builds also set DT\_RUNPATH to the built binaries. See "4.7.11.4 Setting DT\_RUNPATH" for more information.

## 4.7.11.1 Using the Default Version of Ilvm

The default version of llvm is described in "2.1 Required Operating System". If you want to use the default version of llvm, use the OSS documentation to build and install OSS.

## 4.7.11.2 Using a Non-Default Version of Ilvm

1. As superuser, copy the Makefile.global corresponding to the version of llvm you want to use. The following is an example of using version 9 of llvm. Makefile.global is overwritten when an emergency fix is applied or removed from Fujitsu Enterpise Postgres, this procedure should be performed each time a build is performed.

```
$ su -
Password:*****
# cp /opt/fsepv<x>server64/lib/pgxs/src/Makefile.global-vsn9 /opt/fsepv<x>server64/lib/pgxs/src/
Makefile.global
```

- 2. Follow the OSS documentation to build and install OSS.
- 3. As superuser, run the following command:. The following is an example of using version 9 of llvm:.

```
$ su -
Password:*****
# mv /opt/fsepv<x>server64/lib/bitcode/<OSS name>* /opt/fsepv<x>server64/lib/bitcode-vsn9/
```

#### 4.7.11.3 Without Ilvm

If you do not use llvm, use the with \_ llvm = no option when performing the build, as shown below. For other options, follow the OSS documentation.

```
# make USE_PGXS=1 with_llvm=no
```

## 4.7.11.4 Setting DT\_RUNPATH

The default values for DT\_RUNPATH are <Fujitsu Enterprise Postgres installation directory in the build environment>/lib, and \$ORIGIN /../ lib.

If your build and production environments have the same Fujitsu Enterprise Postgres installation directory, you can run the built program without setting the environment variable LD\_LIBRARY\_PATH to < Fujitsu Enterprise Postgres installation directory in the operating environment>/lib

If the installation directories of Fujitsu Enterprise Postgres for the build and production environments cannot be in the same location, or the production installation directory cannot be pre-determined, you can run a program built without *Fujitsu Enterprise Postgres installationdirectory in the operating environment*/lib in the LD\_LIBRARY\_PATH by doing the following:

Set the DT\_RUNPATH attribute to any path.

In your production environment, create a symbolic link to *Fujitsu Enterprise Postgres installationdirectory in the operating environment*/lib in the appropriate path.

To do this, set the DT\_RUNPATH attribute in the environment variable PG\_LDFLAGS(\*1).

If this is not possible, set LD\_LIBRARY\_PATH to < Fujitsu Enterprise Postgres installationdirectory in the operating environment > /lib when you run the program.

For notes on setting the environment variable LD\_LIBRARY\_PATH, see "When DT\_RUNPATH cannot be set" in "How to Build and Run an Application that Uses Shared Libraries" in the Application Development Guide.

\*1:For more information about the PG\_LDFLAGS environment variable, see "Extension Building Infrastructure" in the PostgreSQL Documentation. For example, "make USE\_PGXS = 1 PG\_LDFLAGS =" -Wl, -rpath, '\$\$ORIGIN /../ libdummy', --enable-new-dtags ".

### 4.7.12 Build without PGXS

For extensions that do not utilize PGXS, but utilize the interface of Fujitsu Enterprise Postgres, build to explicitly set DT\_RUNPATH, or set LD\_LIBRARY\_PATH to <Fujitsu Enterprise Postgres installation directory>/lib at runtime.

For information about how to set DT\_RUNPATH, refer to "Setting DT\_RUNPATH for Applications" in the Application Development Guide

For notes on using LD\_LIBRARY\_PATH without setting DT\_RUNPATH, refer to "When DT\_RUNPATH cannot be set" in "How to Build and Run an Application that Uses Shared Libraries" in the Application Development Guide.

# 4.8 Deleting Instances

This section explains how to delete an instance.

- 4.8.1 Using WebAdmin
- 4.8.2 Using Server Commands

When automatic start and stop of an instance is set

Execute the following command to disable it, and then unregister it.

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

#### Example

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

## 4.8.1 Using WebAdmin

This section explains how to delete an instance using WebAdmin. Always use WebAdmin to delete instances that were created or imported using WebAdmin. Because WebAdmin managementinformation cannot be deleted, WebAdmin will determine that the instance is abnormal.

Use the following procedure to delete an instance.

1. Stop the instance



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 iii

#### **Deleting Unnecessary Directories**

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)

## 4.8.2 Using Server Commands

This section explains how to delete an instance using server commands.

Use the following procedure to delete an instance.

#### 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 "xSPz" in sample windows indicates the version and level of products to uninstall and "<x>" in paths indicates the product version.



- All files and directories in the installation directory are deleted during uninstallation. If user files have been placed in the installation directory, back them up before uninstallation if necessary.
- On SLES, before uninstallation, ensure that JRE 8 is installed, and export the JAVA\_HOME environment variable.

#export JAVA\_HOME="Jre8InstallDir"

- 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 "B.1.3 Stopping the Web Server Feature of WebAdmin" for details.
- 2. Back up the following directory:

webAdminInstallDir/data/fepwa



If an error occurs while the product is being uninstalled, refer to "Uninstall (middleware) Messages" in the Fujitsu Enterprise Postgres product website, 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:

- For a cluster system using failover operation integrated with PRIMECLUSTER, stop the cluster applications and delete the cluster application resources and Fujitsu Enterprise Postgres resources. Refer to the Cluster Operation Guide (PRIMECLUSTER) and PRIMECLUSTER Installation and Administration Guide for details.
- If you have set automatic start and stop of the instance, execute the following commands to disable the script and cancel registration.

 ${\tt systemctl~disable~nameOfUnitFileThatPerformsAutomaticStartAndStop} \\ {\tt rm~/usr/lib/systemd/system/nameOfUnitFileThatPerformsAutomaticStartAndStop} \\ {\tt rm~/usr/lib/systemd/system/nameOfUnitFileThatPerformsAutomaticStartAndStop} \\ {\tt rm~/usr/lib/systemd/sys$ 

#### Example

# systemctl disable fsepsvoi\_instl.service
# rm /usr/lib/systemd/system/fsepsvoi\_instl.service

#### 2. Stop applications and programs

Before starting the uninstallation, stop the following:

- Applications that use the product
- Connection Manager
- Instance

#### Using WebAdmin



#### Using server commands

Execute the pg\_ctl command in stop mode.

```
/opt/fsepv<x>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.

If WebAdmin is installed in /opt/fsepv<*x*>webadmin:

```
# cd /opt/fsepv<x>webadmin/sbin
# ./WebAdminStop
```

#### - Mirroring Controller

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

#### Example

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

- pgBadger
- Pgpool-II
- pgBackRest

#### 3. Start the Uninstall (middleware)

Execute the following command:

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

#### 4. Select the software

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

## 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.

#### 6. 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...
productName is being uninstalled now.
    100% ################################
The following products have been uninstalled successfully:
```

productName

Uninstallation of "productName" has completed successfully.

Exiting Uninstaller.

## 5.2 Uninstallation in Silent Mode

Uninstall according to the following procedure:



- All files and directories in the installation directory are deleted during uninstallation. If user files have been placed in the installation directory, back them up before uninstallation if necessary.
- On SLES, before uninstallation, ensure that JRE 8 is installed, and export the JAVA\_HOME environment variable.

#export JAVA\_HOME="Jre8InstallDir"

- 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 "B.1.3 Stopping the Web Server Feature of WebAdmin" for details.
- 2. Back up the following directory:

webAdminInstallDir/data/fepwa



#### See

Refer to the Fujitsu Enterprise Postgres product website for information on uninstallation in silent mode, such as the error messages.

#### 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:

- For a cluster system using failover operation integrated with PRIMECLUSTER, stop the cluster applications and delete the cluster applications resources and Fujitsu Enterprise Postgres resources. Refer to the Cluster Operation Guide (PRIMECLUSTER) and PRIMECLUSTER Installation and Administration Guide for details.
- If you have set automatic start and stop of the instance, execute the following commands to disable the script and cancel registration.

 ${\tt systemctl~disable~name} of {\tt UnitFileThatPerformsAutomaticStartAndStop} \\ {\tt rm~/usr/lib/systemd/system/name} of {\tt UnitFileThatPerformsAutomaticStartAndStop} \\ {\tt rm~/usr/lib/system/name} of {\tt rm~/usr/lib/system/name} of {\tt rm~/usr/lib/system/name} \\ {\tt rm~/usr/lib/system/name} of {\tt rm~/usr/lib/system/name$ 

#### Example

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

#### 2. Stop applications and programs

Before starting the uninstallation, stop the following:

- Applications that use the product
- Connection Manager
- Instance

#### Using WebAdmin



#### Using server commands

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

```
/opt/fsepv<x>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.

If WebAdmin is installed in /opt/fsepv<*x*>webadmin:

```
# cd /opt/fsepv<x>webadmin/sbin
 ./WebAdminStop
```

- Mirroring Controller

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

#### Example

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

- pgBadger
- Pgpool-II
- pgBackRest

#### 3. Run the uninstallation

Execute the command below.

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

#### Example

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

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

```
# /opt/fsepv<x>webadmin/setup/suninst.sh
```

In the example above, /opt/fsepv<x>webadmin/setup is the name of the installation directory in which the WebAdmin is installed.

```
/opt/fsepv<x>pgpool-II/setup/suninst.sh
```

In the example above, /opt/fsepv<x>pgpool-II/setup is the name of the installation directory in which the Pgpool-II is installed.

```
# /opt/fsepv<x>pgbackrest/setup/suninst.sh
```

In the example above, /opt/fsepv<x>pgbackrest/setup is the name of the installation directory in which the pgBackRest is installed.

# Appendix A Recommended WebAdmin Environments

This appendix describes the recommended WebAdmin environment. The following explanation is based on the assumption that Microsoft Edge is used unless otherwise stated.



The displayed screen varies depending on your environment, so check and set according to the screen.

## A.1 Recommended Browser Settings

- Use a display resolution of 1280 x 768 or higher, and 256 colors or more.
- Select [Setting] >> [Appearance] >> [Font size] >> [Medium (Recommended)].
- Select [Setting] >> [Appearance] >> [Zoom] >> [100%].

## A.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 [Setting] >> [Cookie and site permissions] >> [All Permissions] >> [Pop-ups and redirects].

  If the [Block (Recommended)] switch is not on (blue), the pop-up blocker is not working, and no further action is required.
- 2. Under [Pop-ups and Redirects], click the [Allow] >> [Add] button.
- 3. In [Add Site], in [Site], enter the address of the server where you installed Fujitsu Enterprise Postgres and click the [Add] button.
- 4. Close Microsoft Edge.

# Appendix B Setting Up and Removing WebAdmin

This appendix describes how to set up and remove WebAdmin.

Note that "<x>" in paths indicates the product version.

## B.1 Setting Up WebAdmin

This section explains how to set up WebAdmin.

## **B.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 WebAdmin is installed in /opt/fsepv<*x*>webadmin:

```
# cd /opt/fsepv<x>webadmin/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 starting the WebAdmin window.

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

#### 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.

fsep\_160\_WA\_64\_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.

fsep\_160\_WA\_64\_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.

## **B.1.2 Starting the Web Server Feature of WebAdmin**

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

1. Change to the superuser

Acquire superuser privileges on the system.

#### Example

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

2. Start the Web server feature of WebAdmin

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

Example

If WebAdmin is installed in /opt/fsepv<*x*>webadmin:

```
# cd /opt/fsepv<x>webadmin/sbin
# ./WebAdminStart
```

# **B.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 WebAdmin is installed in /opt/fsepv<*x*>webadmin:

```
# cd /opt/fsepv<x>webadmin/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 a multiserver configuration, the Web server feature must be started and running on all servers at the same time.

# B.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 WebAdmin is installed in /opt/fsepv<*x*>webadmin:

```
# cd /opt/fsepv<x>webadmin/sbin
# ./WebAdminSetup -d
```

# B.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. Start WebAdmin, and log in to the database server.
- 2. Click the [Settings] tab, and then click in the [WebAdmin repository configuration] section.
- 3. 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



- 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.
- Host name, Database name, User name, Password should not contain hazardous characters. Refer to "Appendix C WebAdmin Disallow User Inputs Containing Hazardous Characters".

.....

4. Click to register the repository details.



- 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.

# B.4 Using the WebAdmin Auto-Refresh Feature

The WebAdmin auto-refresh feature automatically refreshes the operating status of all instances in the Instance list at the specified interval. It also refreshes the details of the selected instance. You can use the auto-refresh feature to prevent timeouts.

Follow the procedure below to configure the auto-refresh options.

- 1. Click the [Settings] tab, and then click in the [User preferences] section.
- 2. Enter the following items:
  - [Auto-refresh instance]: To use the auto-refresh feature, select "Enabled". The default is "Disabled".
  - [Refresh interval (seconds)]: Number of seconds between each refresh. This is a countdown timer, which is reset every time the instance status is refreshed by any operation. Specify a value from 30 to 3600 (seconds). The default is 30.
- 3. Click to save the auto-refresh settings.



- Auto-refresh will run only if the [Instances] page is displayed and no user-initiated operation is in progress.
- A text indicator, which is independent of auto-refresh, is displayed at the top of the Instance list. It is dynamically updated to display when the page was last refreshed.

# Appendix C WebAdmin Disallow User Inputs Containing Hazardous Characters

WebAdmin considers the following as hazardous characters, which are not allowed in user inputs.

```
| (pipe sign)
& (ampersand sign)
; (semicolon sign)
$ (dollar sign)
% (percent sign)
@ (at sign)
' (single apostrophe)
" (quotation mark)
\' (backslash-escaped apostrophe)
\" (backslash-escaped quotation mark)
<> (triangular parenthesis)
() (parenthesis)
+ (plus sign)
CR (Carriage return, ASCII 0x0d)
LF (Line feed, ASCII 0x0a)
, (comma sign)
\ (backslash)
```

# 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.



#### See

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



WebAdmin checks for port number and backup storage path anomalies when various operations are performed. An anomaly occurs when the value of [Port number] and/or [Backup storage path] in WebAdmin is different from the value of the corresponding parameter in postgresql.conf. Refer to "Anomaly Detection and Resolution" in the Operation Guide for details.

#### postgresql.conf

Parameters that can be changed in WebAdmin

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

Section	WebAdmin item	postgresql.conf file parameter
Instance Configuration		
Character encoding	Character set	client_encoding
	Message locale	lc_messages
Communication	Max connections	max_connections
SQL options	Transform NULL format	transform_null_equals
	Date output format	DateStyle (*1)
	Interval output format	IntervalStyle
	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
	Numerical value format	lc_numeric
Memory	Sort memory (KB)	work_mem
	Shared buffers (KB)	shared_buffers
Streaming replication	WAL level	wal_level
	Maximum WAL senders	max_wal_senders

Section	WebAdmin item	postgresql.conf file parameter
	WAL save size (MB)	wal_keep_size
	Hot standby	hot_standby
	Synchronous standby names	synchronous_standby_names
	WAL receiver timeout (ms)	wal_receiver_timeout
Edit instance	Edit instance	
	Instance name	n/a
	Instance port	port
	Backup storage path	backup_destination

<sup>\*1:</sup> 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.



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

```
maximumNumberOfConnections = 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 superuser\_reserved\_connections (connections reserved for use by the superuser) in postgresql.conf.

maximumNumberOfConnections = maximumNumberOfConnectionsFromApplications +
superuser\_reserved\_connections

- 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 "Shared buffers" or "Max connections", edit the kernel parameter. Refer to "Appendix H Configuring Kernel Parameters", and "Managing Kernel Resources" in "Server Administration" in the PostgreSQL Documentation for details.

#### Parameters set by WebAdmin

The following postgresql.conf parameters are set by WebAdmin during instance startup (they will be ignored even if specified in postgresql.conf):

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

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

<sup>\*2:</sup> 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
shared_buffers	30% of the machine's installed memory
work_mem	30% of the machine's installed memory / max_connections / 2
effective_cache_size	75% of the machine's installed memory
maintenance_work_mem	10% of the machine's installed memory / (1 + autovacuum_max_workers) (*1)

<sup>\*1:</sup> The value will be capped at 2097151 KB.

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 H Configuring Kernel Parameters", and "Managing Kernel Resources" in "Server Administration" in the PostgreSQL Documentation for information on tuning kernel parameters.



- You can edit postgresql.conf directly with a text editor. However, do not edit the following parameters. If you edit incorrectly, WebAdmin will not work correctly.

.....

- 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
- If you edit postgresql.conf directly, the records should be single line. WebAdmin will not work correctly if the record spans multiple lines.
- If you change superuser\_reserved\_connections, set the value you want to change plus the number of connections required by WebAdmin of 3.

#### 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.



- Configure the instance administrator permissions in the "local" connection format settings. WebAdmin may not work properly if permissions are not configured.

......

- You can also edit pg\_hba.conf directly. However, do not modify items that cannot be configured in WebAdmin. WebAdmin does not work correctly.
- If you edit pg\_hba.conf directly, the records should be single line. WebAdmin will not work correctly if the record spans multiple lines.

# Appendix E Estimating Database Disk Space Requirements

This appendix describes how to estimate database disk space requirements.

# E.1 Estimating Table Size Requirements

The following tables provide the formulas for estimating table size requirements.

Table E.1 Estimation formula when the record length is 2032 bytes or less

Item	a when the record length is 2032 bytes or less  Estimation formula (bytes)	
(1) Record length	27(*1) + NULL map + OID + column data	
	NULL map: Number of columns / 8 (*2) OID: 4	
	Column data: Sum of column lengths	
	*1: Record header section	
	*2: Round the result up to the next integer.	
	<ul> <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 header section, NULL map and OID is a multiple of 8.</li> <li>For example, if the calculated length is 27 + 1 / 8 (rounded up) + 0 = 28 bytes, add</li> </ul>	
	4 to make the length 32 bytes.	
	- 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. 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.	
	Definition: create table tb1(c1 char(1), c2 bigint, c3 int, c4 box)  Estimation: CHAR type 1 byte + boundary adjustment of 7 bytes for BIGINT type 8 bytes + BIGINT type 8 bytes + INT type 4 bytes + boundary adjustment of 12 bytes for BOX type 32 bytes + BOX type 32 bytes = 64 bytes	
	- 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.	
	<ul> <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 "Table E.2 Estimation formula when the record length exceeds 2032 bytes" to estimate the table size.</li> </ul>	
(2) Page size requirement	8192 (*1) × fillfactor (*2) - 24 (*3)	
	*1: Page length (8192)	
	*2: Value of the fillfactor specified in the table definitions (if omitted, 100%)	
	*3: Page header (24)	
	- The calculated (2) page size requirement will be rounded down to the nearest integer.	
(3) Number of records per page	(2) Page size requirement / ((1) record length + 4 (*1))	
	*1: Pointer length (4)	
	- The result will be rounded down to the nearest integer.	

Item	Estimation formula (bytes)	
(4) Number of pages required for storing records	Total number of records / (3) number of records per page	
	- The result will be rounded up to the next integer.	
(5) Amount of space	(4) Number of pages required for storing records x page length x safety factor (*1)	
	*1: Specify 2.0 or higher.	
	<ul> <li>This is the safety factor assumed if vacuuming is performed for garbage collection in tables and indexes.</li> </ul>	

Table E.2 Estimation formula when the record length exceeds 2032 bytes

Item	Estimation formula (bytes)	
(5) Amount of space	Total number of records x (1) record length x safety factor (*1)	
	*1: Specify 2.0 or higher.	
	- This is the safety factor assumed if vacuuming is performed for garbage collection in tables and indexes.	

# **E.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 "E.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 E.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)	
	*1: Entry header	
	*2: The key data length depends on its data type (refer to "E.3 Sizes of Data Types" for details).	
	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.	
	For example, if the calculated length is 28 bytes, add 4 to make the length 32 bytes.	
	<ul> <li>If the key data length exceeds 512 bytes, key data may be automatically compressed.</li> <li>In this case, use the estimation formula given in "Table E.4 Estimation formula when the key data length exceeds 512 bytes" to estimate the key data length.</li> </ul>	
(2) Page size requirement	8192 (*1) × fillfactor (*2) - 24 (*3) - 16 (*4)	
	*1: Page length (8192)	
	*2: Value of the fillfactor specified in the index definitions (if omitted, 90%)	
	In the case of indexes of primary key constraints and unique constraints,	
	the value of the fill factor specified for each constraint in the table definitions (if omitted, 90%)	
	*3: Page header (24)	
	*4: Special data (16)	

Item	Estimation formula (bytes)	
	- The calculated (2) page size requirement will be rounded down to the nearest integer.	
(3) Number of entries per page	(2) Page size requirement / ((1) entry length + 4 (*1))	
	*1: Pointer length	
	- 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	
	- 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)	
	*1: Page length	
	*2: Specify 0.7 or lower.	

Table E.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)	
	*1: The compression ratio depends on the data value, so specify 1.	
	*2: Specify 0.7 or lower as the usage rate.	

# **E.3 Sizes of Data Types**

This section lists the sizes of the data types.

# **E.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

Data type	Size (bytes)
INTERVAL	12
BOOLEAN	1
CIDR	IPv4: 7 IPv6: 19
INET	IPv4: 7 IPv6: 19
MACADDR	6
MACADDR8	8
POINT	16
LINE	32
LSEG	32
BOX	32
CIRCLE	24

## E.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.
polygon	Length of size portion + 36 + 16 x number of vertices	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.
decimal	Length of size portion + 2 + (integer	3) The number of bytes per character depends on the
numeric	precision / 4 + decimal precision / 4) x 2	character set (refer to "E.3.4 Number of Bytes per Character" for details).
bytea	Length of size portion + real data length	Character for details).
character varying(n), varchar(n)	Length of size portion + number of characters x number of bytes per character	
character(n), char(n)	Length of size portion + n x number of bytes per character	
text	Length of size portion + number of characters x number of bytes per character	

## **E.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.  - Example of estimation when array data is "ARRAY[[1,2,3], [1,2,3]]"  Number of dimensions: 2  INTEGER data size: 4  Total size = 1+12+8x2+6x4 = 53

## E.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

## **E.4 Estimating Transaction Log Space Requirements**

This section provides the formula for estimating transaction log space requirements.

```
Transaction log space requirements = max_wal_size
```

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.

## E.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.

## E.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 x 2 + transaction log space requirements + archive log space requirements



If the pgx\_dmpall command performs a backup using a user exit, the backup disk size differs according to the database resources targeted for backup and the copy method.

## E.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.



VCI does not support retrieval of disk space usage using the database object size function pg\_indexes\_size. To find out the actual total VCI disk space, check the disk space of the storage directory using an OS command or other method.

## Appendix F Estimating Memory Requirements

This appendix explains how to estimate the memory.

## F.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**

```
sharedMemoryAmount = 1523444
                            +7154 \times (a + b + c + d + 1)
                            + 405 x (a + b + c + d + e) x f
                            + (1208 + g) \times (a + b + c + d + 9)
                            + 64 x b
                            + 568 x c
                            + 104 \times d
                            + 5666 x e
                            + 112 x h
                            + 8200 x i
                            + 512 x j
                            + 4 \times (k + 10)
                            + 1097984 x m
                            + 258 \times (a + b + c + d + 1 + e) \times o
                            + (1024 x 1024) x p
                            + n
                            + 128 x q
```

The above units are Byte.

#### Parameter Details:

```
x = shared_buffer/8
    Note: Units of shared_buffer (kB)
    Example : x = 16384 (128 x 1024/8) when shared_buffer = 128 MB
        Convert MB to KB to calculate x.
a = max_connections
b = autovacuum_max_workers
c = max_worker_processes
d = max_wal_senders
e = max_prepared_transactions
f = max_locks_per_transaction
g = track_activity_query_size (byte)
h = max_logical_replication_workers
i = wal_buffers/8
  Note: If wal_buffers is the default value (-1), calculate i = x/32.
         However, if it becomes 2048 or more, set the maximum value to 2048.
         If i = x/32, there is a limit on the maximum value of i.
         Max i = WAL segment size/8
         The WAL segment size can be set with the initdb option --wal-segsize.
         The WAL segment size is in kilobytes.
         (The default WAL segment size is 16 MB. Convert to KB when calculating i)
  Example: If shared_buffer = 128 MB and wal_buffers = -1, i = 512 (16384/32)
             If shared\_buffer = 2 GB and wal\_buffers = -1, i = 2048 (2 x 1024 x 1024/8/32 = 8192)
             but the maximum value of i is 2048)
             If wal_buffers = 512 \text{ kB}, i = 64 (512/8)
             i = 4096 (32 \times 1024/8) when wal_buffers = 32 MB
```

```
Converts MB to KB to calculate i.

j = max_replication_slots

k = old_snapshot_threshold

Note: If old_snapshot_threshold is the default value (-1), there is no need to add "4 x (k + 10)"

to the quote formula.

old_snapshot_threshold units (min)

Example: k = 60 (1 x 60) if old_snapshot_threshold = 1 h

Convert h to min to get k.

m = pgx_global_metacache (megabytes)

n = memory size requested by the plug-in (determined by the plug-in)

o = max_pred_locks_per_transaction

p = min_dynamic_shared_memory (MB)

q = number of database roles
```

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

#### Process stack area

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

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

```
memoryUsedInDbSessionsThatPerformSortAndHashTableOperations
= work_mem (*1) x max_connections
```

\*1) For hash table operations, multiply work\_mem by hash\_mem\_multiplier.

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

```
memoryUsedInMaintenanceOperations
= maintenance_work_mem x (numOfSessionsPerformingMaintenance + autovacuum_max_workers)
```

Note that 'maintenance operations' are operations such as VACUUM, CREATE INDEX, and ALTER TABLE ADD FOREIGN KEY.

#### Base memory used in each process

```
baseMemoryUsedInEachProcess = baseMemoryUsedInOneProcess x (max_connections + autovacuum_max_workers + 9)
```

Use the result of the following formula for memory consumed per process. 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.

The amount of memory consumed per process is determined by the number of tables, indexes, and all columns of all tables that the process accesses. If your system has about 100 tables, you can estimate it to be 3 MB, but otherwise use the following estimate:

\*1) Safety Factor (1.5)

There are variable length information. This value takes that into account.

#### Memory used preparing for data access

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.

## F.2 Database Multiplexing Memory Requirements

This section describes the formula for estimating database multiplexing memory requirements for the database server.

Use the following formula to obtain a rough estimate of memory required for database multiplexing:

```
Memory usage of the database multiplexing feature for the database server

= Peak memory usage of the Mirroring Controller processes

+ Peak memory usage of the Mirroring Controller commands

Peak memory usage of the Mirroring Controller processes=150 MB

Peak memory usage of the Mirroring Controller commands=50 MB x Number of commands executed simultaneously
```

## F.3 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\_buffers).

```
memForData = (numOfRowsInTables) \times (numOfBytesPerRow) + (wosSize)
```

#### Number of bytes per row

```
numOfBytesPerRow
= (19 + (numOfColsInCreateIndexStatement) / 8 + (numOfBytesPerSingleColValue)) x 1.1
```

Note: Round up the result to the nearest integer.

#### WOS size

```
wosSize = (numOfWosRows) / 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.

#### Memory required for each process

memForEachProcess

- = memUsedPerScanning
- + memUsedForVciMaintenace
- + memUsedByCreateIndexStatement

#### Memory used per scanning

- Parallel scan

```
memUsedPerScanning
= vci.shared_work_mem + (numOfParallelWorkers + 1) x 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

```
\textit{memUsedForVciMaintenace} = \texttt{vci.maintenance\_work\_mem} \ \ x \ \ \texttt{vci.control\_max\_workers}
```

#### Memory used by CREATE INDEX

memUsedByCreateIndexStatement = vci.maintenance\_work\_mem



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.

## F.4 High-Speed Data Load Memory Requirements

This section describes the formula for estimating memory requirements for the high-speed data load feature.

Use the following formula to obtain a rough estimate of memory requirements:

```
Memory usage of high speed data load

= (Peak memory usage of pgx_loader processes + Peak memory usage of the pgx_loader commands)

x Number of commands executed simultaneously

Peak memory usage of pgx_loader processes

= Peak memory usage of the backend process (6 MB)

+ Peak memory usage of parallel workers (6 MB x number of parallel workers)

+ Peak memory usage of dynamic shared memory (80 MB x number of parallel workers)

Peak memory usage of the pgx_loader commands=9 MB
```



In addition to the size calculated using the formula above, the database cache on the shared memory estimated using the shared\_buffers parameter is consumed according to the size of the data (table and index keys) loaded using this feature. Refer to "E.1 Estimating Table Size Requirements" and "E.2 Estimating Index Size Requirements" for information on estimating an appropriate shared buffers value.

## F.5 Global Meta Cache Memory Requirements

This section describes the formula for estimating Global Meta Cache memory requirements.

The memory calculated by "Size of the GMC area" is allocated to the shared memory. The memory calculated by the per-process meta cache management information is allocated to the local memory. Refer to the graphic in "Architecture of Global Meta Cache Feature" in the "Memory usage reduction by Global Meta Cache" in the General Description for more information.

Use the following formula to obtain a rough estimate of memory requirements:

```
Amount of memory used by the Global Meta Cache feature

= Size of GMC area + Per-process meta cache management information

Size of GMC area = (All user tables x 0.4 KB

+ All user indexes x 0.3 KB

+ All user columns x 0.8 KB) x 1.5 (*1)

Per-process meta cache management information

= (All user tables + All user indexes + All user columns) x 0.1KB x max_connections x 1.5 (*1)
```

This value takes into account the case where both GMC before and after the change temporarily exist at the same time in shared memory when the table definition is changed or the row of the system catalog is changed.

<sup>\*1)</sup> Safety Factor (1.5)

## Appendix G Quantitative Limits

This appendix lists the quantitative limits of Fujitsu Enterprise Postgres.

Table G.1 Length of identifier

Item	Limit
Database name	Up to 63 bytes (*1) (*2)
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)
Tablespace 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)
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)

<sup>\*1:</sup> This is the character string byte length when converted by the server character set character code.

<sup>\*2:</sup> If an identifier that exceeds 63 bytes in length is specified, the excess characters are truncated and it is processed.

Table G.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 tablespaces	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 index access methods	Less than 4,294,967,296 (*1)
Number of profile	Less than 4,294,967,296 (*1)

<sup>\*1</sup>: The total number of all database objects must be less than 4,294,967,296.

## Table G.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

<sup>\*1:</sup> Operation might proceed correctly even if operations are performed with a quantity outside the limits.

## Table G.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)

<sup>\*1:</sup> This is the character string byte length when converted by the server character set character code.

Table G.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	2 bytes	From -32,768 to 32,767
	expression	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 express	sion	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 4 terabyte

<sup>\*1:</sup> This is the character string byte length when converted by the server character set character code.

## Table G.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

<sup>\*2:</sup> This is the character string byte length when converted by the server character set character code.

Item	Limit
Number of SQL statements or control statements that can be specified in a function processing implementation	No limit

Table G.7 Data operation statement

ltem	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 G.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)

<sup>\*1:</sup> Operation might proceed correctly even if operations are performed with a quantity outside the limits.

## Appendix H 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.



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 currentValue + calculatedValue
SHMSEG	No compatible parameter	
SHMMNI	kernel.shmmni	Specify currentValue + calculatedValue
SEMMNI	Fourth parameter of kernel.sem	Specify currentValue + calculatedValue
SEMMNS	Second parameter of kernel.sem	Specify currentValue + calculatedValue
SEMMSL	First parameter of kernel.sem	If <i>currentValue</i> < <i>calculatedValue</i> , configure the calculated value
SEMMAP	No compatible parameter	
SEMVMX	No compatible parameter	

Remark 1: kernel.shmall specifies the number of pages.

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 I 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.

## I.1 WebAdmin Configurations

WebAdmin can be installed in two configurations:

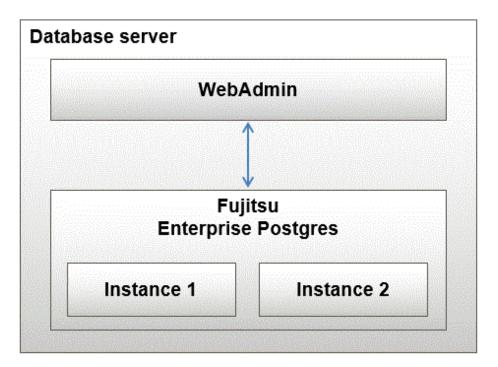
- Single-server
- Multiserver

WebAdmin does not support encrypted communication between browser and server or between servers. Therefore, when using WebAdmin in either configuration, build the communication path with the browser or each server on a network that cannot be accessed externally.

## I.1.1 Single-Server Configuration

A single-server configuration enables you to create and operate instances on a single server. In this configuration, WebAdmin must be installed on the same database server as the Fujitsu Enterprise Postgres Server component.

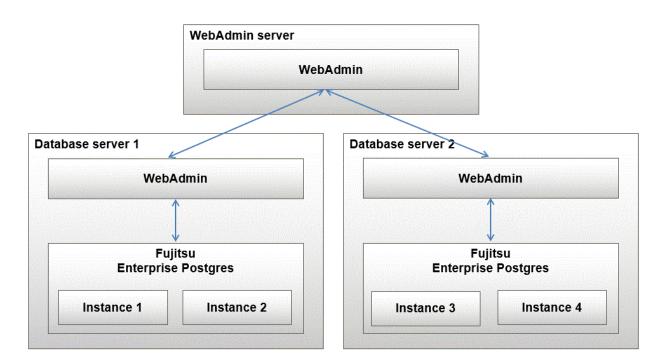
Single-server configuration



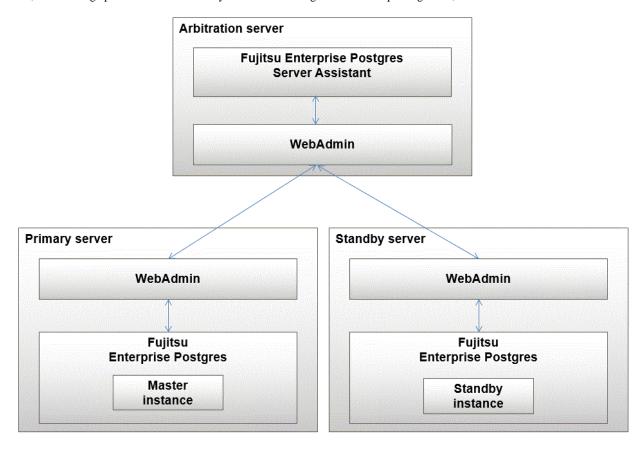
## I.1.2 Multiserver Configuration

A multiserver configuration enables you to create and operate instances stored on multiple database servers. As shown in the figure below, WebAdmin can be installed on a dedicated WebAdmin server and used to collectively manage the instances stored on the database servers.

Multiserver configuration



Also, when setting up the arbitration server by WebAdmin during database multiplexing mode, install WebAdmin on the arbitration server.



## I.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 on the same machine.

Select the following items when installing Fujitsu Enterprise Postgres in a single-server configuration:

- Fujitsu Enterprise Postgres Advanced Edition or Fujitsu Enterprise Postgres Standard Edition
- WebAdmin

## I.3 Installing WebAdmin in a Multiserver Configuration

In a multiserver configuration, install WebAdmin on one server, and both WebAdmin and the Fujitsu Enterprise Postgres Server component on any number of database servers.

Select the following items when installing Fujitsu Enterprise Postgres in a multiserver configuration:

- WebAdmin server:
  - WebAdmin
- Database server:
  - Fujitsu Enterprise Postgres Advanced Edition or Fujitsu Enterprise Postgres Standard Edition
  - WebAdmin

Also, when setting up the arbitration server by WebAdmin during database multiplexing mode, select the following when installing Fujitsu Enterprise Postgres.

- Arbitration server
  - Fujitsu Enterprise Postgres Server Assistant
  - WebAdmin



Refer to the Installation and Setup Guide for Server Assistant for details on how to install the Server Assistant.

## Appendix J System Configuration when using Pgpool-II

Describes the system configuration when using Pgpool-II.

The system configuration when using Pgpool-II is as follows:

#### Place on database server

System configuration to coexist the database server with Pgpool-II.

#### Place on application server

System configuration to coexist the application server with Pgpool-II.

#### Place on dedicated server

System configuration in which Pgpool-II resides on a dedicated server (Pgpool-II Server) that is separate from the database and application servers.

Select the system configuration that best meets your operational requirements.

## J.1 Pgpool-II Configuration

In this example, Pgpool-II is deployed on a different Pgpool-II server than the database and application servers.

There are three configurations of Pgpool-II:

- Single-machine configuration
- Two-machine configuration
- Three-machine configuration

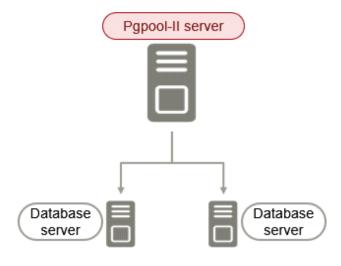
Although the Pgpool-II server can be operated on a single machine, to ensure business continuity, it is recommended to operate the Pgpool-II server using a three-machine configuration in Fujitsu Enterprise Postgres.

If employing a configuration of three or more machines, use an odd number of machines in the configuration.

## J.1.1 Single-Machine Configuration

This is the basic configuration when running Pgpool-II.

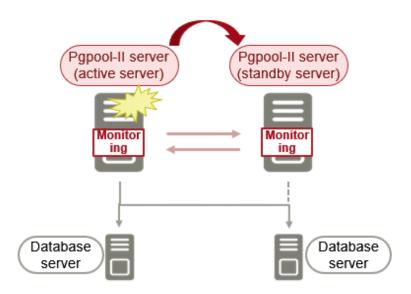
Although the database server has redundancy, if an error occurs on the Pgpool-II server that accesses the database server, the job will stop.



## J.1.2 Two-Machine Configuration

When an error occurs on the active server, the Pgpool-II monitoring feature that mutually monitors the status of the Pgpool-II servers enables jobs to continue uninterrupted by switching to the standby server.

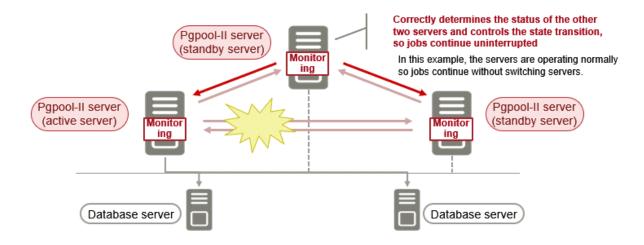
If the network between Pgpool-II servers is disconnected, even if the Pgpool-II servers are running correctly, which may lead to stoppage of jobs.



## J.1.3 Three-Machine Configuration

The Pgpool-II monitoring feature enables a Pgpool-II server to monitor the other two Pgpool-II servers.

Even if any of the networks monitoring the Pgpool-II servers are disconnected, the status of servers on a network that is operating normally can be checked correctly, enabling accurate continuation of jobs.



## J.2 Installing Pgpool-II

Pgpool-II is bundled with the server program and the client program. To use Pgpool-II, use the server program or the client program to install and set up Pgpool-II.

Depending on where Pgpool-II is installed, select the appropriate DVD for deployment:

#### Installing on Database Server (coexist)

Install the Pgpool-II program along with the server program from the server program DVD.

#### Installing on Application Server (coexist)

Install the Pgpool-II program along with the client program from the client program DVD.

## Installing on Dedicated server different from the above (Pgpool-II server)

Install the Pgpool-II program along with the client program from the client program DVD.

## J.3 Pgpool-II Setup

Describes how to set up Pgpool-II.

## J.3.1 Setting Environment Variables

If you use the Pgpool-II command, set the following environment variables:

#### **PATH** environment variable

Add "Install Directory/bin".

The following is an example of setting environment variables:

#### Example

The following is an example of setting environment variables when the installation directory is "/ opt/fsepv < x > pgpool-II".

"< x >"" indicates the product version.

\$ PATH=/opt/fsepv<x>pgpool-II/bin:\$PATH ; export PATH

## J.3.2 Configuration file

Describes Pgpool-II configuration files.

## J.3.2.1 Configuring papool.conf

To configure pgpool.conf, see the Pgpool-II documentation.

A sample configuration file is located under the installation directory/etc.

## J.3.2.2 Using Configuration Files

The pgpool command makes use of configuration files such as pgpool.conf, pcp.conf, and pool\_hba.conf.

To take advantage of these configuration files, specify the path to the files in the pgpool command options.

The following example shows how to configure options for the pgpool command:

#### Example

\$ pgpool -f /usr/local/etc/pgpool.conf -F /usr/local/etc/pcp.conf -a / usr/local/etc/pool\_hba.conf

## Appendix K Supported contrib Modules and Extensions Provided by External Projects

Fujitsu Enterprise Postgres supports PostgreSQL contrib modules, and extensions provided by external projects.

Refer to the following for details on the supported contrib modules:

- "Additional Supplied Modules" in the PostgreSQL Documentation
- "Additional Supplied Programs" in the PostgreSQL Documentation



You can also check the list of available extensions using the pg\_available\_extensions view.

Refer to "OSS Supported by Fujitsu Enterprise Postgres" in the General Description for information on supported extensions provided by external projects.

## Appendix L Procedure when Modifying the JRE Installation

This appendix describes the procedures to follow when modifying the JRE installation.

The JRE, of which the installation destination is specified in the JAVA\_HOME environment variable when installing Fujitsu Enterprise Postgres, is used by features such as WebAdmin and database multiplexing.

Therefore, when updating or reinstalling JRE after installing Fujitsu Enterprise Postgres, the procedures below must be performed.

## L.1 When Using WebAdmin

WebAdmin must be set up again.

Follow the procedure below to modify the JRE installation:

1. Stop the Web server feature of WebAdmin

Refer to "B.1.3 Stopping the Web Server Feature of WebAdmin" for details.

2. Remove WebAdmin

Refer to "B.2 Removing WebAdmin" for details.

- 3. Modify the JRE installation
- 4. Set the JAVA\_HOME environment variable

Set the JAVA\_HOME environment variable to the installation destination of JRE 8.

Example

# export JAVA\_HOME="*Jre8InstallDir*"

5. Set up WebAdmin

Refer to "B.1.1 Setting Up WebAdmin" for details.

6. Start the Web server feature of WebAdmin

Refer to "B.1.2 Starting the Web Server Feature of WebAdmin" for details.

## L.2 When Performing Database Multiplexing

Mirroring Controller must be restarted.

Follow the procedure below to modify the JRE installation:

1. Stop Mirroring Controller

Refer to the Cluster Operation Guide (Database Multiplexing) for details.

- 2. Modify the JRE installation
- 3. Change the installation environment to be used by Mirroring Controller



If database multiplexing is performed using WebAdmin, perform the procedure described in this procedure after performing step 4 "Set the JAVA\_HOME environment variable" in "L.1 When Using WebAdmin".

Set the JAVA\_HOME environment variable to the installation destination of JRE 8, and use the mc\_update\_jre\_env command to change the installation environment to be used by Mirroring Controller.

This procedure must be executed by the superuser.

## Example

/opt/fsepv<*x*>server64/bin is the installation directory where the server product is installed.

```
$ su -
Password:*****
# export JAVA_HOME="Jre8InstallDir"
# /opt/fsepv<x>server64/bin/mc_update_jre_env
```

## 4. Start Mirroring Controller

Refer to the Cluster Operation Guide (Database Multiplexing) for details.

## Appendix M Access to Key Management System Using Plug-in

## M.1 What to do with Plug-ins

Plug-ins are called to verify, encrypt, and decrypt keys.

Key validation, encryption, and decryption requests are required.

## M.2 Where the Plug-in is Stored

Plug-ins are stored as executables with the same name as the plug-in name in the directory specified in the tde\_kms.plugin.path parameter. It is the responsibility of the database administrator to ensure that only secure plugins are stored in this directory.

## M.3 Invoking the Plug-in

The plug-in runs with the same ownership as the user running the FEP server. The plug-in is passed information that should be kept secret. It is the database administrator's responsibility to ensure that the plug-in is trustworthy.

Plug-ins can be invoked at the same time (multiple).

The plug-in must complete the operation in a timely manner and return a response.

## M.4 Passing Confidential Information to Plug-ins

Confidential credentials passed to the FEP instance using the FEP keystore open facility (pgx open keystore function, opening at server startup prompt, opening using obfuscated files) are passed to the plug-in as environment variables.

You can pass arbitrary values as arguments when calling the plug-in, but do not use this feature to pass sensitive information.

The authentication and authorization of access to the key management system depends on the implementation of the plug-in.

## M.5 Calling Convention

## M.5.1 Key Verification

#### Arguments

The following arguments are supplied:

	Argument value	Notes
First argument	validate-key	Fixed
second argument	keyid	Fixed
third argument	keyid	Variable; the key ID specified in the pgx_declare_external_master_key function is passed
After the fourth argument	extraarg	Arguments specified in the connection information file, if any, are given in the specified order

#### Environment variable

The following environment variables are supplied:

Name of the environment variable	Value of the environment variable	Notes
TDE_KMS_SECRE T	KMS Secret	String entered in the FEP to open the keystore

## Return value

The command ends with the following return values:

Return value	Condition	
0	If the processing is successful	
Other than 0	When processing does not complete normally	

## delivery of data

Data is delivered to the plug-in in the following way. The plug-in also returns results in the following ways:

Classification	Data Content	Delivery method	Notes
Input	Key ID	Arguments	
Output	Process Status	Plug-in return code	
Output	Message	Plugin standard error output	Expected to be printable

## Calling opportunity

Called before starting to use the encryption key.

#### Processing contents

Verifies the existence of the encryption key identified by the key ID and whether the user is authorized to use the encryption key.

## M.5.2 Encryption

#### Arguments

The following arguments are supplied:

	Argument value	Notes
First argument	encrypt	Fixed
second argument	keyid	Fixed
third argument	keyid	Variable; the key ID specified in the pgx_declare_external_master_key function is passed
After the fourth argument	extraarg	The values specified in extra-args in the key management system connection information file, if any, are passed in the specified order

#### Environment variable

The following environment variables are supplied:

Name of the environment variable	Value of the environment variable	Notes
TDE_KMS_SECRE T	KMS Secret	String entered in the FEP to open the keystore

#### Return value

The command ends with the following return values:

Return value	Condition
0	If the processing is successful
Other than 0	When processing does not complete normally

## delivery of data

Data is delivered to the plug-in in the following way. The plug-in also returns results in the following ways:

Classification	Data Content	Delivery method	Notes
Input	Data to be encrypted	Standard input for the plug-in	As Is (not Base 64 encoding, etc)
Input	Key ID	Arguments	
Input	Encryption parameter	-	Not passed by the FEP
Output	Encryption result	Standard output of the plug-in	As Is (not Base 64 encoding, etc)
Output	Status of the action	plug-in return code	
Output	Message	Standard error output of the plug- in	It is expected to be printable

## Calling opportunity

Called when encryption with the master encryption key is required.

#### **Processing Contents**

Encrypts the given data to be encrypted with the encryption key identified by the specified key ID, and returns the result. The returned encryption result must be decryptable with the same key ID.

#### Caution

- Implement so that data to be encrypted is not leaked. For example, temporarily storing encrypted data that is plaintext in a file poses a risk of disclosure.
- Fujitsu Enterprise Postgres only guarantees the following during decryption:
  - The same key ID is handed over during decryption as during encryption.
  - The data received as a result of the "encryption" operation is passed as-is when decrypting.
- The maximum amount of data to be encrypted passed from the Fujitsu Enterprise Postgres is 2048 bytes.

## M.5.3 Decryption

#### Arguments

The following arguments are supplied:

	Argument value	Notes
First argument	decrypt	Fixed
second argument	keyid	Fixed
third argument	keyid	Variable; the key ID specified in the pgx_declare_external_master_key function is passed
After the fourth argument	extraarg	The values specified in extra-args in the key management system connection information file, if any, are passed in the specified order.

#### Environment variable

The following environment variables are supplied:

Name of the environment variable	Value of the environment variable	Notes
TDE_KMS_SECRET	KMS Secret	String entered in the FEP to open the keystore

#### Return value

The command ends with the following return values:

Return value	Condition					
0	If the processing is successful					
Other than 0	When processing does not complete normally					

#### delivery of data

Data is delivered to the plug-in in the following way. The plug-in also returns results in the following ways:

Classification	Data Content	Delivery method	Notes			
Input	Data to be decrypted	Standard input for the plug-in	As Is (not Base 64 encoding, etc.)			
Input	Key ID	Arguments				
Input	Encryption parameter	-	Not passed by the FEP			
Output	Decoding result	Standard output of the plug-in	As Is (not Base 64 encoding, etc.)			
Output	Status of the action	plug-in return code				
Output	Message	Standard error output of the plug- in	It is expected to be printable			

#### Calling opportunity

Called when decryption with the master encryption key is required.

## **Processing Contents**

Decrypts the given encrypted data with the encryption key identified by the given key ID and returns the result.

#### Caution

- Implement so that the decrypted data is not leaked. For example, there is a risk of leakage if the decryption result data, which is clear text, is temporarily stored in a file.
- If decryption requires the same encryption parameters as encryption, it is the plug-in's responsibility to ensure this. During decryption, the FEP only ensures that the plug-in receives the same key ID and encrypted data as was encrypted.
- The data to be decrypted is passed as is the data returned by the plug-in in response to the encryption request.

## Appendix N Deploying Virtual Machines by Cloning

Learn how to install Fujitsu Enterprise Postgres on a virtual machine, clone the virtual machine, and deploy a new virtual machine.

## N.1 If you are installing only

There are no guidelines for installing Fujitsu Enterprise Postgres on a virtual machine only and cloning a virtual machine.

## N.2 If you are creating an instance

When creating an instance on a virtual machine and cloning the virtual machine, the following precautions must be taken:

- Clone the virtual machine while the instance and WebAdmin are stopped.
- Modify the IP address and host name settings in files such as postgresql.conf and pg\_hba.conf if they are different for each replicated machine.
- Use transparent data encryption on the replicated machine. Instances that use transparent data encryption cannot be cloned for use.
- If you cloned the virtual machine that contains the WebAdmin server, reinstall WebAdmin and import the instance that WebAdmin created.

## Index

[A]
Access to key management system using plug-in
[C]
Changing client authentication information
Changing Instance Settings
Check the disk space
Check the installed products and determine the installation
method
Creating an Instance
Creating an Instance Administrator
Creating Instances
-
[D]
Disk Space Required for Installation8
[E]
Editing instance information
Excluded Software8
[G]
GSSAPI認証のサーバkeytabファイルの設定35
•
[H]
Hardware Environment
How to Set Up the Pop-up Blocker52
[1]
Importing Instances
Installation
Installation in Interactive Mode
Installation in Silent Mode
Installation Types
Instance configuration
[L]
Logging in to WebAdmin24
[M]
Multi-Version Installation
INI
[N] New Installation1
[O]
Operating Environment
Operating Method Types and Selection
[P]
Port number to use when Tomcat is stopped53
postgresql.conf58
Pre-installation Tasks
Preparations for Setup
Procedure when Modifying the JRE Installation86

[R]	
Recommended Browser Settings	52
Reinstallation	1
Related Software	<mark>7</mark>
Remove applied updates	13
Removing WebAdmin	55
Required Operating System	3
Recommended Browser Settings Reinstallation Related Software Remove applied updates	8
[S]	
	31
Stopping the Web Server Feature of WebAdmin	54
Projects	85
r <del></del> 1	
	0
TCP/IP Protocol	9
Uninstallation	.2,48
Using WebAdmin	23
[W]	
WebAdmin automatic start	54
Web server port number	53
When an Instance was Created with the initdb Command	31
When an Instance was Created with WebAdmin	31
When Performing Database Multiplexing	86
When Using WebAdmin	86



# **Fujitsu Enterprise Postgres 16**

# Installation and Setup Guide for Client

Windows/Linux

J2UL-2950-01ENZ0(00) July 2024

## **Preface**

## Purpose of this document

This document describes how to install, uninstall 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:



- PostgreSQL
- SQL
- Windows



- 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

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## **Contents**

Chapter 1 Overview of Installation	
1.1 Features that can be Installed	
1.2 Installation Types	
1.2.1 New Installation.	
1.2.2 Reinstallation	
1.2.3 Multi-Version Installation.	
1.3 Installation Procedure.	
1.3.1 Installation in Interactive Mode	
1.3.2 Installation in Silent Mode	
1.4 Uninstallation.	
Chapter 2 Installation and Uninstallation of the Windows Client	
2.1 Operating Environment.	
2.1.1 Required Operating System	
2.1.2 Related Software	3
2.1.3 Excluded Software	
2.1.4 Required Patches.	4
2.1.5 Hardware Environment	
2.1.6 Disk Space Required for Installation	
2.1.7 Supported System Environment	
2.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers	(
2.2 Installation.	(
2.2.1 Pre-installation Tasks.	
2.2.2 Pre-installation Considerations.	
2.2.3 Installation in Interactive Mode	
2.2.4 Installation in Silent Mode	
2.3 Uninstallation.	
2.3.1 Uninstallation in Interactive Mode	1
2.3.2 Uninstallation in Silent Mode	
	1
Chapter 3 Installation and Uninstallation of the Linux Client	13
Chapter 3 Installation and Uninstallation of the Linux Client	13 13
Chapter 3 Installation and Uninstallation of the Linux Client	13
Chapter 3 Installation and Uninstallation of the Linux Client	13
Chapter 3 Installation and Uninstallation of the Linux Client	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment.  3.1.1 Required Operating System.  3.1.2 Related Software.  3.1.3 Excluded Software.  3.1.4 Required Patches.	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment.  3.1.1 Required Operating System.  3.1.2 Related Software.  3.1.3 Excluded Software.  3.1.4 Required Patches.  3.1.5 Hardware Environment.	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment.  3.1.1 Required Operating System.  3.1.2 Related Software.  3.1.3 Excluded Software.  3.1.4 Required Patches.	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment 3.1.1 Required Operating System 3.1.2 Related Software 3.1.3 Excluded Software 3.1.4 Required Patches 3.1.5 Hardware Environment 3.1.6 Disk Space Required for Installation.	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment.  3.1.1 Required Operating System.  3.1.2 Related Software.  3.1.3 Excluded Software.  3.1.4 Required Patches.  3.1.5 Hardware Environment.  3.1.6 Disk Space Required for Installation.  3.1.7 Supported System Environment.  3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers.	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment.  3.1.1 Required Operating System.  3.1.2 Related Software.  3.1.3 Excluded Software.  3.1.4 Required Patches.  3.1.5 Hardware Environment.  3.1.6 Disk Space Required for Installation.  3.1.7 Supported System Environment.  3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers.  3.2 Installation.	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment.  3.1.1 Required Operating System.  3.1.2 Related Software.  3.1.3 Excluded Software.  3.1.4 Required Patches.  3.1.5 Hardware Environment.  3.1.6 Disk Space Required for Installation.  3.1.7 Supported System Environment.  3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers.  3.2 Installation.  3.2.1 Pre-installation Tasks.	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment 3.1.1 Required Operating System 3.1.2 Related Software 3.1.3 Excluded Software 3.1.4 Required Patches 3.1.5 Hardware Environment 3.1.6 Disk Space Required for Installation 3.1.7 Supported System Environment 3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers. 3.2 Installation 3.2.1 Pre-installation Tasks 3.2.2 Installation in Interactive Mode	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment.  3.1.1 Required Operating System.  3.1.2 Related Software.  3.1.3 Excluded Software.  3.1.4 Required Patches.  3.1.5 Hardware Environment.  3.1.6 Disk Space Required for Installation.  3.1.7 Supported System Environment.  3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers.  3.2 Installation.  3.2.1 Pre-installation Tasks.  3.2.2 Installation in Interactive Mode.  3.2.3 Installation in Silent Mode.	
Chapter 3 Installation and Uninstallation of the Linux Client  3.1 Operating Environment  3.1.1 Required Operating System  3.1.2 Related Software  3.1.3 Excluded Software  3.1.4 Required Patches  3.1.5 Hardware Environment  3.1.6 Disk Space Required for Installation  3.1.7 Supported System Environment  3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers.  3.2 Installation  3.2.1 Pre-installation Tasks  3.2.2 Installation in Interactive Mode  3.3 Uninstallation  3.3 Uninstallation	
Chapter 3 Installation and Uninstallation of the Linux Client  3.1 Operating Environment  3.1.1 Required Operating System  3.1.2 Related Software  3.1.3 Excluded Software  3.1.4 Required Patches  3.1.5 Hardware Environment  3.1.6 Disk Space Required for Installation  3.1.7 Supported System Environment  3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers  3.2 Installation  3.2.1 Pre-installation Tasks  3.2.2 Installation in Interactive Mode  3.3.3 Uninstallation in Silent Mode  3.3.1 Uninstallation in Interactive Mode  3.3.2 Uninstallation in Interactive Mode  3.3.3 Uninstallation in Silent Mode	11 12 12 12 12 12 12 12 12 12 12 12 12 1
Chapter 3 Installation and Uninstallation of the Linux Client  3.1 Operating Environment 3.1.1 Required Operating System 3.1.2 Related Software 3.1.3 Excluded Software 3.1.4 Required Patches 3.1.5 Hardware Environment 3.1.6 Disk Space Required for Installation 3.1.7 Supported System Environment. 3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers. 3.2 Installation 3.2.1 Pre-installation Tasks 3.2.2 Installation in Interactive Mode 3.3.3 Uninstallation in Silent Mode 3.3.1 Uninstallation in Silent Mode 3.3.2 Uninstallation in Silent Mode 3.3.3 Uninstallation in Silent Mode 3.3.4 Uninstallation in Silent Mode Chapter 4 Setup	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment.  3.1.1 Required Operating System.  3.1.2 Related Software.  3.1.3 Excluded Software.  3.1.4 Required Patches.  3.1.5 Hardware Environment.  3.1.6 Disk Space Required for Installation.  3.1.7 Supported System Environment.  3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers.  3.2 Installation.  3.2.1 Pre-installation Tasks.  3.2.2 Installation in Interactive Mode.  3.3.3 Uninstallation in Silent Mode.  3.3 Uninstallation in Interactive Mode.  3.3.1 Uninstallation in Interactive Mode.  3.3.2 Uninstallation in Silent Mode.  Chapter 4 Setup.  4.1 Configuring Environment Variables.	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment  3.1.1 Required Operating System  3.1.2 Related Software  3.1.3 Excluded Software  3.1.4 Required Patches  3.1.5 Hardware Environment  3.1.6 Disk Space Required for Installation  3.1.7 Supported System Environment  3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers  3.2 Installation  3.2.1 Pre-installation Tasks  3.2.2 Installation in Interactive Mode  3.3 Uninstallation  3.3.1 Uninstallation  3.3.2 Uninstallation in Silent Mode  3.3.2 Uninstallation in Silent Mode  3.3.3 Uninstallation in Silent Mode  4.1 Configuring Environment Variables  4.1.1 Windows	13
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment.  3.1.1 Required Operating System.  3.1.2 Related Software.  3.1.3 Excluded Software.  3.1.4 Required Patches.  3.1.5 Hardware Environment.  3.1.6 Disk Space Required for Installation.  3.1.7 Supported System Environment.  3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers.  3.2 Installation.  3.2.1 Pre-installation Tasks.  3.2.2 Installation in Interactive Mode.  3.3.3 Uninstallation in Silent Mode.  3.3.1 Uninstallation in Silent Mode.  3.3.2 Uninstallation in Silent Mode.  3.3.3 Uninstallation in Silent Mode.  4.1 Configuring Environment Variables.  4.1.1 Windows.  4.1.2 Linux.	
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment.  3.1.1 Required Operating System.  3.1.2 Related Software.  3.1.3 Excluded Software.  3.1.4 Required Patches.  3.1.5 Hardware Environment.  3.1.6 Disk Space Required for Installation.  3.1.7 Supported System Environment.  3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers.  3.2 Installation.  3.2.1 Pre-installation Tasks.  3.2.2 Installation in Interactive Mode.  3.3.3 Uninstallation in Silent Mode.  3.3.1 Uninstallation in Silent Mode.  3.3.2 Uninstallation in Silent Mode.  3.3.1 Uninstallation in Silent Mode.  4.1 Configuring Environment Variables.  4.1.1 Windows.  4.1.2 Linux.  4.2 Setting Up and Removing OSS.	11 12 13 14 15 16 16 17 17 17 17 17 17 17 17 17 17 17 17 17
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment.  3.1.1 Required Operating System.  3.1.2 Related Software.  3.1.3 Excluded Software.  3.1.4 Required Patches.  3.1.5 Hardware Environment.  3.1.6 Disk Space Required for Installation.  3.1.7 Supported System Environment.  3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers.  3.2 Installation.  3.2.1 Pre-installation Tasks.  3.2.2 Installation in Interactive Mode.  3.2.3 Installation in Silent Mode.  3.3 Uninstallation.  3.3.1 Uninstallation in Silent Mode.  3.2.2 Uninstallation in Silent Mode.  4.1 Configuring Environment Variables.  4.1.1 Windows.  4.1.2 Linux.  4.2 Setting Up and Removing OSS.  4.2.1 pgBackRest.	11 11 12 12 12 12 12 12 12 12 12 12 12 1
Chapter 3 Installation and Uninstallation of the Linux Client.  3.1 Operating Environment.  3.1.1 Required Operating System.  3.1.2 Related Software.  3.1.3 Excluded Software.  3.1.4 Required Patches.  3.1.5 Hardware Environment.  3.1.6 Disk Space Required for Installation.  3.1.7 Supported System Environment.  3.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers.  3.2 Installation.  3.2.1 Pre-installation Tasks.  3.2.2 Installation in Interactive Mode.  3.3.3 Uninstallation in Silent Mode.  3.3.1 Uninstallation in Silent Mode.  3.3.2 Uninstallation in Silent Mode.  3.3.1 Uninstallation in Silent Mode.  4.1 Configuring Environment Variables.  4.1.1 Windows.  4.1.2 Linux.  4.2 Setting Up and Removing OSS.	13

4.2.1.3 Servers to which pgBackRest can Connect	25
4.2.2 ldap2pg	
4.2.2.1 Setting Up ldap2pg	26
4.2.2.2 Removing ldap2pg	
4.2.2.3 Using ldap2pg to Synchronize Database Roles	
4.2.2.4 Configuration with Confidentiality Management	27
4.2.2.5 Servers to which ldap2pg can Connect	32
Index	33

## 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	JDBC	ODBC	.NET Data Provider	C language (libpq)	Embedded SQL (ECPG) in C language	Embedded SQL (ECOBPG) in COBOL	Connection Manager	High-speed data load	pgAdmin	Pgpool-II	ldap2pg	pgBackRest
Windows	Y	Y	Y	Y	Y	Y	Y	Y	Y			
Linux	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y

Y: Supported

## 1.2 Installation Types

The following 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 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(R) 10 Home
- Windows(R) 10 Education
- Windows(R) 10 Pro
- Windows(R) 10 Enterprise
- Windows(R) 11 Home
- Windows(R) 11 Education
- Windows(R) 11 Pro
- Windows(R) 11 Enterprise
- Microsoft Windows Server 2016 Datacenter
- Microsoft Windows Server 2016 Standard
- Microsoft Windows Server 2016 Essentials
- Microsoft Windows Server 2019 Datacenter
- Microsoft Windows Server 2019 Standard
- Microsoft Windows Server 2019 Essentials
- Microsoft Windows Server 2022 Datacenter
- Microsoft Windows Server 2022 Standard
- Microsoft Windows Server 2022 Essentials

Note: If Windows is 32 bit, only the Windows client (32 bit) can be installed.



The following components of Windows Server(R) 2016, Windows Server(R) 2019 and Windows Server(R) 2022 are not supported:

- Server Core
- Nano Server
- Windows Server Container

#### 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	2015 2017 2019 2022
2	.NET	6.0 7.0 8.0
3	.NET Standard	2.0 2.1
4	C compiler (*1)	-
5	JDK or JRE	JDK 8 JRE 8 JDK 11 JRE 11 JDK 17 JRE 17
6	NetCOBOL NetCOBOL for .NET	(*2) (*3)

<sup>\*1:</sup> Only operations using the C compiler provided with the operating system are guaranteed.

- \*2: NetCOBOL is available in the following editions:
  - NetCOBOL Base Edition V10.5.0 or later
  - NetCOBOL Standard Edition V10.5.0 or later
  - NetCOBOL Professional Edition V10.5.0 or later
  - NetCOBOL Enterprise Edition V10.5.0 or later
- \*3: NetCOBOL for .NET is available in the following editions:
- NetCOBOL Standard Edition for .NET V5.0.0 or later
- NetCOBOL Professional Edition for .NET V5.0.0 or later
- NetCOBOL Enterprise Edition for .NET V5.0.0 or later



The following JDKs or JREs are available:

- JDK or JRE shipped with the Interstage Application Server
- JDK shipped with the Enterprise Application Platform
- Oracle JDK or JRE
- An OpenJDK that has passed the Java TCK (Technology Compatibility Kit)

It is recommended that the JDK or JRE included with Interstage Application Server and Enterprise Application Platform is used.

The following table lists servers that can be connected to the Windows client.

When connecting to a server product with a different version from this client function, only the range of functions provided by the server product version is available.

Table 2.2 Connectable servers

os	Software name
Windows	- Fujitsu Enterprise Postgres Advanced Edition 9.5 or later, up to 16
	- Fujitsu Enterprise Postgres Standard Edition 9.4 or later, up to 16
Linux	- Fujitsu Enterprise Postgres Advanced Edition 9.5 or later, up to 16
	- Fujitsu Enterprise Postgres Standard Edition 9.4 or later, up to 16
Solaris	- FUJITSU Software Enterprise Postgres Standard Edition 9.6

## 2.1.3 Excluded Software

Fujitsu Enterprise Postgres

The Windows client cannot coexist with the Fujitsu Enterprise Postgres Community Edition (hereafter, "CE") client.

Other products

There are no exclusive products.

# 2.1.4 Required Patches

No patches are required.

#### 2.1.5 Hardware Environment

The following hardware is required to use the Windows client.

Memory

At least 256 MB of memory is required.

Mandatory hardware

None.

# 2.1.6 Disk Space Required for Installation

The disk space shown below is required for new installation of the Windows client.

At the Windows (32-bit) client installation destination:

200 MB

At the Windows (64-bit) client installation destination:

1760 MB

Windows system drive:

300 MB

# 2.1.7 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.

#### File system

You can install Fujitsu Enterprise Postgres only if the system folder is an NTFS volume.

# 2.1.8 Versions of Open-Source Software Used as the Base for Fujitsu Enterprise Postgres Drivers

For the version of open-source software that Fujitsu Enterprise Postgres each driver is based on, refer to "OSS Supported by Fujitsu Enterprise Postgres" in the General Description.

# 2.2 Installation

This section explains how to install the Windows client.



When installing the Fujitsu Enterprise Postgres Client (32 bit) in a 64 bit environment, do not specify a destination folder under the environment ProgramFiles variable.

#### 2.2.1 Pre-installation Tasks

This section describes the operations to be performed before installing the Windows client.

#### 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(R) 10, or Windows(R) 11, assign write privileges in advance to the user responsible for editing the hosts file.

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

In Windows, click [All Programs] or [All apps], then [Fujitsu], and then [Uninstall (middleware)]. In the displayed window, check the installed products.

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:

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.

C:\Program Files (x86)\Fujitsu\UpdateAdvisor\UpdateAdvisorMW>uam remove -i update-number

#### **Confirm service**

The Windows Installer service must be running.

#### **Confirm Path system environment variable**

Ensure that the Path system environment variable includes "%SystemRoot%\system32".

## 2.2.2 Pre-installation Considerations

This section describes points that the user must take into account prior to installation.

- The remote desktop service is installed in application server mode, 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.

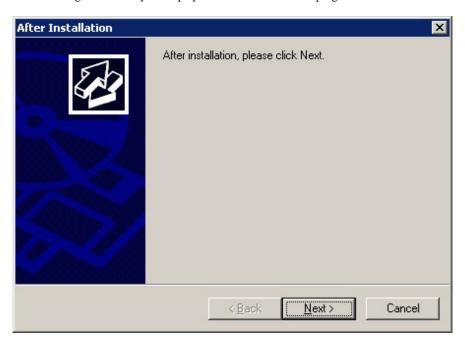
Before installation:

CHANGE USER /INSTALL

After installation:

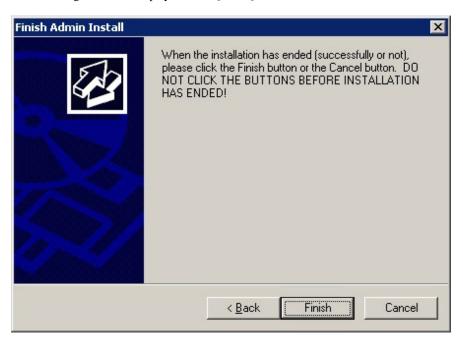
CHANGE USER /EXECUTE

- 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.



- If the [User Account Control] dialog box 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, the [Program Compatibility Assistant] dialog box 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.



For installation in interactive mode, default values are set for the installation information. The following settings can be changed for a new installation or a multi-version installation:

- Installation folder

#### 1. Stop applications and programs

If the installation method is the following, all applications and programs that use the product must be stopped:

- Reinstallation

Before starting the installation, stop the following:

- Applications that use the product
- Connection Manager
- pgAdmin

#### 2. Insert the DVD

Insert the client program DVD into 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 "6. Check the settings".



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.

Click [Next] to start the installation.

To modify the settings, select [Modify], and then click [Next]. Follow the on-screen instructions.

#### 6. Check the settings

The [Confirm installation] window will be displayed for reinstallation, or if the installation information is modified.

Click [Install] to start the installation.

To modify the settings again, click [Back].

#### 7. Completion of installation

The completion window is displayed. Click [Finish].

### 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



#### See

Refer to the Fujitsu Enterprise Postgres product website for information on installation in silent mode, such as the installation parameters and error messages.

The installation procedure is described below.

#### 1. Insert the DVD

Insert the client program DVD into 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
```



#### Information

The template for the installation parameters CSV file is "Z:\sample\sample\_windows.csv (Z is the drive into which the DVD is inserted.).

#### 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 into which the DVD is inserted.

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.

# 2.3 Uninstallation

This section describes the procedure for uninstalling the Windows client.



- 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.



If an error occurs while the product is being uninstalled, refer to "Uninstall (middleware) Messages" in the Fujitsu Enterprise Postgres product website, and take the required action.

#### 1. Stop applications and programs

Before starting the uninstallation, stop the following:

- Applications that use the product
- Connection Manager
- 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

The [Uninstall (middleware)] window is displayed. Click [Close].

#### 2.3.2 Uninstallation in Silent Mode

The uninstallation procedure is described below.



Refer to the Fujitsu Enterprise Postgres product website for information on uninstallation in silent mode, such as the error messages.

#### 1. Stop applications and programs

Before starting the uninstallation, stop the following:

- Applications that use the product
- Connection Manager
- 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:> installFolder\suninst.bat

X: Drive on which the product is installed

# 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:

- RHEL8.2 or later minor version
- RHEL9.2 or later minor version
- SLES 15 SP3 or later minor version



- The following packages are required for operations on RHEL8.

Package name	Remarks
bzip2-libs	Required when using pgBackRest.
glibc	-
glibc.i686	-
libnsl2	-
libgcc	-
libmemcached	Required when using Pgpool-II.
libstdc++	-
libtool-ltdl	-
libzstd	-
lz4-libs	Required when using pgBackRest.
ncurses-libs	-
nss-softokn-freebl	-
redhat-lsb	-
rsync	Required when using Pgpool-II.
sudo	-
unixODBC	Required when using ODBC drivers
unzip	-
xz-libs	-
zlib	-

- The following packages are required for operations on RHEL9.

Package name	Remarks
bzip2-libs	Required when using pgBackRest.

Package name	Remarks
glibc	-
glibc.i686	-
libnsl2	-
libgcc	-
libmemcached-awesome	Required if Pgpool-II is used.
libstdc++	-
libtool-ltdl	-
libzstd	-
lz4-libs	Required when using pgBackRest.
ncurses-libs	-
nss-softokn-freebl	-
rsync	Required if Pgpool-II is used.
sudo	-
unixODBC	Required if you are using an ODBC driver.
Unzip	-
xz-libs	-
zlib	-

- The following packages are required for operations on SLES 15.

Package name	Remarks
glibc	-
glibc-32bit	-
JRE 8	Required by installer The following JREs are available:  Oracle JRE Use update 31 or later of the 64-bit version.  OpenJDK Past the Java TCK (Technology Compatibility Kit)
libbz2-1	Required when using pgBackRest.
libfreebl3	-
libgcc	-
libltdl7	-
liblz4-1	Required when using pgBackRest.
liblzma5	-
libmemcached	Required when using Pgpool-II.
libncurses5	F
libstdc++	-
libz1	-
libzstd1	-
rsync	Required when using Pgpool-II.
sudo	-

Package name	Remarks
unixODBC	Required when using ODBC drivers
unzip	-

## 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	Version
1	.NET	6.0
		7.0
		8.0
2	.NET Standard	2.0
		2.1
3	C compiler (*1)	-
4	JDK or JRE	JDK 8
		JRE 8
		JDK 11
		JRE 11
		JDK 17
		JRE 17
5	NetCOBOL	(*2)

<sup>\*1:</sup> Only operations using the C compiler provided with the operating system are guaranteed.

- \*2: NetCOBOL is available in the following editions:
  - NetCOBOL Base Edition V12.2.0 or later
  - NetCOBOL Standard Edition V12.2.0 or later
  - NetCOBOL Enterprise Edition V12.2.0 or later



The following JDKs or JREs are available:

- JDK or JRE shipped with the Interstage Application Server
- JDK shipped with the Enterprise Application Platform
- Oracle JDK or JRE
- An OpenJDK that has passed the Java TCK (Technology Compatibility Kit)

It is recommended that the JDK or JRE included with Interstage Application Server and Enterprise Application Platform is used.

The following table lists servers that can be connected to the Linux client.

When connecting to a server product with a different version from this client function, only the range of functions provided by the server product version is available.

Table 3.2 Connectable servers

os	Software name
Windows	- Fujitsu Enterprise Postgres Advanced Edition 9.5 or later, up to 16
	- Fujitsu Enterprise Postgres Standard Edition 9.4 or later, up to 16
Linux	- Fujitsu Enterprise Postgres Advanced Edition 9.5 or later , up to 16
	- Fujitsu Enterprise Postgres Standard Edition 9.4 or later, up to 16
Solaris	- FUJITSU Software Enterprise Postgres Standard Edition 9.6

## 3.1.3 Excluded Software

Fujitsu Enterprise Postgres

The Linux client cannot coexist with the Fujitsu Enterprise Postgres Community Edition (hereafter, "CE") client.

Other products

There are no exclusive products.

# 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 160 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.

#### RHEL

Directory	Required disk space Unit: MB
/etc	1 + 1 (*1)
/var	1 + 2 (*1)
/opt	300 (*1)
Installation destination of the client (64-bit)	180
Installation destination of Pgpool-II	35
Installation destination of ldap2pg	30
Installation destination of pgBackRest	40

<sup>\*1:</sup> Uninstall (middleware) must be installed.

SLES

Directory	Required disk space Unit: MB
/etc	1 + 1 (*1)
/var	1 + 2 (*1)
/opt	300 (*1)
Installation destination of the client (64-bit)	180
Installation destination of Pgpool-II	35
Installation destination of ldap2pg	30
Installation destination of pgBackRest	40

<sup>\*1:</sup> 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

For the version of open-source software that Fujitsu Enterprise Postgres each driver is based on, refer to "OSS Supported by Fujitsu Enterprise Postgres" in the General Description.

## 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 "3.1.6 Disk Space Required for Installation" for information on disk space requirements.

If sufficient free disk space is unavailable, reconfigure disk partitions.

#### Set JAVA\_HOME (SLES only)

Ensure that JRE 8 is installed, and export the JAVA\_HOME environment variable.

#export JAVA\_HOME="Jre8InstallDir"

#### **Executable Users**

Installation and uninstallation is performed by superuser.

On the system, run the following command to become superuser.

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

#### 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 -c
Loading Uninstaller...

Currently installed products
1. productName
2. productName
Type [number] to select the software you want to uninstall.
[number,q]
=>q

Exiting Uninstaller.
```

If the Linux 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 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:

```
# /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.

```
# /opt/FJSVfupde/bin/uam remove -i update-number
```



If the installation directory/lib is set in the environment variable LD LIBRARY PATH for the running user, remove the installation directory/lib from LD\_LIBRARY\_PATH.

## 3.2.2 Installation in Interactive Mode

The installation procedure is described below.



The following characters can be used as input values:

Alphanumeric characters, hyphens, commas and forward slashes



For installation in interactive mode, default values are set for the installation information. The following settings can be changed for a new installation or a multi-version installation:

- Installation directory

#### 1. Stop applications and programs

If the installation method is the following, all applications and programs that use the product must be stopped:

- Reinstallation

Before starting the installation, stop the following:

- Applications that use the product
- Connection Manager
- pgBadger
- Pgpool-II
- ldap2pg
- pgBackRest

#### 2. Mount the DVD drive

Insert the client program DVD into the DVD drive, and then execute the following command:

#### Example

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

Here /dev/dvd is the device name for the DVD drive (which may vary depending on your environment), and /media/dvd is the mount point (which may need to be created 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. Run the installation

Execute the following command:

#### Example

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

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

#### 4. Select the product to install

The list of installation target products is displayed.

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



If the selected product has already been installed, a window for selecting reinstallation or multi-version installation is displayed for each product. Follow the on-screen instructions to select the installation method.

#### 5. Check the settings

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

Type "y" and press Enter to start the installation.

To change the settings, type "c" and press Enter, and follow the on-screen instructions. This option is not displayed if there is no information that can be modified.

#### 6. Check the changed settings

If the installation information has been modified, the new installation information is displayed.

Type "y" and press Enter to start the installation.

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

#### 7. Finish the installation

When the installation is complete, a message is displayed showing the status.

If installation was successful, the following message 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.

#### 3.2.3 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



See

Refer to the Fujitsu Enterprise Postgres product website for information on installation in silent mode, such as the installation parameters and error messages.

The installation procedure is described below.

#### 1. Mount the DVD drive

Insert the client program DVD into the DVD drive, and then execute the following command:

#### Example

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

Here /dev/dvd is the device name for the DVD drive (which may vary depending on your environment), and /media/dvd is the mount point (which may need to be created 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.

#### 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.

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



The templates for the installation parameters CSV file is "mountPoint/sample/sample\_linux.csv"

#### 3. 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.

# 3.3 Uninstallation

This section describes the procedure for uninstalling the Linux client.



- Before uninstalling the product, close the product program and all applications that are using it.
- On SLES, before uninstallation, ensure that JRE 8 is installed, and export the JAVA\_HOME environment variable.

.....

#export JAVA\_HOME="Jre8InstallDir"

# 3.3.1 Uninstallation in Interactive Mode

The uninstallation procedure is described below.



If an error occurs while the product is being uninstalled, refer to "Uninstall (middleware) Messages" in the Fujitsu Enterprise Postgres product website, and take the required action.

............

#### 1. Stop applications and programs

Before starting the uninstallation, stop the following:

- Applications that use the product
- Connection Manager
- pgBadger
- Pgpool-II
- ldap2pg
- pgBackRest

#### 2. Start the Uninstall (middleware)

Execute the following command:

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

#### 3. Select the product

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

#### 4. Start the uninstallation

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

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

#### 5. Finish the uninstallation

If uninstallation is successful, the message below is displayed.

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

# 3.3.2 Uninstallation in Silent Mode

The uninstallation procedure is described below.



Refer to the Fujitsu Enterprise Postgres product website for information on uninstallation in silent mode, such as the error messages.

.....

#### 1. Stop applications and programs

Before starting the uninstallation, stop the following:

- Applications that use the product
- Connection Manager
- pgBadger
- Pgpool-II
- ldap2pg
- pgBackRest

#### 2. Run the uninstallation

Execute the following command:

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

#### Example

# /opt/fsepv<x>client64/setup/suninst.sh

In the example above, /opt/fsepv<x>client64 is the installation directory, and "<x>" indicates the product version.

# /opt/fsepv<x>pgpool-II/setup/suninst.sh

In the example above, /opt/fsepv<*x*>pgpool-II/setup is the name of the installation directory in which the Pgpool-II is installed.

# /opt/fsepv<x>ldap2pg/setup/suninst.sh

In the example above, /opt/fsepv<x>ldap2pg/setup is the name of the installation directory in which the ldap2pg is installed.

# /opt/fsepv<x>pgbackrest/setup/suninst.sh

In the example above, /opt/fsepv<x>pgbackrest/setup is the name of the installation directory in which the pgBackRest is installed.

# **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

This example is specific to 32-bit Windows.

Note that "<x>" indicates the product version.

- > SET PATH=%ProgramFiles%\Fujitsu\fsepv<x>client32\bin;%PATH%
- > SET PGLOCALEDIR=%ProgramFiles%\Fujitsu\fsepv<x>client32\share\locale

# 4.1.2 Linux

PATH environment variable

Add "installationDirectory/bin".

MANPATH environment variable

Add "installationDirectory/share/man".

PGLOCALEDIR environment variable

Add "installationDirectory/share/locale".

Examples of environment variable configurations are shown below.

#### Example

Note that "<*x*>" indicates the product version.

- \$ PATH=/opt/fsepv<x>client64/bin:\$PATH ; export PATH
- \$ MANPATH=/opt/fsepv<x>client64/share/man:\$MANPATH ; export MANPATH
- PGLOCALEDIR=/opt/fsepv<x>client64/share/locale ; export PGLOCALEDIR

# 4.2 Setting Up and Removing OSS

This section explains how to set up OSS supported by Fujitsu Enterprise Postgres.

If you want to use OSS supported by Fujitsu Enterprise Postgres, follow the setup procedure.

If you decide not to use the OSS supported by Fujitsu Enterprise Postgres, follow the removing procedure.



In this section, the applicable database that enables the features of each OSS is described as "postgres".

Refer to "OSS Supported by Fujitsu Enterprise Postgres" in the General Description for information on OSS other than those described below.

# 4.2.1 pgBackRest

## 4.2.1.1 Setting Up pgBackRest

1. Install pgBackRest.

To use the pgbackrest command on the same host as the Fujitsu Enterprise Postgres server, install pgBackRest using the server program DVD. If you want to use the pgbackrest command on a different host than the Fujitsu Enterprise Postgres server, install pgBackRest using the client program DVD.

2. Set the environment variable PATH for pgBackRest.

The pgBackRest material is stored under /opt/fsepv<x>pgbackrest. Set the environment variable PATH to the storage location/bin of the pgBackRest material to be used.

\$ export PATH=/opt/fsepv<x>pgbackrest/bin:\$PATH

3. Perform pgBackRest setup.

Refer to "User Guides" in the pgBackRest website (https://pgbackrest.org/) for details.



- This feature is not available for instances created with WebAdmin. It is available only for operation using server commands.
- The pg\_rman, pgx\_dmpall, and pgx\_rcvall commands cannot be used when using pgBackRest because of conflicting shell commands to set archive\_command.

# 4.2.1.2 Removing pgBackRest

1. Sets parameters in the postgresql.conf file.

Reverses the information specified during setup

- 2. Restart Fujitsu Enterprise Postgres.
- 3. If it was set to perform periodic backups, unset it.

# 4.2.1.3 Servers to which pgBackRest can Connect

The following table lists server that pgBackRest can connected to.

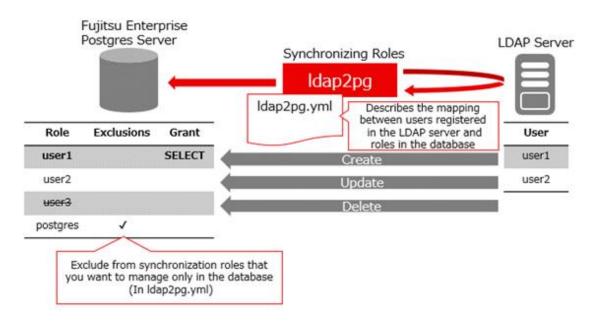
Table 4.1 Connectable server

os	Product name
Linux	- Fujitsu Enterprise Postgres Advanced Edition 16
	- Fujitsu Enterprise Postgres Standard Edition 16

# 4.2.2 Idap2pg

PostgreSQL supports LDAP authentication and can be used on both Linux and Windows. You can use an LDAP server to authenticate users, but you must first create a role for the database server.

ldap2pg allows users registered with the LDAP server to be synchronized with Fujitsu Enterprise Postgres roles, so that the above database server roles can be created automatically. This allows you to centrally manage roles on the LDAP server. Note that ldap2pg only supports Linux.



Users registered with the LDAP server and Fujitsu Enterprise Postgres roles are synchronized when the ldap2pg command is executed, based on the ldap2pg.yml that defines these mappings. If a role defined in ldap2pg.yml does not exist in Fujitsu Enterprise Postgres, it is created, and any roles not defined in ldap2pg.yml are removed. Roles that would be difficult to update or delete, such as database administrator roles that do not work with LDAP servers, can be excluded from synchronization by setting them to ldap2pg.yml.

The key points of operation are explained below.

#### **Timing of Synchronization**

Synchronize when the LDAP server user changes so that the database server is always up to date. Therefore, you must synchronize periodically to automatically propagate the LDAP server information, or manually propagate it as the LDAP server changes.

If you synchronize periodically, ensure that the synchronization interval is an acceptable time lag before LDAP server changes are propagated to the database server. This is because, even when fully synchronized, ldap2pg accesses the LDAP server and database to check for changes. For example, run the ldap2pg command periodically every 5 minutes or so.

If you use cron, for example, to run automatically on a regular basis, you should log the standard output and standard error output of ldap2pg using settings or redirects such as cron. You can check the log to see if ldap2pg was interrupted or if an unexpected role was removed.

If you want to synchronize immediately or if you want to control the synchronization timing yourself, synchronize manually.

#### **Enhanced Security in Combination with Confidentiality Management**

ldap2pg can also manage database privileges, but it cannot manage granular units such as tables and rowsets. Combined with the confidentiality management, which allows such configuration and allows auditing of privilege settings, it provides robust security measures.

## 4.2.2.1 Setting Up Idap2pg

- Install ldap2pg
   Install ldap2pg using the client program DVD.
- 2. Set the environment variable PATH for ldap2pg.

\$ export PATH=/opt/fsepv<x>ldap2pg/bin:\$PATH

- 3. Define a database role on the database server that has superuser privileges as the executor of ldap2pg. For more information about defining roles, refer to "CREATE ROLE" in "Reference" in the PostgreSQL Documentation for information on the CREATE ROLE.
- 4. Perform ldap2pg setup.
  - Refer to "Configuration" or "Cookbook" in the ldap2pg document (https://ldap2pg.readthedocs.io/en/latest/) for details.
- 5. Set roles that are defined and used only by the database, such as database administrators not managed by an LDAP server, or roles that exclude synchronization, as defined by Fujitsu Enterprise Postgres.
  Add the settings to roles\_blacklist\_query in the ldap2pg.yml file.

Fujitsu Enterprise Postgres-specific roles to add:

- pgx\_update\_profile\_status, and roles that inherit from pgx\_update\_profile\_status (Role for streaming replication of the Set Operational Policy by Profile feature)
- pgx\_cgroup\_role\_\* (Confidentiality role for the confidentiality management)

#### When the Database Server is redundant

In a database redundancy environment, specify "primary" for the target\_session\_attrs parameter. You can also specify "read-write".

# 4.2.2.2 Removing Idap2pg

- 1. .If you have set ldap2pg to run periodically, unset it.
- 2. Uninstall ldap2pg. Refer to "3.3 Uninstallation" for more information.
- 3. If you have defined a role on the database server specifically for running ldap2pg, remove that role.

# 4.2.2.3 Using Idap2pg to Synchronize Database Roles

Describes how to use ldap2pg to synchronize users of an LDAP server with a database server as database roles.

- Edit the ldap2pg.yml file, for example if you want to grant access to a role that synchronizes with an LDAP user. For information on ldap2pg.yml, refer to the following document: https://ldap2pg.readthedocs.io/en/latest/config/
- 2. Use environment variables to specify information about the connection destination to the LDAP server or database. https://ldap2pg.readthedocs.io/en/latest/cli/#environment-variables
  - The user who connects to the database server must be the user created during the setup procedure. Connections to LDAP servers support LDAP-initiated environment variables and ldaprc files, while database access supports PG-initiated environment variables available in libpq. These environment variables are used to configure the connection.
- 3. Run ldap2pg with the check option to verify that the role being modified matches the role being modified.
- 4. Run ldap2pg with the --real option to synchronize roles with the database server.
- 5. Configure LDAP server users and database roles to synchronize periodically after the initial synchronization. Prepare the script that sets the environment variables and the script that synchronizes the roles that you performed in steps 2 and 4, and register the script in the cron job so that the script that synchronizes the roles references the environment variables and synchronizes the roles.

#### [Configuration Examples for cron]

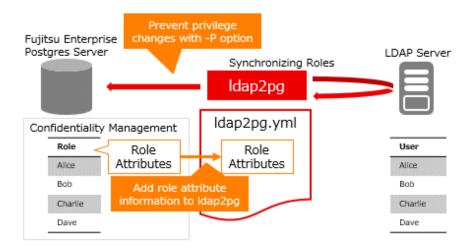
```
SHELL=/bin/bash
*/5 * * * source /home/postgres/env.sh && . /home/postgres/sample.sh >> /home/postgres/
sample.log 2>&1
```

# 4.2.2.4 Configuration with Confidentiality Management

The combination of ldap2pg and the confidentiality management provides detailed access control. To do this, role attributes and privileges are assigned to the confidentiality management.

Feature	Role Management Assignment
ldap2pg	Add, remove, and managing role membership
Confidentiality Management	Set role attributes, grant and revoke privileges, and audit them

In this case, since ldap2pg overrides the role attributes and parent-child relationships with the information in ldap2pg.yml, it sets the role attributes and privileges set for the confidentiality management so that they are not updated by the execution of ldap2pg.



- Add privilege information for confidentiality management roles to the ldap2pg configuration file (ldap2pg.ymml) so that the attributes and privileges of roles set for confidentiality management are not updated by running ldap2pg
- Run ldap2pg with the -P option to prevent privilege changes when ldap2pg is run

The following is the flow for configuring the confidentiality management and ldap2pg.

#### Introduction

Configure the necessary settings to run ldap2pg as described in the following procedure.

- 1. Design user-role mappings on the LDAP server to create a list of roles that should be managed by the confidentiality management.
- 2. To create an yml file:
  - a. Specify the settings for retrieving and synchronizing the listed objects from the LDAP server.
  - b. Write a confidentiality management role starting with pgx\_cgroup\_role\_ in roles\_blacklist\_query.
  - c. Ensure that the grant and revoke privileges settings are not listed in the yml file.
- 3. Stop synchronization if it is already running using ldap2pg.
- 4. Create a role as described in "4.2.2.3 Using ldap2pg to Synchronize Database Roles".
- 5. Refer to "Confidentiality Management" in the "Security Operations Guide" and perform all necessary tasks. Register all roles in the list of roles with the confidentiality management.
- 6. Modify the yml file so that ldap2pg does not interfere with the operation of the confidentiality management. Refer to "Settings When You Change the Attributes or Privileges of a role in a Confidentiality Groups" for a sample script that prints an yml file.
- 7. If you have already done regular synchronization using ldap2pg, try again.

#### Operation

Use the following procedure to manipulate roles according to your situation.

Adding an Idap2pg Role to a Confidentiality Groups

- 1. Creates a confidentiality management confidentiality groups.
- 2. Run ldap2pg with the -P option to create the LDAP server user as a database role.
- 3. Add the role you added above to the confidentiality groups.
- 4. Reflect the confidentiality management configuration in ldap2pg.yml, referring to the "Example of Applying Role Attributes".

#### Example of Applying Role Attributes

Use the following example to execute SQL and retrieve the settings for each role:
 For all roles, this example retrieves the LOGIN attribute, the role attributes of the confidentiality management,
 and the membership of the confidentiality management role. If you want to change the settings to suit your
 environment, rewrite the SQL, such as modifying the 'LOGIN' part of the SQL Execution Example, or modify
 the Example of Run Results directly.

#### [SQL Execution Example]

```
SELECT '- name: ' ||pgxgr.name || chr(10) || ' options: ' || pgxgr.opt ||
chr(10) || ' parent: ' || chr(10) || '
FROM (SELECT pgxg.cgrorolename,
       concat_ws('',
       'LOGIN',
       CASE pgxg.cgrosuperuser WHEN true THEN 'SUPERUSER' END,
       CASE pgxg.cgrocreatedb WHEN true THEN 'CREATEDB' END,
       CASE pgxg.cgrocreaterole WHEN true THEN 'CREATEROLE' END,
       CASE pgxg.cgroreplication WHEN true THEN 'REPLICATION' END,
       CASE pgxg.cgrobypassrls WHEN true THEN 'BYPASSRLS' END) AS opt,
       pgxroles.name
     FROM pgx_confidential_group pgxg,
     (SELECT pgxr.crolmatid as matid, pgxr.crolgroid as groid, pgxr.crolname
AS name FROM pgx_confidential_role pgxr ) as pgxroles
     WHERE pgxg.cgromatid = pgxroles.matid and pgxg.cgroid = pgxroles.groid)
paxar
GROUP BY pgxgr.name, pgxgr.opt;
```

#### [Example of Run Results]

```
- name: alice
   options: LOGIN CREATEDB
  parent:
   - pgx_cgroup_role_000000000000000001
- name: bob
  options: LOGIN CREATEDB
  parent:
   -pgx_cgroup_role_000000000000000001
- name: charlie
  options: LOGIN CREATEDB CREATEROLE
  parent:
   - pgx_cgroup_role_0000000000000000002
- name: dave
  options: LOGIN CREATEDB CREATEROLE
  parent:
```

2. Put the setting of roles at the top of the rules in ldap2pg.yml based on the information in the above settings. If it is not at the top, the configuration information that synchronizes with the LDAP server takes effect, and the confidentiality management configuration does not take effect.

#### Settings When You Change the Attributes or Privileges of a role in a Confidentiality Groups

- 1. Confidentiality management modifies role attributes and privileges information.
- 2. Create a script to retrieve the confidentiality management configuration information and register it in a cron job so that the changed information is automatically reflected in the yml file.

The following is an example shell script:. Please change the settings to suit your environment.

The shell script shown here consists of two configuration files, ldap2pg\_pre.yml and ldap2pg\_after.yml, and the confidentiality management configuration information (In the sample, it is output to confidential\_roles.yml) that is reflected in yml. Combine these three files to create the ldap2pg.yml file.

ldap2pg\_pre.yml is the information to be placed before the confidentiality management configuration information in ldap2pg.yml, and contains the postgres section and up to "roles:" in the rules section. ldap2pg\_after.yml is information to be placed after the confidentiality management configuration information in ldap2pg.yml, and contains information about roles not managed by the confidentiality management.

[Example of Shell Script]

#### ldap2pg\_pre.yml: Provides information about the postgres section

#### ldap2pg\_after.yml: Provides information about roles that are not part of the confidentiality groups

```
- names:
    - readers
    options: NOLOGIN
- name: writers
    # Grant reading to writers
    parent: [readers]
    options: NOLOGIN
(Omitted)
```

# sample.sh: A script that outputs information about confidentiality groups to confidential\_roles.yml and combines them into a single yml file

```
#!/bin/bash

psql -h localhost -p 27500 -d postgres -U postgres -A -t <<EOF > /home/postgres/
confidential_roles.yml

SELECT ' - name: ' ||pgxgr.name || chr(10) || ' options: ' || pgxgr.opt ||
chr(10) || ' parent: ' || chr(10) || ' - ' || string_agg(pgxgr.cgrorolename,
chr(10) || ' - ')
```

```
FROM (SELECT pgxg.cgrorolename,
       concat_ws('',
        'LOGIN',
       CASE pgxg.cgrosuperuser WHEN true THEN 'SUPERUSER' END,
       CASE pgxg.cgrocreatedb WHEN true THEN 'CREATEDB' END,
       CASE pgxg.cgrocreaterole WHEN true THEN 'CREATEROLE' END,
       CASE pgxg.cgroreplication WHEN true THEN 'REPLICATION' END,
       CASE pgxg.cgrobypassrls WHEN true THEN 'BYPASSRLS' END) AS opt,
       pgxroles.name
      FROM pgx_confidential_group pgxg,
      (SELECT pgxr.crolmatid as matid, pgxr.crolgroid as groid, pgxr.crolname AS
name FROM
pgx_confidential_role pgxr ) as pgxroles
     WHERE pgxg.cgromatid = pgxroles.matid and pgxg.cgroid = pgxroles.groid) pgxgr
GROUP BY pgxgr.name, pgxgr.opt;
EOF
cat /home/postgres/ldap2pg_pre.yml /home/postgres/confidential_roles.yml /home/
postgres/ldap2pg_after.yml > /home/postgres/ldap2pg.yml
    ldap2pg -P -c ldap2pg.yml to update retrieved role information
```



If you want to manually apply the attribute or privilege information of a role that has been changed in confidentiality management to ldap2pg.yml, obtain the change information and apply it to ldap2pg.yml, referring to "Example of Applying Role Attributes".

#### Adding Roles Created with Idap2pg to a Confidentiality Groups

- 1. Create a role to add to the confidentiality groups in ldap2pg.
- 2. Add the database role you created in step 1 to the existing confidentiality groups.
- 3. Reflect the newly added role's confidentiality management settings in ldap2pg.yml, as shown in "Example of Applying Role Attributes".



If cron automatically reflects changes to the confidentiality groups in ldap2pg.yml, stop cron and add the newly added database role to the confidentiality groups.

#### Removing Roles Added in Idap2pg from a Confidentiality Groups

- 1. Remove the role you want to remove from the confidentiality groups.
- 2. Reflect changes to confidentiality management in ldap2pg.yml, referring to "Example of Applying Role Attributes".
- 3. Execute ldap2pg with the -P option to reflect.



If you deleted the confidentiality matrix and the confidentiality groups, perform steps 2 and 3 above.

# See See

- If you accidentally delete a role managed by confidentiality management using the ldap2pg, refer to "How to Check Confidentiality Objects and Roles" in the Security Operation Guide to recover the role managed by confidentiality management.
- If you accidentally delete the confidentiality role in ldap2pg, refer to "Creating a Confidentiality Management Role" in the Security Operations Guide to recover.

# 4.2.2.5 Servers to which Idap2pg can Connect

The following table lists server that ldap2pg can connected to.

Table 4.2 Connectable server

os	Product name
Linux	- Fujitsu Enterprise Postgres Advanced Edition 16
	- Fujitsu Enterprise Postgres Standard Edition 16

# <u>Index</u>

[C]
Check the disk capacity
Configuring Environment Variables
Confirm service
Connectable servers
[D]
Disk Space Required for Installation5,16
2 is space required for instantation in the space of the
[E]
Excluded Software5,16
ובו
[F] Features that can be Installed1
File system
The system
[H]
Hardware Environment5,16
hosts file settings
ru.
Installation
Installation and Uninstallation of the Linux Client
Installation and Uninstallation of the Windows Client
Installation in Silent Mode
Installation Procedure
Installation Types
Installation Types
[M]
[M] MANPATH environment variable24
• •
MANPATH environment variable
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]       1         New Installation.       1         [O]       Operating Environment.       3,13
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]       1         New Installation.       1         [O]       Operating Environment.       3,13         [P]
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]       New Installation.       1         [O]       Operating Environment.       3,13         [P]       PATH environment variable.       24
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]          New Installation.          [O]          Operating Environment.       3,13         [P]         PATH environment variable.          PGLOCALEDIR environment variable.          24          PGLOCALEDIR environment variable.
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]          New Installation.          [O]          Operating Environment.       3,13         [P]          PATH environment variable.          PGLOCALEDIR environment variable.          Pre-installation Considerations.
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]          New Installation.          [O]          Operating Environment.       3,13         [P]         PATH environment variable.          PGLOCALEDIR environment variable.          24          PGLOCALEDIR environment variable.
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]          New Installation.          [O]          Operating Environment.       3,13         [P]          PATH environment variable.          PGLOCALEDIR environment variable.          Pre-installation Considerations.
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]       Image: New Installation.       1         [O]       Operating Environment.       3,13         [P]       PATH environment variable.       24         PGLOCALEDIR environment variable.       24         Pre-installation Considerations.       7         Pre-installation Tasks.       17
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]       Image: I
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]       Image: I
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]       Image: I
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]       IN         New Installation.       1         [O]       Operating Environment.       3,13         [P]       PATH environment variable.       24         PGLOCALEDIR environment variable.       24         Pre-installation Considerations.       7         Pre-installation Tasks.       17         [R]       Reinstallation.       1         Related Software.       3,15         Required Operating System.       3,13         Required Patches.       5,16
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]       IN         New Installation.       1         [O]       Operating Environment.       3,13         [P]       PATH environment variable.       24         PGLOCALEDIR environment variable.       24         Pre-installation Considerations.       7         Pre-installation Tasks.       17         [R]       Reinstallation.       1         Related Software.       3,15         Required Operating System.       3,13         Required Patches.       5,16
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]       IN         New Installation.       1         [O]       Operating Environment.       3,13         [P]       PATH environment variable.       24         PGLOCALEDIR environment variable.       24         Pre-installation Considerations.       7         Pre-installation Tasks.       17         [R]       Reinstallation.       1         Related Software.       3,15         Required Operating System.       3,13         Required Patches.       5,16         [S]       Setup.
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]       IN         New Installation.       1         [O]       Operating Environment.       3,13         [P]       PATH environment variable.       24         PGLOCALEDIR environment variable.       24         Pre-installation Considerations.       7         Pre-installation Tasks.       17         [R]       Reinstallation.       1         Related Software.       3,15         Required Operating System.       3,13         Required Patches.       5,16
MANPATH environment variable.       24         Multi-Version Installation.       1         [N]       IN         New Installation.       1         [O]       Operating Environment.       3,13         [P]       PATH environment variable.       24         PGLOCALEDIR environment variable.       24         Pre-installation Considerations.       7         Pre-installation Tasks.       17         [R]       Reinstallation.       1         Related Software.       3,15         Required Operating System.       3,13         Required Patches.       5,16         [S]       Setup.

[U]	
Uninstallation	2,11,2
Uninstallation in Interactive Mode	2
Uninstallation in Silent Mode	11,2



# **Fujitsu Enterprise Postgres 16**

# Installation and Setup Guide for Server Assistant

Windows/Linux

J2UL-2951-01ENZ0(00) July 2024

# **Preface**

#### Purpose of this document

This document describes how to install and uninstall the Fujitsu Enterprise Postgres Server Assistant.

#### 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
- \_
  - SQL
  - Windows

- PostgreSQL

#### 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 Linux Server Assistant

Describes how to install and uninstall the Linux Server Assistant

Chapter 3 Installation and Uninstallation of the Windows Server Assistant

Describes how to install and uninstall the Windows Server Assistant

Chapter 4 Setup of the Server Assistant

Describes the setup to be performed after installation

Appendix A Estimating Memory Requirements

Describes the formulas for estimating memory requirements

Appendix B Procedure when Modifying the JRE Installation

Describes the procedure to follow when modifying the JRE installation.

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# **Contents**

Index	21
Appendix B Procedure when Modifying the JRE Installation	24
A.1 Server Assistant Memory Requirements	
Appendix A Estimating Memory Requirements	
Chapter 4 Setup of the Server Assistant	22
3.3.2 Uninstallation in Silent Mode	
3.3.1 Uninstallation in Interactive Mode	
3.3 Uninstallation	
3.2.3 Installation in Silent Mode	
3.2.2 Installation in Interactive Mode	
3.2.1 Pre-installation Tasks.	
3.2 Installation.	
3.1.7 Supported System Environment	
3.1.5 Disk Space Required for Installation	
3.1.4 Required Patches	
3.1.3 Excluded Software	
3.1.2 Related Software.	
3.1.1 Required Operating System	
3.1 Operating Environment	
Chapter 3 Installation and Uninstallation of the Windows Server Assistant	
2.3.2 Uninstallation in Silent Mode.	
2.3.1 Uninstallation in Interactive Mode	
2.3 Uninstallation.	
2.2.2 Installation in Silent Mode	
2.2.1 Pre-installation Tasks	
2.2 Installation.	
2.1.7 Supported System Environment	
2.1.6 Disk Space Required for Installation.	
2.1.5 Hardware Environment.	
2.1.4 Required Patches	
2.1.3 Excluded Software.	
2.1.2 Related Software	
2.1.1 Required Operating System	
2.1 Operating Environment	
Chapter 2 Installation and Uninstallation of the Linux Server Assistant	
1.4 Uninstallation	
1.3.2 Installation in Silent Mode	
1.3.1 Installation in Interactive Mode	
1.3 Installation Procedure.	
1.2.3 Multi-Version Installation.	
1.2.2 Reinstallation	
1.2.1 New Installation.	
1.2 Installation Types	
1.1 Features that can be Installed	
Chapter 1 Overview of Installation	

# Chapter 1 Overview of Installation

This chapter provides an overview of Fujitsu Enterprise Postgres Server Assistant installation and uninstallation.

## 1.1 Features that can be Installed

The Server Assistant is provided as a Server Assistant package, which is installed on a different server (referred to as the arbitration server) to that of the database server.

The following table shows the relationship between the platforms and the features provided by the Server Assistant package.

Platform	Server Assistant
Linux	Y
Windows	Y

Y: Can be installed

# 1.2 Installation Types

The following 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 Server Assistant 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 Multi-Version Installation

Fujitsu Enterprise Postgres products can be installed on the same server if the product version (indicated by "x" in "x SPz") is different from that of any version of the product that is already installed.

### 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 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 Server Assistant.

# Chapter 2 Installation and Uninstallation of the Linux Server Assistant

This chapter explains how to install and uninstall the Linux Server Assistant.

# 2.1 Operating Environment

This section describes the operating environment required in order to use the Linux Server Assistant.

# 2.1.1 Required Operating System

One of the following operating systems is required in order to use the Linux Server Assistant:

- RHEL8.2 or later minor version
- RHEL9.2 or later minor version
- SLES 15 SP3 or later minor version



- The following packages are required for operations on RHEL8.

Package name	Remarks
gdb	Required to run FJQSS.
glibc	-
glibc.i686	-
iputils	Required for Mirroring Controller.
libgcc	-
libstdc++	-
ncurses-libs	-
nss-softokn-freebl	-
redhat-lsb	-
rsync	Required when using Pgpool-II.
sudo	-
sysstat	Required when using FJQSS. Set up the sar command after installation.
unzip	-
xz-libs	-
zlib	-

- The following packages are required for operations on RHEL9.

Package name	Remarks
gdb	Required to run FJQSS.
glibc	-
glibc.i686	-
iputils	Required when using Mirroring Controller.

Package name	Remarks	
libgcc	-	
libstdc++	-	
ncurses-libs	-	
nss-softokn-freebl	-	
rsync	Required to use Pgpool-II.	
sudo	-	
sysstat	Required if using FJQSS.	
unzip	-	
xz-libs	-	
zlib	-	

- The following packages are required for operations on SLES 15.

Package name	Remarks		
gdb	-		
glibc	-		
glibc-32bit	-		
iputils	Required for Mirroring Controller.		
	Required when using the installer or Server Assistant. The following JREs are available:		
JRE 8	- Oracle JRE		
	Use update 31 or later of the 64-bit version.		
	- OpenJDK Past the Java TCK (Technology Compatibility Kit)		
libfreebl3	-		
libgcc	-		
libltdl7	-		
liblzma5	-		
libncurses5	-		
libstdc++	-		
libz1	-		
rsync	Required when using Pgpool-II.		
sudo	-		
sysstat	Set up the sar command after installation.		
unzip	-		

# 2.1.2 Related Software

No other software is required in order to use Fujitsu Enterprise Postgres.

The following table lists servers that can be connected to the Linux Server Assistant.

Table 2.1 Connectable servers

os	Software name		
Linux	Fujitsu Enterprise Postgres Advanced Edition 16		
Windows Fujitsu Enterprise Postgres Advanced Edition 16			

#### 2.1.3 Excluded Software

There is no excluded software.

# 2.1.4 Required Patches

There are no required patches.

#### 2.1.5 Hardware Environment

The following hardware is required in order to use the Linux Server Assistant:

Memory

At least 150 MB of memory is required.

Mandatory hardware

None.

# 2.1.6 Disk Space Required for Installation

The following table lists the disk space requirements of the corresponding directories for new installation of the Linux Server Assistant. If necessary, increase the size of the file system.

Disk space required for installation

Table 2.2 RHEL

Directory	Required disk space Unit: MB
/etc	1 + 1 (*1)
/var	1 + 2 (*1) +1 (*2)
/opt	300 (*1) +1 (*2)
serverAssistantInstallDir	410

<sup>\*1:</sup> Uninstall (middleware) must be installed.

Table 2.3 SLES

Directory	Required disk space Unit: MB
/etc	1 + 1 (*1)
/var	1 + 2 (*1) +1 (*2)
/opt	300 (*1) +1 (*2)
serverAssistantInstallDir	10

<sup>\*1:</sup> Uninstall (middleware) must be installed.

<sup>\*2:</sup> Required for the installation of FJQSS.

<sup>\*2:</sup> Required for the installation of FJQSS.

# 2.1.7 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.

#### 2.2 Installation

This section describes how to install the Linux Server Assistant.

#### 2.2.1 Pre-installation Tasks

Check the following system environment before installing the Linux Server Assistant.

#### Check the disk space

Ensure that there is sufficient disk space to install the Linux Server Assistant.

Refer to "2.1.6 Disk Space Required for Installation" for information on disk space requirements.

If sufficient free disk space is unavailable, reconfigure disk partitions.

#### Set JAVA\_HOME (SLES only)

Ensure that JRE 8 is installed, and export the JAVA\_HOME environment variable.

```
#export JAVA_HOME="Jre8InstallDir"
```

Refer to "Appendix B Procedure when Modifying the JRE Installation" for information on modifying JRE after installation.

#### **Executable Users**

Installation and uninstallation is performed by superuser.

On the system, run the following command to become superuser.

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

#### 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 -c
Loading Uninstaller...

Currently installed products
1. productName

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

Exiting Uninstaller.

If the Linux Server Assistant is already installed, determine the installation method to use:

- Reinstallation
- Multi-version installation

#### Remove applied updates

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



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 reinstallation after removing the update.

#### 1. Display the applied updates

Execute the following command to display the applied updates:

# /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.

# /opt/FJSVfupde/bin/uam remove -i update-number



If the installation directory/lib is set in the environment variable LD\_LIBRARY\_PATH for the running user, remove the installation directory/lib from LD\_LIBRARY\_PATH.

.....

#### 2.2.2 Installation in Interactive Mode

The installation procedure is described below.



The following characters can be used as input values:

Alphanumeric characters, hyphens and forward slashes



In interactive mode installation, the default values of the installation information are set. The following setting can be changed for a new installation or a multi-version installation.

- Installation directory

#### 1. Stop the program

If the installation method is the following, the program must be stopped:

- Reinstallation

Before starting the installation, stop the following:

- Mirroring Controller arbitration process

Execute the mc\_arb command in stop mode to stop the Mirroring Controller arbitration process.

Example

\$ mc\_arb stop -M /mcarb\_dir/arbiter1

#### 2. Mount the DVD drive

Insert the Server Assistant program DVD into the DVD drive, and then execute the following command:

Example

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

Here /dev/dvd is the device name for the DVD drive (which may vary depending on your environment), and /media/dvd is the mount point (which may need to be created 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. Run the installation

Execute the following command:

Example

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

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

#### 4. Select the product to install

The list of installation target products is displayed.

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



If the selected product has been installed, a window for selecting reinstallation or multi-version installation is displayed for each product. Follow the on-screen instructions to select the installation method.

#### 5. Check the settings

The window for checking the installation information is displayed.

Type "y" and press Enter to start the installation.

To change the settings, type "c", press Enter, and follow the on-screen instructions. This option is not displayed if there is no information that can be modified.

#### 6. Check the changed settings

If the settings have been changed, the new installation information is displayed.

Type "y" and press Enter to start the installation.

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

#### 7. Finish the installation

When the installation is complete, a message is displayed showing the status.

If installation was successful, the following message 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.

#### 2.2.3 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



See

Refer to the Fujitsu Enterprise Postgres product website for information on installation in silent mode, such as the installation parameters and error messages.

The installation procedure is described below.

#### 1. Mount the DVD drive

Insert the Server Assistant program DVD into the DVD drive, and then execute the following command:

#### Example

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

Here /dev/dvd is the device name for the DVD drive (which may vary depending on your environment), and /media/dvd is the mount point (which may need to be created 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.

#### 2. Create an installation parameters CSV file

Create an installation parameters CSV file that uses the following specification format.

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



The templates for the installation parameters CSV file is "mountPoint/sample/sample.csv"

#### 3. 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.

# 2.3 Uninstallation

This section describes how to uninstall the Linux Server Assistant.



Before uninstalling the product, close the product program.

## 2.3.1 Uninstallation in Interactive Mode

The uninstallation procedure is described below.



Information

If an error occurs while the product is being uninstalled, refer to "Uninstall (middleware) Messages" in the Fujitsu Enterprise Postgres product website, and take the required action.

#### 1. Stop the program

Before starting the uninstallation, stop the following:

- Mirroring Controller arbitration process

Execute the mc\_arb command in stop mode to stop the Mirroring Controller arbitration process.

Example

\$ mc\_arb stop -M /mcarb\_dir/arbiter1

#### 2. Start Uninstall (middleware)

Execute the following command:

# /opt/FJSVcir/cimanager.sh -c

#### 3. Select the product

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

#### 4. Start the uninstallation

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

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

#### 5. Finish the uninstallation

If uninstallation is successful, the message below is displayed.

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

#### 2.3.2 Uninstallation in Silent Mode

The uninstallation procedure is described below.



See

Refer to the Fujitsu Enterprise Postgres product website for information on uninstallation in silent mode, such as the error messages.

#### 1. Stop the program

Before starting the uninstallation, stop the following:

- Mirroring Controller arbitration process

Execute the mc\_arb command in stop mode to stop the Mirroring Controller arbitration process.

Example

```
$ mc_arb stop -M /mcarb_dir/arbiter1
```

#### 2. Run the uninstallation

Execute the following command:

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

Example

```
# /opt/fsepv<x>assistant/setup/suninst.sh
```

In the example above, /opt/fsepv<x>assistant is the installation directory, and "<x>" indicates the product version.

# Chapter 3 Installation and Uninstallation of the Windows Server Assistant

This chapter explains how to install and uninstall the Windows Server Assistant.

# 3.1 Operating Environment

This section describes the operating environment required in order to use the Windows Server Assistant.

# 3.1.1 Required Operating System

One of the following operating systems is required in order to use the Windows Server Assistant:

- Microsoft(R) Windows Server(R) 2016 Datacenter
- Microsoft(R) Windows Server(R) 2016 Standard
- Microsoft(R) Windows Server(R) 2016 Essentials
- Microsoft(R) Windows Server(R) 2019 Datacenter
- Microsoft(R) Windows Server(R) 2019 Standard
- Microsoft(R) Windows Server(R) 2019 Essentials
- Microsoft(R) Windows Server(R) 2022 Datacenter
- Microsoft(R) Windows Server(R) 2022 Standard
- Microsoft(R) Windows Server(R) 2022 Essentials



- The following features of Windows Server(R) 2016, Windows Server(R) 2019 and Windows Server(R) 2022 are not supported:

- Server Core
- Nano Server
- Windows Server Container
- The TCP/IP protocol must be installed.

#### 3.1.2 Related Software

There is no software related to Fujitsu Enterprise Postgres.



- The following programs are installed during installation of Fujitsu Enterprise Postgres:
  - Microsoft Visual C++ 2015-2019 Redistributable version 14.24.28127.4

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 Windows Server Assistant.

Table 3.1 Connectable servers

os	Software name		
Linux	Fujitsu Enterprise Postgres Advanced Edition 16		
Windows Fujitsu Enterprise Postgres Advanced Edition 16			

#### 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 in order to use the Windows Server Assistant:

Memory

At least 256 MB of memory is required.

Mandatory hardware

None.

# 3.1.6 Disk Space Required for Installation

The disk space shown below is required for new installation of the Windows Server Assistant.

Windows Server Assistant installation destination:

440 MB

Windows system drive:

330 MB

# 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.

#### File system

You can install Fujitsu Enterprise Postgres only if the system folder is an NTFS volume.

#### 3.2 Installation

This section describes how to install the Windows Server Assistant.



- 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.
- If antivirus software is installed, the system may crash, fail to start, or stop responding during installation or when starting after installation. Set the scan exclusions so that the installation directory and the resource allocation directory are not scanned for viruses.
- The remote desktop service is installed in application server mode, 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.

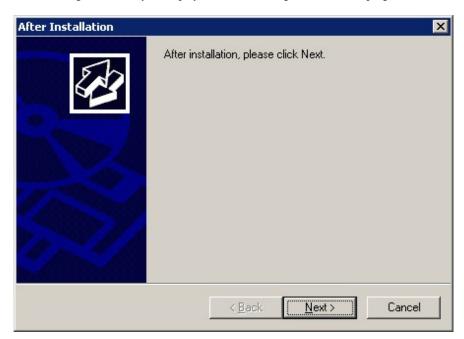
[Before the installation]

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].





- If a [User Account Control] dialog box 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, the [Program Compatibility Assistant] dialog box may be displayed. Click [This program installed correctly] and continue operation.

#### 3.2.1 Pre-installation Tasks

This section describes the tasks to be performed before installing the Windows Server Assistant.

#### Check the disk space

Ensure that there is sufficient disk space to install the Windows Server Assistant.

Refer to "3.1.6 Disk Space Required for Installation" for information on disk space requirements.

#### hosts file settings

Using an editor, add the IP address and name of the server to be connected to the \System32\drivers\etc\hosts file in the folder where Windows is installed.

#### 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 Server Assistant 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 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:

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.

C:\>uam remove -i update-number

#### 3.2.2 Installation in Interactive Mode

The installation procedure is described below.



In interactive mode installation, the default values of the installation information are set. The following setting can be changed for a new installation or a multi-version installation.

- Installation folder

#### 1. Stop the program

If the installation method is the following, the program must be stopped:

- Reinstallation

Before starting the installation, stop the following:

- Mirroring Controller arbitration process

 $Execute \ the \ mc\_arb \ command \ in \ stop \ mode \ to \ stop \ the \ Mirroring \ Controller \ arbitration \ process.$ 

Example

> mc\_arb stop -M D:\mcarb\_dir\arbiter1

#### 2. Insert the DVD

Insert the Server Assistant program DVD into the DVD drive.

#### 3. Run the installation

The installation menu is displayed. Click [Installation].

#### 4. Select the product to install

The [Installation product] window is displayed.

Select the product to install, and then click [Next].

If a selected product can only be reinstalled, refer to "6. Check the settings".



If the selected product has been installed, a window for selecting reinstallation or multi-version installation is displayed for each product. Follow the on-screen instructions to select the installation method.

#### 5. Confirm the contents for installation

The [Confirm installation] window will be displayed.

Click [Next] to start the installation.

To modify the settings, select [Modify], and then click [Next]. Follow the on-screen instructions.

#### 6. Check the settings

The [Confirm installation] window will be displayed. Click [Install] to start the installation.

To modify the settings again, click [Back].

#### 7. Completion of installation

The completion window is displayed. Click [Finish].

## 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.



#### See

Refer to the Fujitsu Enterprise Postgres product website for information on installation in silent mode, such as the installation parameters and error messages.

#### 1. Insert the DVD

Insert the Server Assistant program DVD into the DVD drive.

The [Install Menu] window is displayed. Click [Finish].

#### 2. Create an installation parameters CSV file

Create an installation parameters CSV file that uses the following specification format.

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



The template for the installation parameters CSV file is "Z:\sample\sample.csv (Z is the drive into which the DVD is inserted.).

#### 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 into which the DVD is inserted.

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.

#### 3.3 Uninstallation

This section describes how to uninstall the Windows Server Assistant.



- Before uninstalling the product, close the product program.
- 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.



- 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.

#### 3.3.1 Uninstallation in Interactive Mode

The uninstallation procedure is described below.



If an error occurs while the product is being uninstalled, refer to "Uninstall (middleware) Messages" in the Fujitsu Enterprise Postgres product website, and take the required action.

#### 1. Stop the program

Before starting the uninstallation, stop the following:

Mirroring Controller arbitration process

1. Execute the mc\_arb command in stop mode to stop the Mirroring Controller arbitration process.

#### Example

```
> mc_arb stop -M D:\mcarb_dir\arbiter1
```

2. Unregister the Mirroring Controller arbitration process from the Windows service.

Execute the mc\_arb command in unregister mode to unregister the Mirroring Controller arbitration process from the Windows service.

#### Example

```
> mc_arb unregister -M D:\mcarb_dir\arbiter1
```

3. Delete registrations related to the event log.

If messages are output to the event log, DLLs are registered in accordance with "Preparatory Tasks for the Output of Error Logs to the Event Log (Windows)" in the Cluster Operation Guide (Database Multiplexing). Delete these registrations so that no unnecessary issues occur.

- Delete registration for the default event source name

```
Example)
```

The example below deletes a DLL of a 64-bit product registered under the default event source name. "< x >" indicates the product version.

```
> regsvr32 /u "c:\Program Files\Fujitsu\fsepv<x>assistant64\lib\mcarbevent.dll"
```

- Delete registration for other event source names

DLL registration is performed so that messages output to the event log are output to any event source named by the user.

Accordingly, it is necessary to delete the DLL registration. Do this for any event source name.

```
Example)
```

The example below deletes a DLL of a 64-bit product registered under the event source name "Mirroring Controller arbiterl". "<x>" indicates the product version.

```
> regsvr32 /u /i:"Mirroring Controller arbiter1" "c:\Program Files\Fujitsu
\fsepv<x>assistant64\lib\mcarbevent.dll"
```

- If installing multiple versions

If error logs are set to be output to the event log, use the DLL path name that you took note of previously as explained in "Preparatory Tasks for the Output of Error Logs to the Event Log (Windows)" in the Cluster Operation Guide (Database Multiplexing) to reregister the default event source name.



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.

#### 2. Start Uninstall (middleware)

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 will be displayed. Click [Finish].

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

#### 6. Stop Uninstall (middleware)

Click [Close].

#### 3.3.2 Uninstallation in Silent Mode

The uninstallation procedure is described below.



See

Refer to the Fujitsu Enterprise Postgres product website for information on uninstallation in silent mode, such as the error messages.

#### 1. Stop the program

Before starting the uninstallation, stop the following:

Mirroring Controller arbitration process

1. Execute the mc\_arb command in stop mode to stop the Mirroring Controller arbitration process.

#### Example

```
> mc_arb stop -M D:\mcarb_dir\arbiter1
```

2. Unregister the Mirroring Controller arbitration process from the Windows service.

Execute the mc\_arb command in unregister mode to unregister the Mirroring Controller arbitration process from the Windows service.

#### Example

```
> mc_arb unregister -M D:\mcarb_dir\arbiter1
```

3. Delete registrations related to the event log.

If messages are output to the event log, DLLs are registered in accordance with "Preparatory Tasks for the Output of Error Logs to the Event Log (Windows)" in the Cluster Operation Guide (Database Multiplexing). Delete these registrations so that no unnecessary issues occur.

- Delete registration for the default event source name

```
Example)
```

The example below deletes a DLL of a 64-bit product registered under the default event source name. "<x>" indicates the product version.

```
> regsvr32 /u "c:\Program Files\Fujitsu\fsepv<x>assistant64\lib\mcarbevent.dll"
```

- Delete registration for other event source names

DLL registration is performed so that messages output to the event log are output to any event source named by

Accordingly, it is necessary to delete the DLL registration. Do this for any event source name.

```
Example
```

The example below deletes a DLL of a 64-bit product registered under the event source name "Mirroring Controller arbiterl". "<x>" indicates the product version.

> regsvr32 /u /i:"Mirroring Controller arbiter1" "c:\Program Files\Fujitsu \fsepv<x>assistant64\lib\mcarbevent.dll"

#### - If installing multiple versions

If error logs are set to be output to the event log, use the DLL path name that you took note of previously as explained in "Preparatory Tasks for the Output of Error Logs to the Event Log (Windows)" in the Cluster Operation Guide (Database Multiplexing) to reregister the default event source name.



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.

#### 2. Start the command prompt

In Windows, right-click [Command Prompt] and then select [Run as administrator].

#### 3. Run the uninstallation

Execute the following command:

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

#### Example

X:> installFolder\suninst.bat

X: Drive on which the product is installed

# Chapter 4 Setup of the Server Assistant

The Server Assistant is a feature that is installed and used on the arbitration server, so its setup is performed as the arbitration server setup.



Refer to "Setting Up Database Multiplexing Mode" in the Cluster Operation Guide (Database Multiplexing) for information on setting up and operating the Mirroring Controller arbitration server.

# Appendix A Estimating Memory Requirements

This appendix explains how to estimate the memory.

# A.1 Server Assistant Memory Requirements

This section describes the formula for estimating memory requirements for the Server Assistant.

Use the following formula to obtain a rough estimate of memory requirements:

Memory usage of the Server Assistant

= Peak memory usage of the Mirroring Controller arbitration

processes

+ Peak memory usage of the Mirroring Controller commands

Peak memory usage of the Mirroring Controller arbitration processes=100 MB

Peak memory usage of the Mirroring Controller commands=50 MB \* Number of commands executed simultaneously

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# Appendix B Procedure when Modifying the JRE Installation

This appendix describes the procedure to follow when modifying the JRE installation.

The JRE, of which the installation destination is specified in the JAVA\_HOME environment variable when installing Fujitsu Enterprise Postgres, is used by the Server Assistant.

Therefore, when updating or reinstalling JRE after installing Fujitsu Enterprise Postgres, it is necessary to restart the Mirroring Controller arbitration process, therefore follow the procedure below to modify the JRE installation:

1. Stop the Mirroring Controller arbitration process.

Refer to the Cluster Operation Guide (Database Multiplexing) for details.

- 2. Modify the JRE installation.
- 3. Change the installation environment to be used by Mirroring Controller.

Set the JAVA\_HOME environment variable to the installation destination of JRE 8, and use the mc\_update\_jre\_env command to change the installation environment to be used by the Server Assistant.

This procedure must be executed by the superuser.

#### Example

/opt/fsepv<x>assistant/bin is the installation directory where the Server Assistant is installed.

```
$ su -
Password:*****
# export JAVA_HOME="Jre8InstallDir"
# /opt/fsepv<x>assistant/bin/mc_update_jre_env
```

4. Start the Mirroring Controller arbitration process.

Refer to the Cluster Operation Guide (Database Multiplexing) for details.

# <u>Index</u>

[C]
Check the disk space6,15
Check the installed product and determine the installation method
[D]
Disk Space Required for Installation5,13
[E]
Estimating Memory Requirements
Excluded Software5,13
[F]
Features that can be Installed1
run
[H] Hardware Environment5,13
hosts file settings
nosts the settings
[1]
Installation
Installation and Uninstallation of the Linux Server Assistant3
Installation and Uninstallation of the Windows Server Assistant
Installation in Silent Mode
Installation Procedure
Installation Types
2.300.1.00 2.3pco
[M]
Multi-Version Installation
[N]
New Installation1
[O]
Operating Environment
Operating environment
[P]
Pre-installation Tasks
Procedure when Modifying the JRE Installation24
ID1
[R] Reinstallation1
Related Software
Remove applied updates
Required Operating System3,12
Required Patches
ro1
[S]
Server Assistant Memory Requirements
Setup of the Server Assistant
0,13
[T]
TCP/IP Protocol6

[U]	
Uninstallation	2,10,18
Uninstallation in Interactive Mode	10,18
Uninstallation in Silent Mode	11,20



# **Fujitsu Enterprise Postgres**

# Installation/Uninstallation in Silent Mode (Parameters and Messages)

Linux

# **Preface**

#### Purpose of this document

This document explains the parameters to be specified when installing and uninstalling Fujitsu Enterprise Postgres in silent mode, and explains the installation messages and return values.

#### Structure of this document

This document is structured as follows:

#### Chapter 1 Server Feature

Describes how to install and uninstall the Fujitsu Enterprise Postgres server feature in silent mode.

#### Chapter 2 Client Feature

Describes how to install and uninstall the Fujitsu Enterprise Postgres client feature in silent mode.

#### **Chapter 3 Server Assistant**

Describes how to install and uninstall the Fujitsu Enterprise Postgres Server Assistant in silent mode.

#### **Export restrictions**

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# **Contents**

Chapter 1 Server Feature	1
1.1 Installation	
1.1.1 Specification Format	1
1.1.2 List of Parameters	1
1.1.3 Messages and Return Values	4
1.1.4 CSV File Format	6
1.2 Uninstallation	7
1.2.1 Messages and Return Values	7
	_
Chapter 2 Client Feature	
2.1 Installation	
2.1.1 Specification Format	9
2.1.2 List of Parameters.	10
2.1.3 Messages and Return Values	13
2.1.4 CSV File Format	15
2.2 Uninstallation	17
2.2.1 Messages and Return Values	17
Chapter 3 Server Assistant	
3.1 Installation	
3.1.1 Specification Format	19
3.1.2 List of Parameters	20
3.1.3 Messages and Return Values	21
3.1.4 CSV File Format	23
3.2 Uninstallation	25
3.2.1 Messages and Return Values.	25

# L

# Chapter 1 Server Feature

This chapter provides specifications for installation and uninstallation of the server feature in silent mode.

#### 1.1 Installation

This chapter provides specifications for installation.

# 1.1.1 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
sectionName	Specify the section name. There are two types of section names:	Mandatory
	"installinfo": Set the product information.	
	"parameters": Set the parameter information for this product.	
parameterName	Specify the parameter name. Each section has a valid parameter.	Mandatory
value	Specify the value.	Optional



- 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 "parameters":

Alphanumeric characters, hyphens, commas and forward slashes



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

#### 1.1.2 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.	Туре	Parameter		Description
1	Software ID	Parameter name	Name	Mandatory.
		Value/Range	String	Specify the software identifier.  For this software, specify the following
		Default value	None	value:
				"Fujitsu Enterprise Postgres"



- 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 "<x>" indicates the product version.

No.	Туре	Parameter		Description
1	Whether to install the server	Parameter name	ServerInstallExecute	Optional.  Specify whether to run the installation of
		Value/Range	Y or N	the server.
		Default value	Y	Y: Install
				No: Do not install
2	Installation	Parameter	ServerInstallPath	Optional.
	destination of the	name		Specify the installation destination of the
	server	Value/Range	Path name	software.
		Default value	/opt/fsepv< <i>x</i> >server64	The root directory (/) cannot be specified.
3	Whether to install	Parameter	Client64InstallExecute	Optional.
	the client (64-bit)	name		Specify whether to run the installation of
		Value/Range	Y or N the client (64-bi	the client (64-bit).
		Default value	Y	Y: Install
				N: Do not install

No.	Туре		Parameter	Description
4	Installation destination of the	Parameter name	Client64InstallPath	Optional.
	client (64-bit)	Value/Range	Path name	Specify the installation destination of the client (64-bit).
		Default value	/opt/fsepv< <i>x</i> >client64	The root directory (/) cannot be specified.
5	Whether to install	Parameter	WebAdminInstallExecute	Optional.
	WebAdmin	name		Specify whether to run the installation of
		Value/Range	Y or N	WebAdmin in multiserver mode.
		Default value	Y	Y: Install
				N: Do not install
6	Installation destination of	Parameter	WebAdminInstallPath	Optional.
	WebAdmin	name Value/Range	Path name	Specify the installation destination of WebAdmin.
		Default value	<u> </u>	+
7	Whathanta	Parameter	/opt/fsepv <x>webadmin</x>	The root directory (/) cannot be specified.
1	Whether to set up WebAdmin	name	WebSetupExecute	Optional.
		Value/Range	Y or N	Specify whether to set up WebAdmin.
		Default value	Y	Y: Setup
				N: Do not set up
				This will be ignored if the WebAdmin is not installed.
8	Web server port	Parameter	WebPortNumber1	Optional.
	number	name		Specify the port number of the Web
		Value/Range	1024 to 32767	server.
		Default value	27515	This will be ignored if the WebAdmin is not installed.
9	WebAdmin	Parameter	WebPortNumber2	Optional.
	internal port number	name		Specify the WebAdmin internal port
	indinoci	Value/Range	1024 to 32767	number.
		Default value	27516	This will be ignored if the WebAdmin is not installed.
10	Whether to install Pgpool-II	Parameter name	Pgpool2InstallExecute	Specify whether to run the installation of the Pgpool-II.
		Value/Range	Y or N	Y: Install
		Default value	N	N: Do not install
11	Installation	Parameter	Pgpool2InstallPath	Optional.
	destination of	name	-	Specify the installation destination of
	Pgpool-II	Value/Range	Path name	Pgpool-II.
		Default value	/opt/fsepv< <i>x</i> >pgpool-II	The root directory (/) cannot be specified.
12	Whether to install pgBackRest	Parameter name	PgbackrestInstallExecute	Specify whether to run the installation of the pgBackRest.
		Value/Range	Y or N	Y: Install
		Default value	N	N: Do not install

No.	Туре	Parameter		Description
				This parameter is valid in Fujitsu Enterprise Postgres 15 SP1 and later.
13	Installation destination of	Parameter name	PgbackrestInstallPath	Optional.  Specify the installation destination of
	pgBackRest	Value/Range	Path name	pgBackRest.
		Default value	/opt/fsepv< <i>x</i> >pgbackrest	The root directory (/) cannot be specified.
				This parameter is valid in Fujitsu Enterprise Postgres 15 SP1 and later.

#### Example

```
parameters, ServerInstallExecute, Y
parameters, ServerInstallPath,
parameters, Client64InstallExecute, Y
parameters, Client64InstallPath,
parameters, WebAdminInstallExecute, Y
parameters, WebAdminInstallPath,
parameters, WebSetupExecute, Y
parameters, WebPortNumber1, 27515
parameters, WebPortNumber2, 27516
parameters, Pgpool2InstallExecute, Y
parameters, Pgpool2InstallPath,
parameters, PgbackrestInstallExecute, Y
parameters, PgbackrestInstallExecute, Y
parameters, PgbackrestInstallPath,
```

# 1.1.3 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

In "xyz" below, "x" is the product version, "z" is the product level, and for this release, "y" is 0.

```
var/log/fsep_SERVER64_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.  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.

Return value	Message	Explanation and actions
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.
		The parameter name is displayed in @1@.
		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.
		The parameter name is displayed in @1@ and @2@.
23	The @2@ of @1@ already exists.	The path already exists. Specify a different path.
		The parameter name is displayed in @1@.
		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.
		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:
		- ServerInstallExecute
		- Client64InstallExecute
		- WebAdminInstallExecute
		- Pgpool2InstallExecute
		- PgbackrestInstallExecute
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 setup WebAdmin.
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.
17	Failed to install because a required package is missing.
19	A process is running.
30	Failed to copy the installation material.

Return value	Explanation
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.
63	The uninstallation cannot be performed either because Uninstall (middleware) does not exist or because there are no execution privileges.
83	Failed to install FJQSS or register information.
85	Different editions of the same generation are installed.
86	A newer version of the product is already installed.
88	Exclusive product is already installed.
99	A system error occurred.
106	The command was not executed with administrator privileges.
110	License registration failed.
129	Unsupported operating system.
200	Failed to install of package.
201	A conflicting package is installed.

# 1.1.4 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

#### **Double quotation marks**

- Enclose fields that contain newlines, double quotation marks, or commas in double quotation marks.

Format	Record		
"aaa","bb b","ccc"	aaa	bb 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



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.

- 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.

- The double quotation escape characters are not positioned correctly.

- Double quotation marks enclose the entire field.

"aaa,bbb,ccc"

# 1.2 Uninstallation

This chapter provides specifications for uninstallation.

# 1.2.1 Messages and Return Values

The uninstaller result is output to the log file.

#### Log file

In "xyz" below, "x" is the product version, "z" is the product level, and for this release, "y" is 0.

Server product

/var/log/fsep\_SERVER64\_xyz\_uninstall.log

#### Client product

/var/log/fsep\_CLIENT64\_xyz\_uninstall.log

#### WebAdmin

/var/log/fsep\_WEBADMIN\_xyz\_uninstall.log

#### Pgpool-II

/var/log/fsep\_PGPOOL2\_xyz\_uninstall.log

#### pgBackRest

/var/log/fsep\_PGBACKREST\_xyz\_uninstall.log

#### **Return values**

The following return values are output:

Return values	Meaning
0	Uninstallation was successful.
3	WebAdmin unsetup failed.
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.
83	Failed to delete the information from FJQSS.
99	A system error occurred.
100	The command argument is invalid.
106	The command was not executed with administrator privileges.
200	Failed to uninstall of package.

# **Chapter 2 Client Feature**

This chapter provides specifications for installation and installation of the client feature in silent mode.

Note that "<x>" in paths indicates the product version.

#### 2.1 Installation

This chapter provides specifications for installation.

## 2.1.1 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.

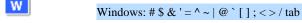
```
sectionName, parameterName, value
sectionName, parameterName, value
:
```

Enter the following settings in respective columns.

Item	Settings	Optional
sectionName	Specify the section name. There are two types of section names:	Mandatory
	"installInfo": Set the product information.	
	"parameters": Set the parameter information for this product.	
parameterName	Specify the parameter name. Each section has a valid parameter.	Mandatory
value	Specify the value.	Optional



- 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".



Linux: " # & = ' ( ) ^ ~ \ | @ ` [ ] { } ; : < > tab



w

The template for the installation parameters CSV file is as follows:

- Windows client: Z:\sample\sample\_windows.csv (Z is the drive into which the DVD is inserted.)

#### 2.1.2 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.	Туре	Parameter		Description	
1	Software ID	Parameter name	Name	Mandatory.	
		Value/Range	String	Specify the software identifier.  For this software, specify the following	
	Default value	None	value:		
				"Fujitsu Enterprise Postgres"	



- 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.	Туре	Parameter		Description
i	Whether to install the client (32-bit)	Parameter name	Client32InstallExecute	Optional.  Specify whether to run the installation of the client (32-
		lient (32-bit) Value/Range	Y or N	
		Default value	Y	bit). Y: Install N: Do not install L This parameter is ignored on Linux.
2	Installation destination of	stination of <b>name</b>	Client32InstallPath	Optional.  Specify the installation
l I	the client (32-bit)	Value/Range	Path name	destination of the client (32-bit).

No.	Туре		Parameter	Description
		Default value	W Windows(32-bit)  %ProgramFiles%\Fujitsu \fsepv <x>client32  Windows(64-bit)  %ProgramFiles(x86)% \Fujitsu\fsepv<x>client32  L Linux  None.</x></x>	A root folder (such as C:\) cannot be specified.  L This parameter is ignored on Linux.
3	Whether to install the client (64-bit)	Parameter name Value/Range Default value	Client64InstallExecute Y or N Y	Optional.  Specify whether to run the installation of the client (64-bit).  Y: Install  N: Do not install  W This parameter is ignored on 32-bit operating systems.
4	Installation destination of the client (64- bit)	Parameter name  Value/Range  Default value	Client64InstallPath  Path name  W Windows(64-bit)  %ProgramFiles%\Fujitsu \fsepv <x>client64  L Linux  /opt/fsepv<x>client64</x></x>	Optional.  Specify the installation destination of the client (64-bit).  W This parameter is ignored on 32-bit operating systems.  A root folder (such as C:\) cannot be specified.  L A root directory cannot be specified.
5	Whether to install Pgpool- II	Parameter name  Value/Range  Default value	Pgpool2InstallExecute  Y or N  N	Specify whether to run the installation of the Pgpool-II. Y: Install N: Do not install W This parameter is ignored on Windows.
6	Installation destination of Pgpool-II	Parameter name  Value/Range  Default value	Pgpool2InstallPath  Path name  /opt/fsepv< <i>x</i> >pgpool-II	Optional.  Specify the installation destination of Pgpool-II.  W This parameter is ignored on Windows.  L A root directory cannot be specified.

No.	Туре	Parameter		Description
7	Whether to install	Parameter name	PgbackrestInstallExecute	Specify whether to run the installation of the
	pgBackRest	Value/Range	Y or N	pgBackRest.
		Default value	N	Y: Install
				N: Do not install
				This parameter is ignored on Windows.
				This parameter is valid in Fujitsu Enterprise Postgres 15 SP1 and later.
8	Installation destination of	Parameter name	PgbackrestInstallPath	Optional.  Specify the installation
	pgBackRest	Value/Range	Path name	destination of pgBackRest.
		Default value	/opt/fsepv <x>pgbackrest</x>	This parameter is ignored on Windows.
				L A root directory cannot be specified.
				This parameter is valid in Fujitsu Enterprise Postgres 15 SP1 and later.
9	Whether to install ldap2pg	Parameter name	Ldap2pgInstallExecute	Specify whether to run the installation of the ldap2pg.
		Value/Range	Y or N	Y: Install
		Default value	N	N: Do not install
				This parameter is ignored on Windows.
				This parameter is valid in Fujitsu Enterprise Postgres 16 and later.
10	Installation	Parameter	Ldap2pgInstallPath	Optional.
	destination of ldap2pg	name Value/Range	Path name	Specify the installation destination of ldap2pg.
		Default value	/opt/fsepv< <i>x</i> >ldap2pg	W This parameter is ignored on Windows.
				L A root directory cannot be specified.
				This parameter is valid in Fujitsu Enterprise Postgres 16 and later.

## Example

parameters,Client64InstallExecute,Y
parameters,Client64InstallPath,
parameters,Pgpool2InstallExecute,Y
parameters,Pgpool2InstallPath,

```
parameters,PgbackrestInstallExecute,Y
parameters,PgbackrestInstallPath,
parameters,Ldap2pgInstallExecute,Y
parameters,Ldap2pgInstallPath,
```

# 2.1.3 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

In "xyz" below, "x" is the product version, "z" is the product level, and for this release, "y" is 0.

Windows

%TEMP%\fsep\_CLIENT\_media\_xyz.log

Linux

/var/log/fsep\_CLIENT\_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.	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.
		The parameter name is displayed in @1@.
		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.
		The parameter name is displayed in @1@ and @2@.
23	The @2@ of @1@ already exists.	The path already exists. Specify a different path.
		The parameter name is displayed in @1@.

Return value	Message	Explanation and actions
		The specified value is displayed in @2@.
24	Drive @2@ of @1@ does not exist.	The drive does not exist. Specify an existing drive.
		The parameter name is displayed in @1@.
		The specified value is displayed in @2@.
28	There is no product for installation.	There is no product to be installed. Specify "Y" for at least one of the following parameters:
		Windows
		- Client32InstallExecute
		- Client64InstallExecute
		Linux
		- Client64InstallExecute
		- Pgpool2InstallExecute
		- PgbackrestInstallExecute
		- Ldap2pgInstallExecute
29	Windows USAGE: silent.bat inputfile	The argument specified in the command is incorrect. Specify the correct argument.
	L Linux	
	USAGE : silent.sh inputfile	

### Product installer errors

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

# Windows

Return value	Explanation
0	Completed successfully.
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).
61	Failed to install Uninstall (middleware).
62	Uninstall (middleware) was started.
74	Failed to write to the registry.
79	Failed to load the registry.
85	Different editions of the same generation are installed.
86	A newer version of the product is already installed.
88	Exclusive product is already 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.
200	Failed to install of package.

Return value	Explanation
201	A conflicting package is installed.
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.

Linux

Return value	Explanation
0	Completed successfully.
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.
17	Failed to install because a required package is missing.
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.
63	The uninstallation cannot be performed either because Uninstall (middleware) does not exist or because there are no execution privileges.
85	Different editions of the same generation are installed.
86	A newer version of the product is already installed.
88	Exclusive product is already installed.
99	A system error occurred.
106	The command was not executed with administrator privileges.
129	Unsupported operating system.
200	Failed to install of package.
201	A conflicting package is installed.

# 2.1.4 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 b","ccc"	aaa	bb 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



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.

- The number of fields differs between records.

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",yyy,"zzz"

- The double quotation escape characters are not positioned correctly.

"aaa","bb"""b","ccc"

- Double quotation marks enclose the entire field.

"aaa,bbb,ccc"

# 2.2 Uninstallation

This chapter provides specifications for uninstallation.

# 2.2.1 Messages and Return Values

The uninstaller result is output to the log file.

# Log file

In "xyz" below, "x" is the product version, "z" is the product level, and for this release, "y" is 0.

Windows

64-bit product

%TEMP%\fsep\_CLIENT64\_xyz\_uninstall.log

32-bit product

%TEMP%\fsep\_CLIENT32\_xyz\_uninstall.log

Linux

64-bit product

/var/log/fsep\_CLIENT64\_xyz\_uninstall.log

Pgpool-II

/var/log/fsep\_PGPOOL2\_xyz\_uninstall.log

pgBackRest

/var/log/fsep\_PGBACKREST\_xyz\_uninstall.log

ldap2pg

/var/log/fsep\_LDAP2PG\_xyz\_uninstall.log

#### **Return values**

The following return values are output:

Windows

Return values	Meaning	
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).	
144	The command was not executed with administrator privileges.	
200	Failed to uninstall of package.	

Return values	Meaning	
251	An error occurred when running a system function.	
255	An internal inconsistency occurred.	

# Linux

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.
200	Failed to uninstall of package.

# **Chapter 3 Server Assistant**

This chapter provides specifications for installation and uninstallation of the Server Assistant in silent mode.

Note that "<x>" in paths indicates the product version.

# 3.1 Installation

This chapter provides specifications for installation.

# 3.1.1 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
sectionName	Specify the section name. There are two types of section names:	Mandatory
	"installInfo": Set the product information.	
	"parameters": Set the parameter information for this product.	
parameterName	Specify the parameter name. Each section has a valid parameter.	Mandatory
value	Specify the value.	Optional



- 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".

Windows: # \$ & ' = ^ ~ | @ ` [ ] ; < > / tab

Linux: " # \$ & = '() ^ ~ \ | @ `[] { };: <> tab



W

The template for the installation parameters CSV file is as follows:

- Windows Server Assistant: Z:\sample\sample.csv (Z is the drive into which the DVD is inserted.)

# 3.1.2 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.	Туре	Parameter		Description	
1	Software ID	Parameter name	Name	Mandatory.	
		Value/Range	String	Specify the software identifier.  For this software, specify the following	
		Default value	None	value:	
				"Fujitsu Enterprise Postgres"	



- 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.	Туре		Parameter	Description
1	Whether to install the	Parameter name	ArbiterInstallExecute	Optional.  Specify whether to run the installation
	server assistant	Value/Range	Y or N	of the Server Assistant.
		Default value	Y	Y: Install N: Do not install
2	Installation destination of	Parameter name	ArbiterInstallPath	Optional.  Specify the installation destination of
	the server assistant	Value/Range	Path name	the Server Assistant.  W A root folder (such as C:\) cannobe specified.
	ussistant	Default value	W Windows %ProgramFiles%\Fujitsu	
			\fsepv< <i>x</i> >assistant64	L A root directory cannot be specified.

No.	Туре	Parameter	Description
		Linux	
		/opt/fsepv <x>assistant</x>	

#### Example

parameters,ArbiterInstallExecute,Y
parameters,ArbiterInstallPath,

# 3.1.3 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

In "xyz" below, "x" is the product version, "z" is the product level, and for this release, "y" is 0.

Windows

%TEMP%\fsep\_SERVER\_ASSISTANT\_media\_xyz.log

Linux

/var/log/fsep\_SERVER\_ASSISTANT\_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.	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.
		The parameter name is displayed in @1@.
		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.

Return value	Message	Explanation and actions
		The parameter name is displayed in @1@ and @2@.
23	The @2@ of @1@ already exists.	The path already exists. Specify a different path.
		The parameter name is displayed in @1@.
		The specified value is displayed in @2@.
24	Drive @2@ of @1@ does not exist.	The drive does not exist. Specify an existing drive.
		The parameter name is displayed in @1@.
		The specified value is displayed in @2@.
28	There is no product for installation.	There is no product to be installed. Specify "Y" for the following parameters:
		- ArbiterInstallExecute
29	Windows	The argument specified in the command is
	USAGE : silent.bat inputfile	incorrect. Specify the correct argument.
	Linux	
	USAGE: silent.sh inputfile	

### Product installer errors

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

# Windows

Return value	Explanation
0	Completed successfully.
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).
61	Failed to install Uninstall (middleware).
62	Uninstall (middleware) was started.
74	Failed to write to the registry.
79	Failed to load the registry.
83	Failed to install FJQSS or register information.
86	A newer version of the product is already installed.
88	Exclusive product is already 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.
200	Failed to install of package.
201	A conflicting package is installed.
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.

Return value	Explanation
255	An internal inconsistency occurred.

Linux

Return value	Explanation
0	Completed successfully.
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.
17	Failed to install because a required package is missing.
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.
63	The uninstallation cannot be performed either because Uninstall (middleware) does not exist or because there are no execution privileges.
83	Failed to install FJQSS or register information.
86	A newer version of the product is already installed.
88	Exclusive product is already installed.
99	A system error occurred.
106	The command was not executed with administrator privileges.
129	Unsupported operating system.
200	Failed to install of package.
201	A conflicting package is installed.

# 3.1.4 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	ссс

#### **Double quotation marks**

- Enclose fields that contain newlines, double quotation marks, or commas in double quotation marks.

Format	Record		
"aaa","bb b","ccc"	aaa	bb 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



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.

- The number of fields differs between records.

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",yyy,"zzz"

- The double quotation escape characters are not positioned correctly.

"aaa","bb"""b","ccc"

- Double quotation marks enclose the entire field.

"aaa,bbb,ccc"

# 3.2 Uninstallation

This chapter provides specifications for uninstallation.

# 3.2.1 Messages and Return Values

The uninstaller result is output to the log file.

#### Log file

In "xyz" below, "x" is the product version, "z" is the product level, and for this release, "y" is 0.

Windows

%TEMP%\fsep\_SERVER\_ASSISTANT\_xyz\_uninstall.log

Linux

/var/log/fsep\_SERVER\_ASSISTANT\_xyz\_uninstall.log

#### **Return values**

The following return values are output:

Windows

Return values	Meaning	
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.	
144	The command was not executed with administrator privileges.	
200	Failed to uninstall of package.	
251	An error occurred when running a system function.	
255	An internal inconsistency occurred.	

Linux

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.	
83	Failed to delete the information from FJQSS.	
99	A system error occurred.	
100	The command argument is invalid.	

Return values Meaning	
106	The command was not executed with administrator privileges.
200	Failed to uninstall of package.



# Fujitsu Enterprise Postgres

# Uninstall (middleware)

Windows/Solaris/Linux

# **Preface**

# Purpose of this document

This document explains the features, notes, and messages of Uninstall (middleware).

#### Structure of this document

This document is structured as follows:

Chapter 1 Using Uninstall (middleware)

Describes the features and notes of Uninstall (middleware).

Chapter 2 Uninstall (middleware) Messages

Describes the messages output by Uninstall (middleware).

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# Contents

Chapter 1 Using Uninstall (middleware)	1
1.1 Features that are Installed	1
1.2 Notes	1
1.2.1 Notes on the Uninstall (middleware) Tool	1
Chapter 2 Uninstall (middleware) Messages	3
2.1 Messages output by FJSVcir	3
2.2 Messages output by Uninstall (middleware).	

# Chapter 1 Using Uninstall (middleware)

# 1.1 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.  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/Solaris]

Feature	Package name	Component name	Remarks	Selectively installed?
Common tool	FJSVcir	CIRuntime Application	Controls the installation and uninstallation of Fujitsu middleware products.  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

# 1.2 Notes

# 1.2.1 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 into the drive device.
- 3. Execute the installation command.

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

In the example above, z is the drive into which the DVD is inserted.

#### [Linux/Solaris]

- 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.

[Linux]

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

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

[Solaris]

# /dvd/dvd0/CIR/Solaris/cirinst.sh

In the example above, /dvd/dvd0 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/Solaris]

/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/Solaris]

# /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.

# Chapter 2 Uninstall (middleware) Messages

# 2.1 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][Solaris]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: Isb\_release was not found. Please install the package below.

#### - redhat-Isb

#### Description

lsb release command was not found.

#### Action method

Add redhat-lsb package and then execute install again.

# FSP\_FJSVCIR\_CIRINST: ERROR: 186: CIRINST186: Isb\_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

#### Parameters are invalid. Please specifiy 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]

# 2.2 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:

HIMIY

/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]

### 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]

 $\% Program Data \% \ | Fujitsu \ | Fujitsu$ 

### 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

 $\% Program Data \% \label{limitsu} Fujitsu F4 CR \cir \temp \mbox{$\ $$meta\_db$}$ 

#### [Notice]Need to restart for uninstall completion.

#### Description

Uninstallation was completed. (silent mode)

### Action method

Restart the system.