Configuring JMS on Weblogic Server 12c
Oracle Banking Treasury Management
Release 14.6.2.0.0
Part No. F75605-01
[November] [2022]

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Table of Contents

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1.   Introduction

1.1 <u>Introduction</u>

Below is brief description on major components in Weblogic JMS Server architecture.

1.2 <u>Purpose</u>

The purpose of this document is to explain the steps required for JMS Configuration for

1) OBTR 14.5.2.0.0

2) WebLogic Server 12.1.4.0.0

<u>JMS Server</u>

JMS server acts as management container for JMS queue and topic resources defined within JMS modules that are targeted to specific that JMS server. A JMS server's main responsibility is to maintain persistent storage for these resources, maintain the state of durable subscriber and etc. JMS servers can host a defined set of modules and any associated persistent storage that reside on a WebLogic Server instance

<u>JMS Module</u>

JMS modules are application-related definitions that are independent of the domain environment. JMS modules group JMS configuration resources (such as queues, topics, and connections factories). These are outside domain configuration. JMS modules are globally available for targeting to servers and clusters configured in the domain and therefore are available to all the applications deployed on the same targeted. JMS modules contain configuration resources, such as standalone queue and topic destinations, distributed destinations, and connection factories.

<u>Subdeployment</u>

Subdeployment is also known as Advanced Targeting. Subdeployment resource is a bridge between the group of JMS resources and JMS Servers. When you create a JMS resource you need to choose one Subdeployment.

<u>JMS Resources</u>

1) **Queue** defines a point-to-point destination type, which are used for asynchronous peer communications. A message delivered to queue is distributed to only one customer.

2) **Topic** defines a publish/subscribe destination type, which are used for asynchronous peer communication. A message delivered to topic is distributed to all topic consumers

3) **Distributed queue** defines a set of queues that are distributed on multiple JMS servers, but are accessible as a single, logical queue to JMS clients

4) **Distributed topic** defines a set of topics that are distributed on multiple JMS servers, but which as accessible as a single, logical topic to JMS clients.

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5) **Uniform Distributed Queue**: queue members are created uniformly from a common configuration.

Persistence store

A persistent store provides a built-in, high-performance storage solution for weblogic server subsystems and services that required persistence. There are two type of mechanism to store the message
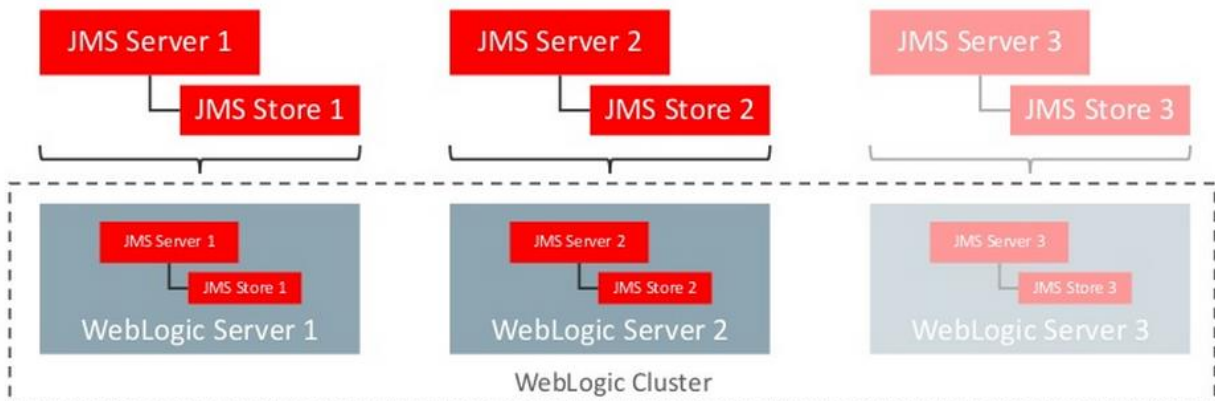
1) File based persistence store –> Message is stored in a file

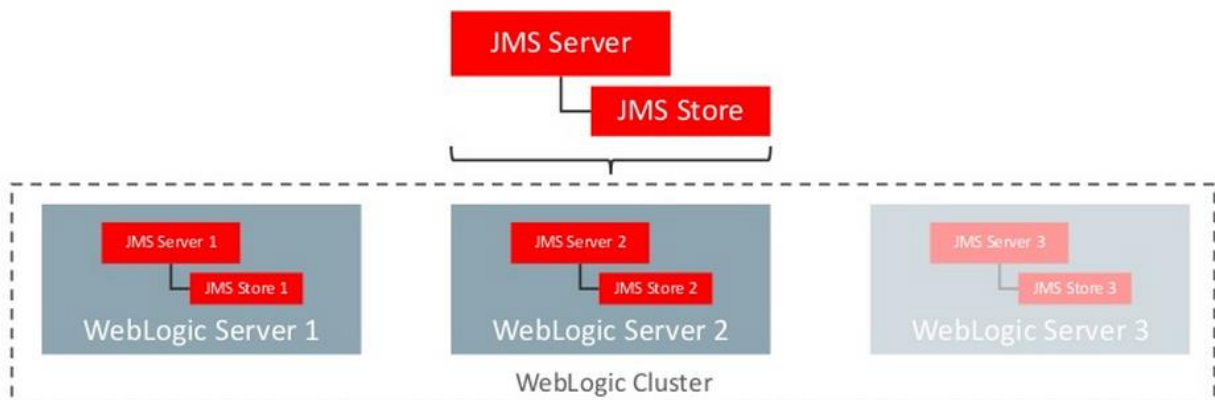2) DB based persistence store –> Message is stored in Database.

1.3 Weblogic 12c New Features

Before weblogic 12c JMS Servers and stores are targeted to individual WLS Servers. Scaling up requires configure the JMS server, the store and target it to new WLS Server

In 12c JMS Servers and stores are targeted to WLS cluster. Scaling up requires to add a WLS server to the cluster.

Architecture previous to 12c

JMS Server 1 — JMS Store 1
JMS Server 2 — JMS Store 2
JMS Server 3 — JMS Store 3

JMS Server 1 — JMS Store 1 — WebLogic Server 1
JMS Server 2 — JMS Store 2 — WebLogic Server 2
JMS Server 3 — JMS Store 3 — WebLogic Server 3

WebLogic Cluster

Architecture in 12c

JMS Server — JMS Store

JMS Server 1 — JMS Store 1 — WebLogic Server 1
JMS Server 2 — JMS Store 2 — WebLogic Server 2
JMS Server 3 — JMS Store 3 — WebLogic Server 3

WebLogic Cluster

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1.4 Components Diagram & Data Flow

Below is the flow diagram which indicates various components that are used and the document explain steps to create.

Servers Involved:

A. External System interacts with the application server
B. Application Server can be Weblogic or Websphere and has managed servers clusterd
C. JMS Provider exposes the Queue's and this can be Weblogic or Websphere. Here JMS_MODULE is deployed on 2 new MS's but it can be done even on MS's that are part of Cluster-APP(MS1-MS4)
D. FileStore is the persistance store which stores the messages, this can be database or clustered file system
E. Database Server which has FCUBS database

Data Flow:

1. External System sends message to MDB_MODULE
2. MDB_MODULE internally sends message to JMS_MODULE
3. JMS_MODULE stores message in FILESTORE. A request queue is formed at FILESTORE as and when messages are received
4. Message is sent to JMS_MODULE in FIFO
5. Message is sent to MDB_MODULE
6. GWMDB application picks up the message for processing
7. GWMDB after validating against XSD sends message to FCUBS database for processing
8. Response from DB to MDB
9. Response from MDB to MDB_MODULE
10. MDB_MODULE sends response to JMS_MODULE
11. RESPONSE is stored in FILESTORE. A response queue is formed in FILESTORE as and when messages are received
12. Message is sent to JMS_MODULE in RESPONSE QUEUE in FIFO
13, 14. External system to read the response message from Response Queue

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2. Pre-Requisites

The document assumes that the below are created before proceeding JMS creation.

2.1 Machines

MAC-1 & MAC-2

2.2 Dynamic Clusters and Managed Servers

Ensure Dynamic cluster for OBTR (4 Managed Servers) and Dynamic cluster for JMS Deployment (2 Managed Servers)

2.3 DataSource

Ensure that DataSource required for the MDB ear is created with Target as Cluster-App

2.4 Shared Folder

A shared folder for File Store Creation is required and this folder should be accessible across both the servers (eg, NFS mount).

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3.   JMS Configuration

3.1   Persistence Store Creation

1)   Navigate to Services → Persistent Stores→New →**Create** FileStore
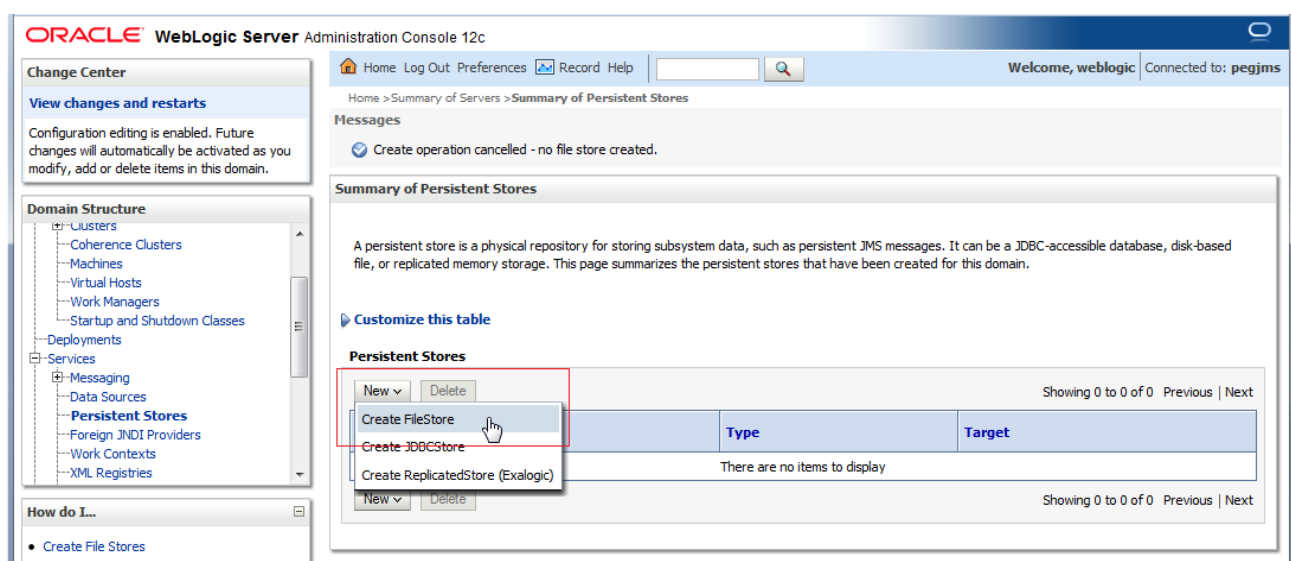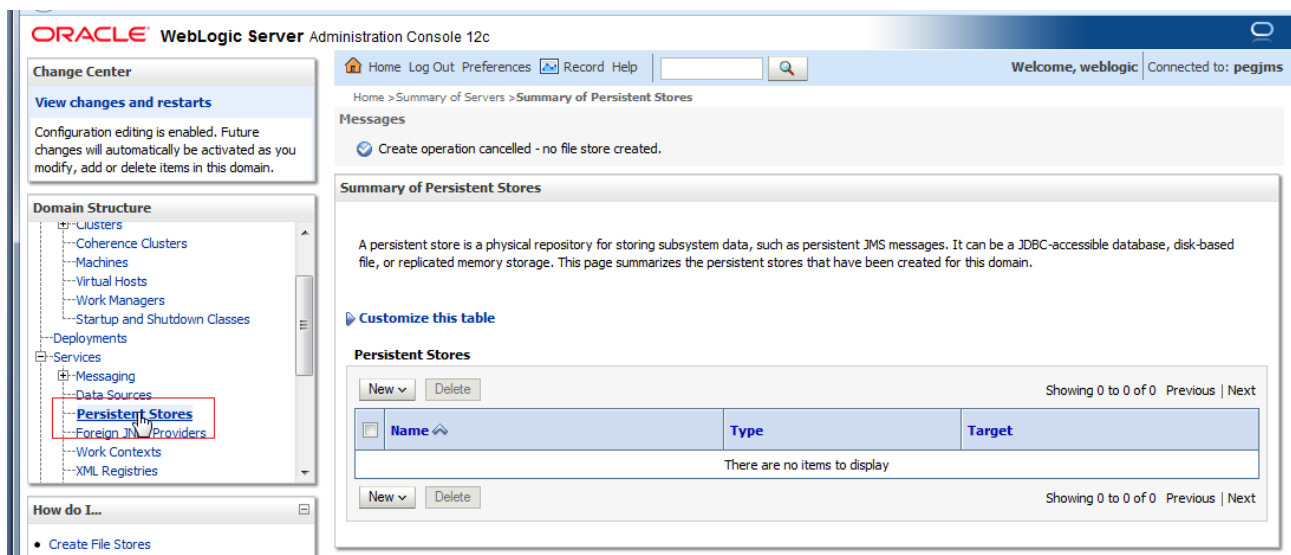
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2) Select **Cluster-JMS** under target dropdown and Click on OK

3) **FileStore-1** is created

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3.2 JMS Server Creation

1) Navigate to Services → Messaging → JMS Servers → Click on **New**
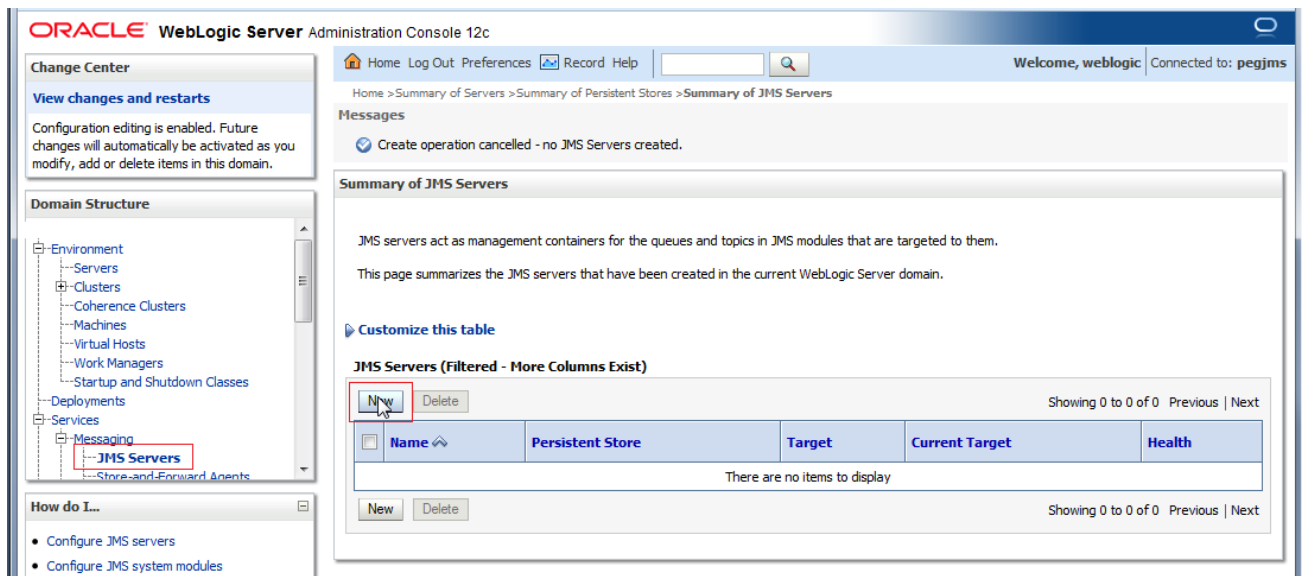
2) Select FileStore-1 , Click **Next**

3) Select Target as Cluster-JMS and click on **Finish**

4) JMS-Server-1 is created

5) In NFS below filestores can be seen

```
[root@        JMS_FILESTORE]# ll
total 2056
-rw-r----- 1 wl12c oinstall 1049088 Jun 16 14:10 FILESTORE-1@DC_JMS_1000000.DAT
-rw-r----- 1 wl12c oinstall 1049088 Jun 16 14:10 FILESTORE-1@DC_JMS_2000000.DAT
[root@        JMS_FILESTORE]# pwd
/scratch/work_area/JMS_FILESTORE
[root@        JMS_FILESTORE]#
```

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3.3 Cluster Configuration for Service Migration

1) Click on Environment → Clusters → Cluster-JMS

2) Click on **Migration** Tab

3) Change Migration Basis to Consensus and Click on **Save**

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4.   JMS Module Creation

4.1   Module Creation

1)   Navigate to Services → Messaging → JMS Modules and Click on **New**.
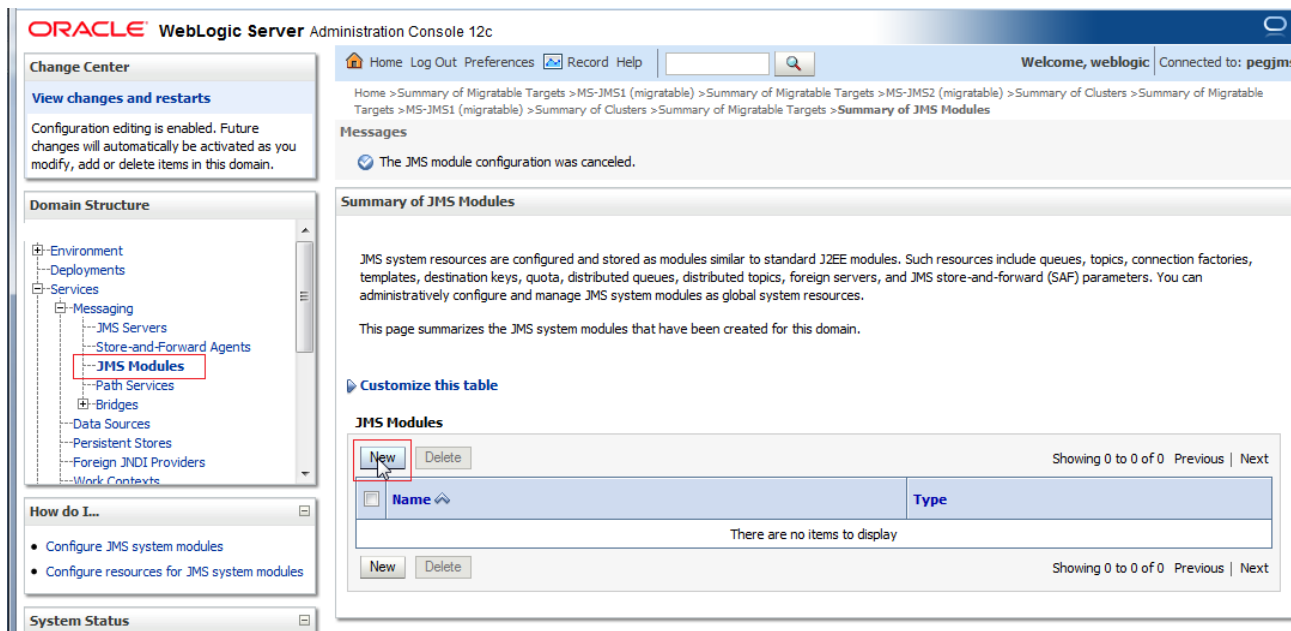
2)   Enter name as JMS_MODULE and Click on **Next**
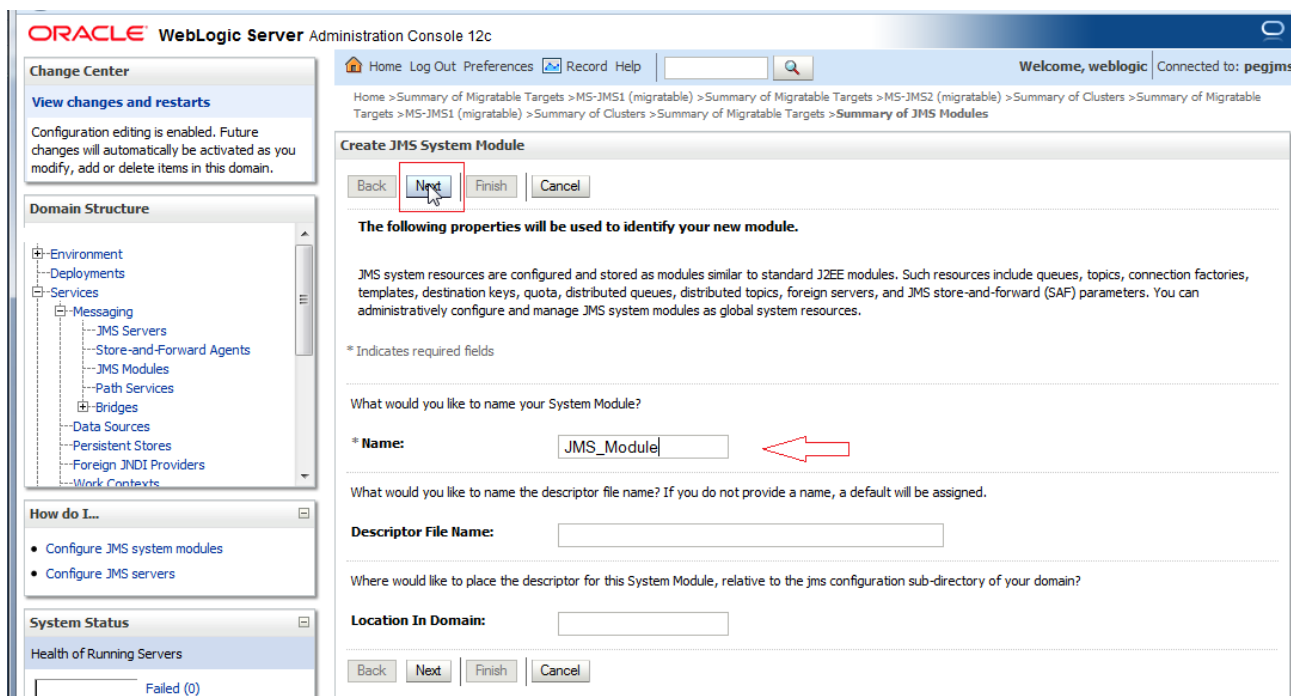
3)   Select Target as Cluster-JMS and Click on **Next**
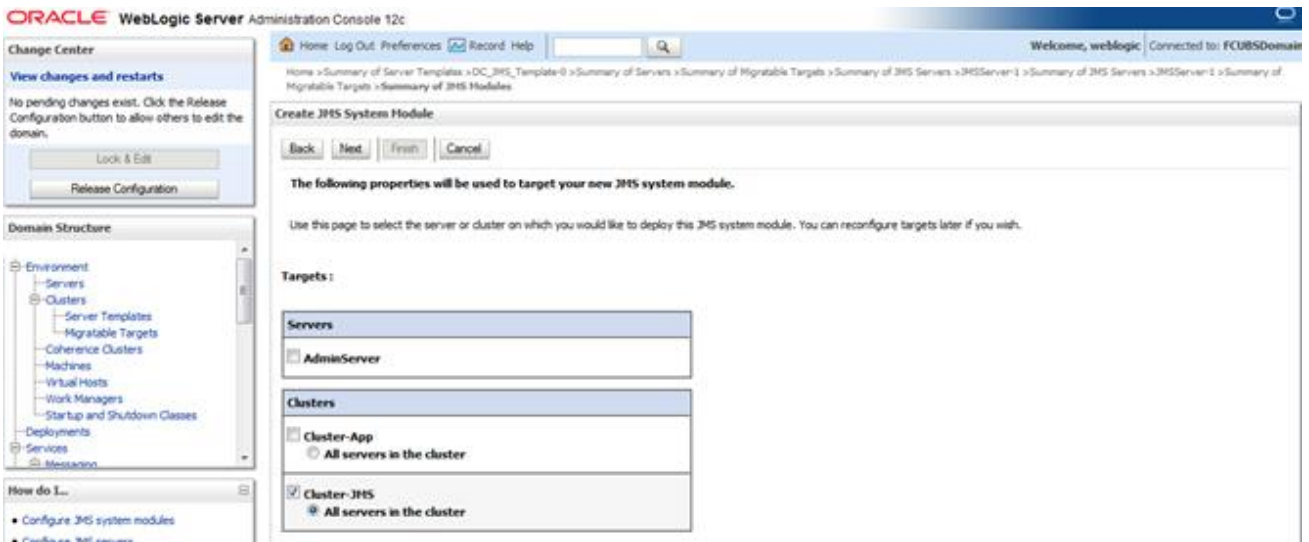
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4) Select the checkbox and Click on **Finish**
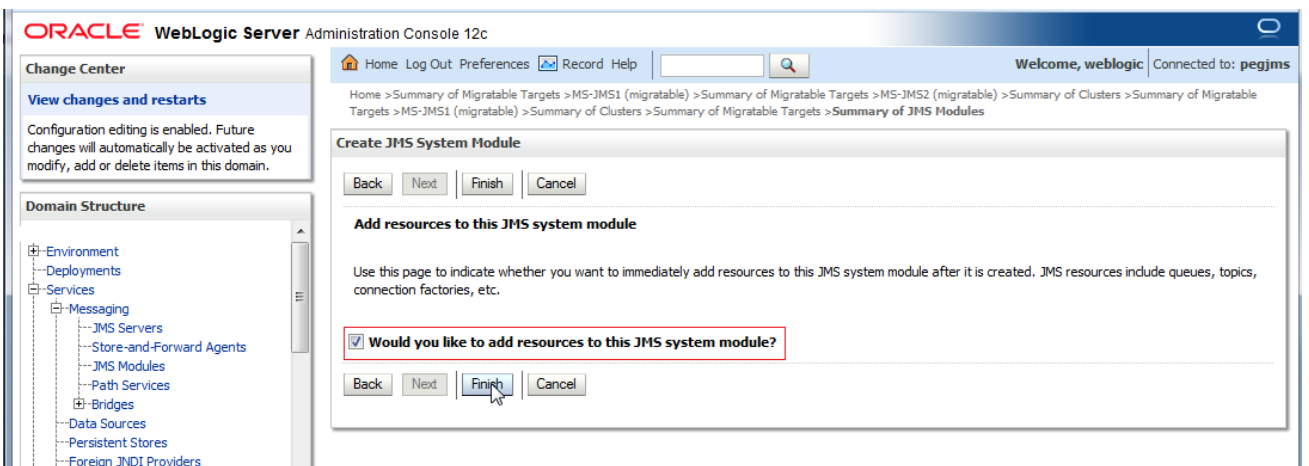
5) JMS_MODULE is created
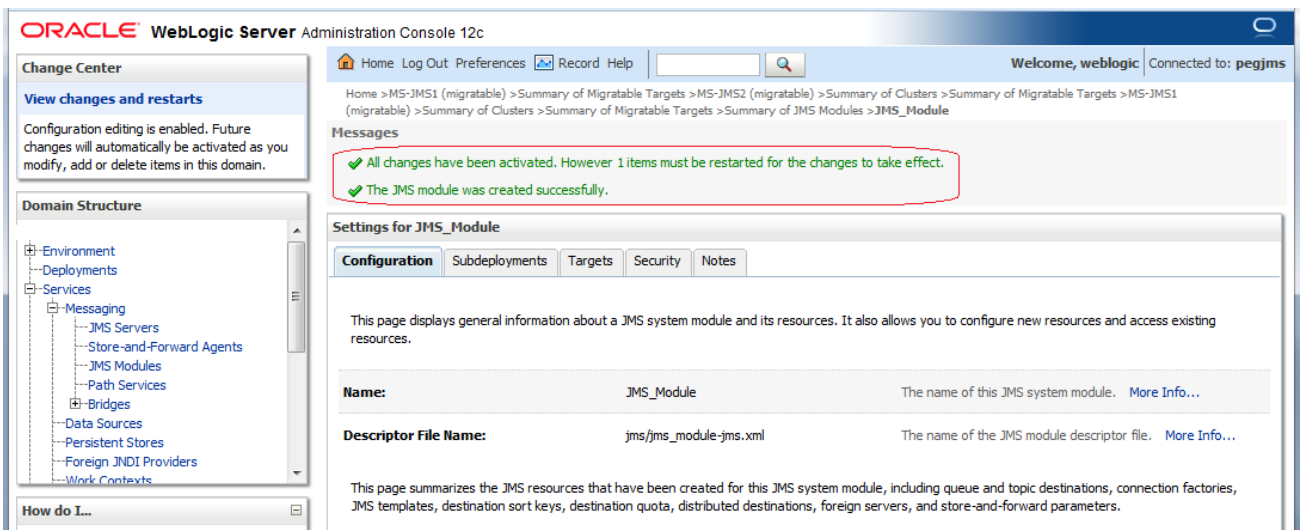
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4.2 Sub Deployment Creation

1) In JMS_MODULE, Click on Sub Deployment tab , Click on **New**

2) Enter name as JMS_SUB and click on **Next**

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3) Select Target as Cluster-JMS and Click on **Finish**

4) Sub-Deployment is created

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4.3   Resource Creation

4.3.1   Queue Creation

1) In JMS_MODULE Click on **New**

2) Select Distributed Queue and Click on **Next**

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3) Enter the queue name and Click on **Next.**
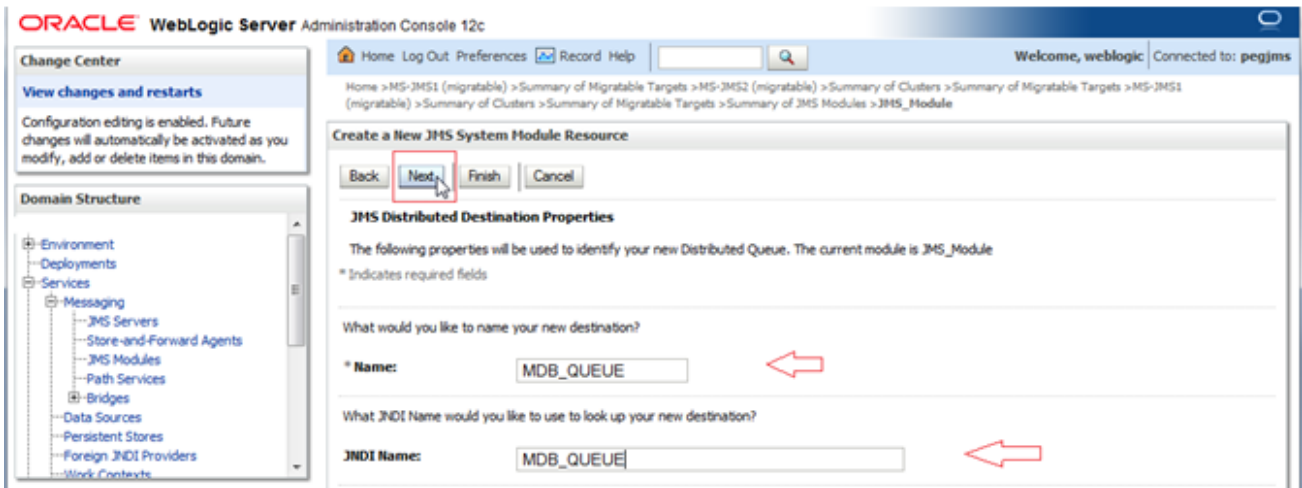
4) Click on **Advance Targeting.**
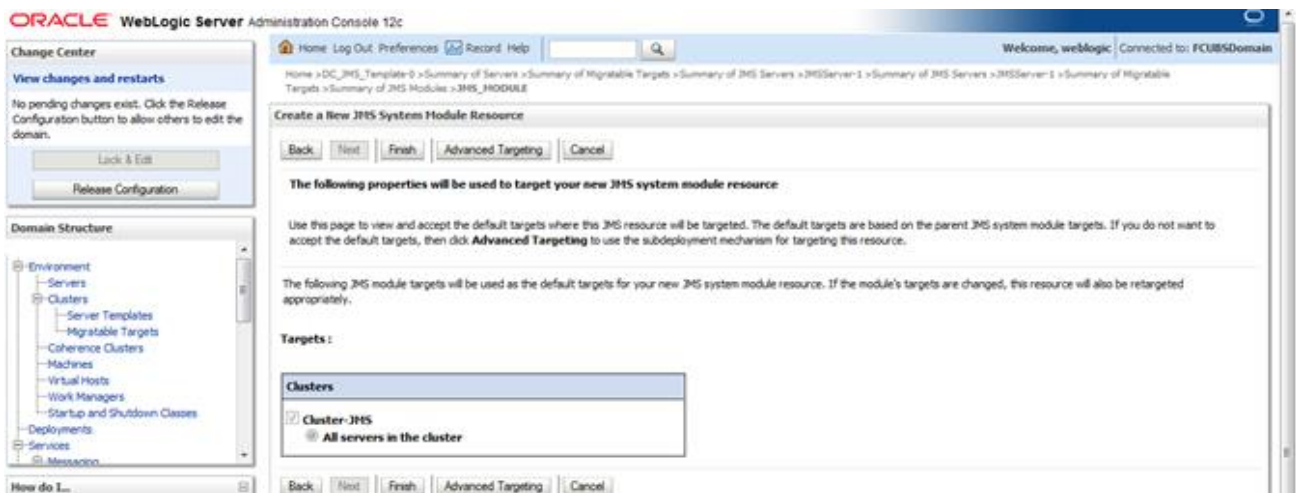
5) Select Subdeployement as JMS_SUB and Click on **Finish.**

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6) MDB_QUEUE is created

7) Similarly Create MDB_QUEUE_RESPONSE and MDB_QUEUE_DLQ

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4.3.2 Connection Factory Creation

1) In JMS_MODULE, Click on **New**

2) Select Connection Factory and click on **Next**

3) Enter the Name and Click on **Next**

4) Click on **Advance Targeting**

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5) Select JMS_SUB and Click on **Finish**

6) Connection Factory is **Created**.
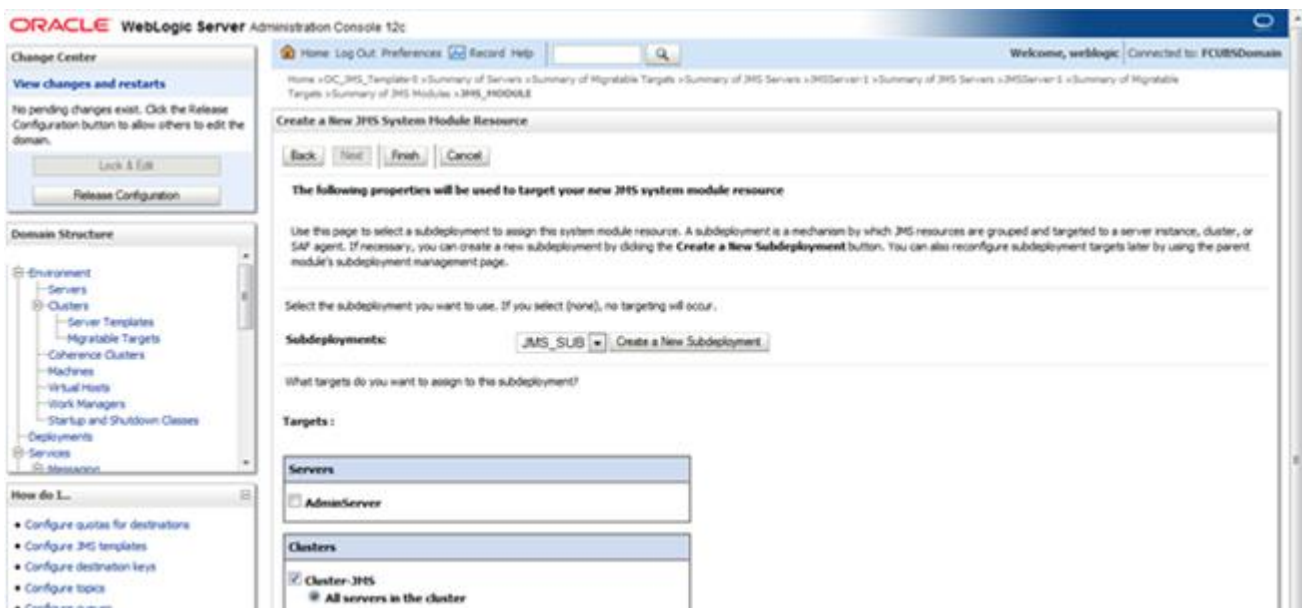
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ORACLE® WebLogic Server Administration Console 12c

Change Center

View changes and restarts

Configuration editing is enabled. Future changes will automatically be activated as you modify, add or delete items in this domain.

Domain Structure

- Environment
- Deployments
- Services
  - Messaging
    - JMS Servers
    - Store-and-Forward Agents
    - JMS Modules
    - Path Services
    - Bridges
  - Data Sources
  - Persistent Stores
  - Foreign JNDI Providers
  - Work Contexts

How do I...

No task help found.

System Status

Health of Running Servers

	Failed (0)
	Critical (0)
	Overloaded (0)
	Warning (0)
	OK (1)

Home Log Out Preferences Record Help

Welcome, weblogic | Connected to: pegjms

Home >MS-JMS1 (migratable) >Summary of Migratable Targets >MS-JMS2 (migratable) >Summary of Clusters >Summary of Migratable Targets >MS-JMS1 (migratable) >Summary of Clusters >Summary of Migratable Targets >Summary of JMS Modules >JMS_Module

Messages

✔ All changes have been activated. However 1 items must be restarted for the changes to take effect.
✔ Connection factory created successfully.

Settings for JMS_Module

| Configuration | Subdeployments | Targets | Security | Notes |

This page displays general information about a JMS system module and its resources. It also allows you to configure new resources and access existing resources.

Name: JMS_Module   The name of this JMS system module.   More Info...

Descriptor File Name: jms/jms_module-jms.xml   The name of the JMS module descriptor file.   More Info...

This page summarizes the JMS resources that have been created for this JMS system module, including queue and topic destinations, connection factories, JMS templates, destination sort keys, destination quota, distributed destinations, foreign servers, and store-and-forward parameters.

▷ Customize this table

Summary of Resources

New   Delete   Showing 1 to 4 of 4 Previous | Next

	Name ⌂	Type	JNDI Name	Subdeployment	Targets
☐	MDBQCF	Connection Factory	MDBQCF	JMS_SUB	Cluster-JMS
☐	MDB_QUEUE	Uniform Distributed Queue	MDB_QUEUE	JMS_SUB	Cluster-JMS
☐	MDB_QUEUE_DLQ	Uniform Distributed Queue	MDB_QUEUE_DLQ	JMS_SUB	Cluster-JMS
☐	MDB_QUEUE_RESPONSE	Uniform Distributed Queue	MDB_QUEUE_RESPONSE	JMS_SUB	Cluster-JMS

New   Delete   Showing 1 to 4 of 4 Previous | Next

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1) Increase the heap size of both DC_JMS_1 and DC_JMS_2 cluster

2) Select the cluster 'DC_JMS_Template-0' and

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3) Click on Server Start Tab and in Arguments Section enter **–XX:MaxPermSize=512m**

4) **Restart** the AdminServer and DC_JMS_1 and DC_JMS_2 managed servers.

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## 6.1	Module Creation

1)	JMS_Modules and Click on **New**

2)	Enter name as MDB_MODULE and click on **Next**

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3) Select target as Cluster-App and click on **Next**
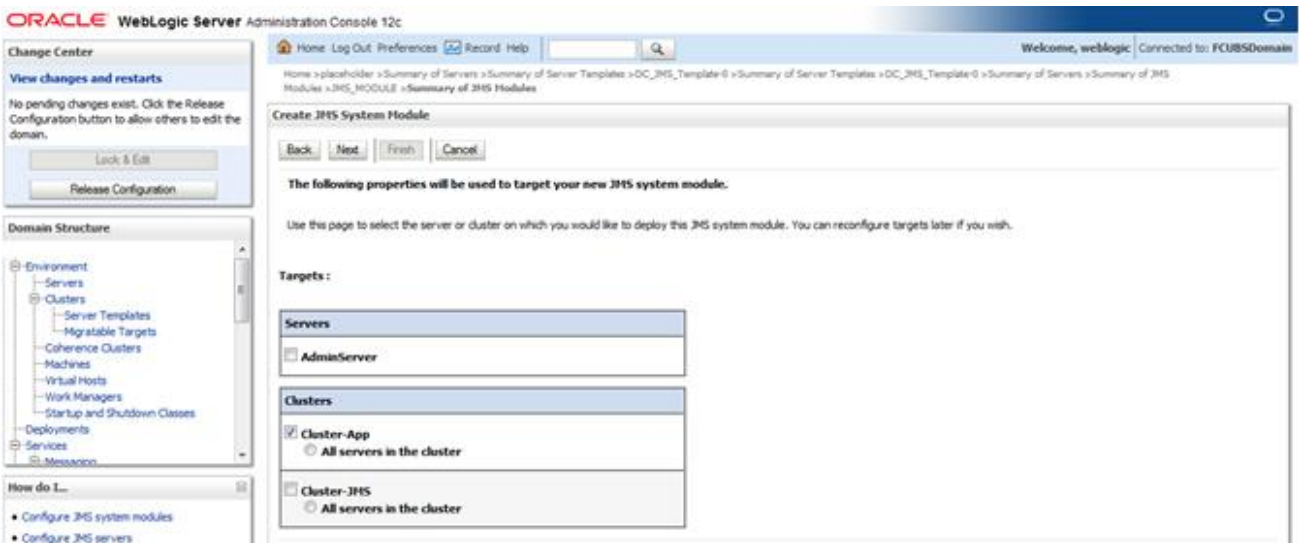
4) Select CheckBox and Click on **Finish**
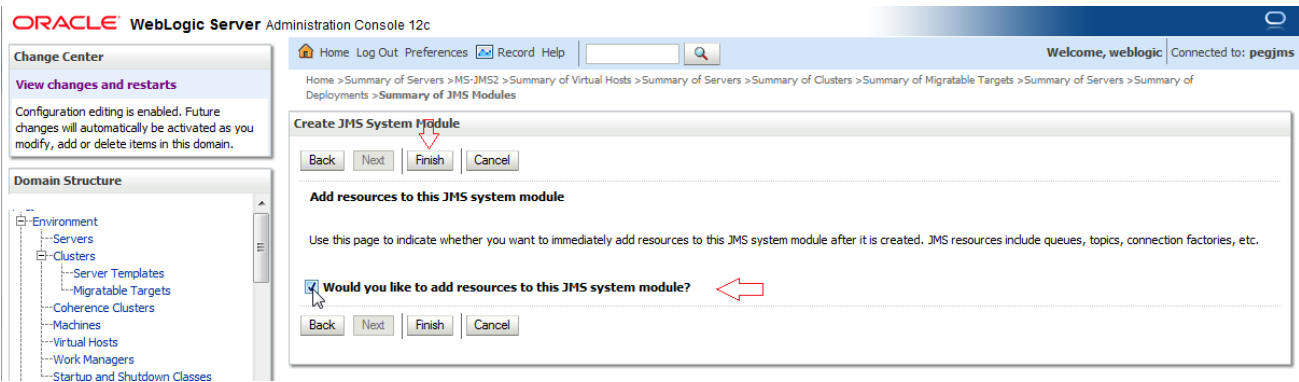
5) MDB_MODULE is **created**

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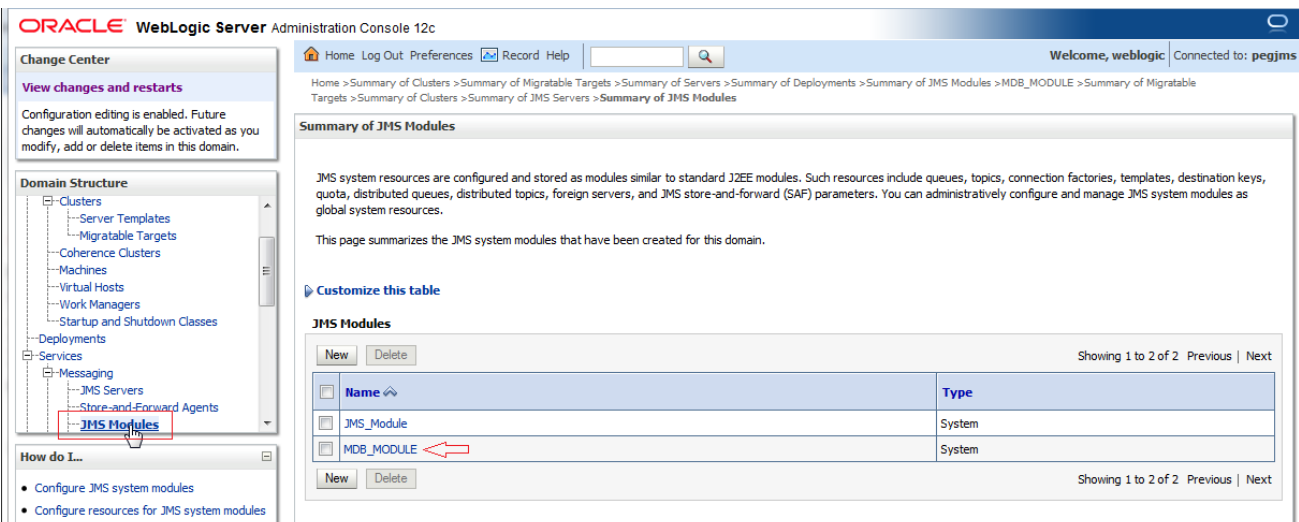
6.2 Foreign Server Creation

In MDB_MODULE, Click on New Resource, Select **Foreign Server**

1) Click on Configuration → **New**

2) Select Foreign Server and Click on **Next**

3) Enter name and Click on **Next**

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4) Click on Advanced Targeting

5) Click on Create New SudDeployment

6) Enter Name as MDB_SUB and Click on OK

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7) Select Target as Cluster-App and Click on Finish

8) Foreign Server is created

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6.3   Foreign Server Configuration

1)   Click on ForeignServer-1

2)   Enter the JNDI URL as Cluster URL(JMS Managed Servers) and Click on Save

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3) Click on Connection Factories

4) Create MDBQCF Connection Factory

5) Click on Destination

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6) Create MDB_QUEUE

7) Similarly Create MDB_QUEUE_RESPONSE, MDB_QUEUE_DLQ

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8) After all the resources are created, **Restart** the Admin and Managed Servers.

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7.   Application Deployment

1)   Deploy the EAR with Target as Cluster-App

2)   Health Should be OK if JMS is configured properly, otherwise Warning will be displayed

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Home Log Out Preferences Record Help

Welcome, weblogic | Connected to: **base_domain**

Home >Summary of Environment >Summary of Servers >Summary of Deployments >JMS Modules >MDB_MODULE >Summary of Environment >Summary of Servers >Summary of Deployments >GWMDB >Summary of Deployments

Change Center

View changes and restarts

Configuration editing is enabled. Future changes will automatically be activated as you modify, add or delete items in this domain.

Domain Structure

- Environment
- **Deployments**
- Services
  - Messaging
    - JMS Servers
    - Store-and-Forward Agents
    - JMS Modules
    - Path Services
    - Bridges
  - Data Sources
  - Persistent Stores
  - Foreign JNDI Providers
  - Work Contexts

How do I...

- Install an Enterprise application
- Configure an Enterprise application
- Update (redeploy) an Enterprise application
- Start and stop a deployed Enterprise application
- Monitor the modules of an Enterprise application

Summary of Deployments

| Control | Monitoring |

This page displays a list of Java EE applications and stand-alone application modules that have been installed to this domain. Installed applications and modules can be started, stopped, updated (redeployed), or deleted from the domain by first selecting the application name and using the controls on this page.

To install a new application or module for deployment to targets in this domain, click the Install button.

▷ **Customize this table**

Deployments

Install | Update | Delete | Start ∨ | Stop ∨   Showing 1 to 5 of 5 | Previous | Next

	Name ⌃	State	Health	Type	Deployment Order
☐	⊞ FCUBSApp	Active	✔ OK	Enterprise Application	100
☐	⊞ GWEJB	Active	✔ OK	Enterprise Application	100
☐	⊞ GWMDB	Active	✔ OK	Enterprise Application	100
☐	jax-rs(1.1,1.9)	Active		Library	100
☐	⊞ SWEJB	Active	✔ OK	Enterprise Application	100

Install | Update | Delete | Start ∨ | Stop ∨   Showing 1 to 5 of 5 | Previous | Next

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8. Frequently Asked Questions

8.1 Application and JMS Cluster Deployed on Same Cluster

Application and JMS Module can be deployed on the same cluster. In this document both are on different clusters, however it is possible to deploy on the one cluster. When it is deployed on same cluster then

1) Foreign Server Creation is not required

2) Targets should be given accordingly during Sub Deployment Creation

8.2 Application Shows Warning upon Restart of Managed Servers

Managed Servers Start Order

1) Stop all managed servers.

2) Start only the JMS Cluster managed servers.

3) After these are started then start the App Cluster managed servers.

Even after proper JMS setup when the managed servers are restarted Health of the Application is Warning

1) Force Stop the Application

2) Then Start the Application, this would resolve the Warning and the Health of Deployment is changed to OK.

8.3 Securing File Store Data

In order to properly secure file store data, set appropriate directory permissions on all file store directories. If data encryption is required, use appropriate third-party encryption software.

8.4 t3s Protocol

To secure the communication with the JMS Server use t3s protocol instead of t3. This is applicable when connecting to the connection factory to send or receive messages and also in the JNDI Connection URL provided in foreign server creation.

NOTE: when using the t3s protocol SSL Listen Port Enabled should be checked in server template and the port number used in the URL should be secure port.

8.5 How to Test the Deployment

1) Navigate to Services → JMS Modules → JMS_MODULE → MDB_QUEUE → MONITORING

2) Select any one Server and Click on Show Messages

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3) Click on New and enter the Message in Body and Click on OK

Change Center

View changes and restarts

Configuration editing is enabled. Future changes will automatically be activated as you modify, add or delete items in this domain.

Home >Configuration >MDBQCF >JMS Modules >JMS_MODULE >MDB_QUEUE >Summary of JMS Messages >JMS Modules >JMS_MODULE >MDB_QUEUE >**Summary of JMS Messages**

Produce JMS Message

OK Cancel

JMS Message

The following properties will be used to produce a JMS message.

Domain Structure

- Environment
  - Servers
  - Clusters
  - Virtual Hosts
  - Migratable Targets
  - Coherence Servers
  - Coherence Clusters
  - Machines
  - Work Managers
  - Startup and Shutdown Classes
- Deployments
- Services
  - Messaging

How do I...

- Manage queue messages
- Manage distributed queue messages
- Manage topic durable subscribers

System Status

Health of Running Servers

| Failed (0) |
| Critical (0) |
| Overloaded (0) |

Type:	
Correlation ID:	
Expiration:	
Priority:	4 ▼
Delivery Mode:	Persistent ▼
Delivery Time:	-1
Redelivery Limit:	-1

Body:

4) Message is Sent

View changes and restarts

Configuration editing is enabled. Future changes will be activated as you modify, add or delete items in this domain.

Home >Configuration >MDBQCF >JMS Modules >JMS_MODULE >MDB_QUEUE >Summary of JMS Messages >JMS Modules >JMS_MODULE >MDB_QUEUE >**Summary of JMS Messages**

Messages

✔ JMS message sent successfully.

Summary of JMS Messages

Domain Structure

- Environment
  - Servers
  - Clusters
  - Virtual Hosts
  - Migratable Targets
  - Coherence Servers
  - Coherence Clusters
  - Machines
  - Work Managers
  - Startup and Shutdown Classes
- Deployments
- Services
  - Messaging

This page summarizes the available messages for a stand-alone queue, a distributed queue, or a topic durable subscriber. Use this page to view message details, create new messages, delete selected messages, move messages to another destination, export message contents in XML format to another file, import XML formatted message contents from another file, or drain all the messages from a destination.

Click on a message to view its contents.

Message Selector: | | Apply

▷ **Customize this table**

JMS Messages (Filtered - More Columns Exist)

How do I...

- Manage queue messages
- Manage distributed queue messages
- Manage topic durable subscribers

| New | Delete ⌄ | Move ⌄ | Import | Export ⌄ | | Showing 1 to 1 of 1 Previous | Next |

	ID ⌃	CorrId	Time Stamp	State String	JMS Delivery Mode	Message Size
☐	ID:<257876.1411126889162.0>		Fri Sep 19 17:11:29 IST 2014	receive transaction	Persistent	472

| New | Delete ⌄ | Move ⌄ | Import | Export ⌄ | | Showing 1 to 1 of 1 Previous | Next |

System Status

Health of Running Servers

| Failed (0) |
| Critical (0) |
| Overloaded (0) |

5) Verify at backend or in the MDB log if the message is processed successfully.

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8.6 Increase maximum number of message-driven bean threads

Default number of consumers for an MDB is 16. To increase or restrict this number create Custom Work Manager with a Max Threads Constraint in conjunction with MDBs.

The solution is to create a work manager with a max threads constraint and assign the proxy services dispatch policy to this work manager.

Steps to create custom work manager

1) Modify the MDB deployment descriptior and redploy the EAR

2) Create Custom Workmanager and add constraints to limit the number of the max MDB threads

8.6.1 Modify weblogic-ejb-jar.xml

1) Add below line to the weblogic-ejb-jar.xml of the MDB Ear
<dispatch-policy>GWMDBWM</dispatch-policy>

2) Remove if any of the below tags present in weblogic-ejb-jar.xml
max-beans-in-free-pool and initial-beans-in-free-pool

3) Save the ear file and redeploy the EAR file.

8.6.2 Work Manager Creation

1) Login into weblogic console, navigate to Domain → Environment → WorkManager
   Create new workmanager with the name GWMDBWM(as mentioned in property file) by following below steps

2) Create new Max Thread Constraint and in the Count field give the desired thread count

3) Modify the newly created workmanager and assign the Maximum Thread Constraint that is created in above step.

4) Restart managed servers and notice the change in the number of consumers for the QUEUE's.

8.7 How High Availability is achieved

1) Application Server:
MDB_MODULE and the GWEJB ear are deployed in a cluster. Cluster has 4 managed servers, if any server goes down then the messages are processed by other managed servers.

2) JMS Provider:
JMS is deployed on 2 managed servers, JMSServer1 and JMSServer2, if any one goes down other will handle the messages.

3) FileStore:
File store is a cluster file system or database where if one node goes down then other will handle the requests.

4) DB Server:
Database is installed in RAC mode where it has more than 1 node, if a node goes down then other nodes will handle messages.

8.8 How to setup for Scheduler/Notifications

The above document can be used for setting up JMS for scheduler/notifications but additional queues and connection factory needs to be created.

8.9 What other modules uses JMS Queue's

JMS is used by following modules, relevant queues and factories needs to be created additionally

1) EMS for swift messages
2) GI for upload
3) ELCM
4) BIP

8.10 References

1) FCUBS_12.1_Weblogic12c_Middleware_Practices.doc
2) GATEWAY_Applications_WL.doc
3) Resource_Creation_WL.doc

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OBTR JMS Cluster Configuration 12c

[November] [2022]

Version 14.6.2.0.0

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