Configuring JMS on Weblogic Server 12c Oracle FLEXCUBE Universal Banking Release 14.5.3.0.0 Part No. F50379-01 [November] [2021]



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1. Introduction

1.1 Introduction

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

1.2 Purpose

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

- 1) FCUBS 12.1
- 2) WebLogic Server 12.1.3.0.0

JMS Server

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

JMS Module

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.

Subdeployment

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.

JMS Resources

- 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.
- 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.



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

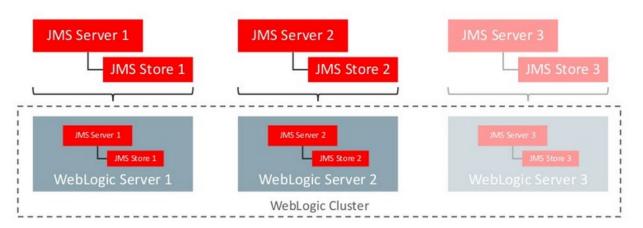
- 1) File based persistence store -> Message is stored in a file
- 2) DB based persistence store -> Message is stored in Database.

1.3 Weblogic 12c New Features

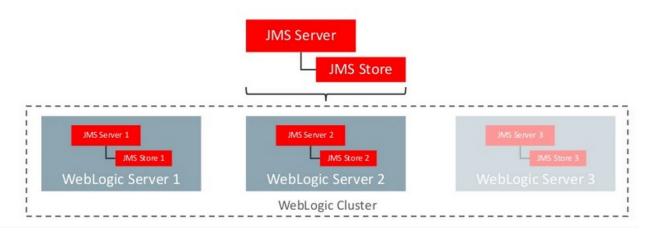
Before weblogic 12c JMS Servers and stores are targeted to individual WLS Servers. Scaling up requires configure the JMS server, the store and target it to new WLS Server

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



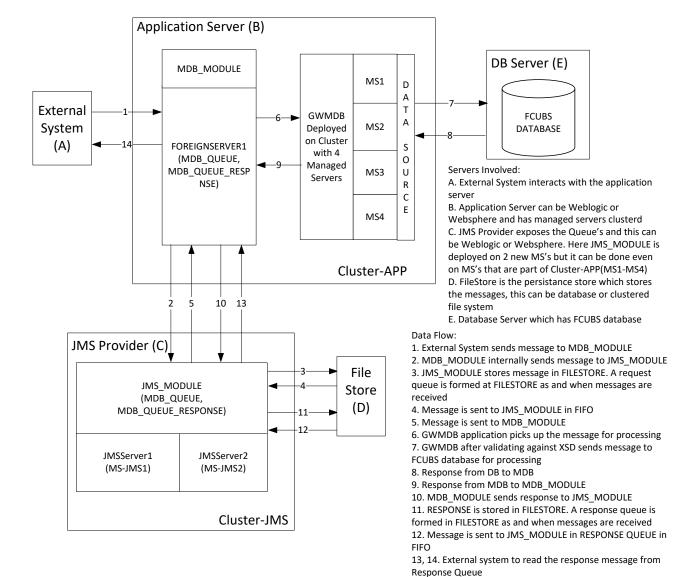
Architecture in 12c





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.



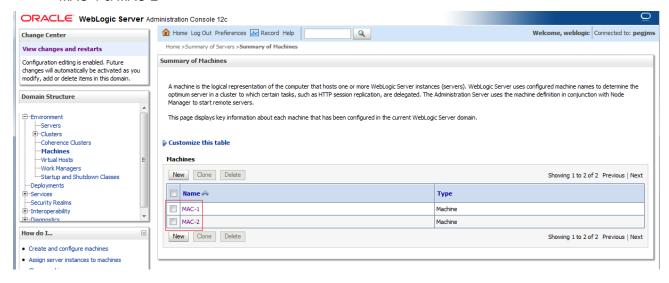


2. Pre-Requisites

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

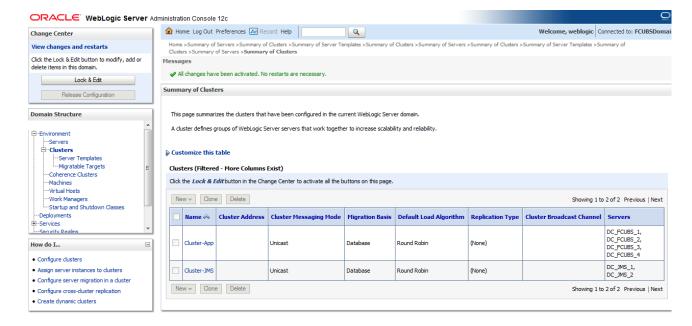
2.1 Machines

MAC-1 & MAC-2

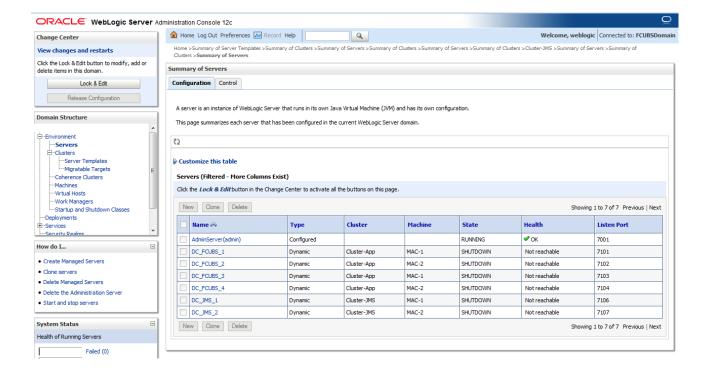


2.2 **Dynamic Clusters and Managed Servers**

Ensure Dynamic cluster for FCUBS (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).

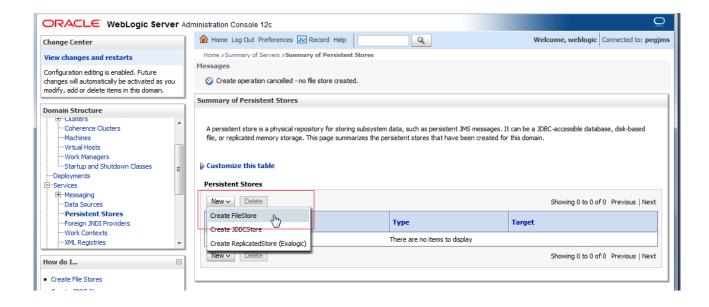


3. JMS Configuration

3.1 Persistence Store Creation

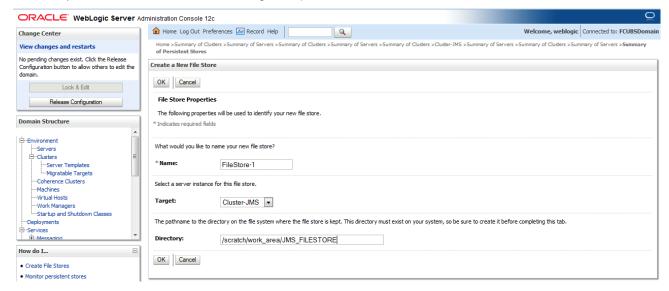
1) Navigate to Services → Persistent Stores→New → Create FileStore



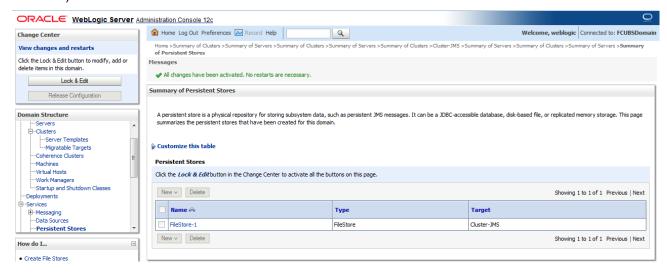




2) Select Cluster-JMS under target dropdown and Click on OK



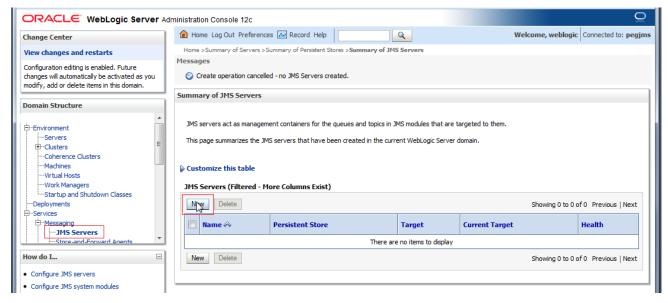
3) FileStore-1 is created



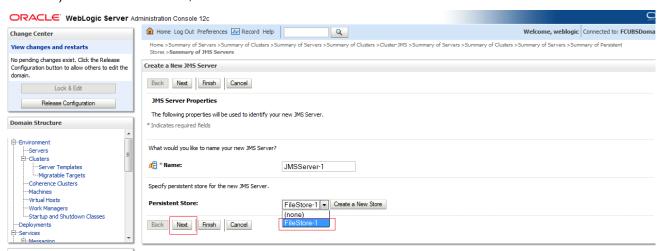


3.2 JMS Server Creation

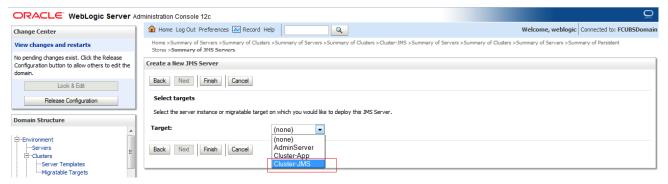
1) Navigate to Services → Messaging → JMS Servers → Click on **New**



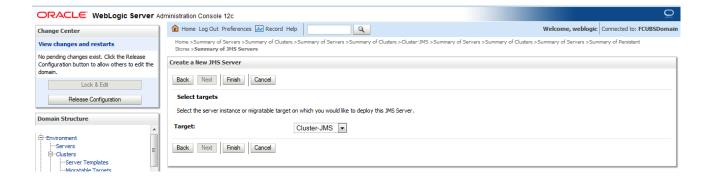
2) .Select FileStore-1, Click Next



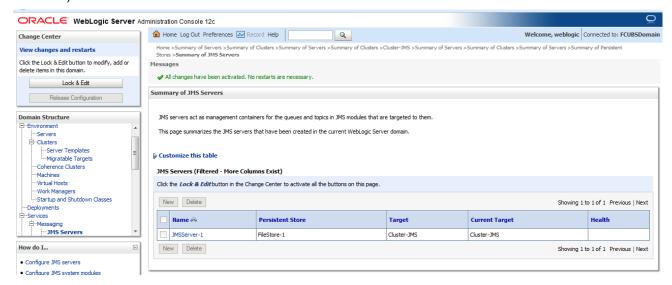
3) Select Target as Cluster-JMS and click on Finish







4) JMS-Server-1 is created

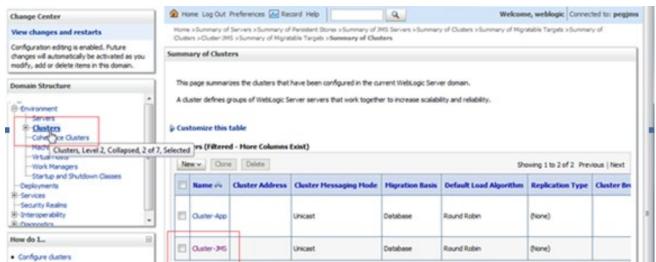


5) In NFS below filestores can be seen



3.3 Cluster Configuration for Service Migration

1) Click on Environment → Clusters → Cluster-JMS



2) Click on Migration Tab



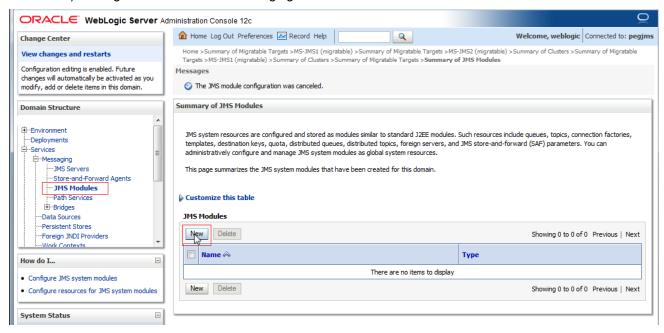
3) Change Migration Basis to Consensus and Click on Save



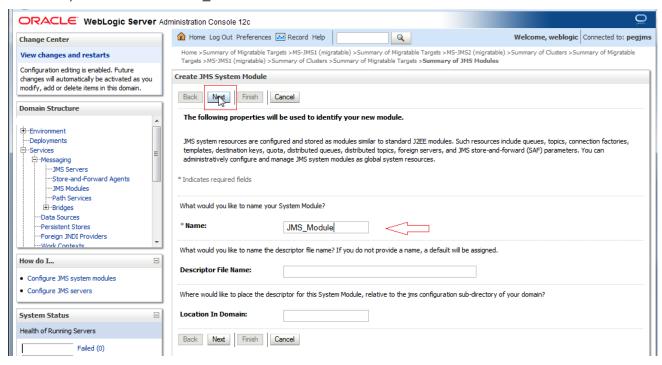
4. JMS Module Creation

4.1 Module Creation

1) Navigate to Services → Messaging → JMS Modules and Click on **New**.

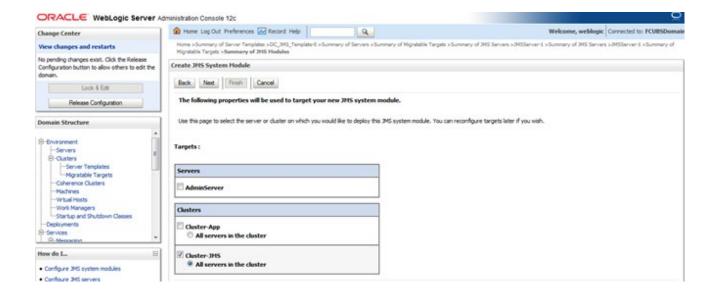


2) Enter name as JMS MODULE and Click on Next

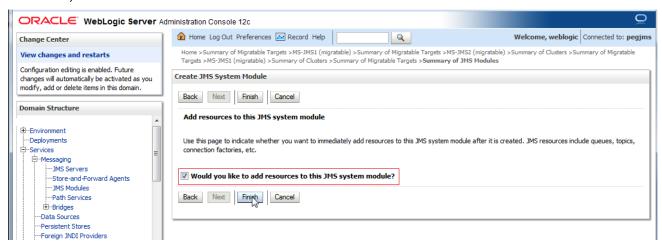


3) Select Target as Cluster-JMS and Click on Next

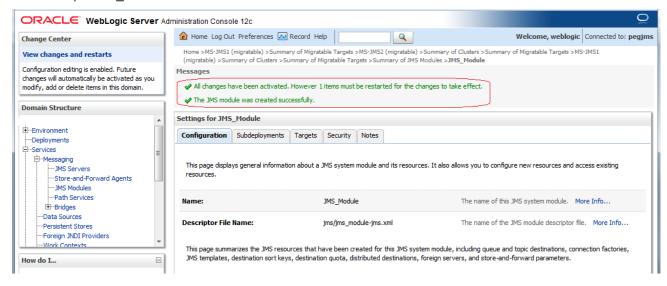




4) Select the checkbox and Click on Finish



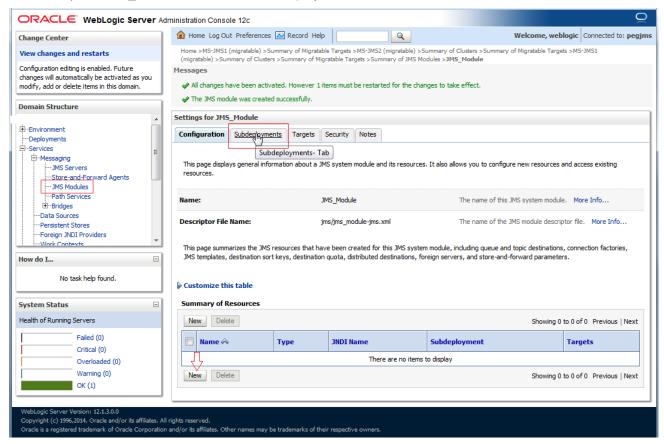
5) JMS MODULE is created



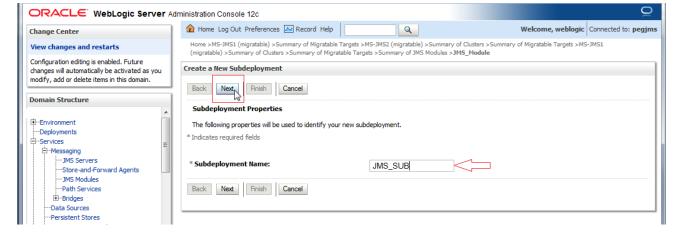


4.2 Sub Deployment Creation

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

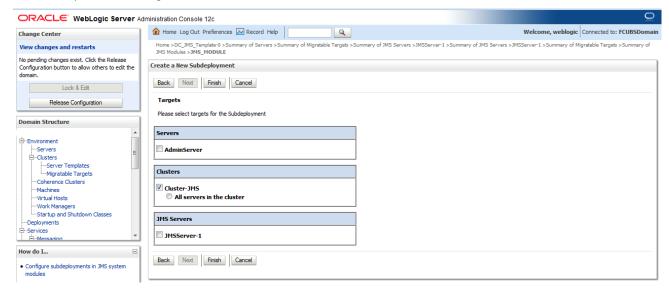


2) Enter name as JMS_SUB and click on Next

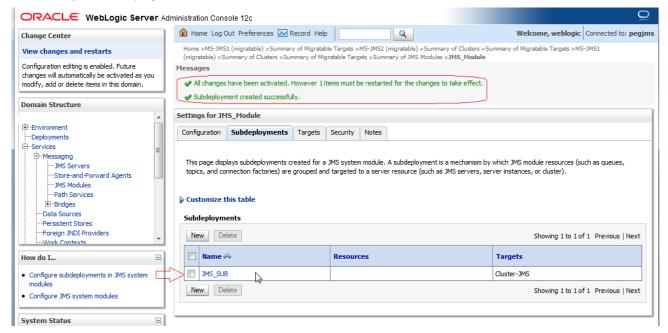




3) Select Target as Cluster-JMS and Click on Finish



4) Sub-Deployment is created

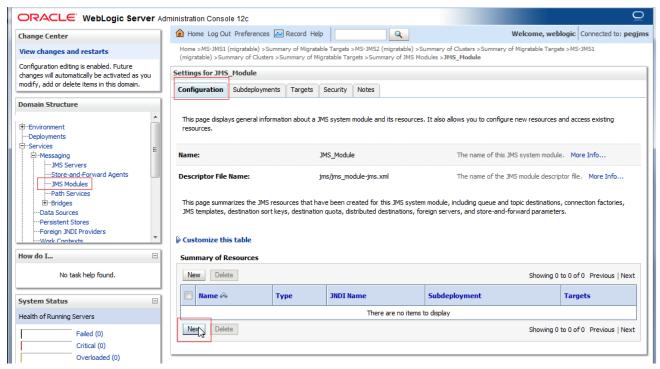




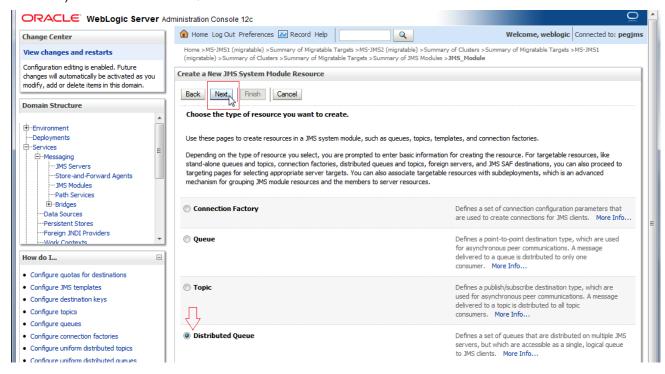
4.3 Resource Creation

4.3.1 Queue Creation

1) In JMS_MODULE Click on New

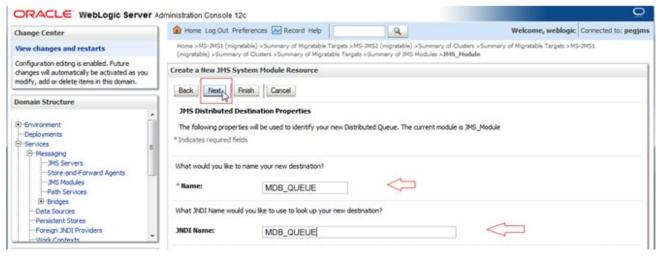


2) Select Distributed Queue and Click on Next

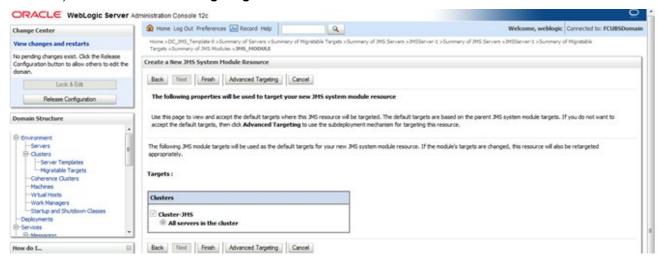


3) Enter the queue name and Click on Next

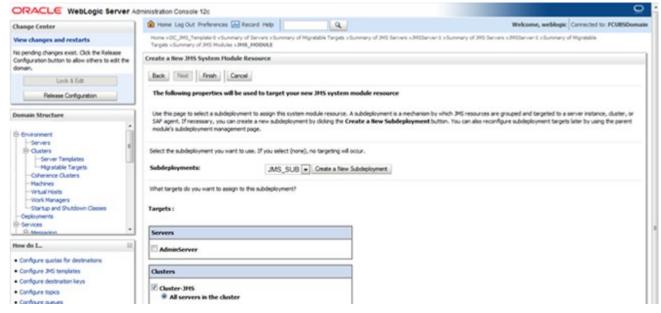




4) Click on Advance Targeting

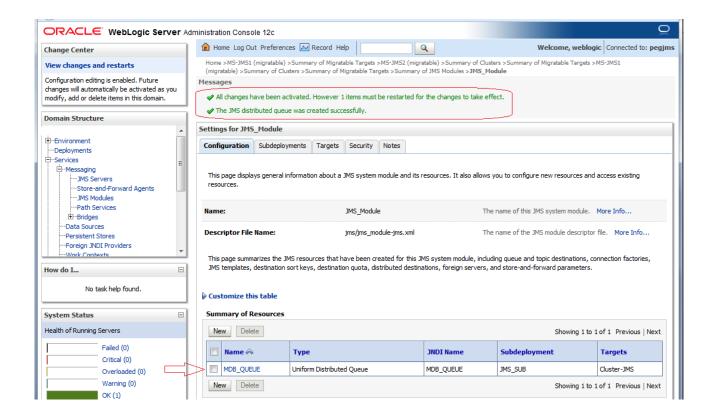


5) Select Subdeployement as JMS_SUB and Click on Finish

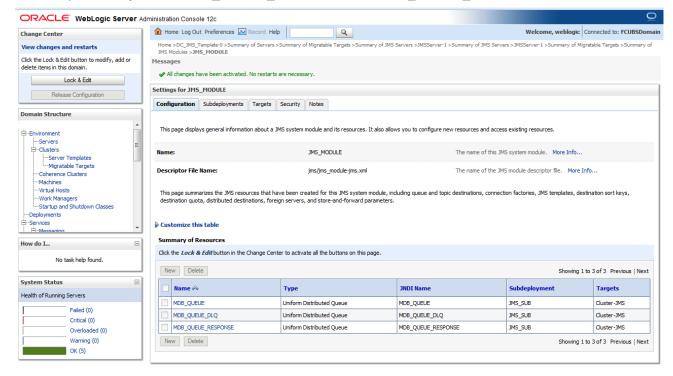


6) MDB QUEUE is created





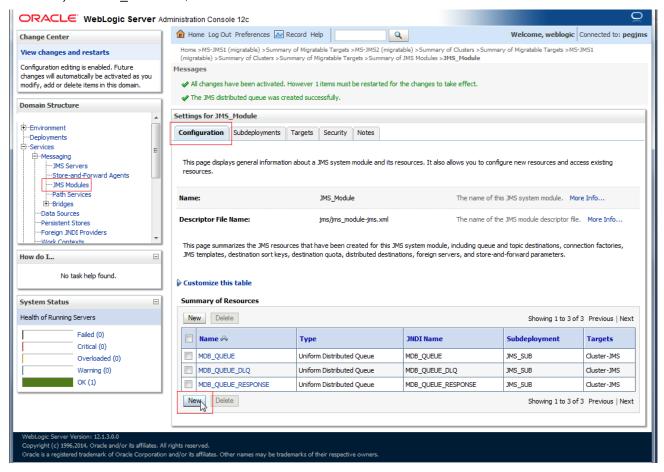
7) Similarly Create MDB_QUEUE_RESPONSE and MDB_QUEUE_DLQ



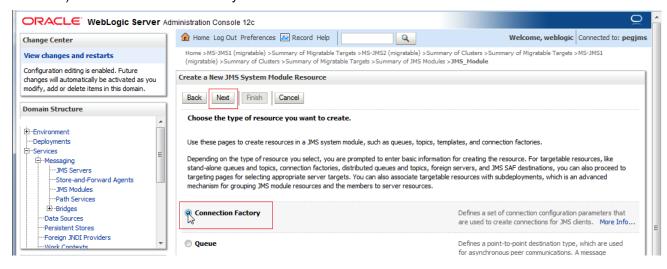


4.3.2 Connection Factory Creation

1) In JMS_MODULE, Click on New

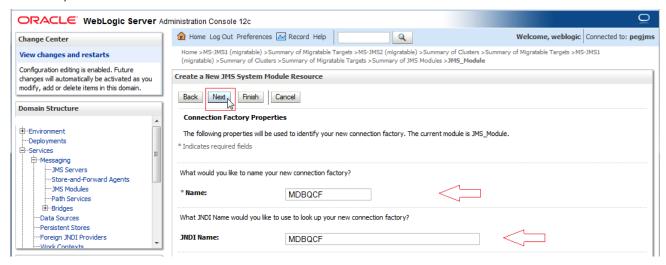


2) Select Connection Factory and click on Next

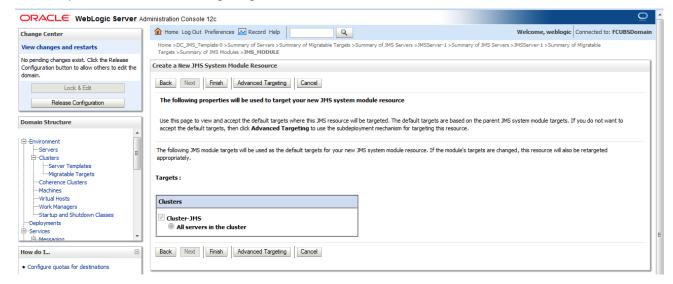




3) Enter the Name and Click on Next

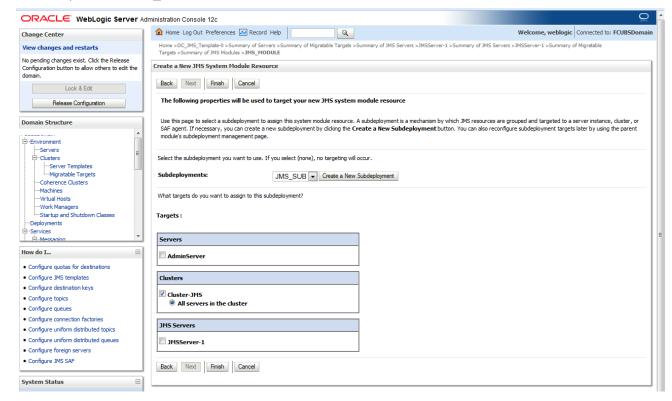


4) Click on Advance Targeting



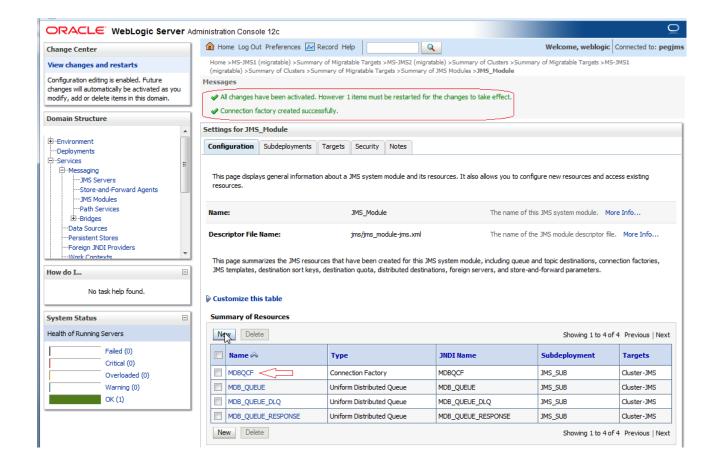


5) Select JMS_SUB and Click on Finish



6) Connection Factory is Created

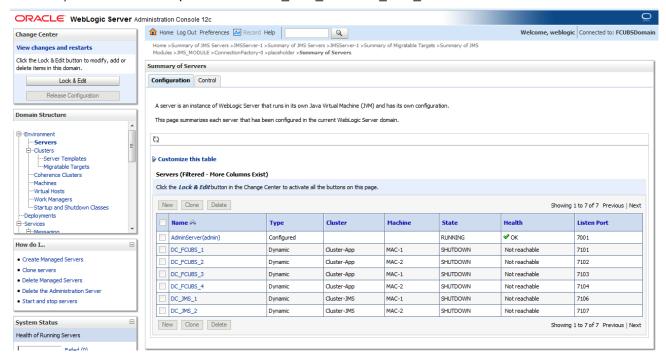




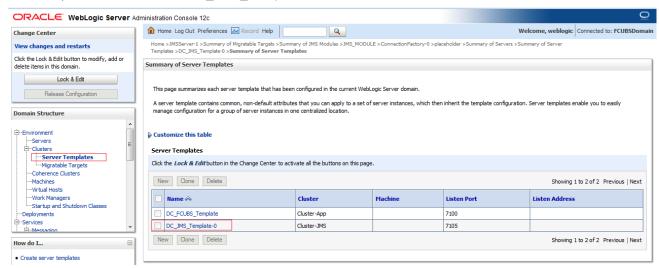


5. Server Restart

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

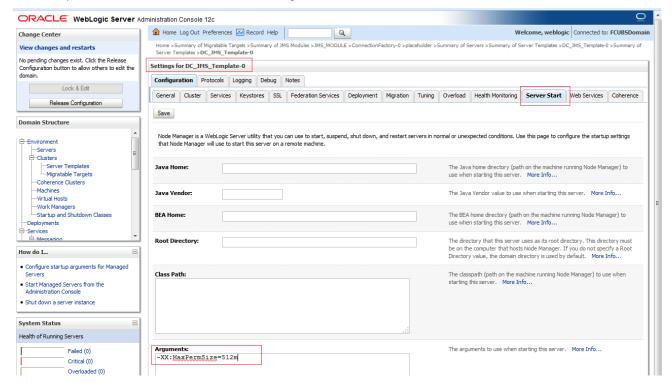


2) Select the cluster 'DC_JMS_Template-0' and





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



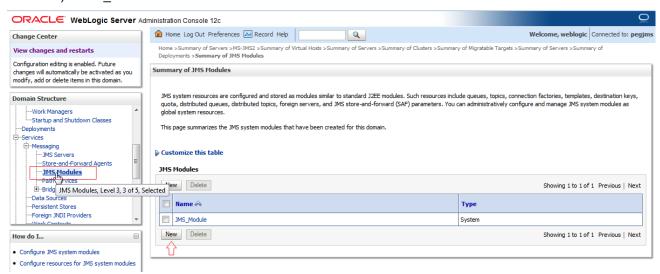
4) Restart the AdminServer and DC_JMS_1 and DC_JMS_2 managed servers.



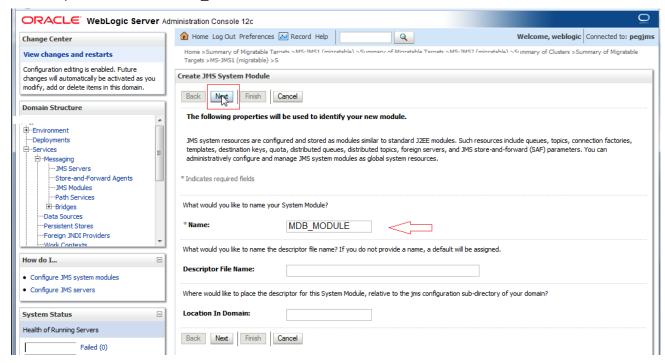
6. Foreign Server Creation

6.1 Module Creation

1) JMS_Modules and Click on New

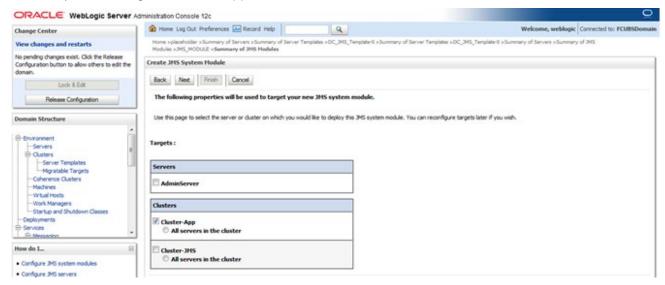


2) Enter name as MDB_MODULE and click on Next

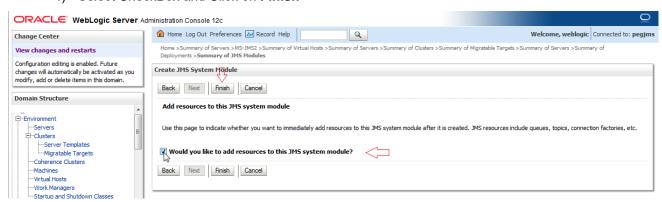




3) Select target as Cluster-App and click on Next



4) Select CheckBox and Click on Finish



5) MDB MODULE is created



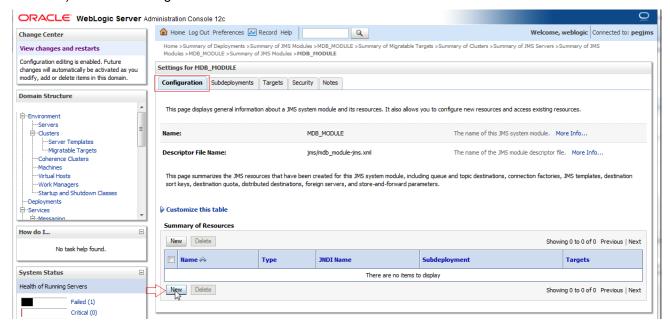


6.2 Foreign Server Creation

In MDB MODULE, Click on New Resource, Select Foreign Server ORACLE WebLogic Server Administration Console 12c ⚠ Home Log Out Preferences № Record Help Welcome, weblogic Connected to: pegji Change Center Home > Summary of Servers > Summary of Deployments > Summary of JMS Modules > MDB_MODULE > Summary of Migratable Targets > Summary of Clusters > Summary of JMS Servers > Summary of JMS Modules > MDB_MODULE > Summary of JMS View changes and restarts Configuration editing is enabled. Future changes will automatically be activated as you modify, add or delete items in this domain. Summary of JMS Modules JMS system resources are configured and stored as modules similar to standard JZEE modules. Such resources include queues, topics, connection factories, templates, destination keys, Domain Structure quota, distributed queues, distributed topics, foreign servers, and JMS store-and-forward (SAF) parameters. You can administratively configure and manage JMS system modules as ⊟-Clusters --Server Templates --Migratable Targets -- Coherence Clusters --Machines --Virtual Hosts Customize this table --Work Managers --Startup and Shutdown Class -Deployments New Delete Showing 1 to 2 of 2 Previous | Next -Services ■ Name Туре --Store-and-Forward Agents JMS_Module -JMS Modules 🔪 System MDB MODULE
New Delete

1) Click on Configuration → New

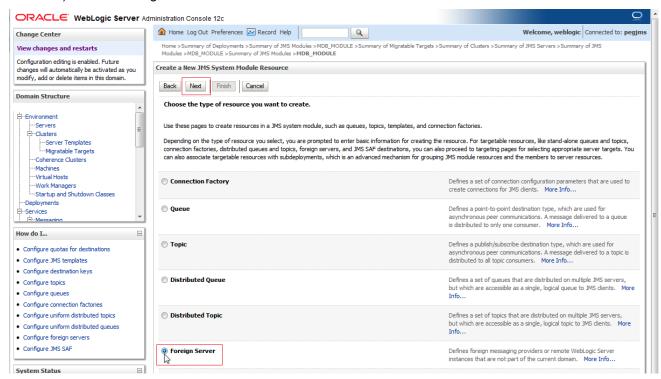
 Configure JMS system modules · Configure resources for JMS system modules



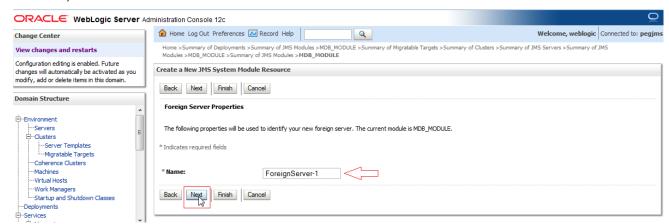


Showing 1 to 2 of 2 Previous | Next

2) Select Foreign Server and Click on Next

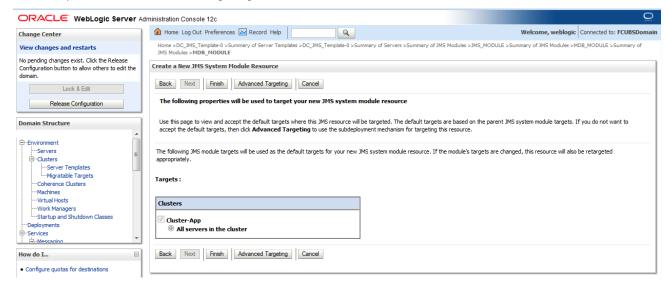


3) Enter name and Click on Next

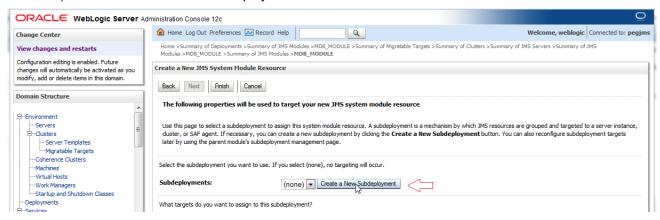




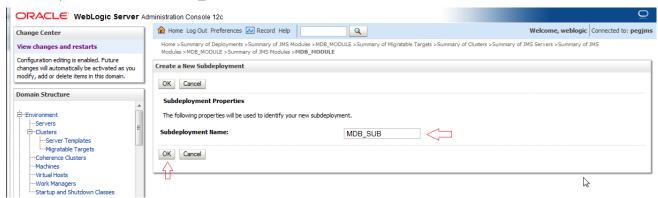
4) Click on Advanced Targeting



5) Click on Create New SudDeployment

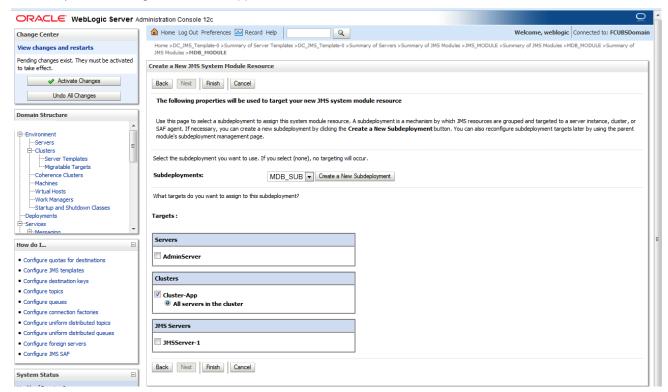


6) Enter Name as MDB_SUB and Click on OK

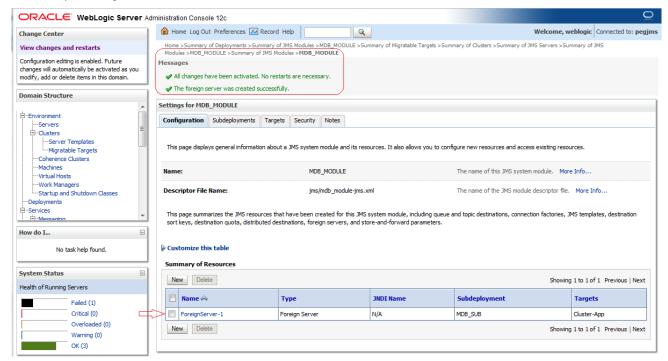




7) Select Target as Cluster-App and Click on Finish



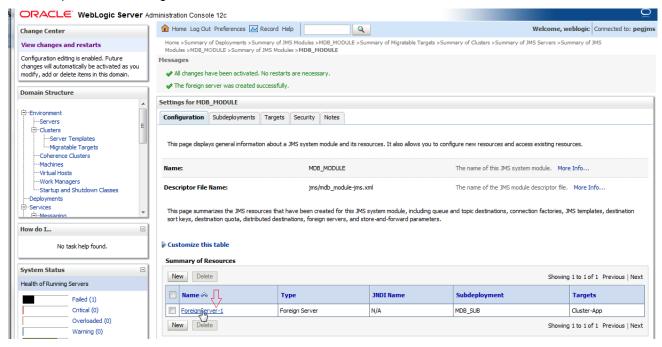
8) Foreign Server is created



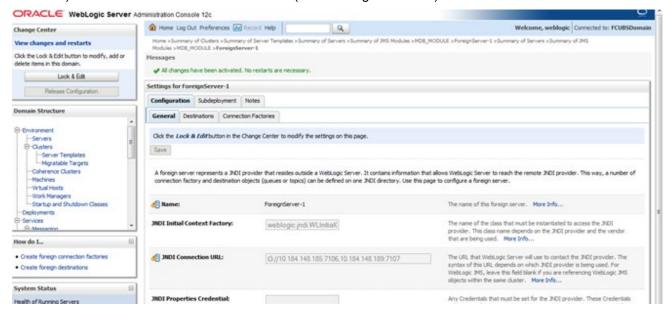


6.3 Foreign Server Configuration

1) Click on ForeignServer-1

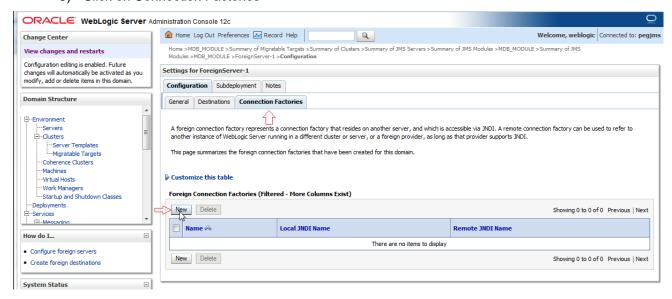


2) Enter the JNDI URL as Cluster URL(JMS Managed Servers) and Click on Save

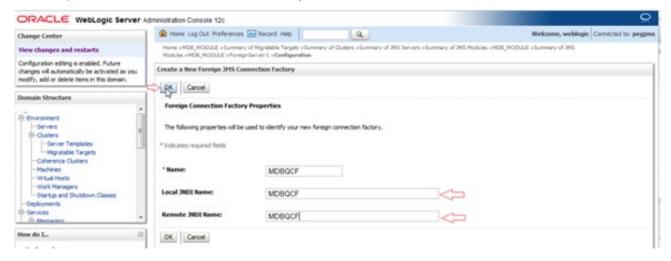




3) Click on Connection Factories



4) Create MDBQCF Connection Factory



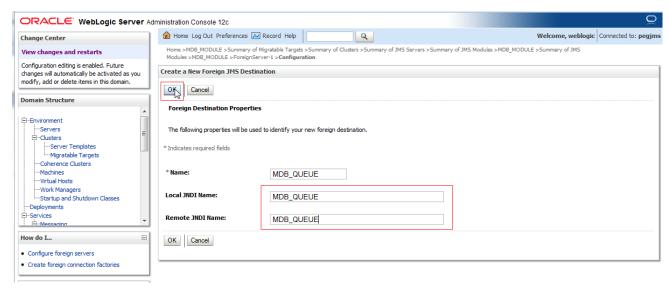
5) Click on Destination



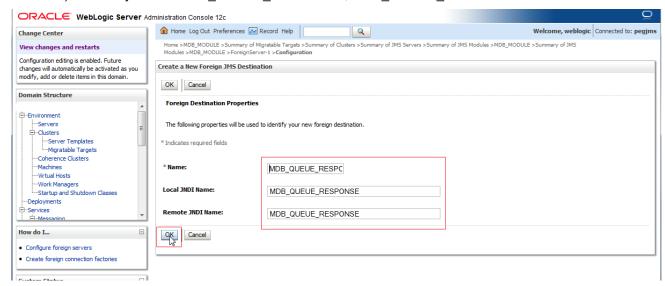


6) Create MDB QUEUE

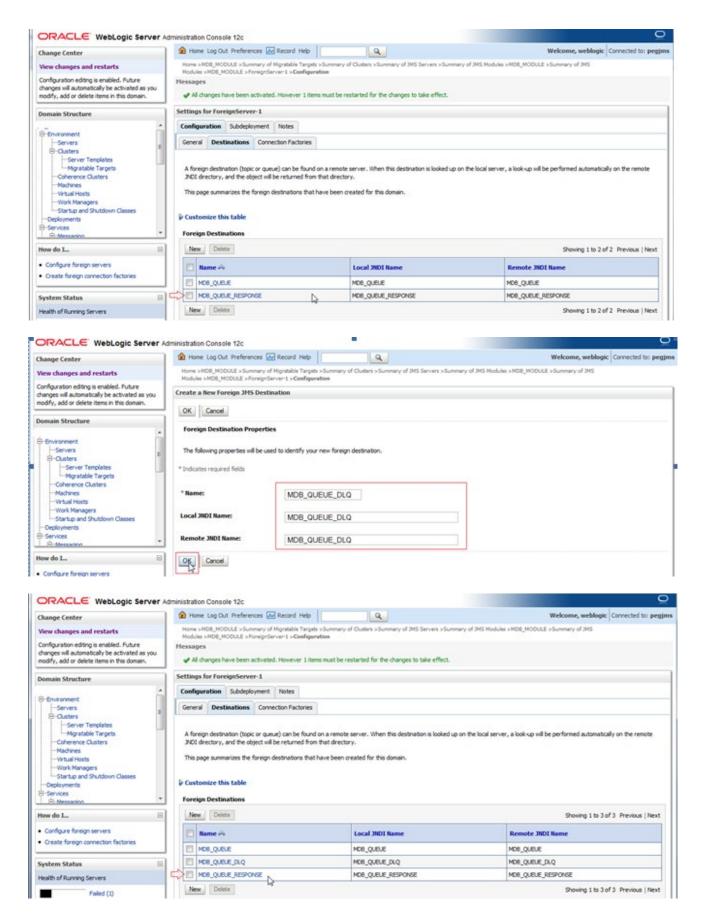




7) Similarly Create MDB_QUEUE_RESPONSE, MDB_QUEUE_DLQ





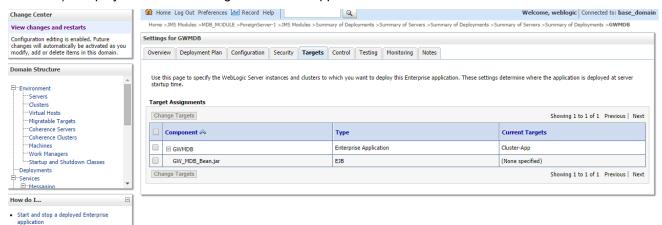


8) After all the resources are created, **Restart** the Admin and Managed Servers.



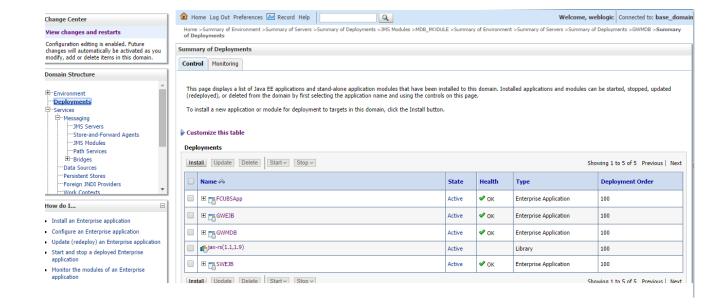
7. Application Deployment

1) Deploy the EAR with Target as Cluster-App



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







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

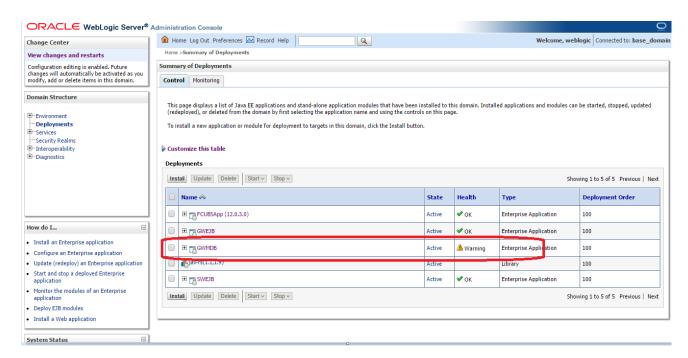
- 1) Foreign Server Creation is not required
- 2) Targets should be given accordingly during SubDeployment Creation

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.

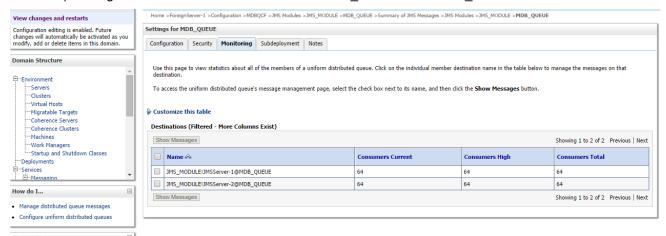
8.4 t3s Protocol

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

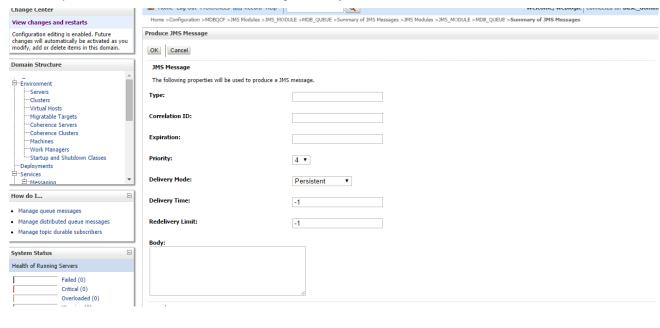


2) Select any one Server and Click on Show Messages

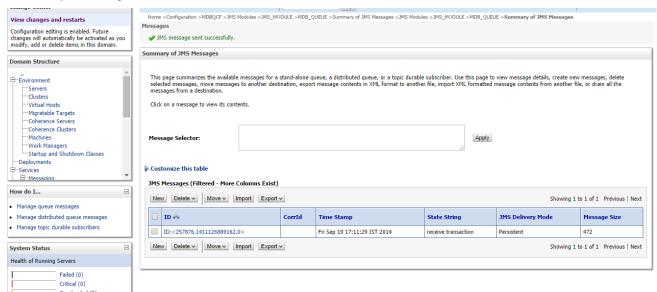




3) Click on New and enter the Message in Body and Click on OK



4) Message is Sent



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



8.6 <u>Increase maximum number of message-driven bean</u> 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

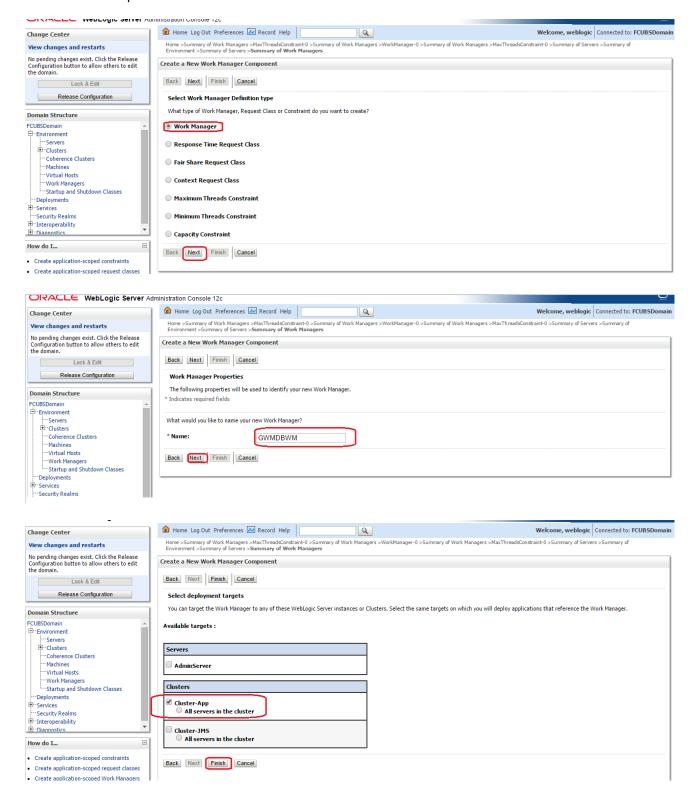
1) Add below line to the weblogic-ejb-jar.xml of the MDB Ear <dispatch-policy>GWMDBWM</dispatch-policy>

- 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.

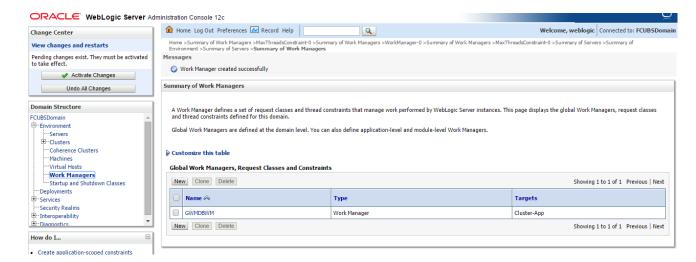


8.6.2 Work Manager Creation

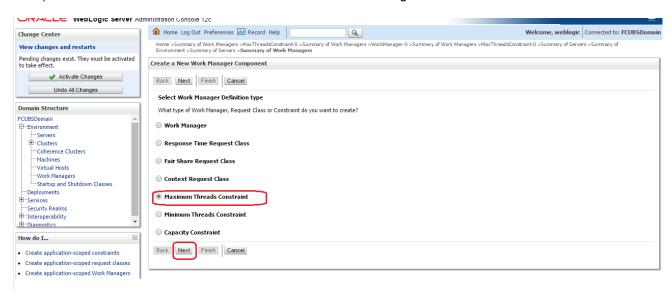
Login into weblogic console, navigate to Domain → Environment → WorkManager
 Create new workmanager with the name GWMDBWM(as mentioned in property file) by following
 below steps

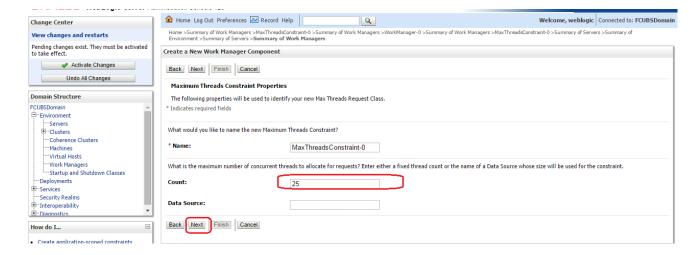




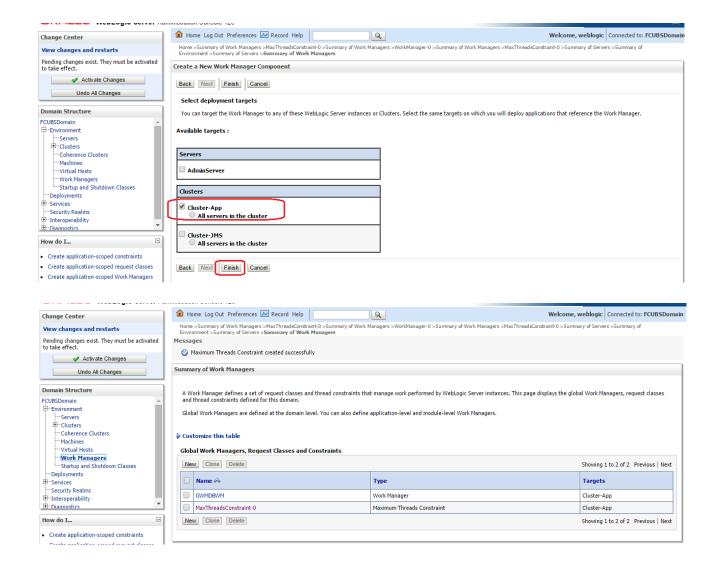


2) Create new Max Thread Constraint and in the Count field give the desired thread count

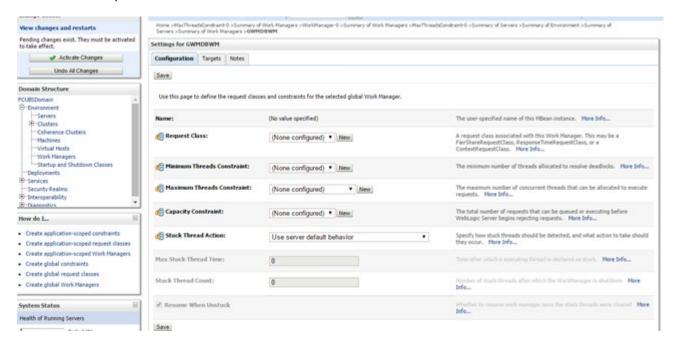




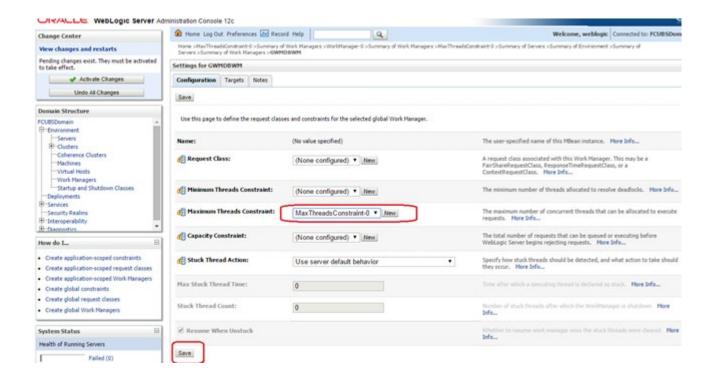




Modify the newly created workmanager and assign the Maximum Thread Constraint that is created in above step.







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





Configuring JMS on Weblogic Server 12c [November] [2021] Version 14.5.3.0.0

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