Fujitsu Enterprise Postgres for Kubernetes

Quick Start Guide

J2UL-QK16-01ENZ0(00)

1. Prerequisites

• Registered OpenShift cluster with Red Hat Marketplace

cf. <u>https://marketplace.redhat.com/en-us/documentation/clusters#register-openshift-cluster-with-red-hat-marketplace</u>

• Buy or try the product 'Fujitsu Enterprise Postgres for Kubernetes ' from Red Hat Marketplace

cf. https://marketplace.redhat.com/en-us/documentation/operators

2. System Requirments

2.1. **CPU**

The following CPU architectures are supported.

No	CPU architecture
1	x86
2	s390x
3	ppc64le

2.2. Supported Platform

The following platform is supported.

No	Platform	Version
1	OpenShift Container Platform	4.12, 4.13, 4.14

3. Operator installation from Red Hat Marketplace

- For information on registering your cluster and creating a namespace, see <u>Red Hat Marketplace</u> <u>Docs</u>. This must be done prior to installing the operator.
- 2. On the main menu, click **Workspace**, click **Software**, click on the **product box** of 'Fujitsu Enterprise Postgres for Kubernetes ', and then click Install Operator.
- 3. On the Update Channel section, select an option.
- 4. On the *Approval Strategy* section, select either *Automatic or Manual*. The approval strategy corresponds to how you want to process operator upgrades.
- 5. On the *Target Cluster* section:

- \circ $\,$ Click the checkbox next to the clusters where you want to install the Operator.
- For each cluster you selected, under **Namespace Scope**, on the **Select Scope** list, select an option.
- 6. Click Install. It may take several minutes for installation to complete.
- 7. Once installation is complete, the status will change from installing to Up to date.
- 8. For further information, see the Red Hat Marketplace Operator documentation

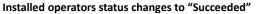
pdate channel			
perators are organized into packages ar ne you want to subscribe to. Learn more		operator is available through multiple channe	ls, you can choose which
• stable			
pproval strategy			
utomatic updates keep the operator and 'Ll. Learn more	any instances on the cluster up to date. Mar	nual updates require approval and are done via	a OpenShift console or
• Automatic			
🔿 Manual			
arget clusters			
	and manage this operator. Then select the N	lamespace scope for each cluster you are inst	alling into. Learn more
	and manage this operator. Then select the N Platform	lamespace scope for each cluster you are inst Namespace Scope	alling into. Learn more
hoose clusters where you want to install	- ·		alling into. Learn more
hoose clusters where you want to install	Platform	Namespace Scope	alling into. Learn more

4. Verification of operator installation

- 1. Once status changes to Up to date, click the vertical ellipsis and select Cluster Console.
- 2. Open the cluster where you installed the product
- 3. Go to **Operators > Installed Operators**
- 4. Select the Namespace or Project you installed on
- 5. Verify status for product is Succeeded

"<x.y.z>" in the screen example indicates the version level of the operator.

≡ ^{ed} Red Hat OpenShift							♠1 G	0	testl v
📽 Administrator	-	Project: fep-install-test 🔹							
Home	•	Installed Operators							
Overview		Installed Operators are represented by ClusterServiceVer	sions within this Namespace. For more information, see the	e Understanding Operators documentation 🗗. Or create an	Operator and ClusterServiceVersion using the Operator SE	Kg.			
Projects		Name Search by name							
Search API Explorer		Name 1	Managed Namespaces	Status	Last updated	Provided APIs			
Events		Fujitsu Enterprise Postgres Operator	() fep-instali-test	Succeeded Up to date	Just now	FEPCluster FEPAction FEPExporter			I
Operators	~					FEPLogging View 4 more			
OperatorHub									
Installed Operators									
Workloads	>								
Networking	•								



5. Deploying FEPCluster using Operator

CR templates are published in the following repository on GitHub.

https://github.com/fujitsu/fep-operator-examples

This repository provides sample files that you can use to run Fujitsu Enterprise Postgres Operator.

To deploy a FEPCluster in a given namespace, follow these steps:

"<x.y.z>" in the screen example indicates the version level of the operator. "<X>" indicates the product version of Fujitsu Enterprise Postgres.

1. Under "Operators" menu item, click on "**Installed Operators**". You will see the installed FEP operator. Click on the name of operator.

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• Administrator	Project: fep-install-test 🔹						
Home	Installed Operators						
Overview	Installed Operators are represented by ClusterServiceV	fersions within this Namespace. For more information	on, see the Understanding Operators documents	tion g. Or create an Operator and ClusterServiceVersion using t	the Operator SDK @.		
Projects	Name Search by name						
Search	Name I	Managed Namespaces	Status	Last updated	Provided APIs		
API Explorer	- Euliteu Enternrice Portorez Onerstor	s fep-install-test	Succeeded	 Just now 	FEPCluster		1
Events	rujitsu <x.y.z> provided by Fujitsu</x.y.z>		Up to date		FEPAction FEPExporter		
Operators		•			FEPLogging View 4 more		
OperatorHub							
Installed Operators							
•							
Workloads							
Networking							

 A page with all CRs that this operator supports will be displayed. FEPCluster is the main CR and all others are child CRs. We would create main CR and all other CRs will be created automatically by Operator. To create Cluster CR, either

(1) Click on "Create Instance" under FEPCluster.

OR

(2) Click on "FEPCluster" on top and then click on "Create FEPCluster" on next page.

Red Hat OpenShift							\$ 1 O	0
🕫 Administrator		Project: fep-install-test 🔹						
Home Overview		Installed Operators > Operator details Fujitsu Enterprise Postgres Operator (x,y,z> provided by Fujitsu						Action
Projects		Details YAML Subscription E	vents All instances FEPCluster	FEPAction FEPExporter FEPLog	gging FEPPgpool2Cert FEPPgp	ool2 FEPRestore	FEPUpgrade	
Search API Explorer		Provided APIs					Provider Fujitsu	
Events		FEPC FEPCluster	FEPA FEPAction	FEPE FEPExporter	FEPL FEPLogging		Created at S minutes ago	
Operators		Not available	Not available	Not available	Not available		Links	
OperatorHub		Create instance	Create instance	Create instance	Create instance		Fujitsu Enterprise Postgres https://www.postgresql.fastware.com/ 🗗	
Installed Operators							Maintainers Fuitsu	
Workloads		FEPP FEPPgpool2Cert	FEPP FEPPgpool2	FEPR FEPRestore	FEPU FEPUpgrade		r gitsu pgtechenquiry⊜au fujitsu.com	
Networking	,	Not available	Not available	Not available	Not available			
		Create instance	Create instance	Create instance	Create instance			
Storage								
Builds		Description						
Observe			e-grade PostgreSQL on OpenShift Container Platfo					
Compute		This solution provides the flexibility of a hybrid clou performance, data governance and security.	ud solution while delivering an enhanced distribution	of PostgreSQL to support enterprise-level workloa	ds and provide improved deployment and manage	ment, availability,		
User Management		Available as a multi-architecture container built for						
-			bject to the terms of the End User License Agreeme rt into a third party program, only Authorised Custor	ent with Fujitsu Limited found at https://www.fast.fuji mers may download and use the Product.	itsu.com/fujitsu-enterprise-postgres-license-agre	ements. Where the		
Administration								

3. This will bring to "Create FEPCluster" page. Here you have two options to configure. The first one is Form View. At the moment, in Form View, one can change only the name of cluster being deployed. Default name is "new-fep".

This name must be unique within a namespace.

Red Hat OpenShift			≜ 1 ⊖ 0
📽 Administrator	•	Project: fep-install-test ▼ Fujitsu Enterprise Postgres Operator → Create FEPCluster	
Home	~	Create FEPCluster	
Overview		Create by completing the form. Default values may be provided by the Operator authors.	
Projects		Configure via: Form view YAML view	
Search			<mark>ស្បីពីSU</mark> provided by Fujitsu
API Explorer		 Note: Some fields may not be represented in this form. Please select "YAML View" for full control of object creation. 	Not available
Events			
Operators	~	Name * new-fep	
OperatorHub		Labels	
Installed Operators		app=frontend	
Workloads	>	Create	
Networking	>		
Storage	>		
Builds	>		

4. In YAML View, starting value of CR is visible and one can choose to modify parameters before creating CR. Refer to the <u>Reference</u> for details of parameters.For example, add a configuration value for the customPgHba parameter according to your environment.

Red Hat OpenShift		•
🎗 Administrator	Project: fep-install-test Fujitsu Enterprise Postgres Operator Create FEPCluster	
Home Overview Projects	Create FEPCluster Create by manually entering YAML or JSON definitions, or by dragging and dropping a file into the editor. Configure via: O Form view 9 YAML view	
Search API Explorer		[Alt] + [F1] Accessibility help
API Explorer Events	1 apiVersion: fep.fujitsu.io/v2 2 kind: FEPCluster 3 metadata: 4 name: new-fep	
Operators OperatorHub	<pre>5 namespace: fep-install-test 6 spec: 7 fep: 8 customAnnotations: 9 allDeployments: {}</pre>	
Installed Operators	10 forcessl: true 11 image: 12 pullPolicy: IfNotPresent	
Workloads	13 instances: 1 14 mcSpec: 15 limits:	
Networking	16 cpu: 500m 17 memory: 700Mi 18 requests:	
Storage	19 cpu: 200m 26 memory: 512Mi 21 podAntAffinity: false	
Builds	22 podDisruptionBudget: false 23 servicePort: 27500 24 syncHode: "off"	
Observe	> 25 sysExtraEvent: true	
Compute	Create	

The FEPCluster custom resource allows you to define the container's CPU, Memory, disk size, etc. You can define each resource size individually, or you can use the following parameters to define the allocations for each resource in bulk.

Parameter	Description
spec.fep.databaseSize	Small, medium, and large define the following values for cpu/memory:
	small: 500m/700Mi
	medium: 2/4Gi
	large: 4/16Gi
spec.fepChildCrVal.storage.dataSize	Specifies the size of the data storage PV.
	Estimate and define the size of the backup storage area when the backup
	is enabled

We recommend that you use transparent data encryption to store your data. Tablespace PVs are mounted in/database/tablespaces/tbspace1. After building the database cluster, create tablespaces and tables as follows:

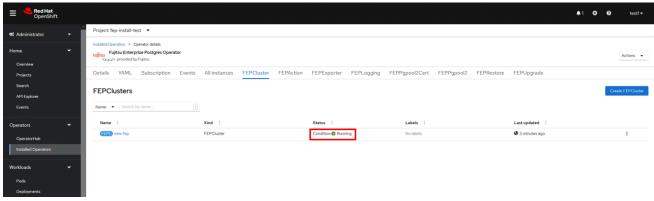
Creating an Encrypted Tablespace CREATE TABLESPACE secure_tablespace LOCATION '/database/tablespaces/tbspace1' WITH (tablespace_encryption_algorithm ='AES256'); # Create Table in Encrypted Tablespace CREATE TABLE secure_table (id int, pref text, city text, data text) TABLESPACE secure_tablespace;

Operator provides features such as backup, audit logging, and monitoring. These features can be enabled with the following parameters:

Parameter	Description
spec.fep.monitoring.enable	When true, monitoring feature is enabled.
spec.fep.pgAuditLog.enable	When true, audit log collection is enabled.
spec.fepChildCrVal.backup.type	local enables backup.
	The backup data is stored in the PV.
spec.fepChildCrVal.autoscale.scaleout.policy	cpu_utilization enables the ability to autoscale out replicas when
	CPU utilization exceeds a threshold.

Refer to the User's Guide for detailed settings and usage information for each function.

5. When "Create" is clicked on either of two pages above, operator creates FEPCluster CR and there after one by one FEPBackup, FEPConfig, FEPVolume, FEPUser and FEPCert child CRs are created automatically. The starting values for child CRs are taken from "fepChildCrVal" section of FEPCluster CR yaml file. Once child CRs are created, respective values are managed through child CRs only. If you want to change the value, modify the value in FEPCluster "fepChildCrVal" section. Operator reflects changes from FEPCluster parent CR to respective child CRs. Only allowable changes are reflected in child CRs. Child CRs are marked internal objects and hence will not be visible on OCP console. However, you can check child CRs using command line tools.



6. In FEPCluster CR, annotations are added to indicate that child CRs are created successfully and have initialized properly. It may take some time to complete.

E Red Hat OpenShift						
🕫 Administrator	Project: fep-install-test 🔹	Edit annotations				
	Installed Operators > fujitsu-enterprise-postgres-operators/510 > FEPCluster detail	Key	Value			
	(FEPG) new-fep	fepBackupCR	Done	٥		Actions 👻
		fepConfigCR	Done	0		
	Details YAML Resources Events	fepCertCR	Done	0		
	FEPCluster overview	fepclusterfepfujitsu.io/MaxFe	15	0		
		comerciante				
	Name new-fep	fepUserCR	Done	•		
	Namespace	tepVolumeDone	True	0		
	(B) fep-install-test	fepConfigDone	True	0		
	Labels	fepBackupDone	True	0		
	No labels					
	Annotations	fepCertDone	True	•		
	12 annotations 🥒	fepCrPatchDefaults	NotNeeded	٥		
	Created at	fepVolumeCR	Done	0		
	🚱 4 minutes ago	fepUserDone	True	0		
	Owner No owner		1104			
		O Add more				
	Conditions			Cancel Save		
	 Type Status				Message	
	Running True	4 minutes ago		Running	Running reconciliation	

7. Once all four child CRs are marked done in annotations, operator creates StatefulSet for the cluster.

Red Hat OpenShift					🐥 77 🗘 😯 support25	
🕫 Administrator	- Î	Project: install-test 👻				
Home	>	Stateful Sets			Create Stateful Set	
Operators	×	Name Search by name				
OperatorHub		Name †	Status 1	Labels 1	Pod Selector	
Installed Operators		S new-fep-sts	1 of 1 pods	app=new-fep-sts fepclustername=new-fep	Q app=new-fep-sts, fepclustername=new-fep	
Workloads	~					
Pods						
Deployments						
Deployment Configs						
Stateful Sets						
Secrets						
Config Maps						
Cron Jobs						
Jobs						
Daemon Sets						
Replica Sets						
Replication Controllers						
Horizontal Pod Autoscal	lers					

8. StatefulSet will start one FEP instance at a time and will wait for each to be ready before starting next one.

Red Hat OpenShift									. 76	? suppo	ort25 👻
🕫 Administrator	-	Project: install-test 🔻									
Home	>	Pods								Creat	e Pod
Operators	~	▼ Filter ▼ Name ▼	Search by name	7							
OperatorHub		Name 1	Status 1	Ready	1	Restarts 1	Owner 1	Memory 1	СРИ 1	Created 🗍	
Installed Operators		4f26dc08e7226781fb269c0 21432a282e84f1b53203189 a8148647966ejj89v	Completed	0/1		0	4f26dc08e7226781fb269c0 21432a282e84f1b53203189 a8148647966ef03b1	-	-	Sep 7, 10:25 pm	1
Workloads Pods	×	P fep-ansible-operator- cm-654679b876-msqx4	$oldsymbol{\mathcal{C}}$ Running	1/1		0	RS fep-ansible-operator- cm-654679b876	123.7 MiB	0.002 cores	Sep 7, 10:26 pm	ł
Deployments		Fujitsu-enterprise-postgres- 13-registry-sp25-77k9j	C Running	1/1		0	S fujitsu-enterprise- postgres-13-registry-sp25	44.9 MiB	0.004 cores	Sep 7, 10:15 pm	÷
Deployment Configs Stateful Sets		P new-fep-sts-0	2 Running	2/2		0	S new-fep-sts	114.1 MiB	0.002 cores	Sep 7, 10:53 pm	÷
Secrets											
Config Maps											
Cron Jobs											
Jobs											
Daemon Sets											
Replica Sets											
Replication Controllers											
Horizontal Pod Autoscaler	rs 🧹										

9. Once all instances of FEP servers are started, operator marks a flag "fepClusterReady" in "fepStatus" section of CR to be **true**, indicating that FEPCluster is ready for use. Looking at YAML of FEPCluster CR, it would look like as below:

Red Hat OpenShift			4 1 C Q	testl 🗸
🛠 Administrator	Project:	fep-install-test 🔻		
Home Overview	FEPC	rs > FEPCluster details new-fep		Actions 👻
Projects Search	Details	YAML	Alt + F1 Accessibility help 😯 View shortcuts	🚯 View sidebar
API Explorer Events	415 416 417 418 419	FND CERTIFICATE crt: - BEGIN CERTIFICATE		
Operators OperatorHub Installed Operators	 420 421 422 423 424 425 	END CERTIFICATE key: - ENG IN RSA PRIVATE KEY ********************************		
Workloads	426 427 > ↓ 432 433	conditions: - lastTransitionTime: '2023-02-07T04:49:24Z' ··· - ansibleKesult: changed: 6		execution of the second s
Pods Deployments	434 435 436 437	completion: '2023-02-07T04:51:49.862517' failures: 0 ok: 85 skipped: 228		And the first an
DeploymentConfigs	438 439 440	lastTransitionTime: '2023-02-07T04:43:17Z' message: Awaiting next reconciliation reason: Successful		
StatefulSets Secrets	441 442 443 >	<pre>status 'True' type: Running l astronastionTime: '2023-02-07104:51:502'</pre>		
ConfigMaps	443 × 448 449 450	<pre>- Lastrianisticoniame: 2023-02-07104,31302 *** fepCurrentInstances: lastrianistic fepCurrentInstances: lastrianistic fepCurrentInstances fepC</pre>		
CronJobs	450 451 452	Tepstatus: fepClusterReady: true		

- 10. Operator also masks the sensitive fields like passwords, passphrase, certificates and keys in FEPCluster fepChildCrVal and also in child CRs.
- 11. For further information, see the Fujitsu Enterprise Postgres 16 for Kubernetes Manuals .