Configuring JMS on Weblogic Server 12c
Oracle Banking Trade Finance
Release 14.6.1.0.0
Part No. F61852-01

[August] [2022]

ORACLE
FINANCIAL SERVICES

Table of Contents

1. INTRODUCTION 1-1

1.1 INTRODUCTION 1-1
1.2 PURPOSE 1-1
1.3 WEBLOGIC 12C NEW FEATURES 1-2
1.4 COMPONENTS DIAGRAM & DATA FLOW 1-3

2. PRE-REQUISITES 2-1

2.1 MACHINES 2-1
2.2 DYNAMIC CLUSTERS AND MANAGED SERVERS 2-1
2.3 DATASOURCE 2-2
2.4 SHARED FOLDER 2-2

3. JMS CONFIGURATION 3-1

3.1 PERSISTENCE STORE CREATION 3-1
3.2 JMS SERVER CREATION 3-3
3.3 CLUSTER CONFIGURATION FOR SERVICE MIGRATION 3-5

4. JMS MODULE CREATION 4-6

4.1 MODULE CREATION 4-6
4.2 SUB DEPLOYMENT CREATION 4-8
4.3 RESOURCE CREATION 4-10
4.3.1 Queue Creation 4-10
4.3.2 Connection Factory Creation 4-13

5. SERVER RESTART 5-17

6. FOREIGN SERVER CREATION 6-1

6.1 MODULE CREATION 6-1
6.2 FOREIGN SERVER CREATION 6-3
6.3 FOREIGN SERVER CONFIGURATION 6-7

7. APPLICATION DEPLOYMENT 7-1

8. FREQUENTLY ASKED QUESTIONS 8-2

8.1 APPLICATION AND JMS CLUSTER DEPLOYED ON SAME CLUSTER 8-2
8.2 APPLICATION SHOWS WARNING UPON RESTART OF MANAGED SERVERS 8-2
8.3 SECURING FILE STORE DATA 8-3
8.4 T3S PROTOCOL 8-3
8.5 HOW TO TEST THE DEPLOYMENT 8-3
8.6 INCREASE MAXIMUM NUMBER OF MESSAGE-DRIVEN BEAN THREADS 8-5
8.6.1 Modify weblogic-ejb-jar.xml 8-5
8.6.2 Work Manager Creation 8-6
8.7 HOW HIGH AVAILABILITY IS ACHIEVED 8-9
8.8 HOW TO SETUP FOR SCHEDULER/NOTIFICATIONS 8-10
8.9 WHAT OTHER MODULES USES JMS QUEUE'S 8-10
8.10 REFERENCES 8-10

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

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.

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

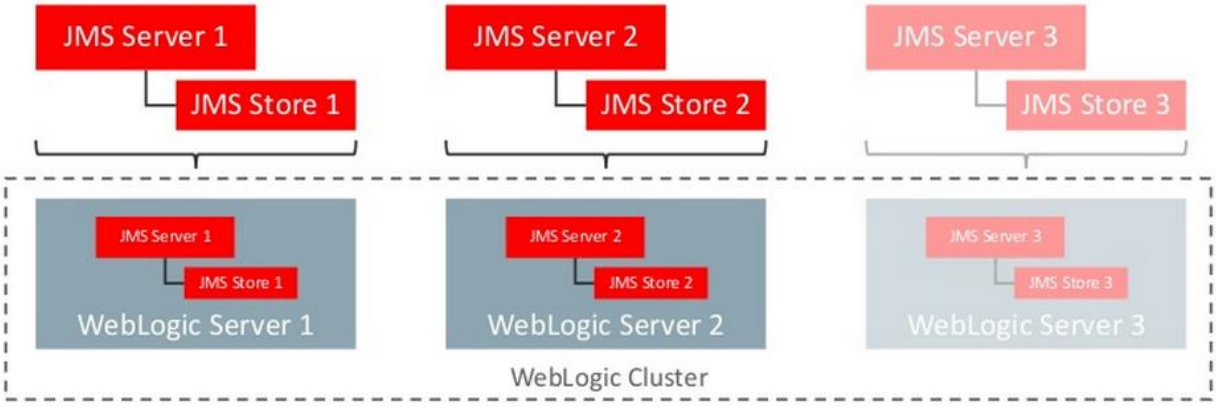
2) DB based persistence store –> Message is stored in Database.

1.3 Weblogic 12c New Features

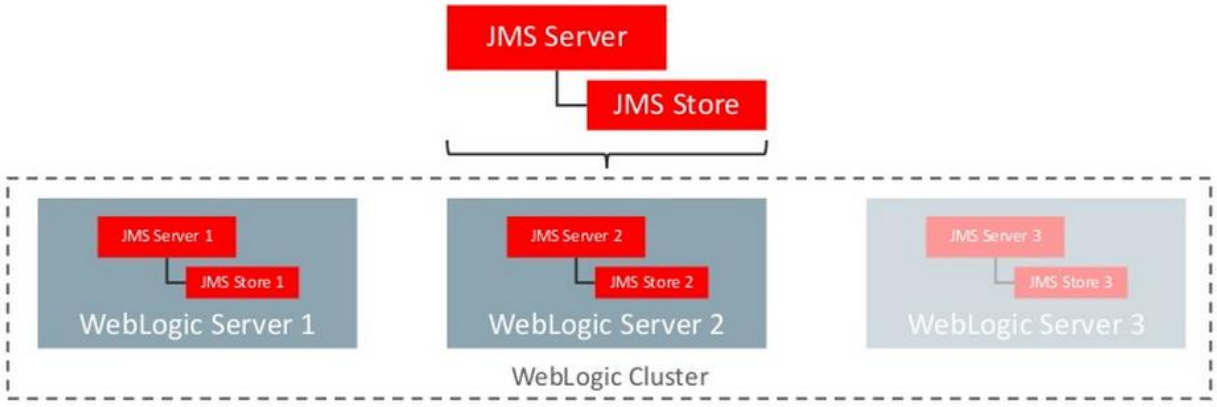
Before weblogic 12c JMS Servers and stores are targeted to individual WLS Servers. Scaling up requires configure the JMS server, the store and target it to new WLS Server

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

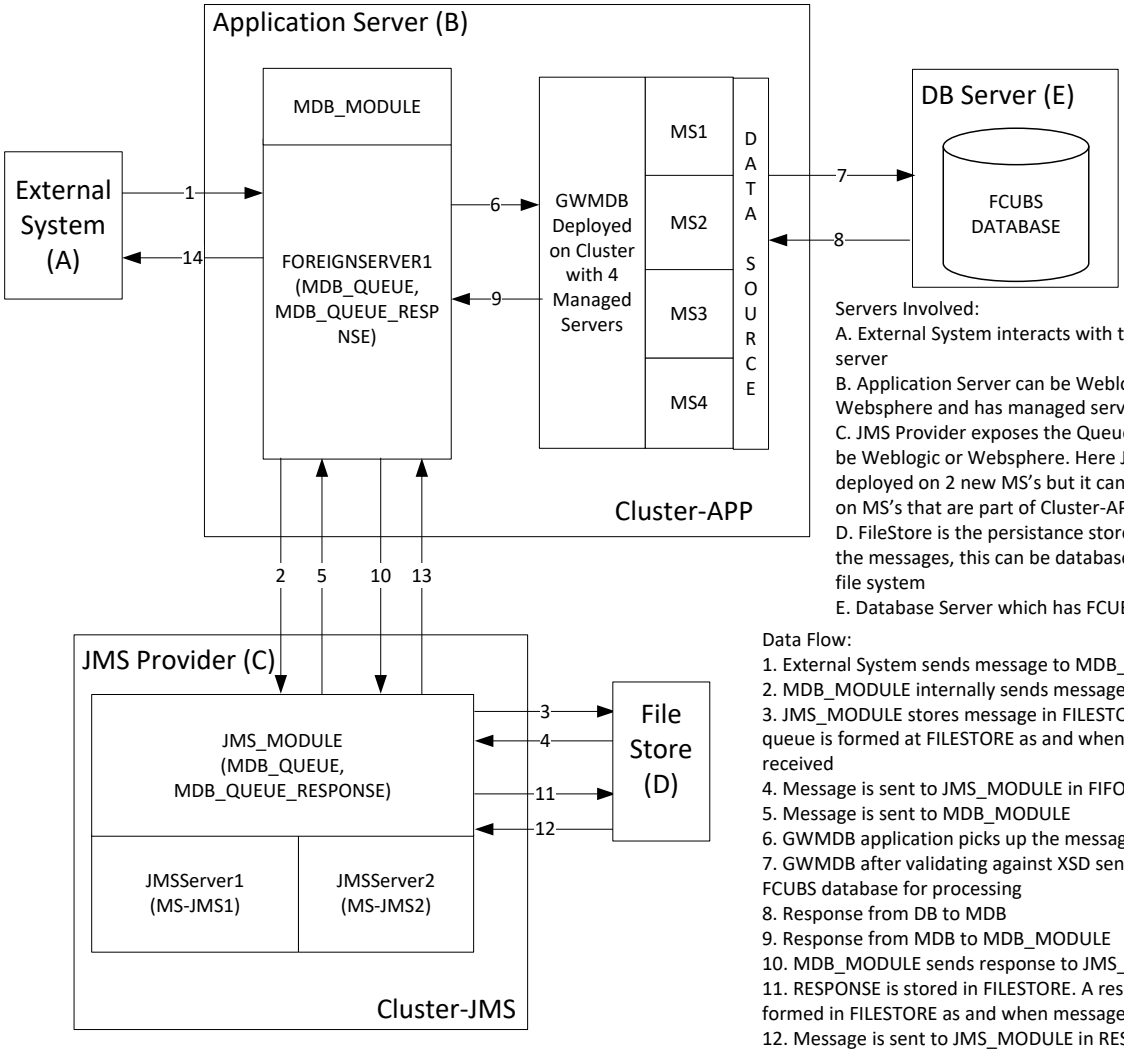


Architecture in 12c



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.



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

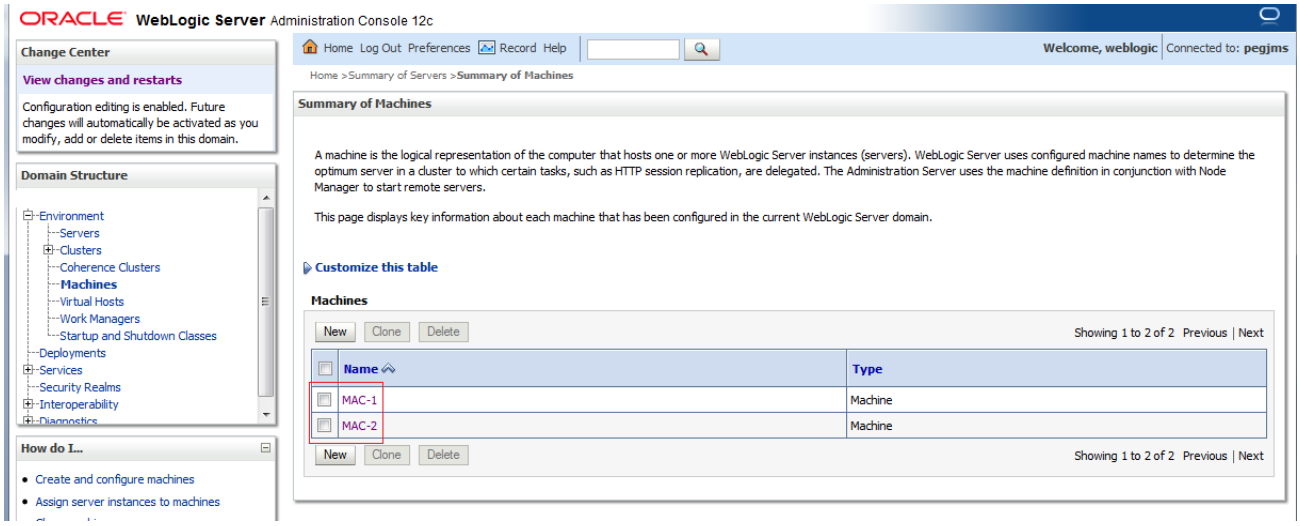
Data Flow:
1. External System sends message to MDB_MODULE
2. MDB_MODULE internally sends message to JMS_MODULE
3. JMS_MODULE stores message in FILESTORE. A request queue is formed at FILESTORE as and when messages are received
4. Message is sent to JMS_MODULE in FIFO
5. Message is sent to MDB_MODULE
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

2. Pre-Requisites

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

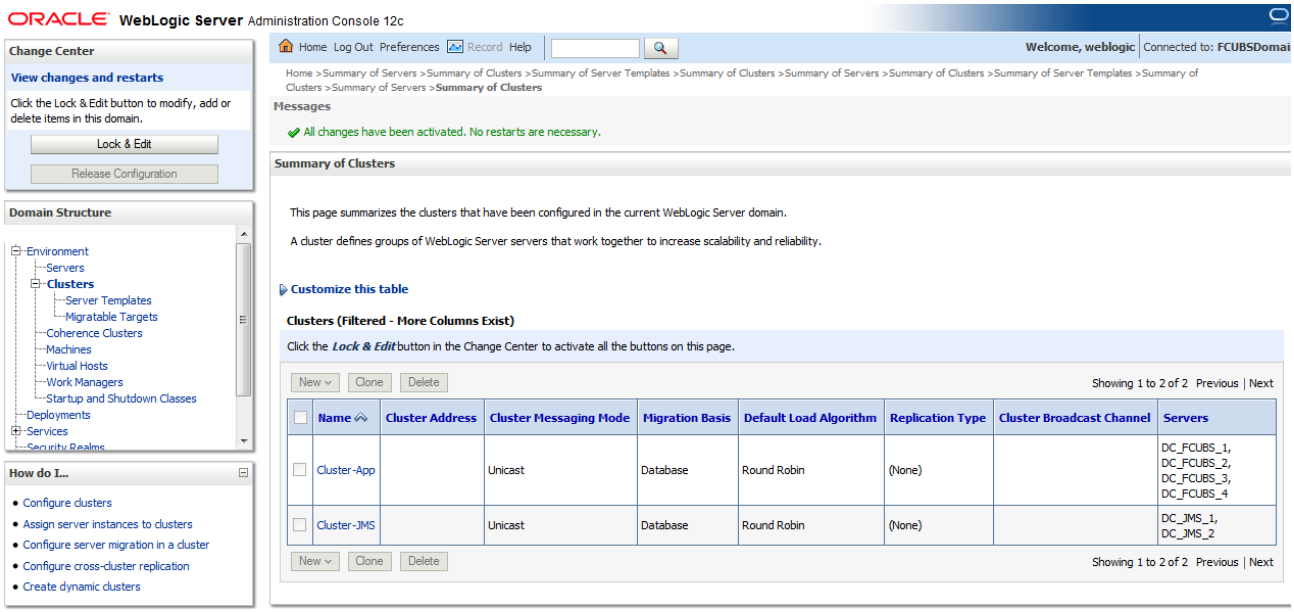
2.1 Machines

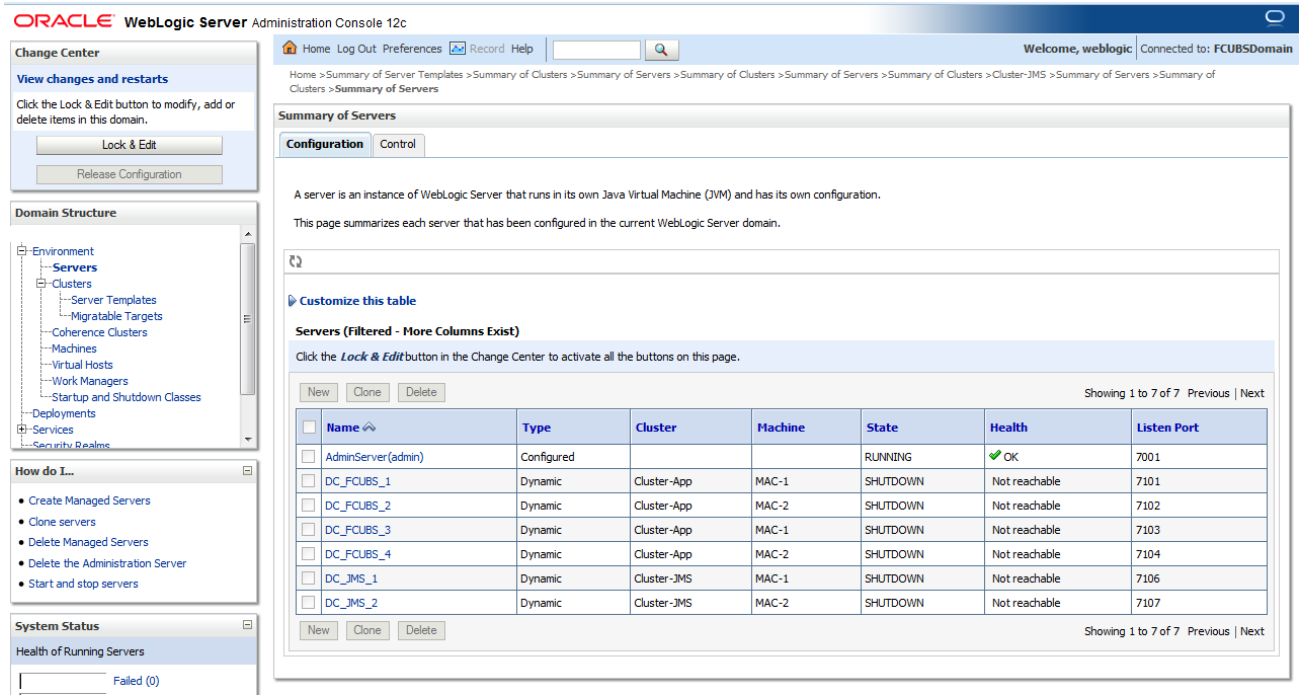
MAC-1 & MAC-2



2.2 Dynamic Clusters and Managed Servers

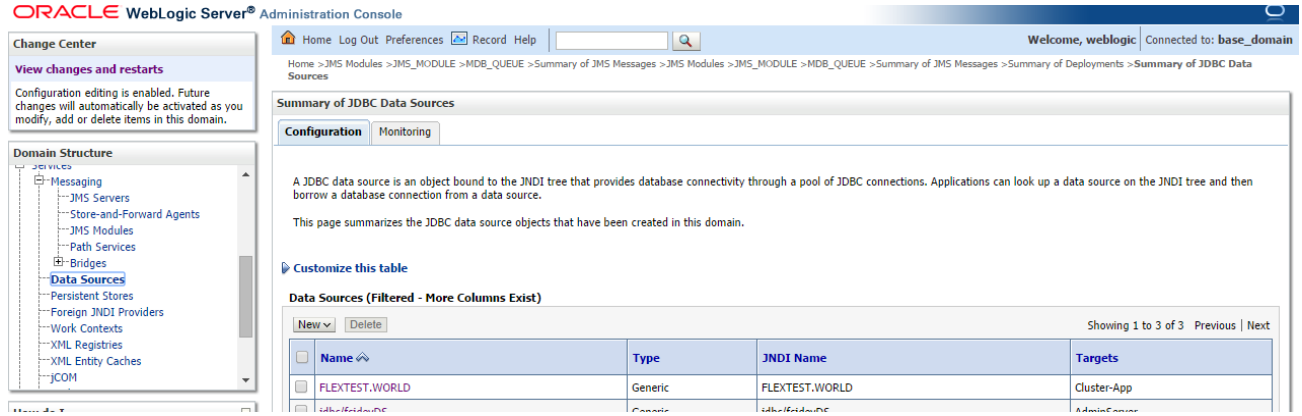
Ensure Dynamic cluster for FCUBS (4 Managed Servers) and Dynamic cluster for JMS Deployment (2 Managed Servers)





2.3 DataSource

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



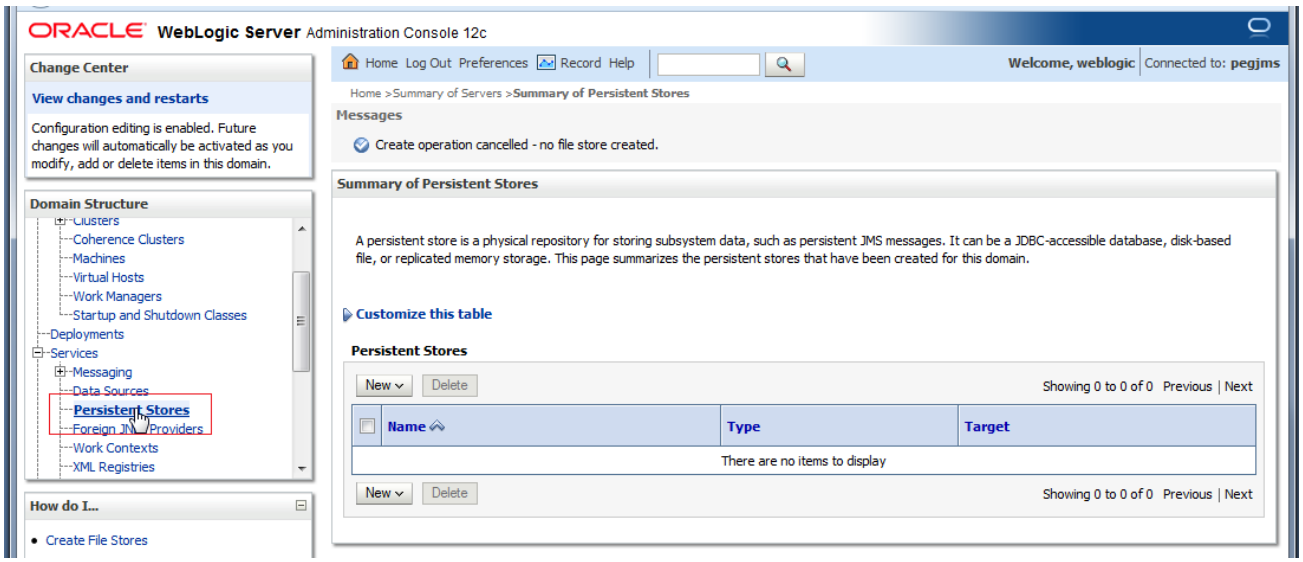
2.4 Shared Folder

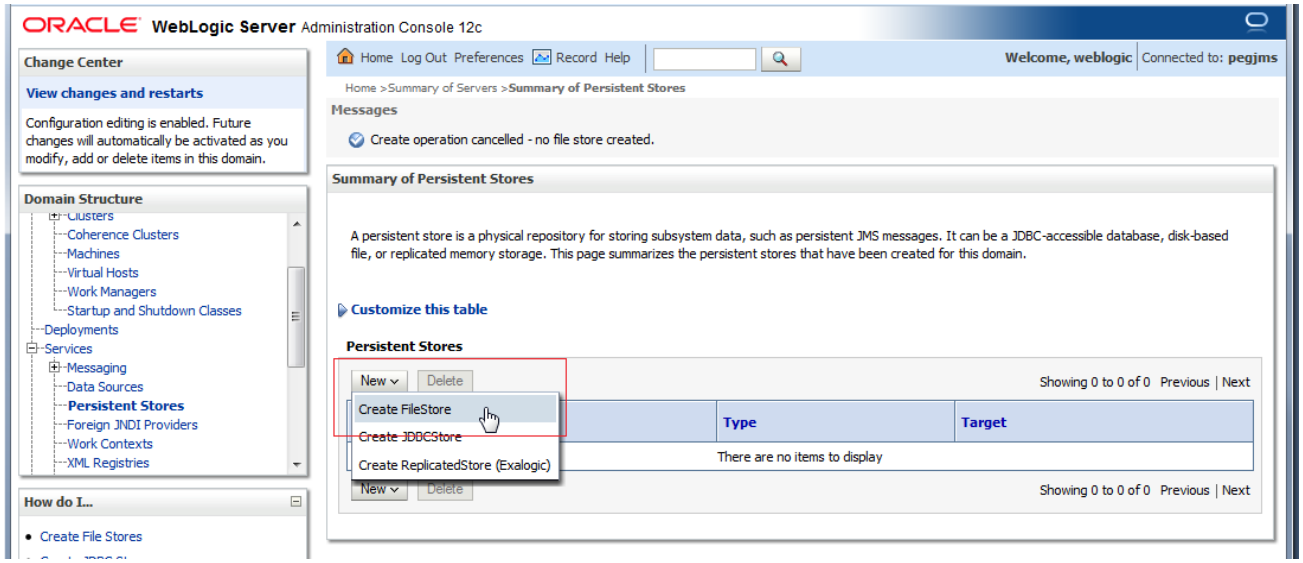
A shared folder for File Store Creation is required and this folder should be accessible across both the servers (eg, NFS mount).

3. JMS Configuration

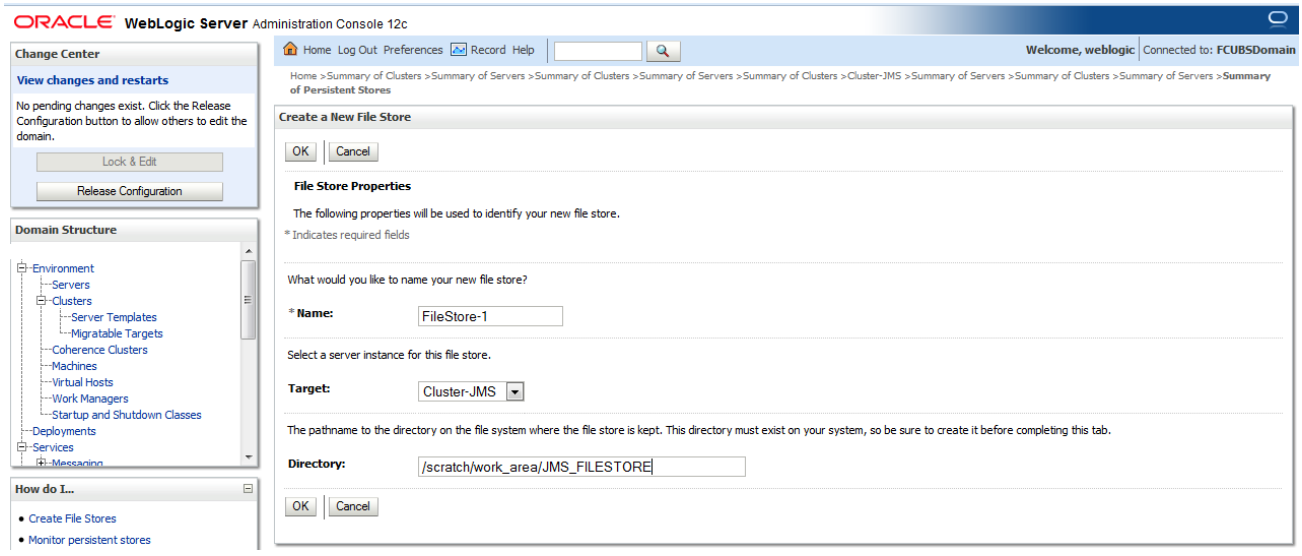
3.1 Persistence Store Creation

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

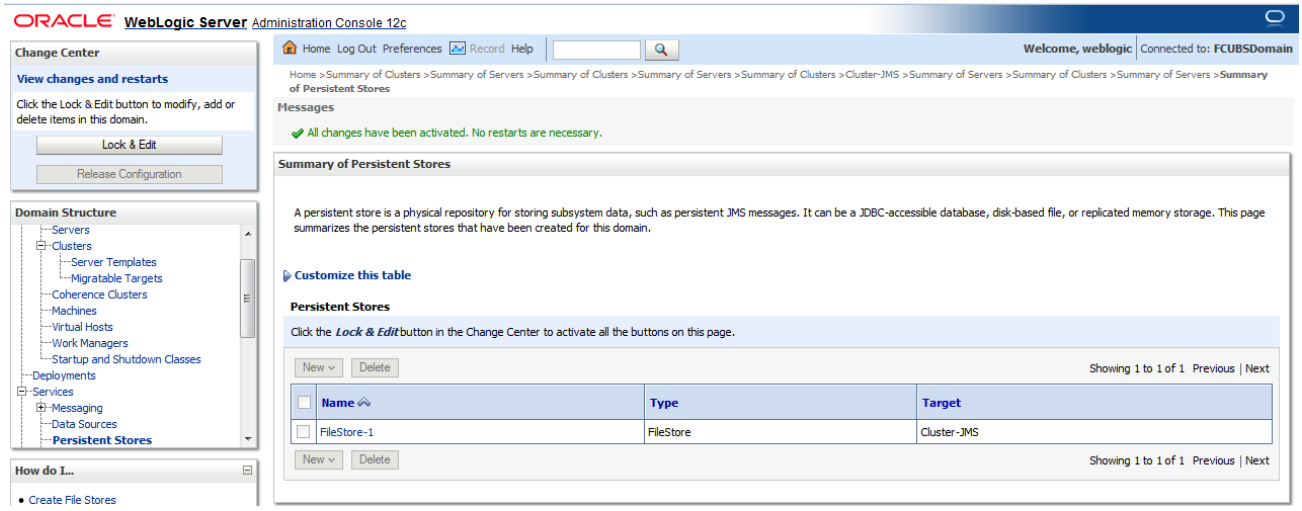




2) Select **Cluster-JMS** under target dropdown and Click on OK

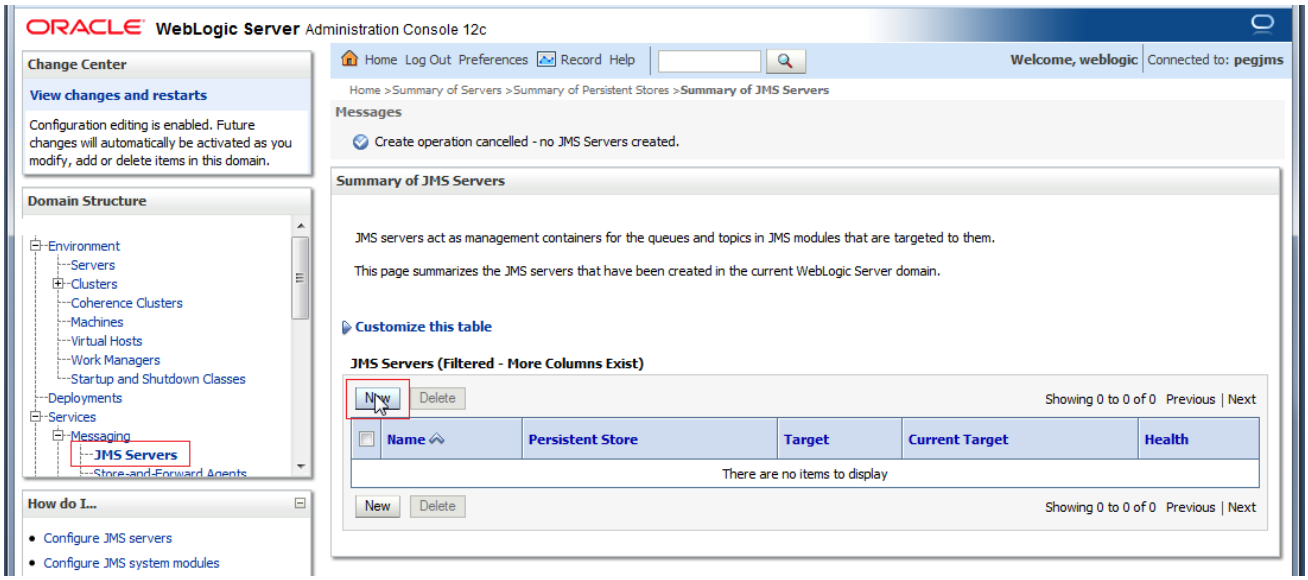


3) **FileStore-1** is created

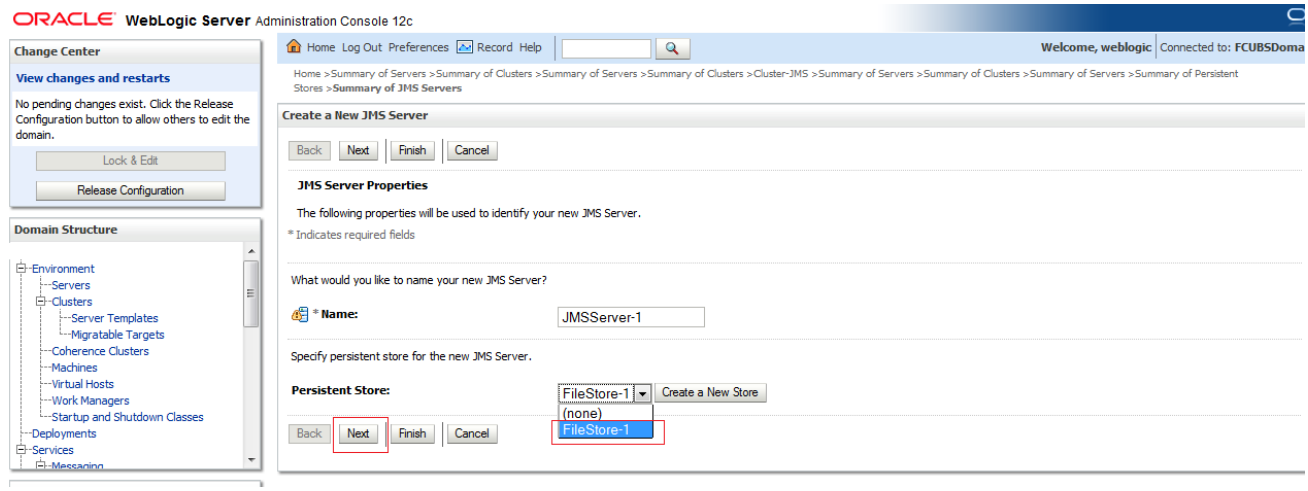


3.2 JMS Server Creation

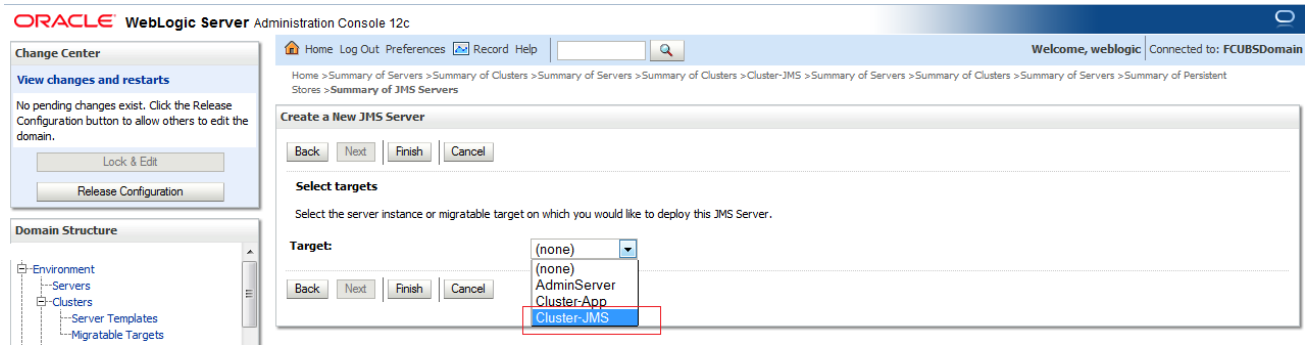
1) Navigate to Services → Messaging → JMS Servers → Click on **New**

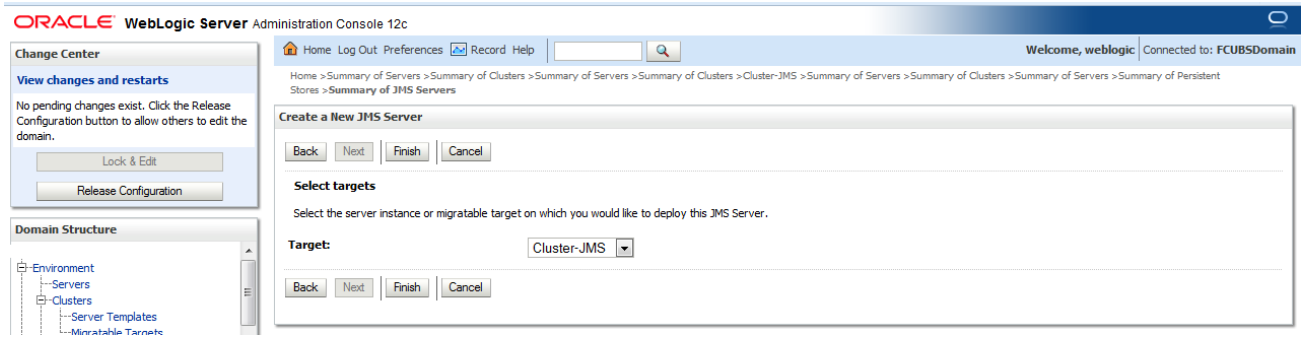


2) .Select FileStore-1 , Click **Next**

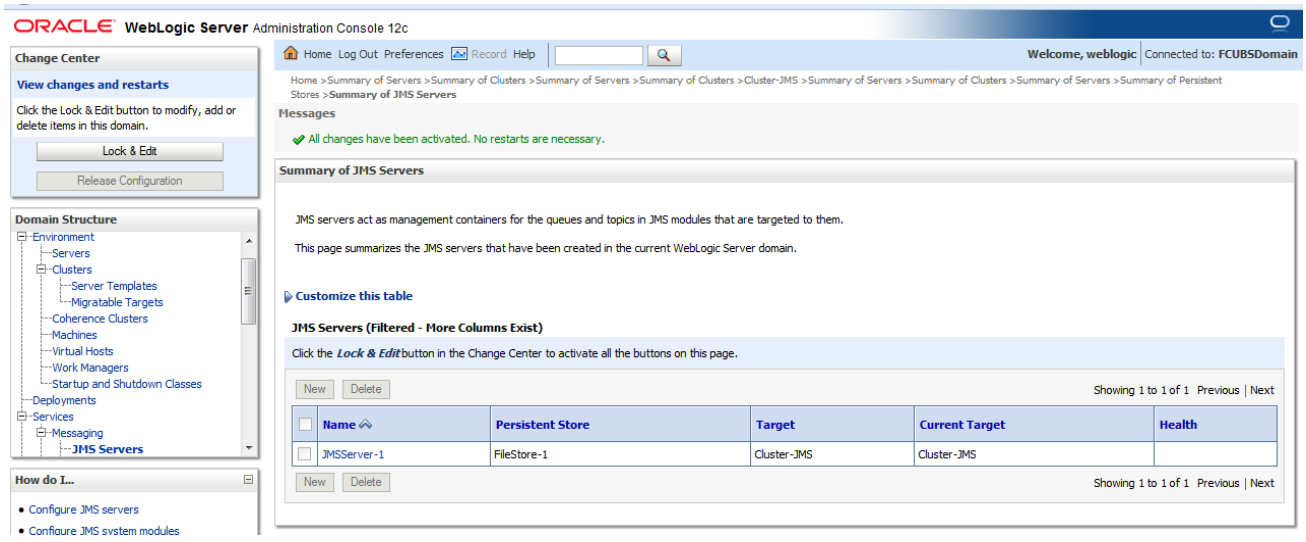


3) Select Target as Cluster-JMS and click on **Finish**





4) JMS-Server-1 is created

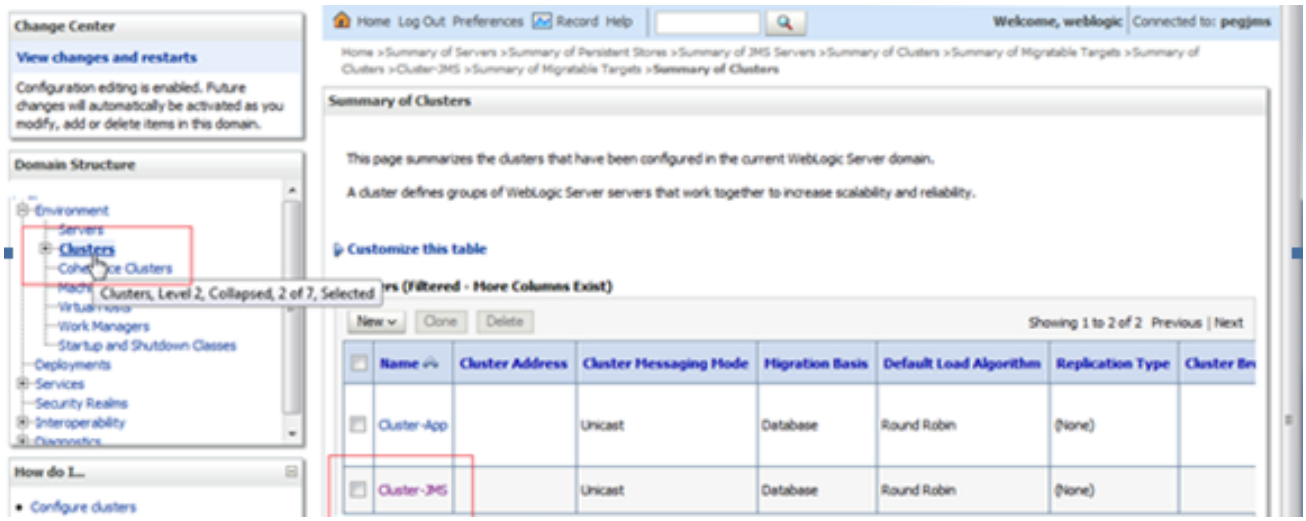


5) In NFS below filestores can be seen

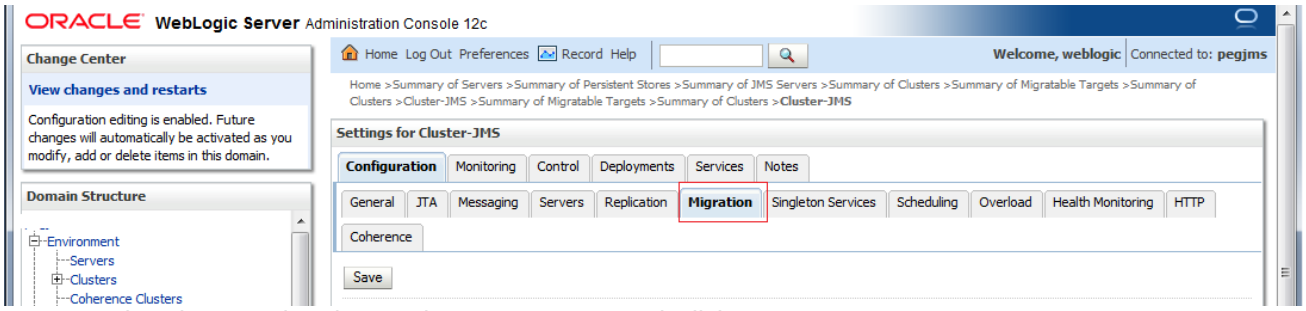
```
[root@           JMS_FILESTORE]# ll
total 2056
-rw-r----- 1 wl12c oinstall 1049088 Jun 16 14:10 FILESTORE-1@DC_JMS_1000000.DAT
-rw-r----- 1 wl12c oinstall 1049088 Jun 16 14:10 FILESTORE-1@DC_JMS_2000000.DAT
[root@           JMS_FILESTORE]# pwd
/scratch/work_area/JMS_FILESTORE
[root@           JMS_FILESTORE]#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

3.3 Cluster Configuration for Service Migration

1) Click on Environment → Clusters → Cluster-JMS



2) Click on **Migration** Tab

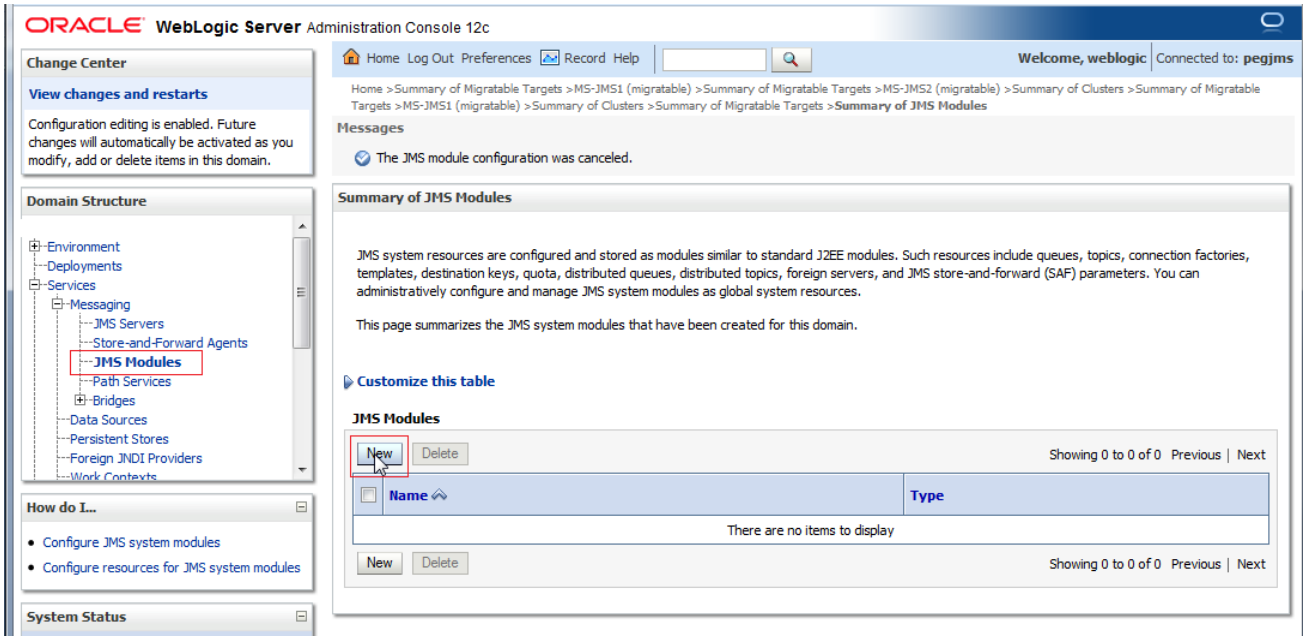


3) Change Migration Basis to Consensus and Click on **Save**

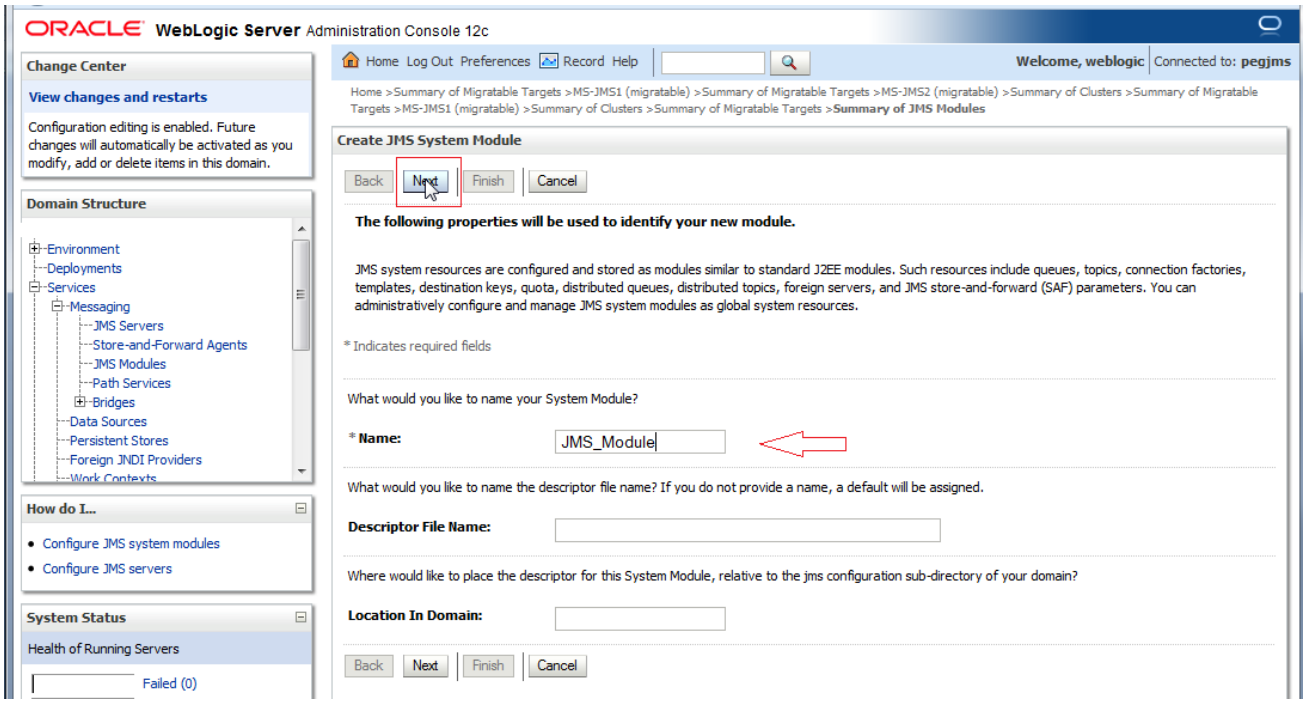
4. JMS Module Creation

4.1 Module Creation

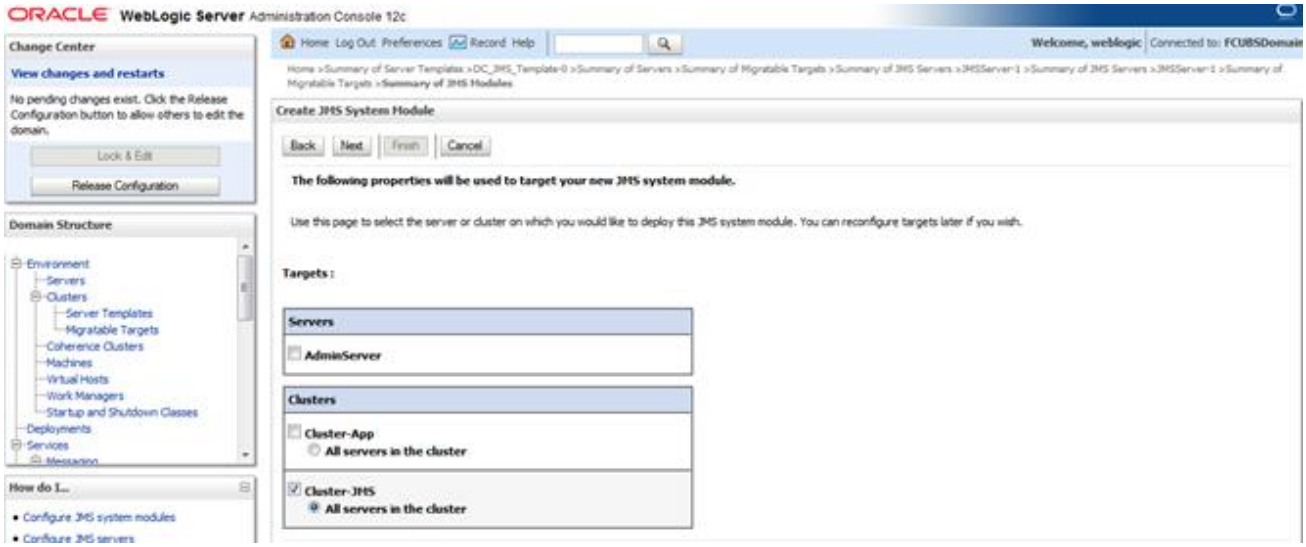
1) Navigate to Services → Messaging → JMS Modules and Click on **New**.



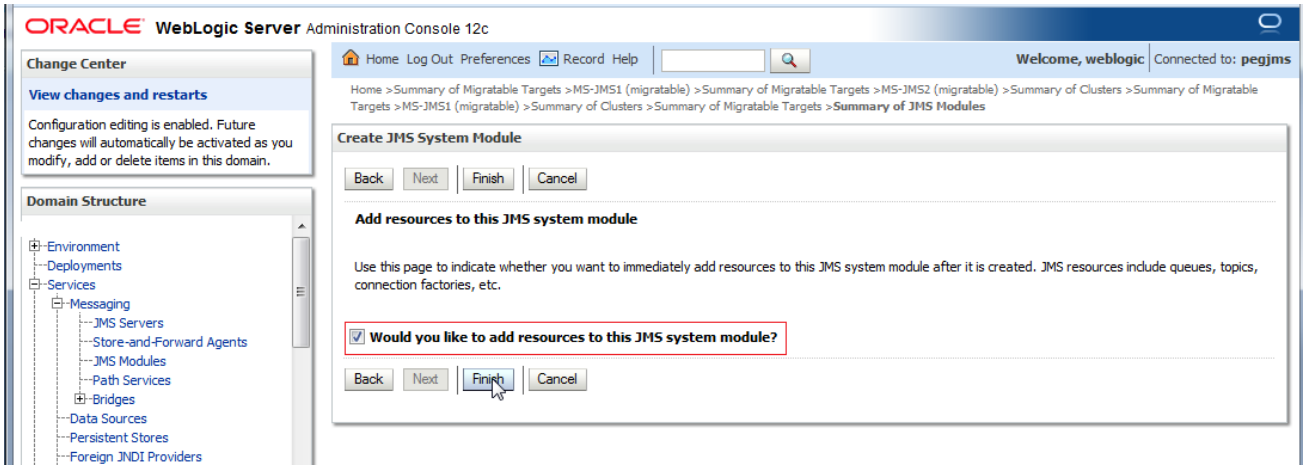
2) Enter name as JMS_MODULE and Click on **Next**



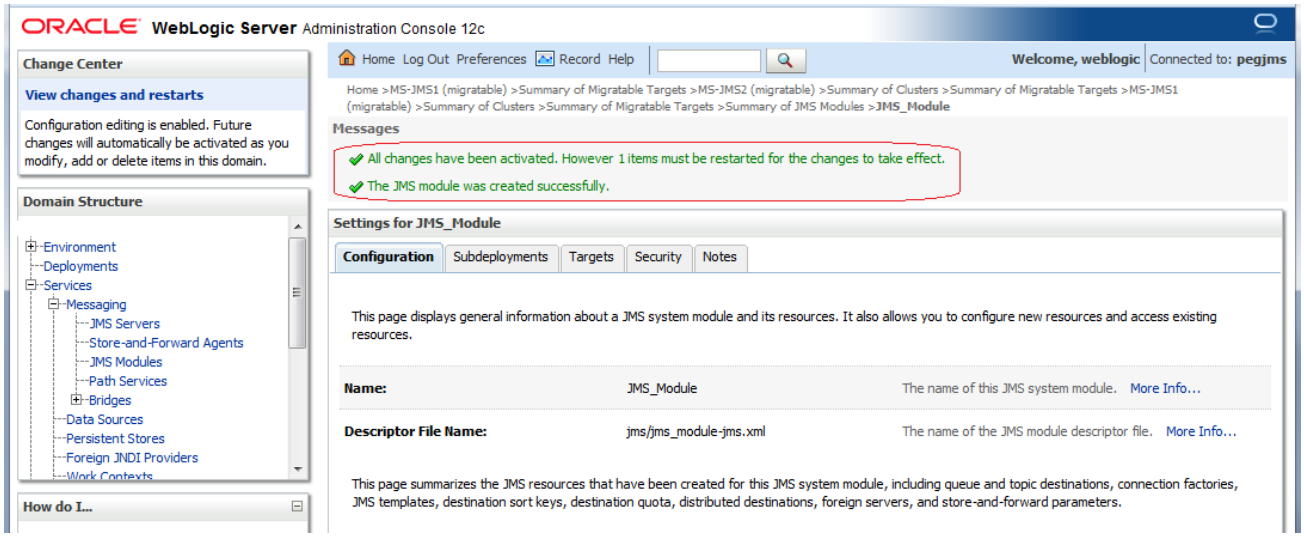
3) Select Target as Cluster-JMS and Click on **Next**



4) Select the checkbox and Click on **Finish**

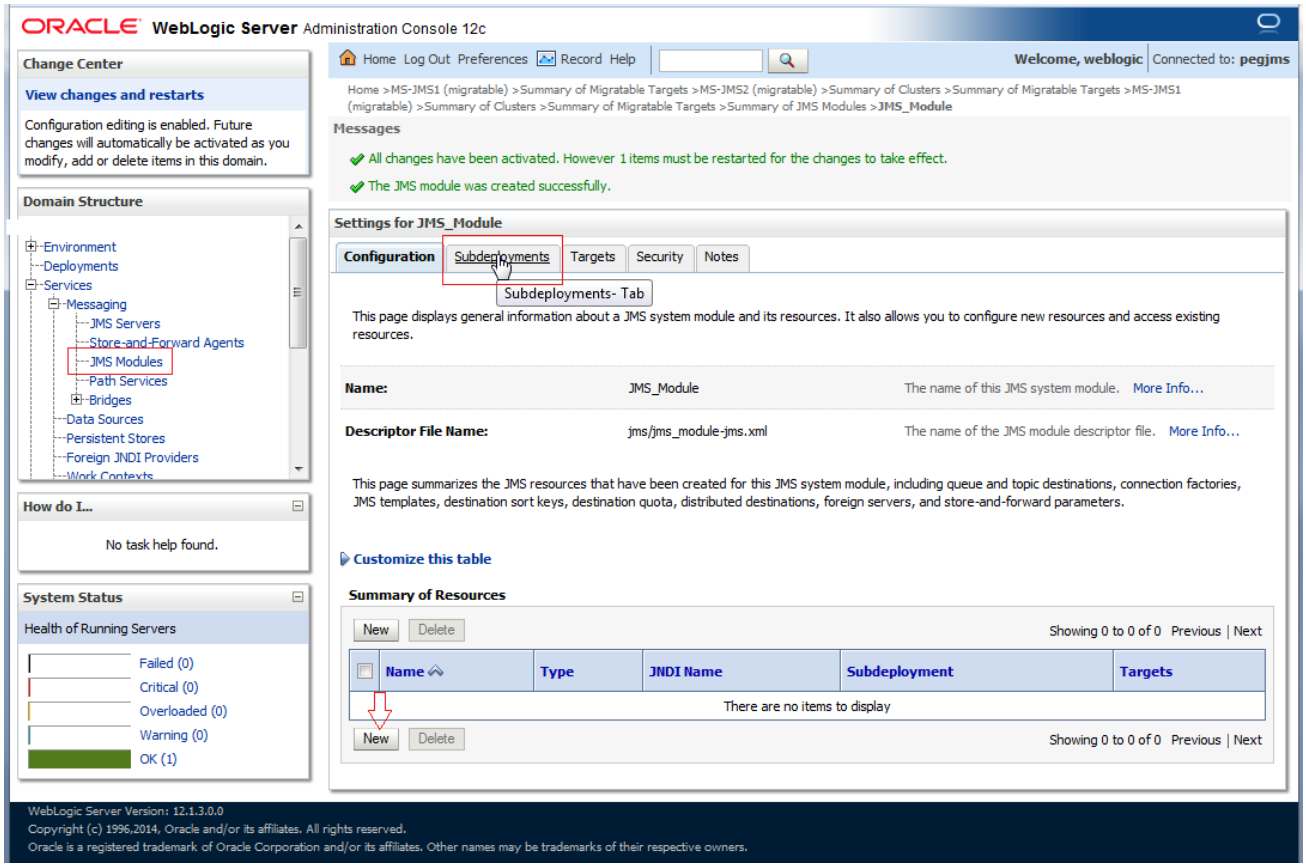


5) JMS_MODULE is created

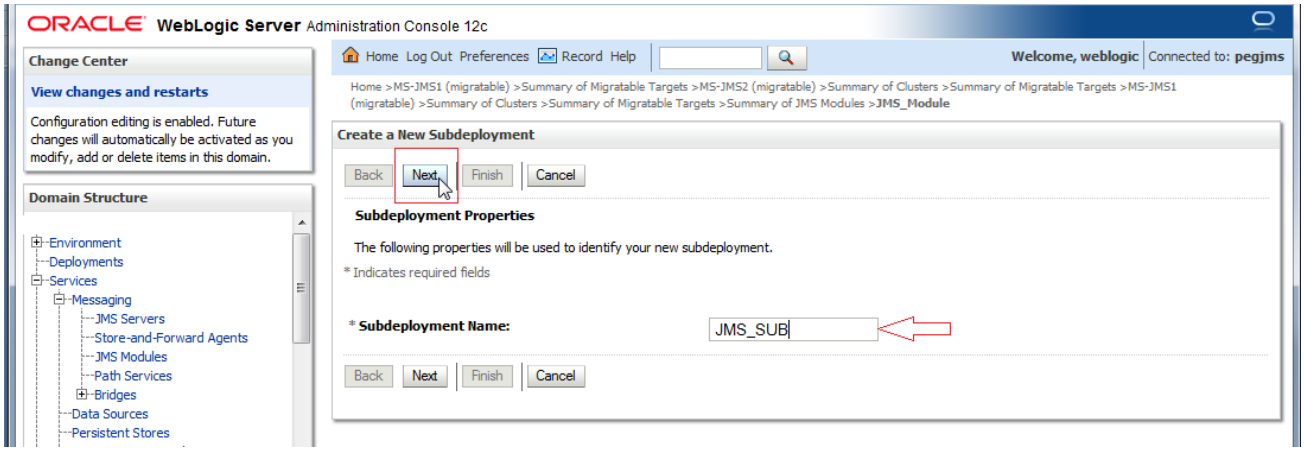


4.2 Sub Deployment Creation

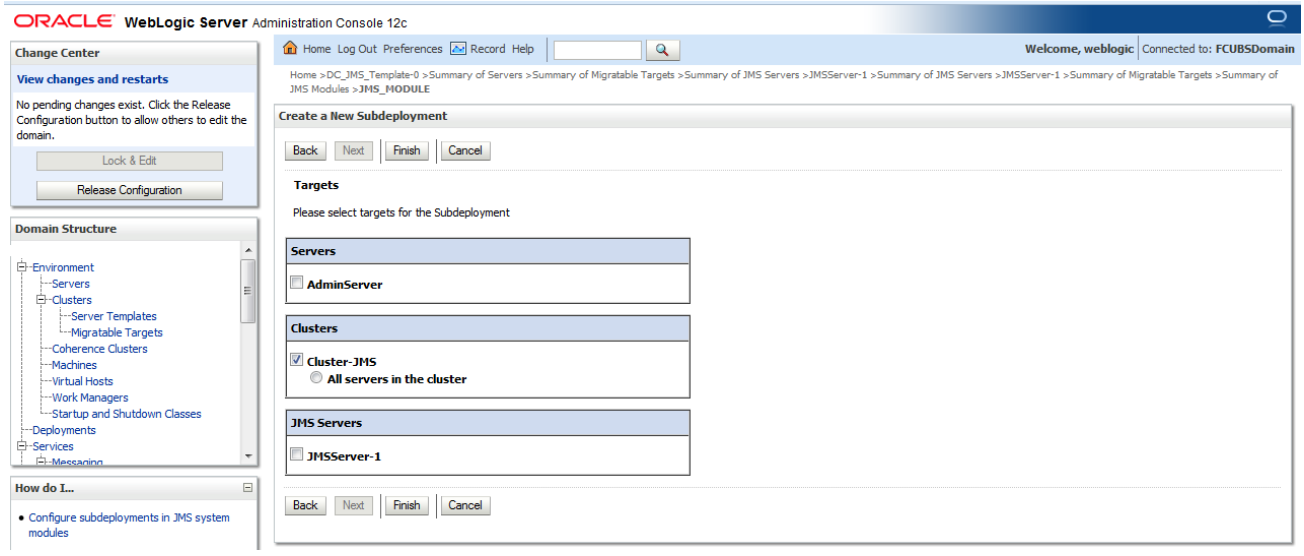
1) In JMS_MODULE, Click on Sub Deployment tab , Click on **New**



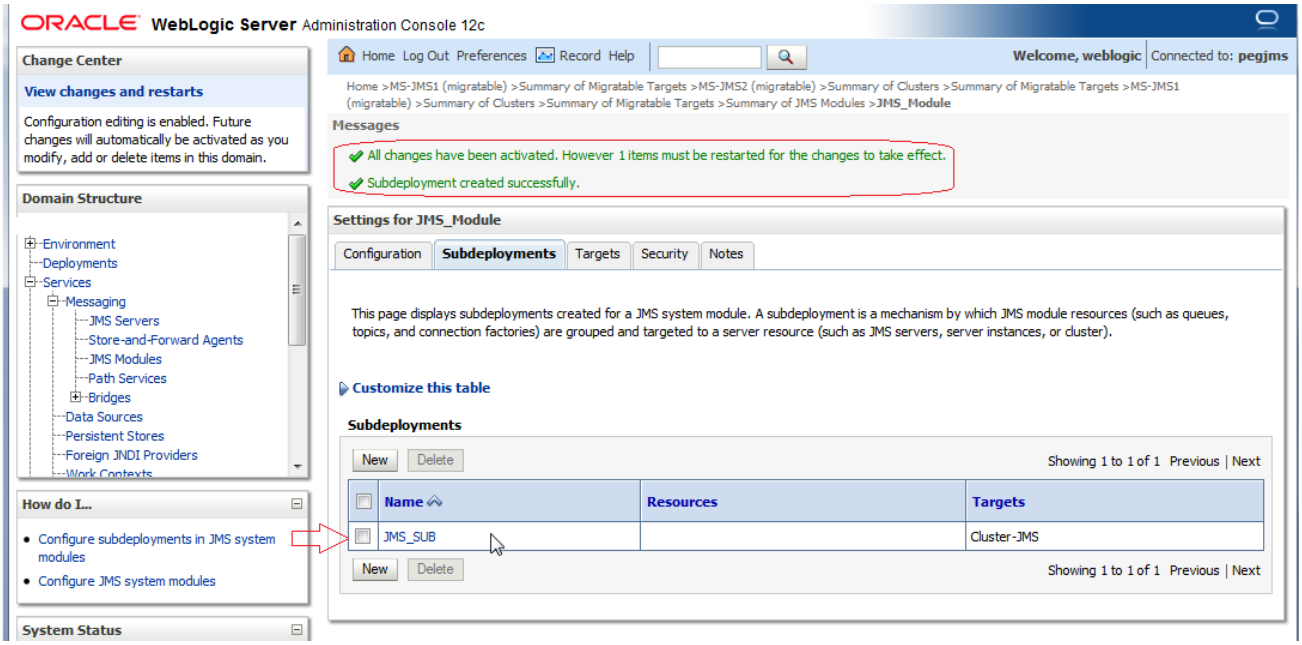
2) Enter name as JMS_SUB and click on **Next**



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



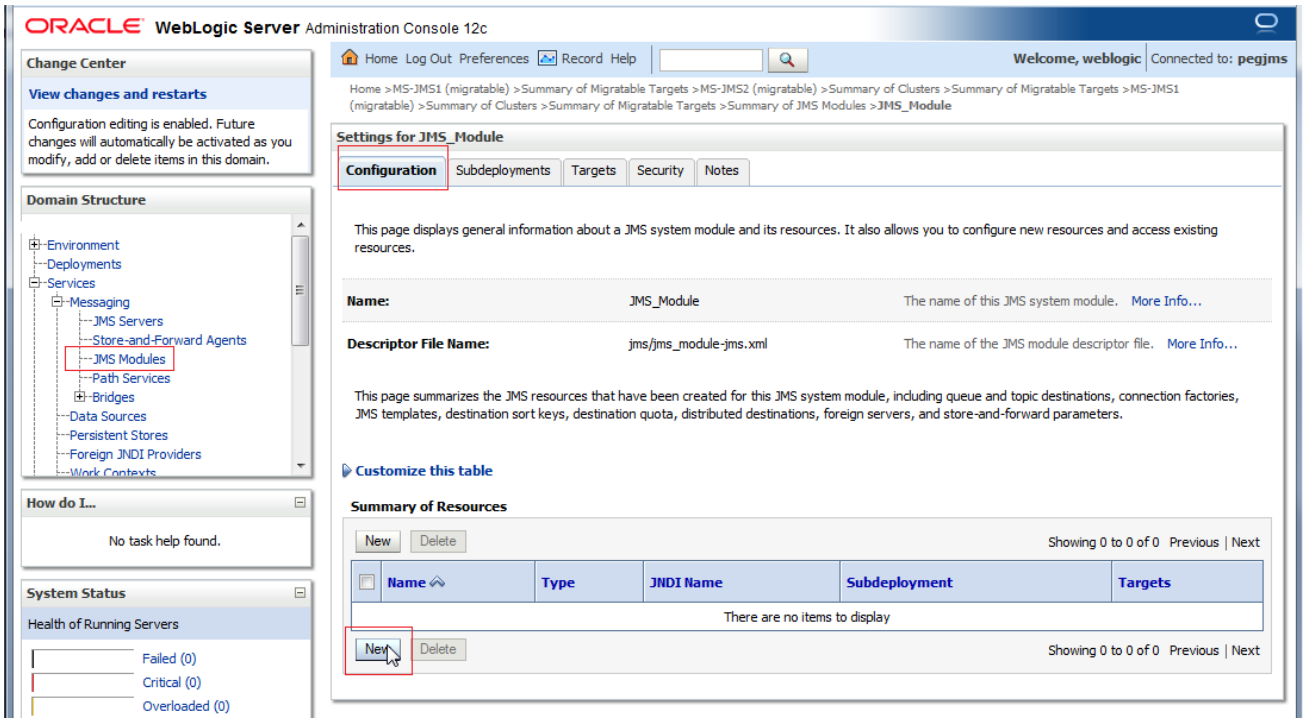
4) Sub-Deployment is created



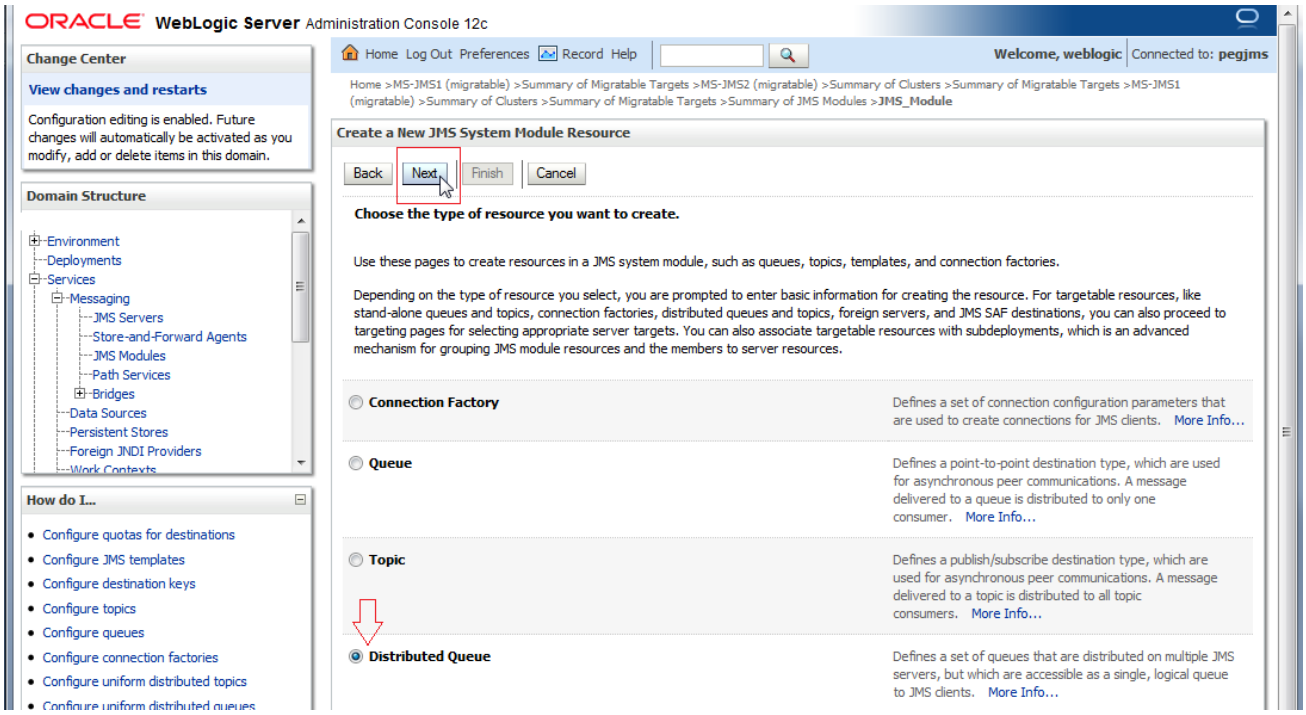
4.3 Resource Creation

4.3.1 Queue Creation

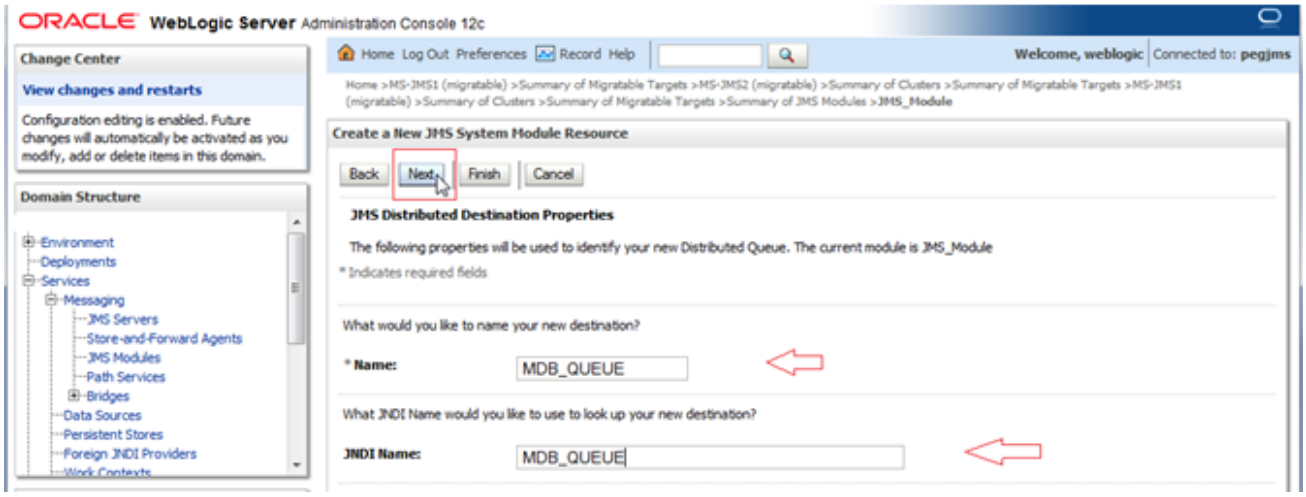
1) In JMS_MODULE Click on **New**



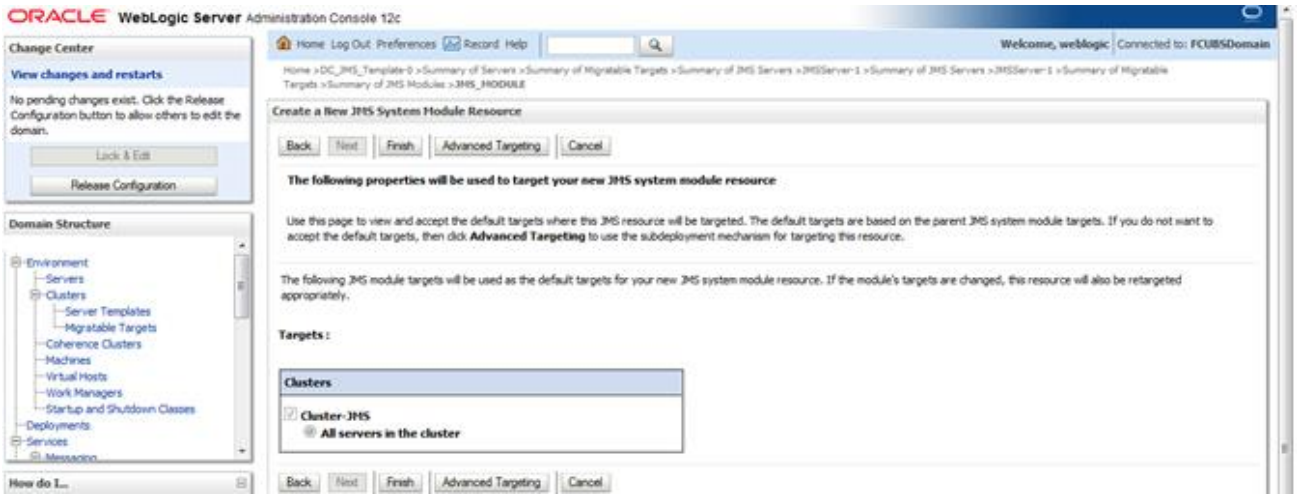
2) Select Distributed Queue and Click on **Next**



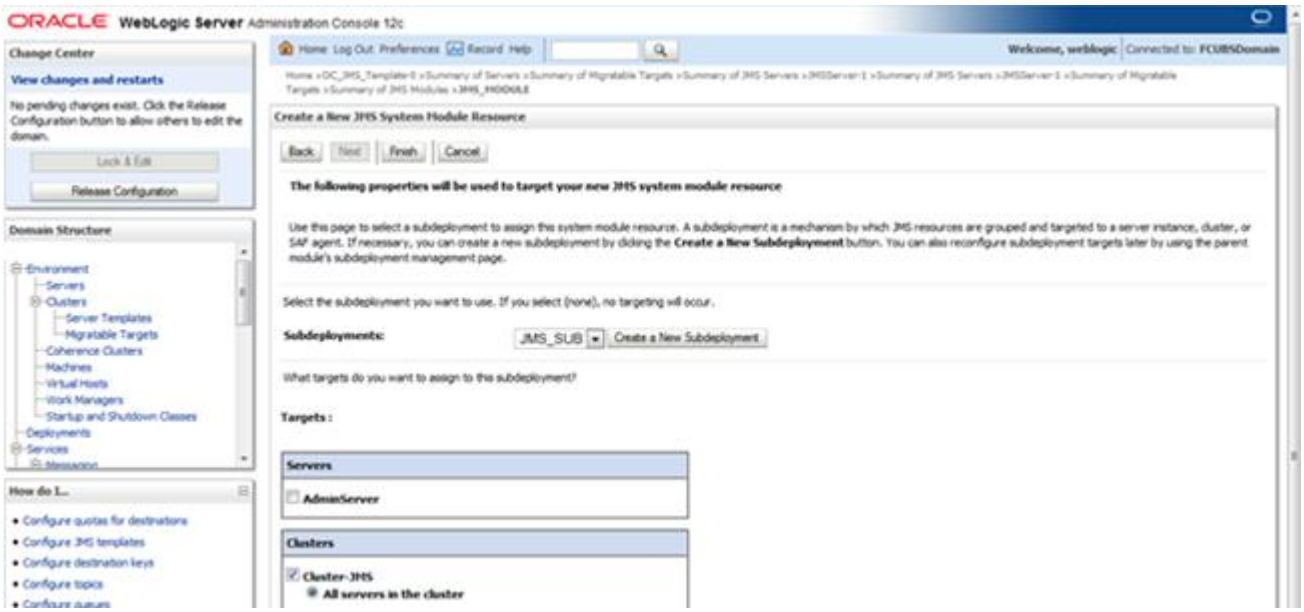
3) Enter the queue name and Click on **Next**



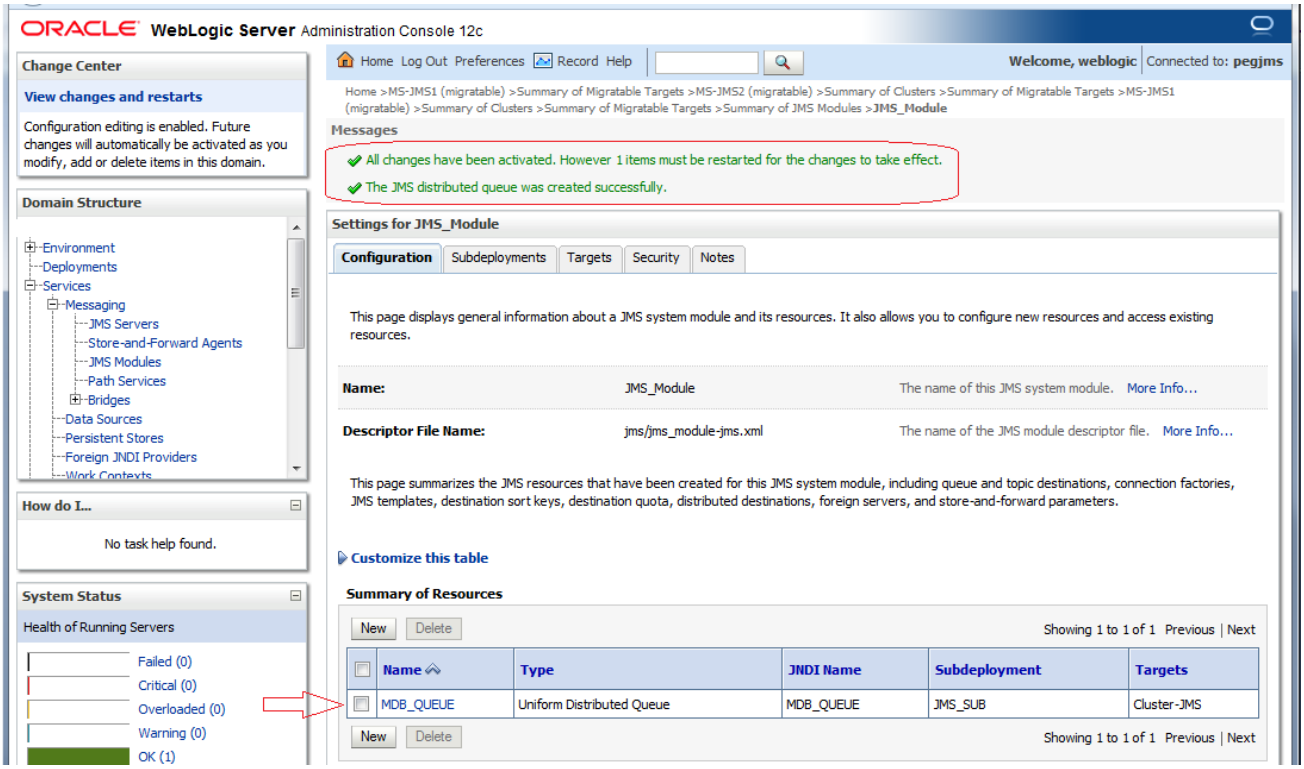
4) Click on **Advance Targeting**



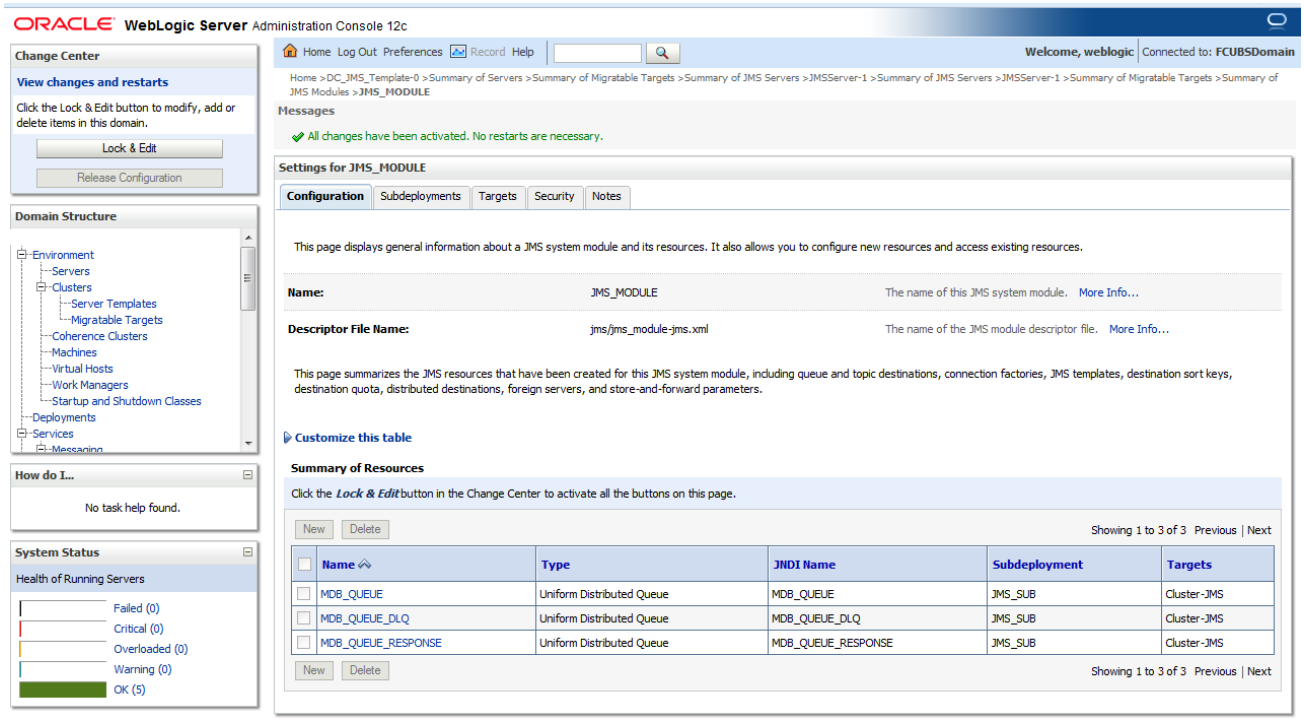
5) Select Subdeployement as JMS_SUB and Click on **Finish**



6) MDB_QUEUE is created

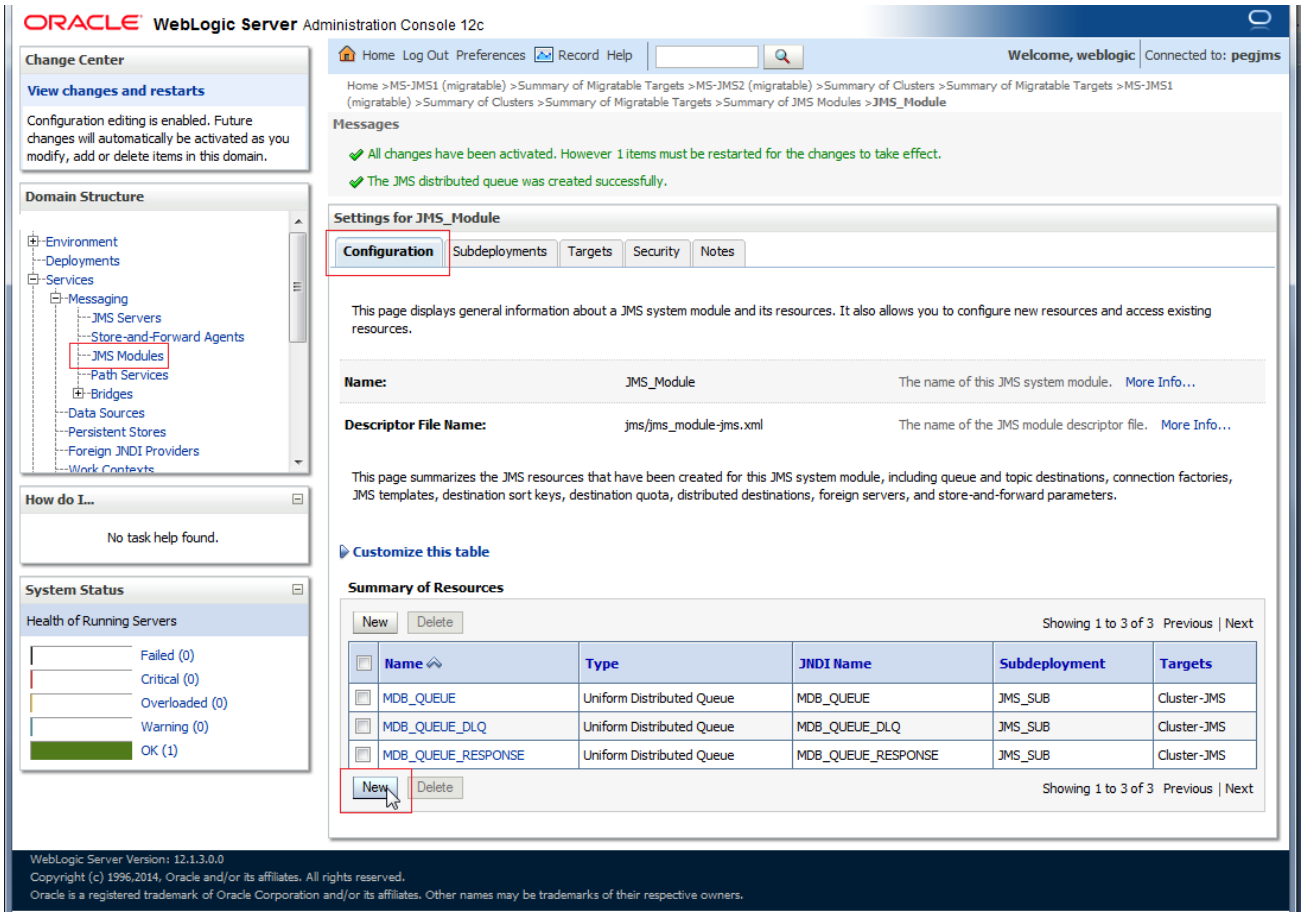


7) Similarly Create MDB_QUEUE_RESPONSE and MDB_QUEUE_DLQ

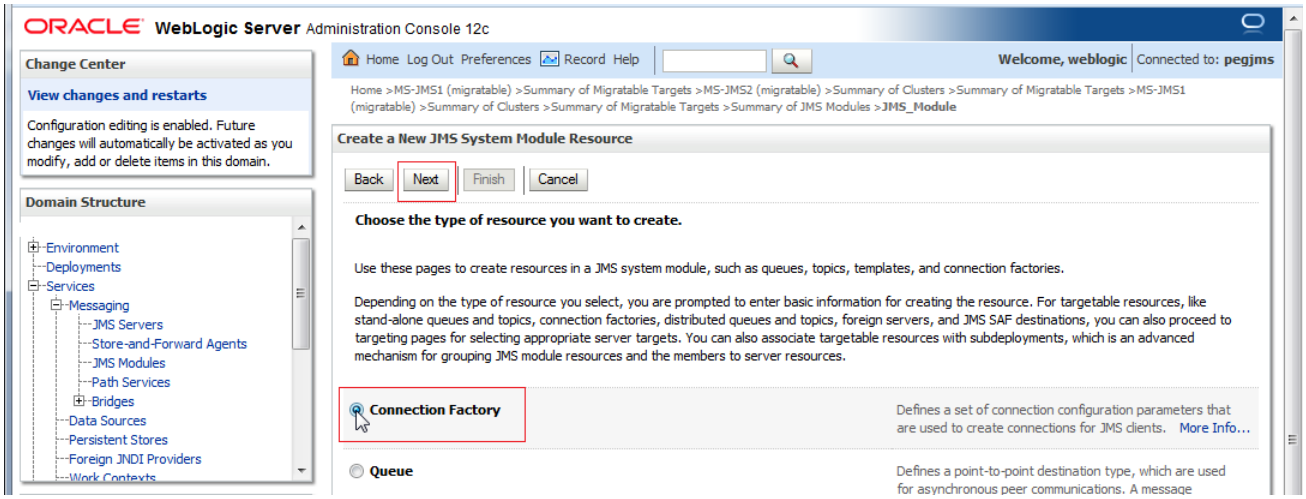


4.3.2 Connection Factory Creation

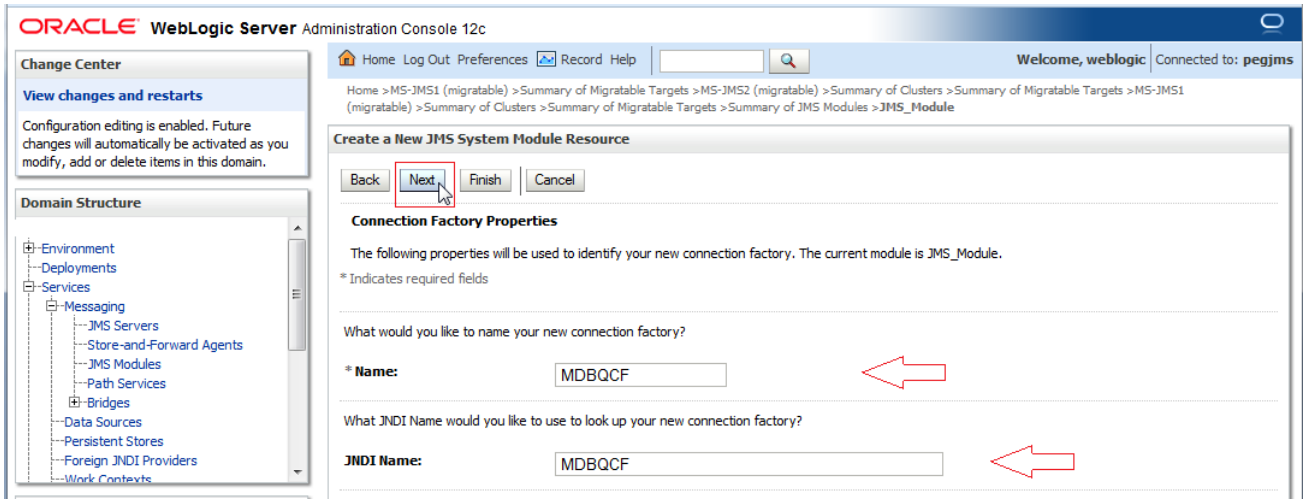
1) In JMS_MODULE, Click on **New**



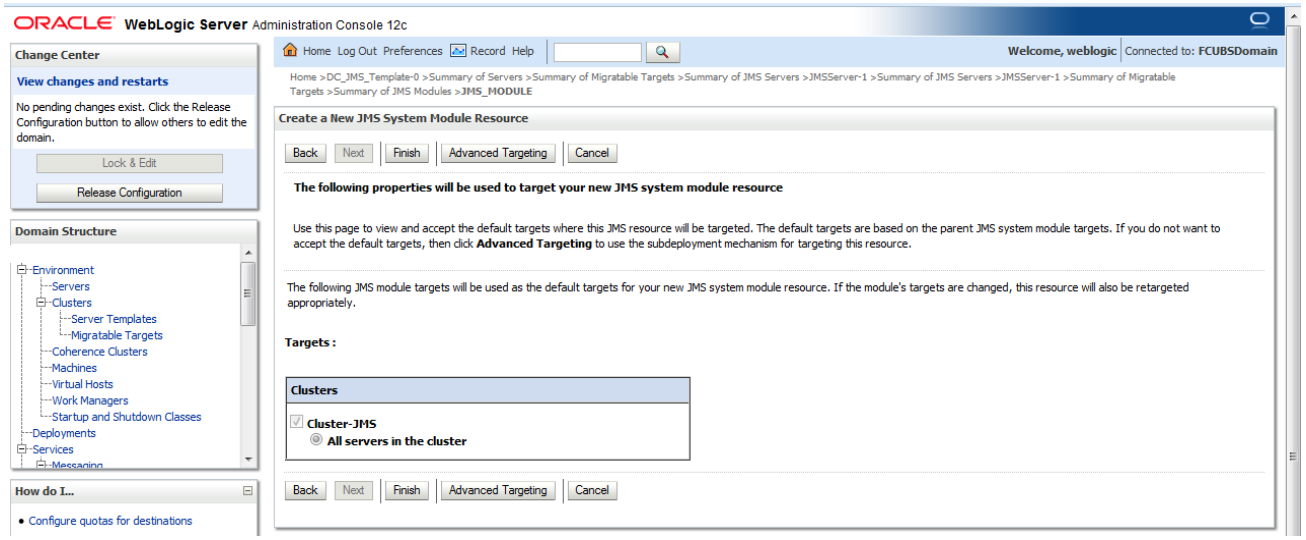
2) Select Connection Factory and click on **Next**



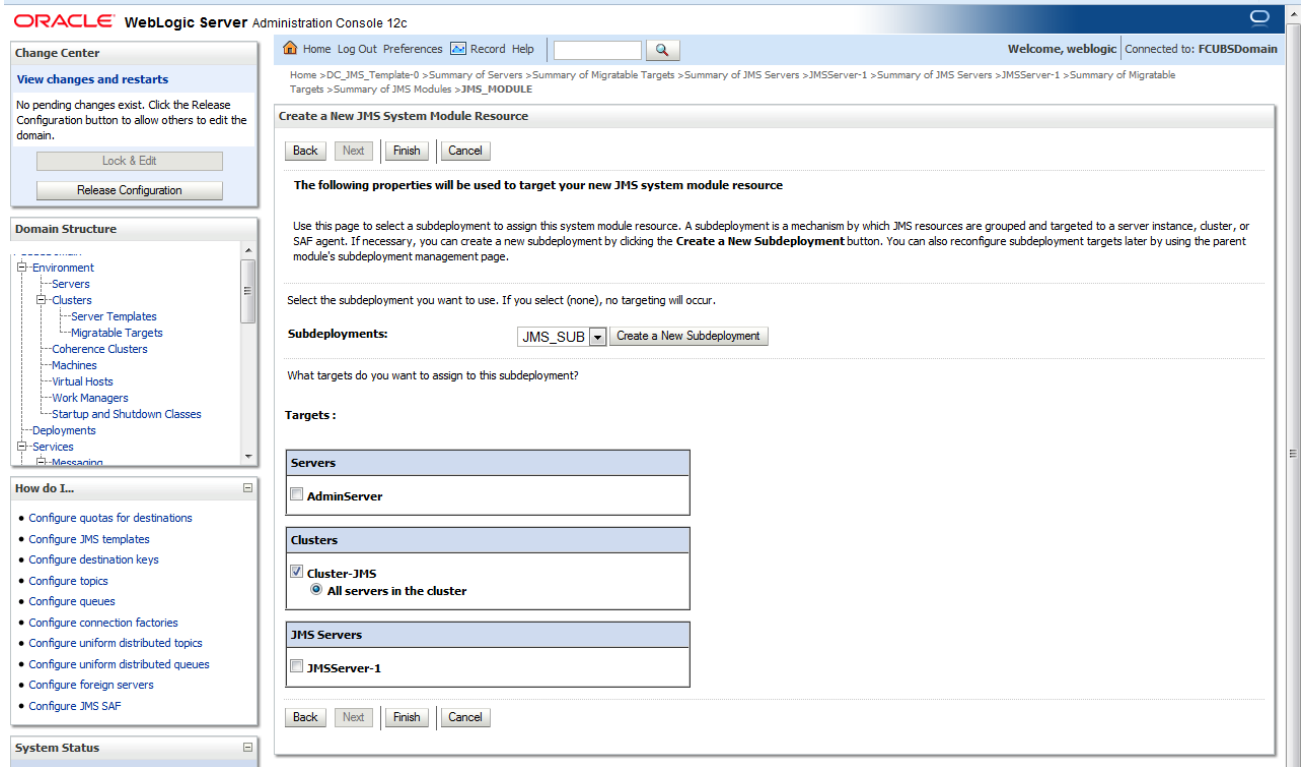
3) Enter the Name and Click on **Next**



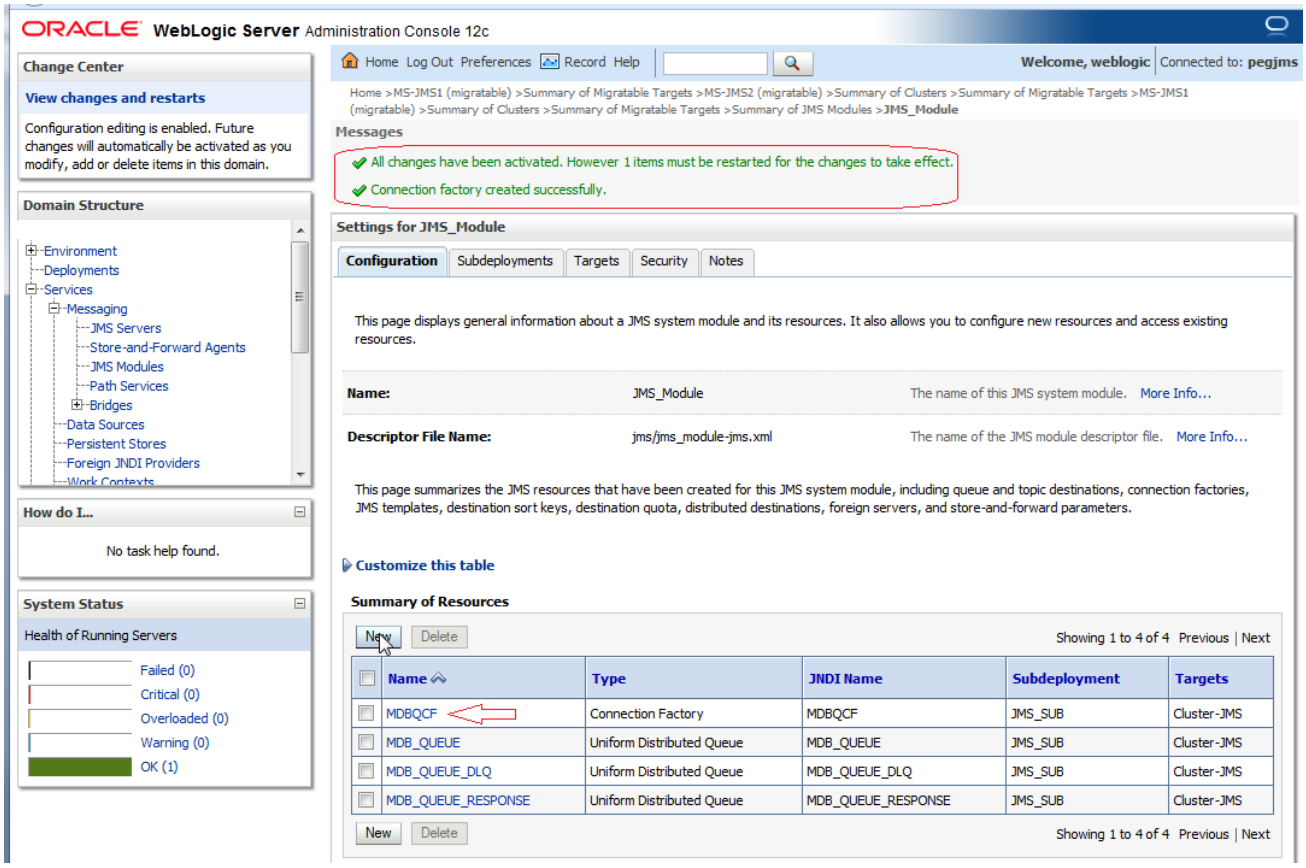
4) Click on **Advance Targeting**



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

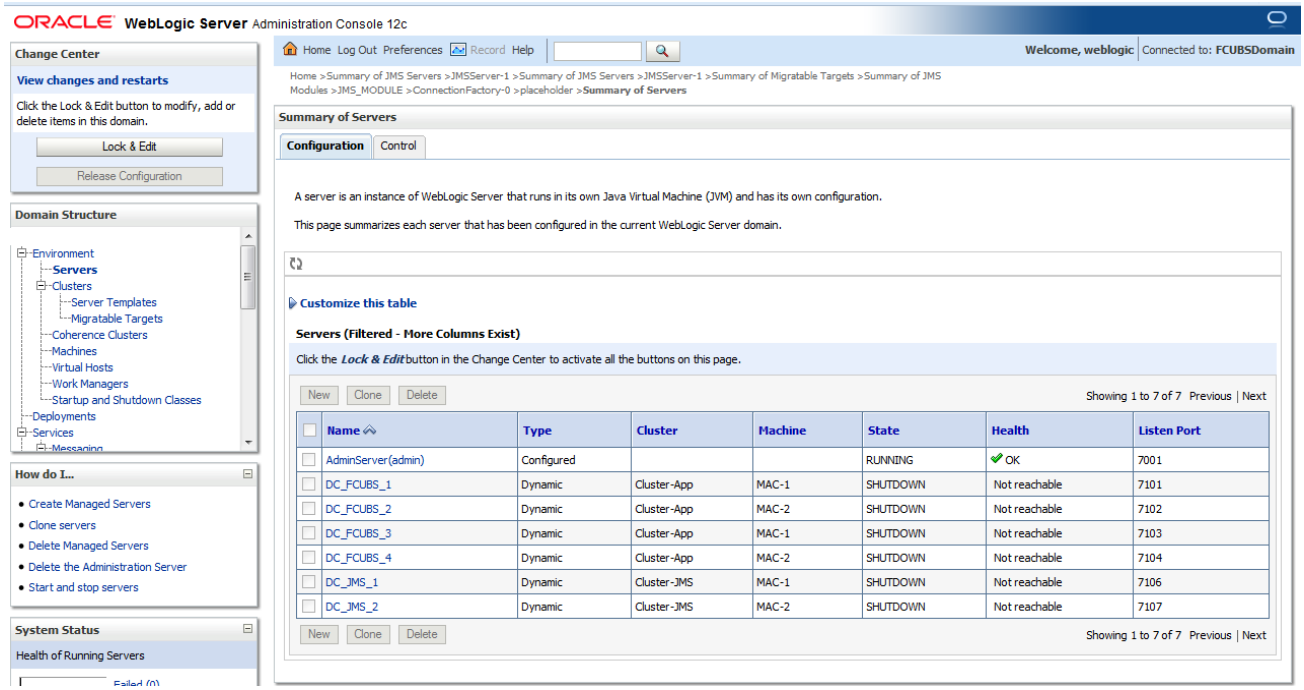


6) Connection Factory is **Created**

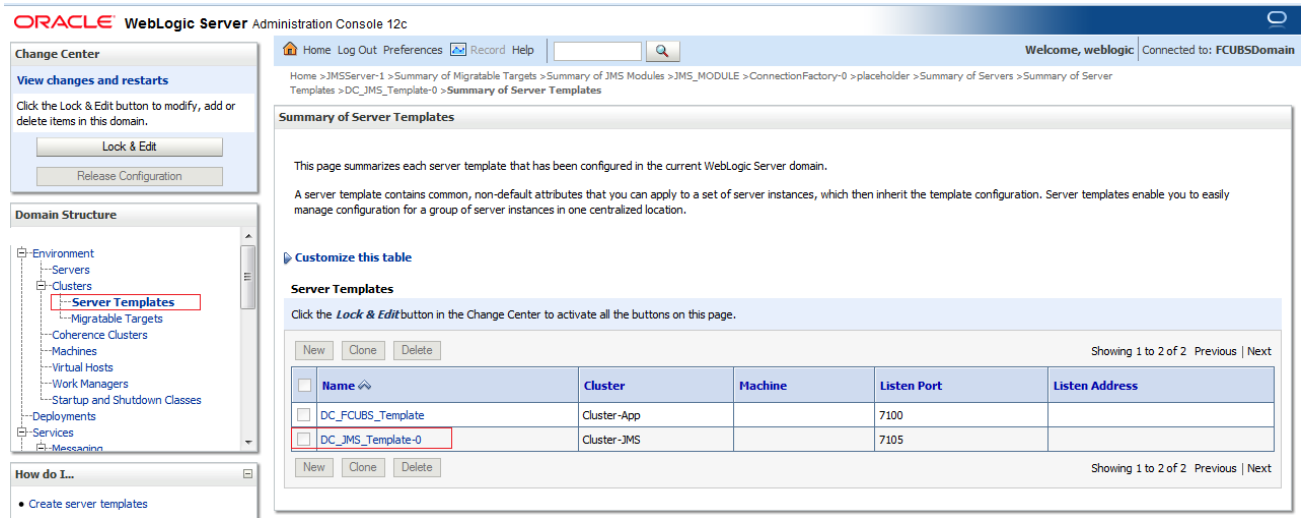

ORACLE WebLogic Server Administration Console 12c
Change Center
View changes and restarts
Configuration editing is enabled. Future changes will automatically be activated as you modify, add or delete items in this domain.
Domain Structure
Environment
Deployments
Services
Messaging
JMS Servers
Store-and-Forward 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

5. Server Restart

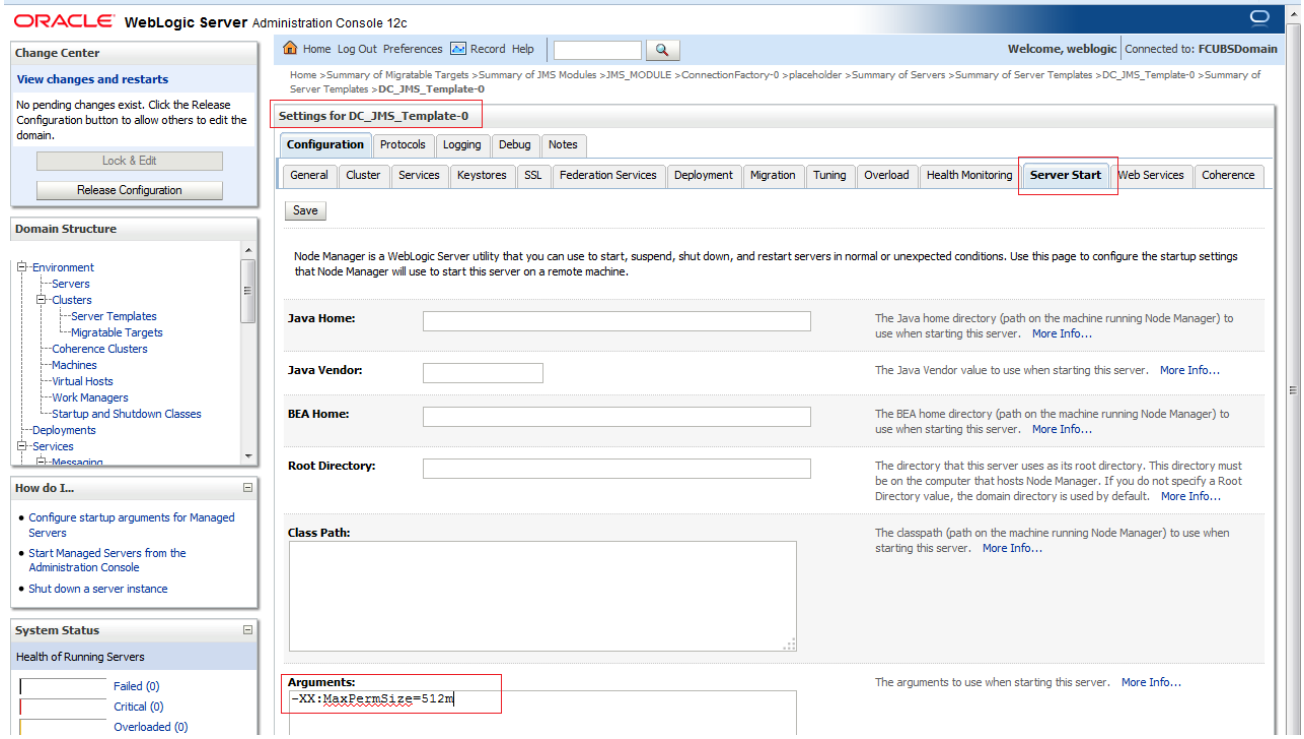
1) Increase the heap size of both DC_JMS_1 and DC_JMS_2 cluster



2) Select the cluster ‘DC_JMS_Template-0’ and



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

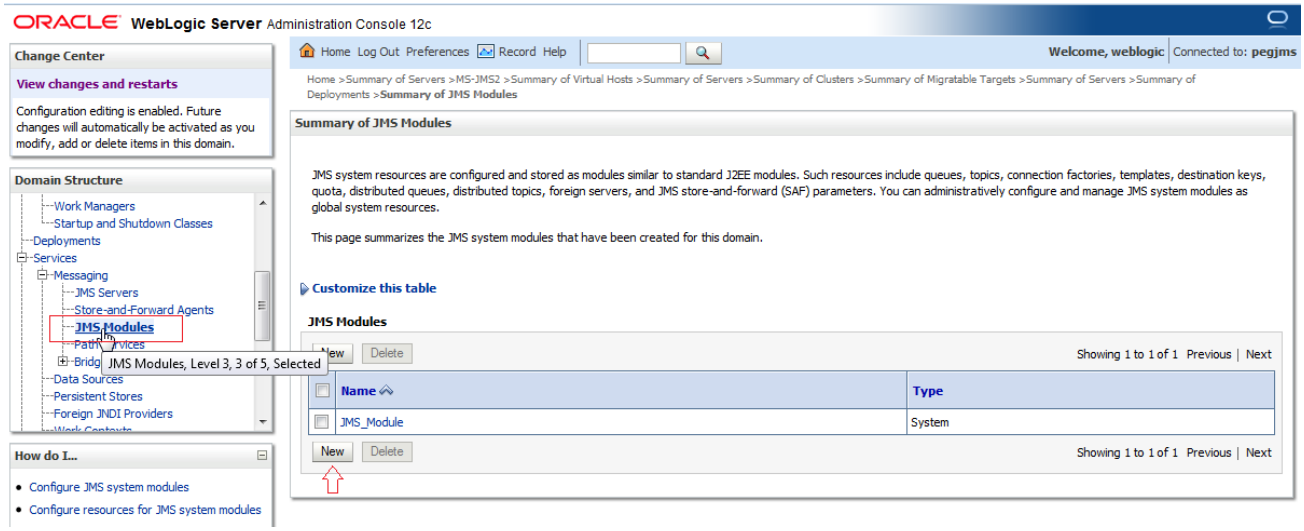


4) **Restart** the AdminServer and DC_JMS_1 and DC_JMS_2 managed servers.

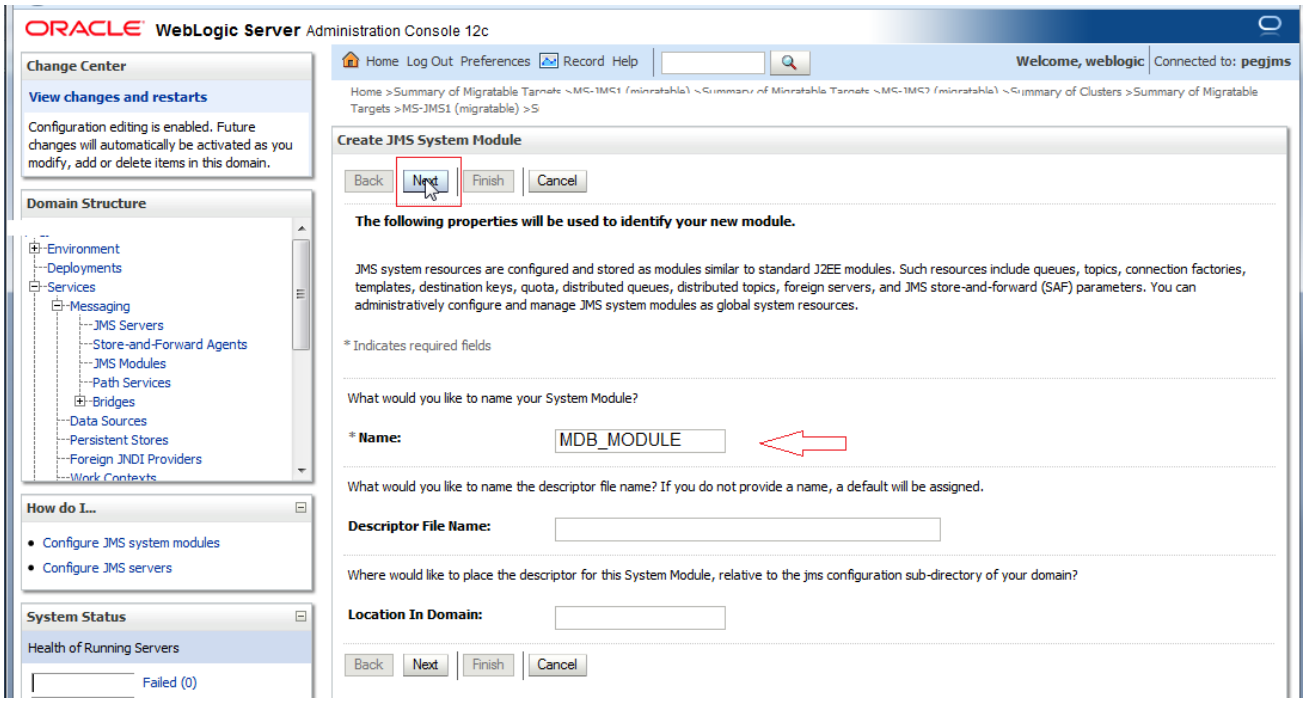
6. Foreign Server Creation

6.1 Module Creation

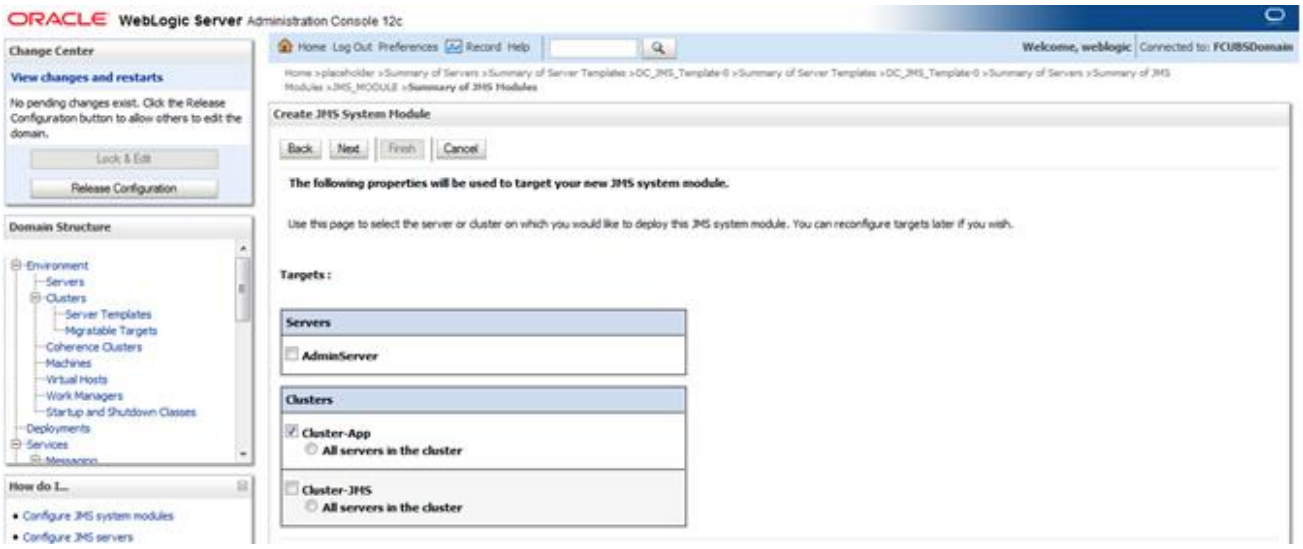
1) JMS_Modules and Click on **New**



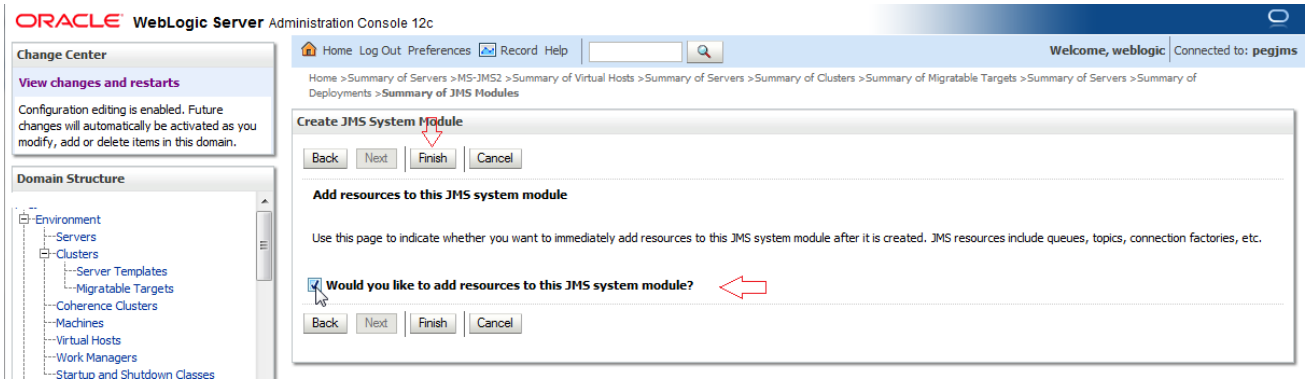
2) Enter name as MDB_MODULE and click on **Next**



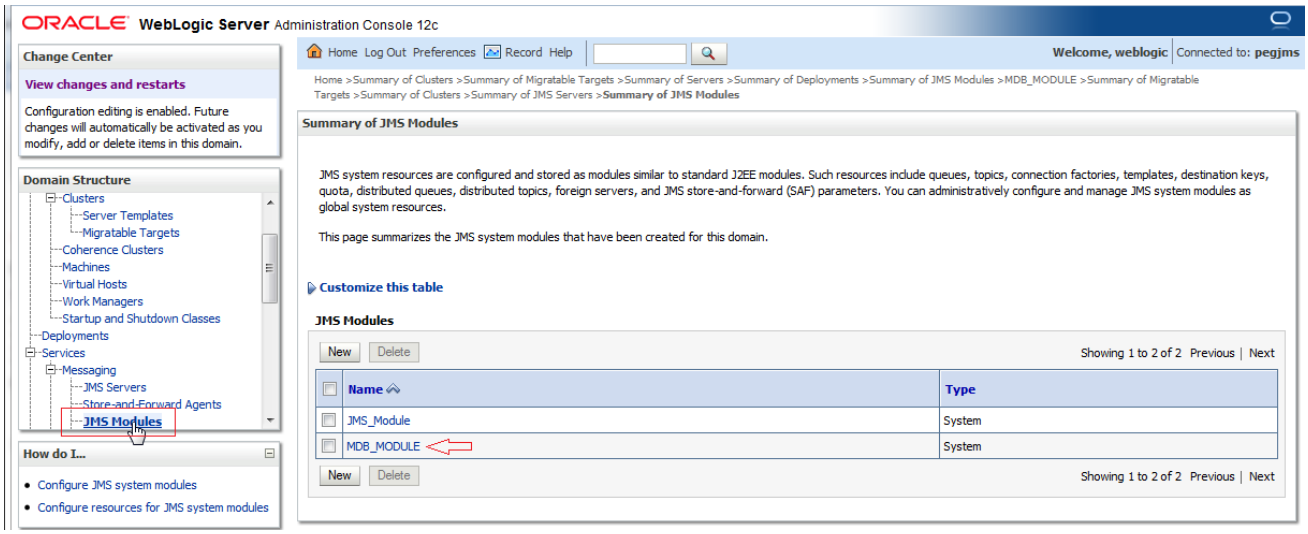
3) Select target as Cluster-App and click on **Next**



4) Select CheckBox and Click on **Finish**

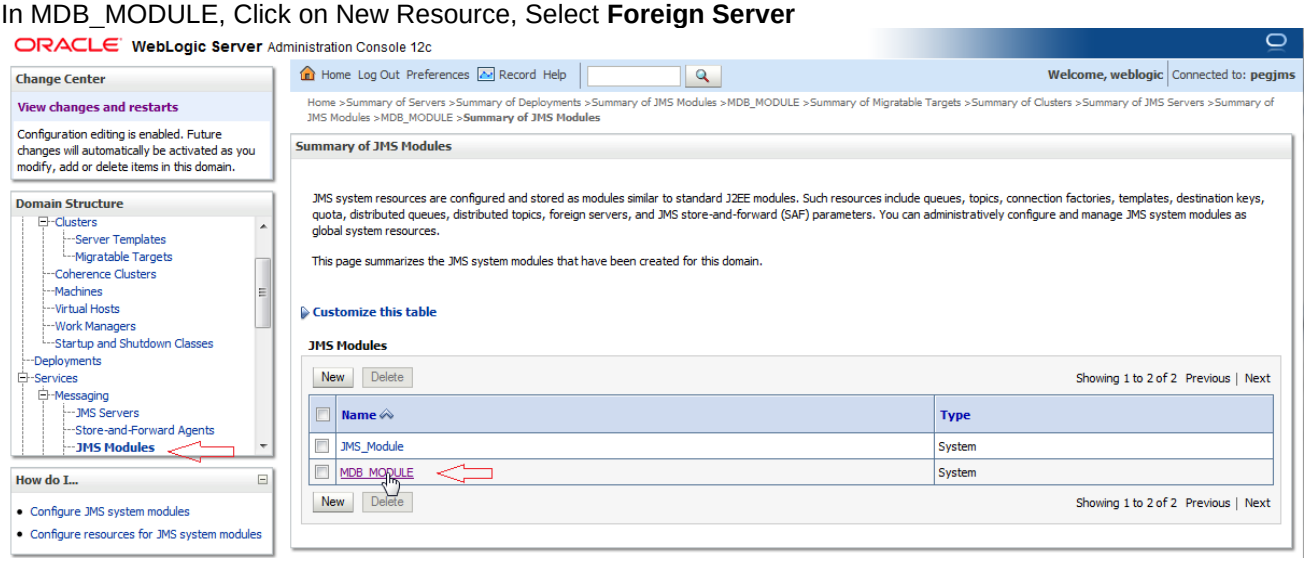


5) MDB_MODULE is **created**

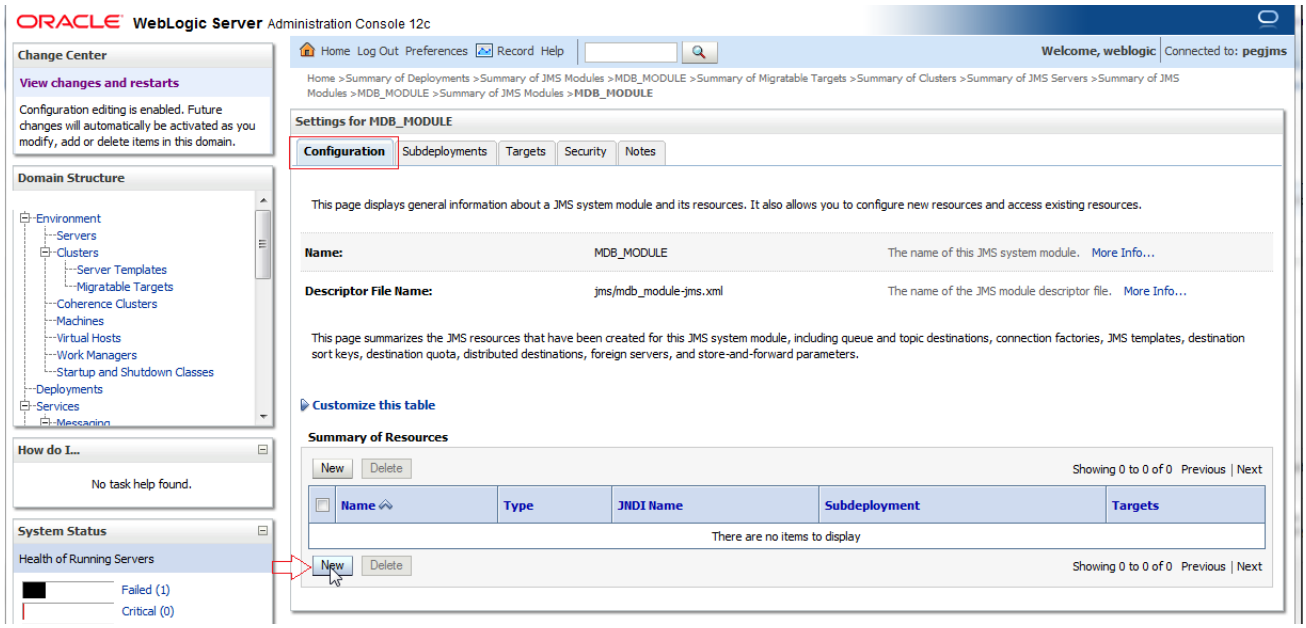


6.2 Foreign Server Creation

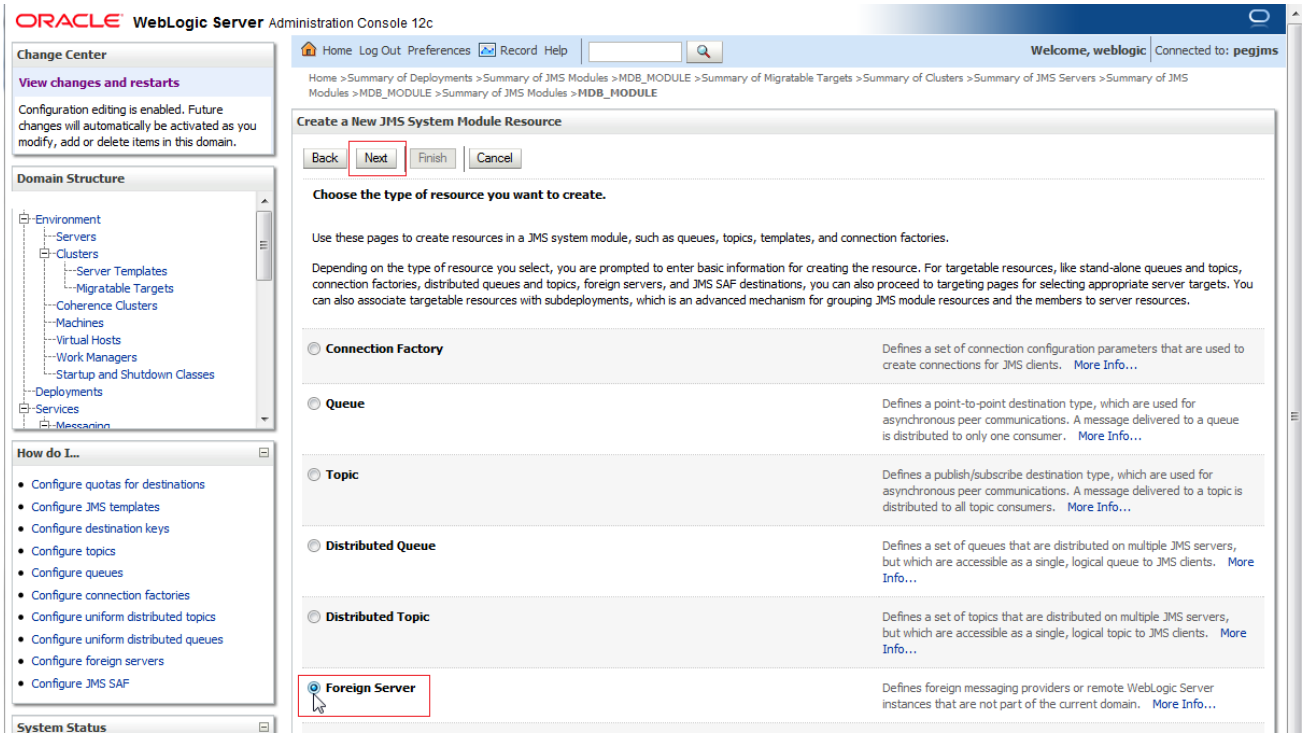
In MDB_MODULE, Click on New Resource, Select **Foreign Server**



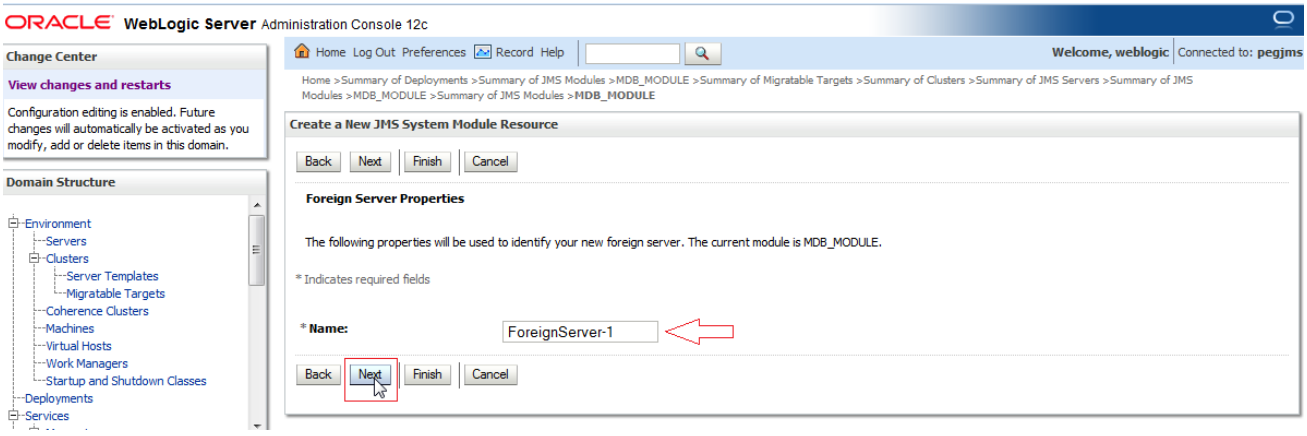
1) Click on Configuration → **New**



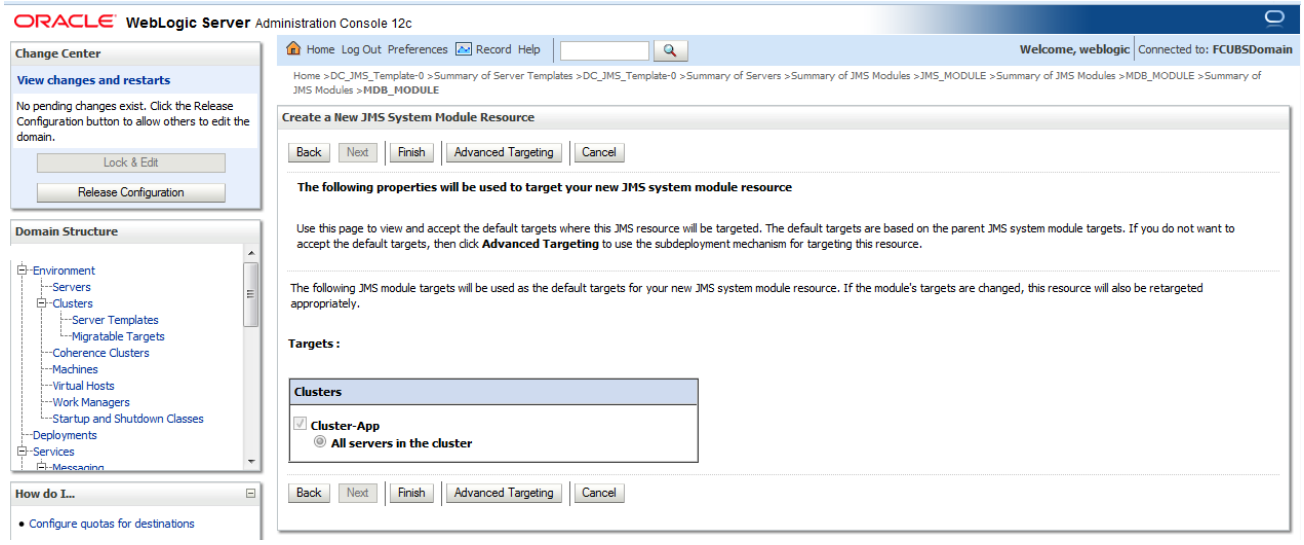
2) Select Foreign Server and Click on **Next**



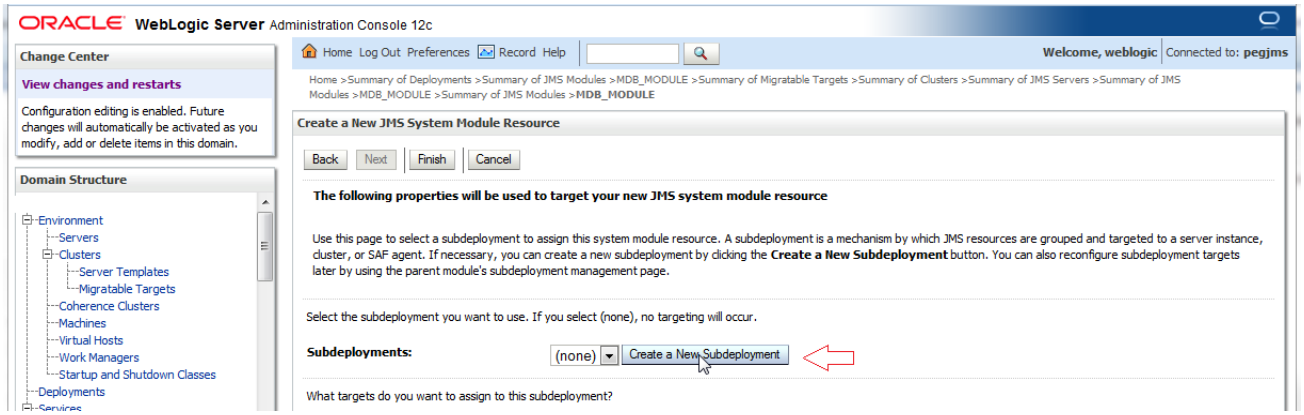
3) Enter name and Click on **Next**



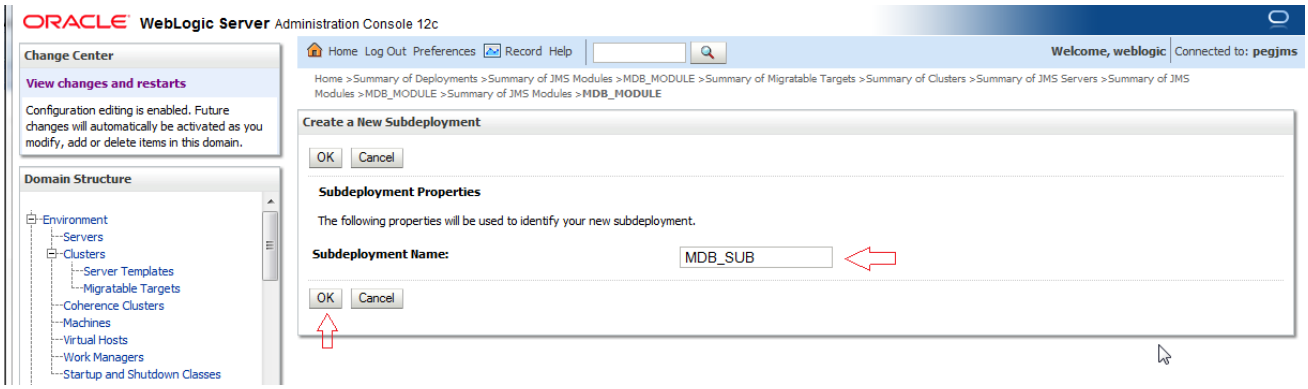
4) Click on Advanced Targeting



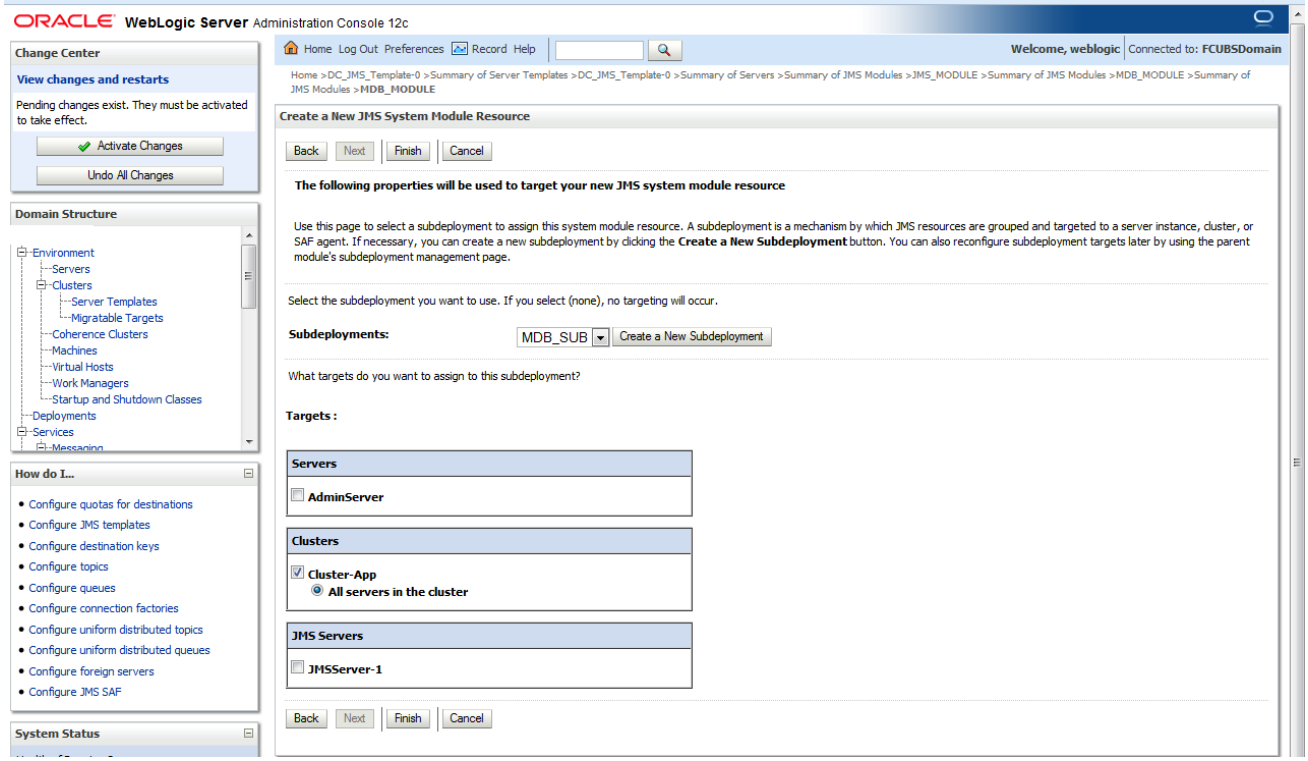
5) Click on Create New SudDeployment



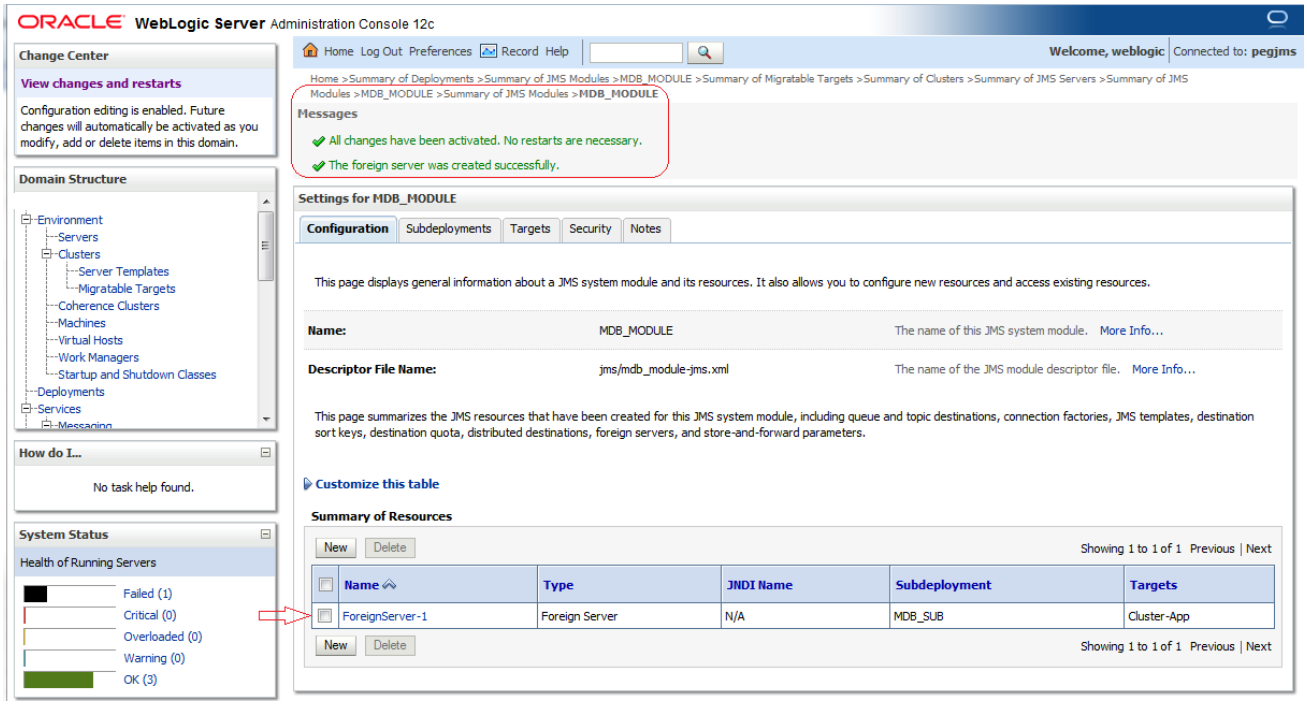
6) Enter Name as MDB_SUB and Click on OK



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

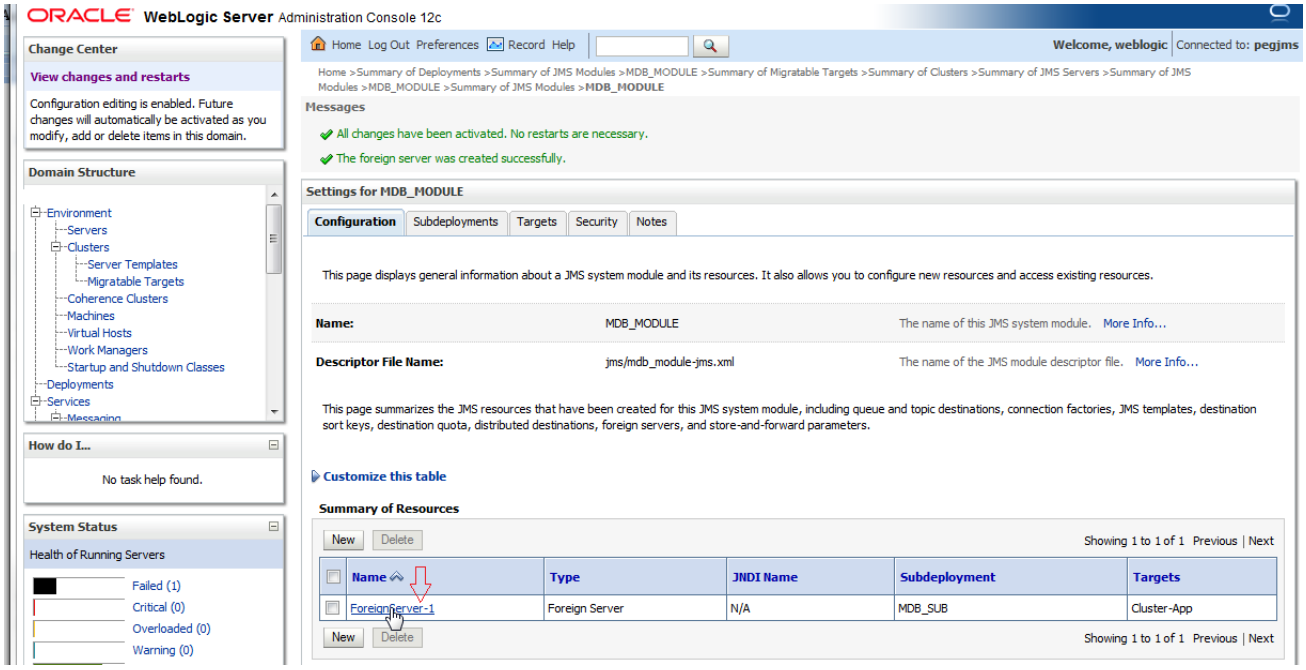


8) Foreign Server is created

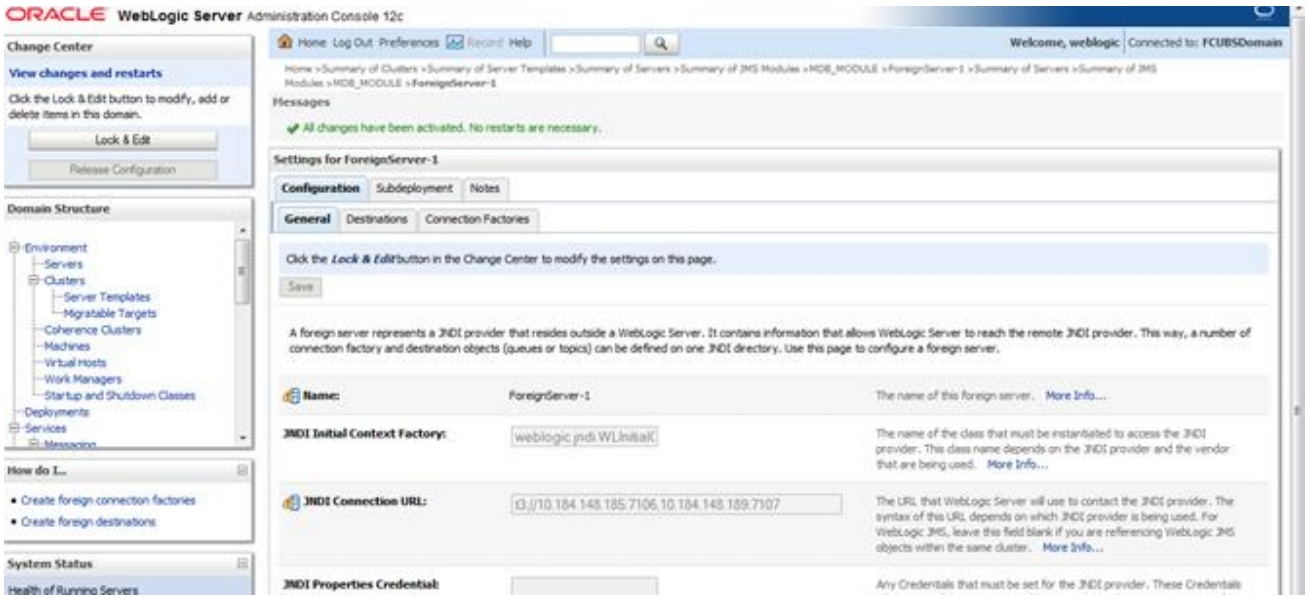


6.3 Foreign Server Configuration

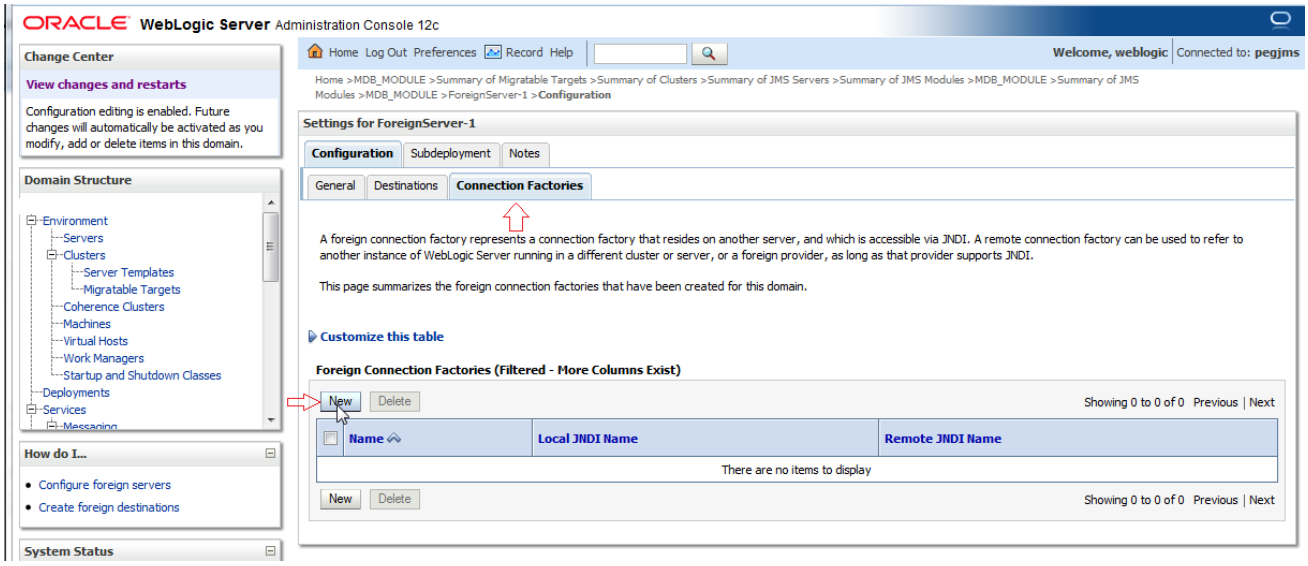
1) Click on ForeignServer-1



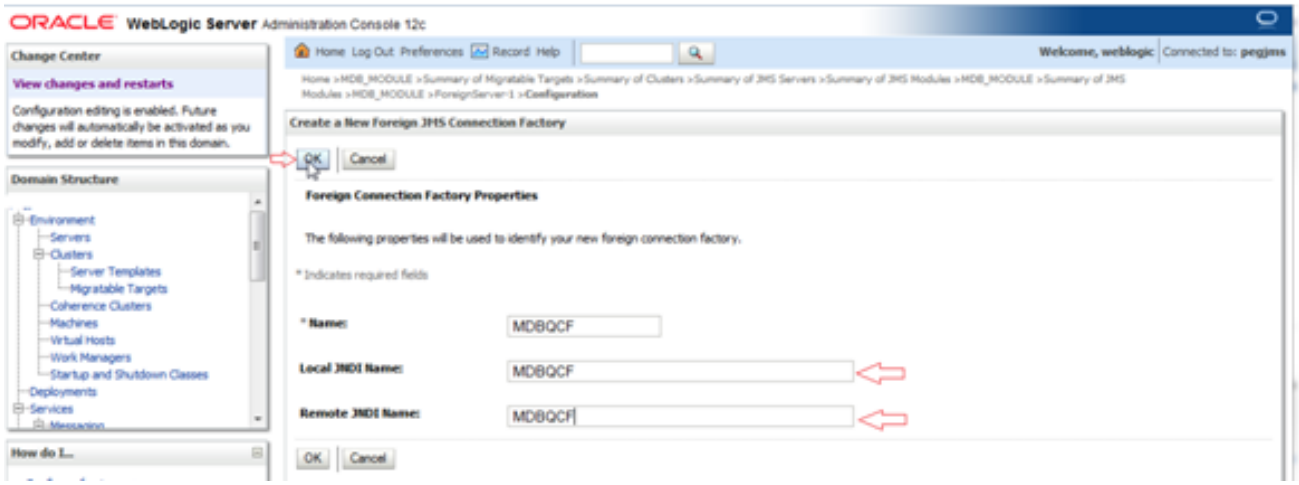
2) Enter the JNDI URL as Cluster URL(JMS Managed Servers) and Click on Save



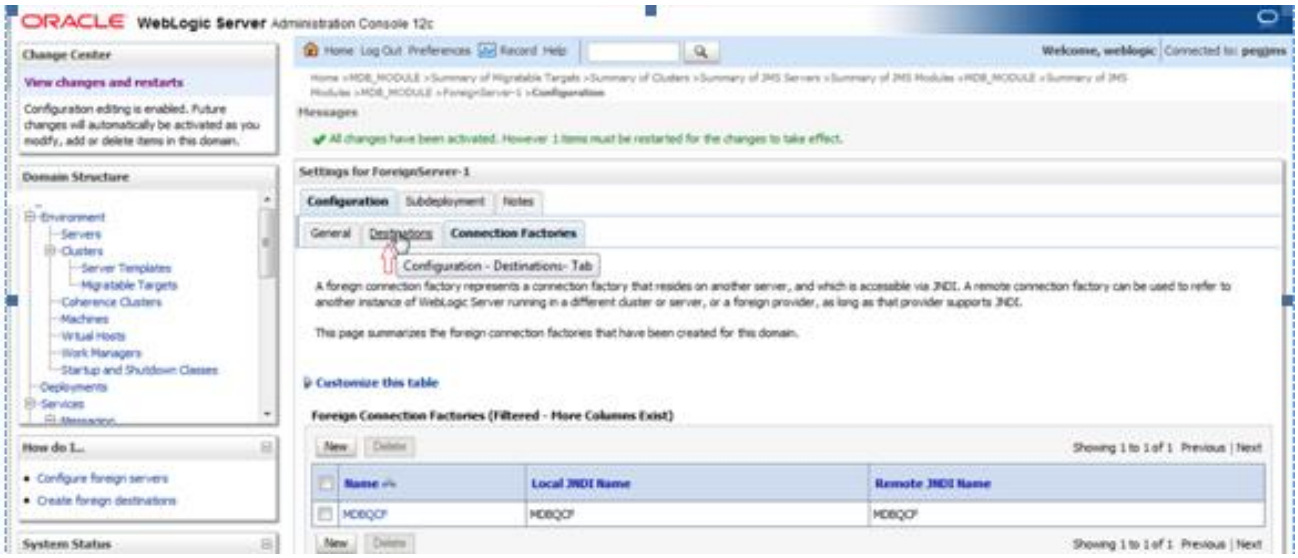
3) Click on Connection Factories



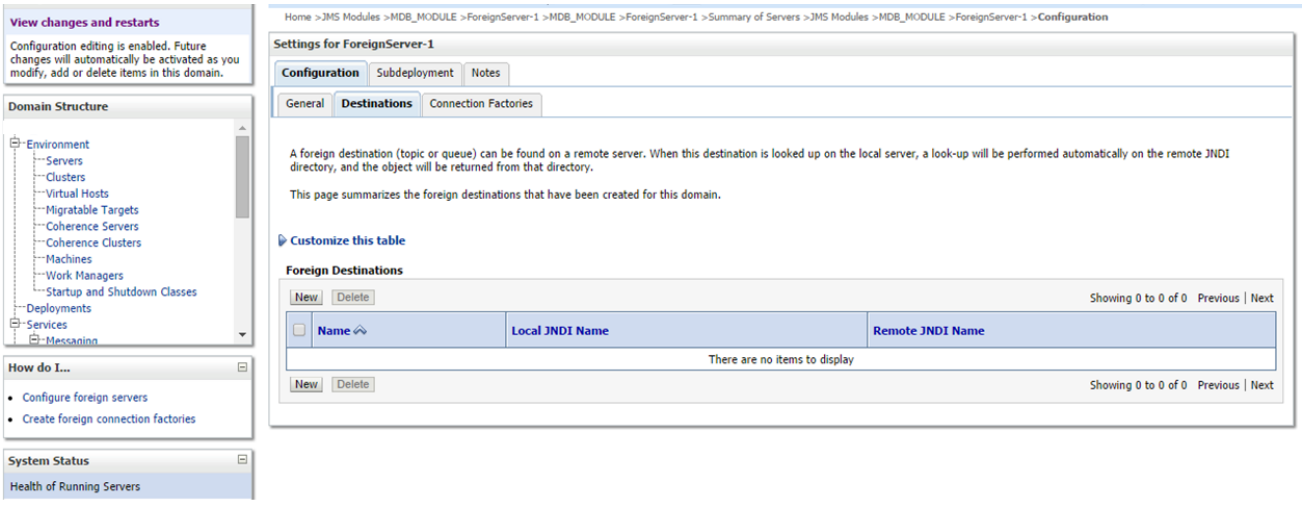
4) Create MDBQCF Connection Factory

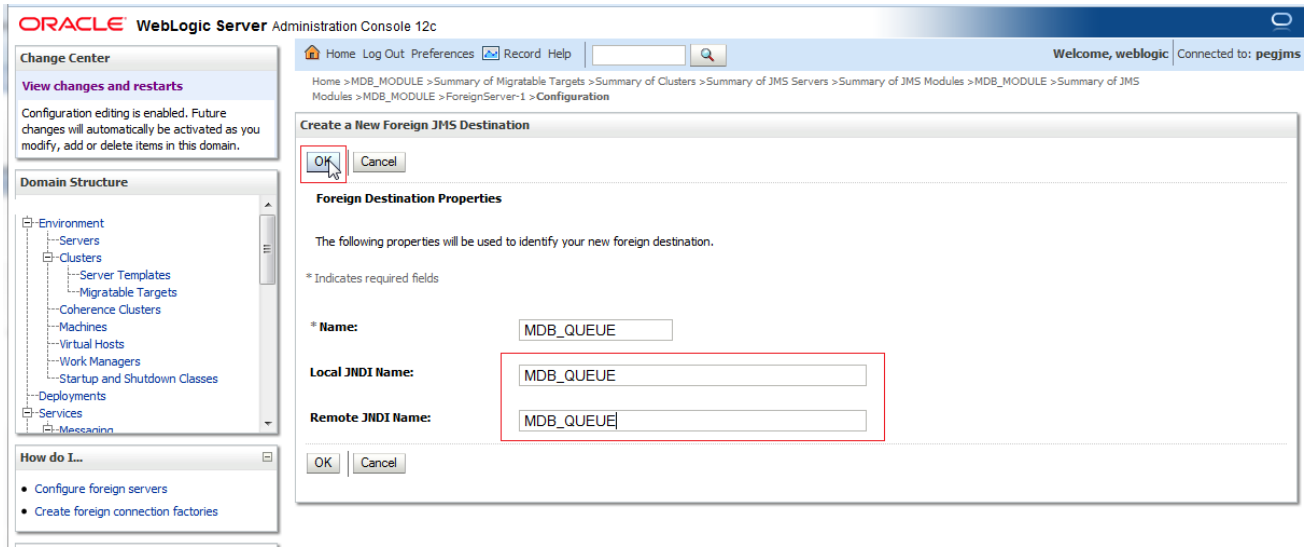


5) Click on Destination

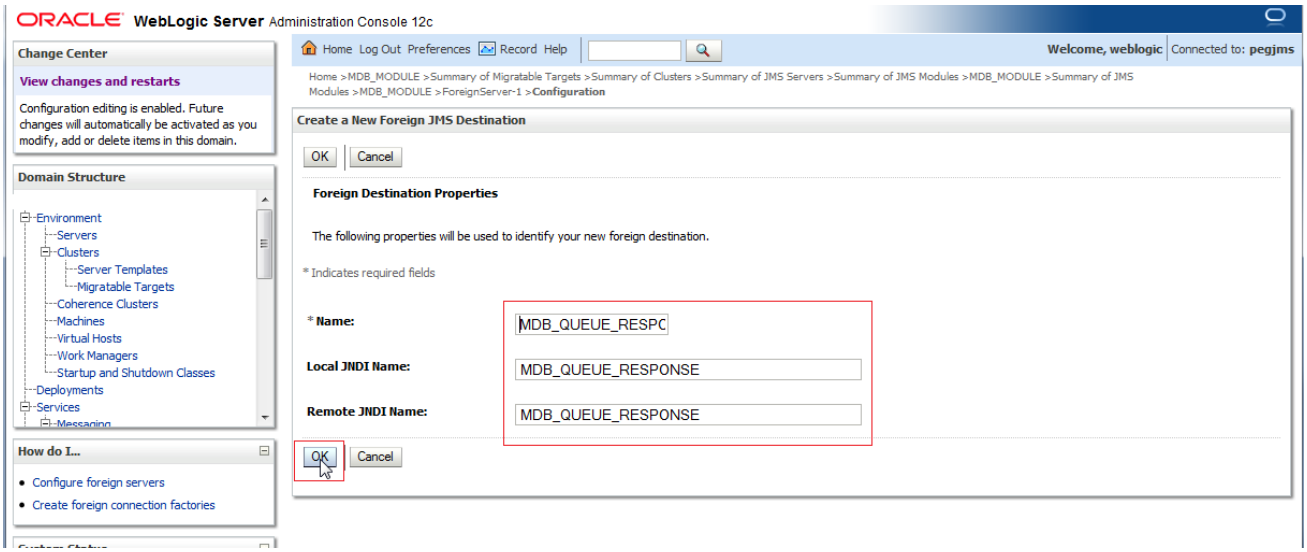


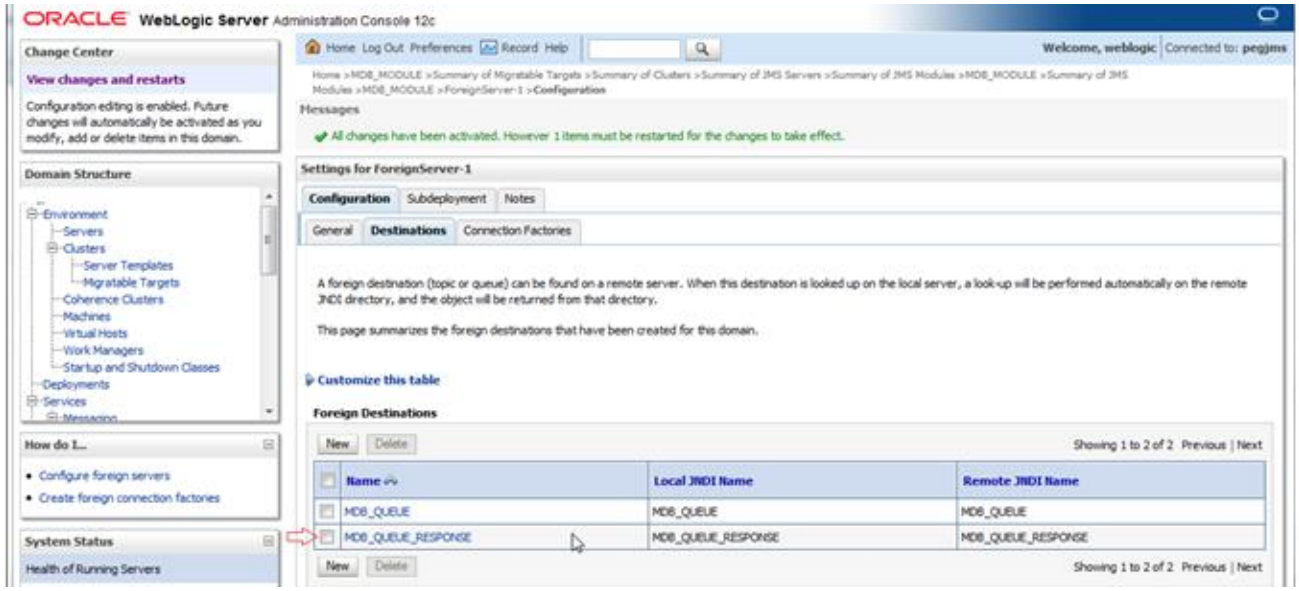
6) Create MDB_QUEUE

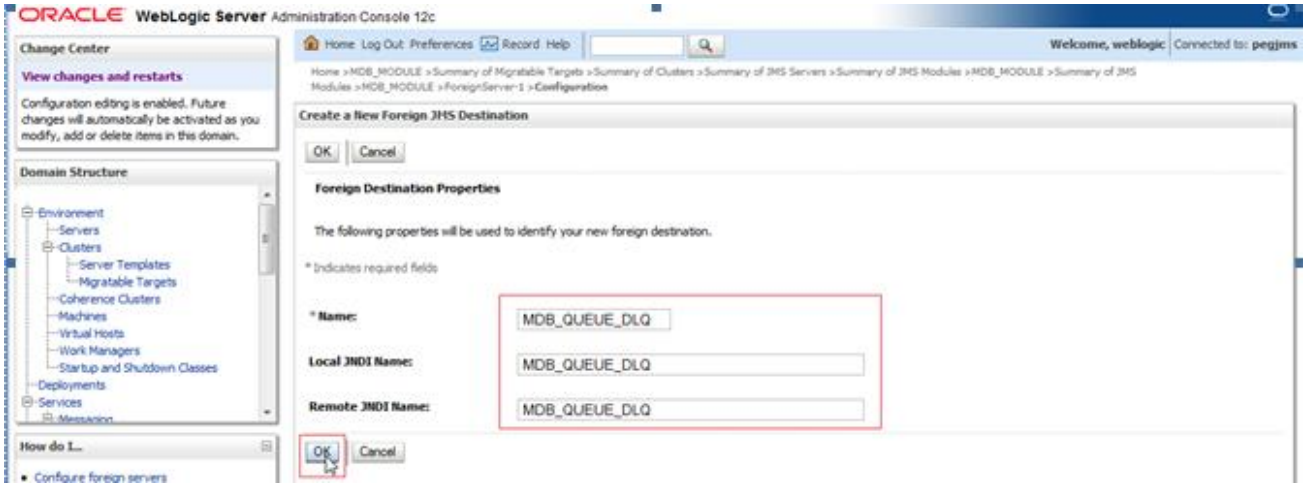


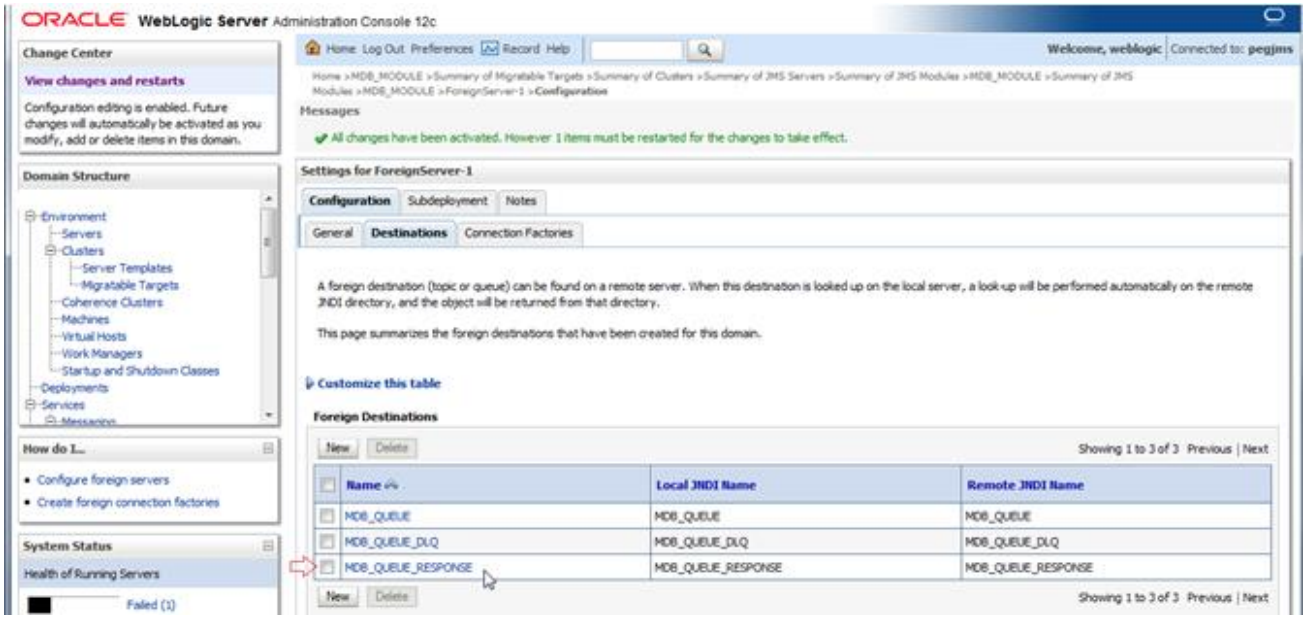


7) Similarly Create MDB_QUEUE_RESPONSE, MDB_QUEUE_DLQ





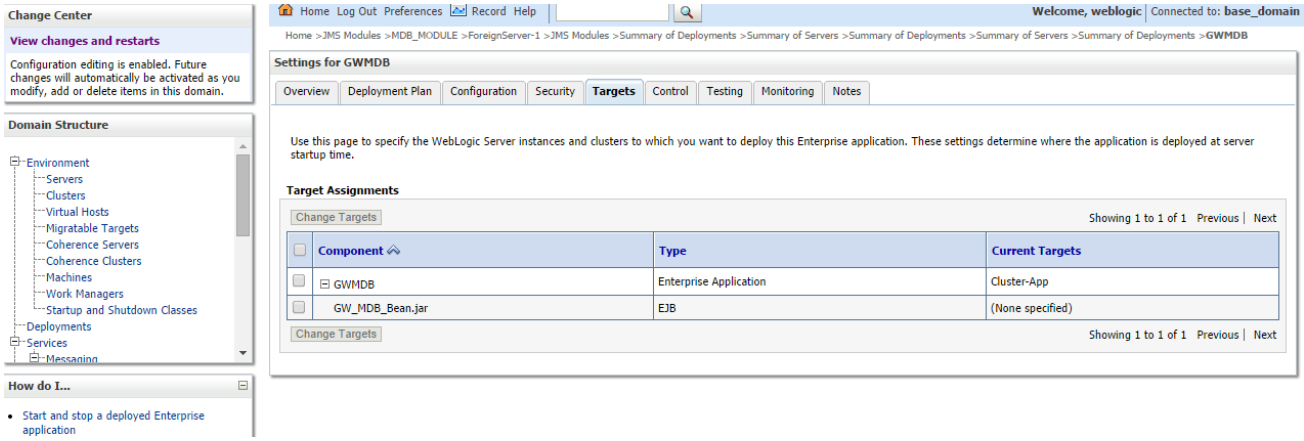




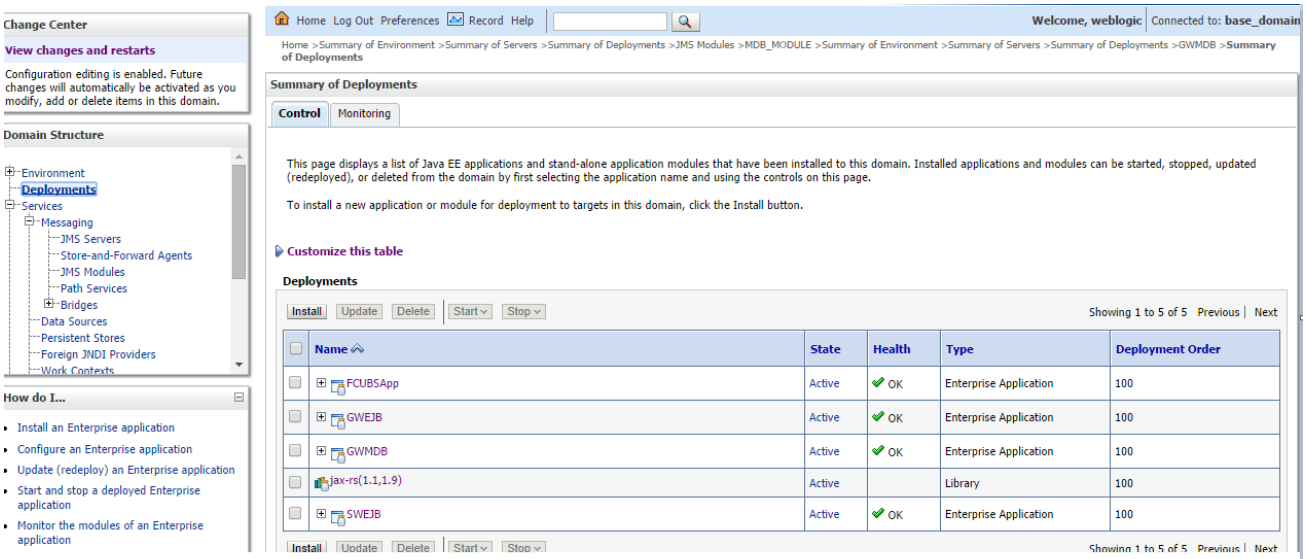
8) After all the resources are created, **Restart** the Admin and Managed Servers.

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


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
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
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

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

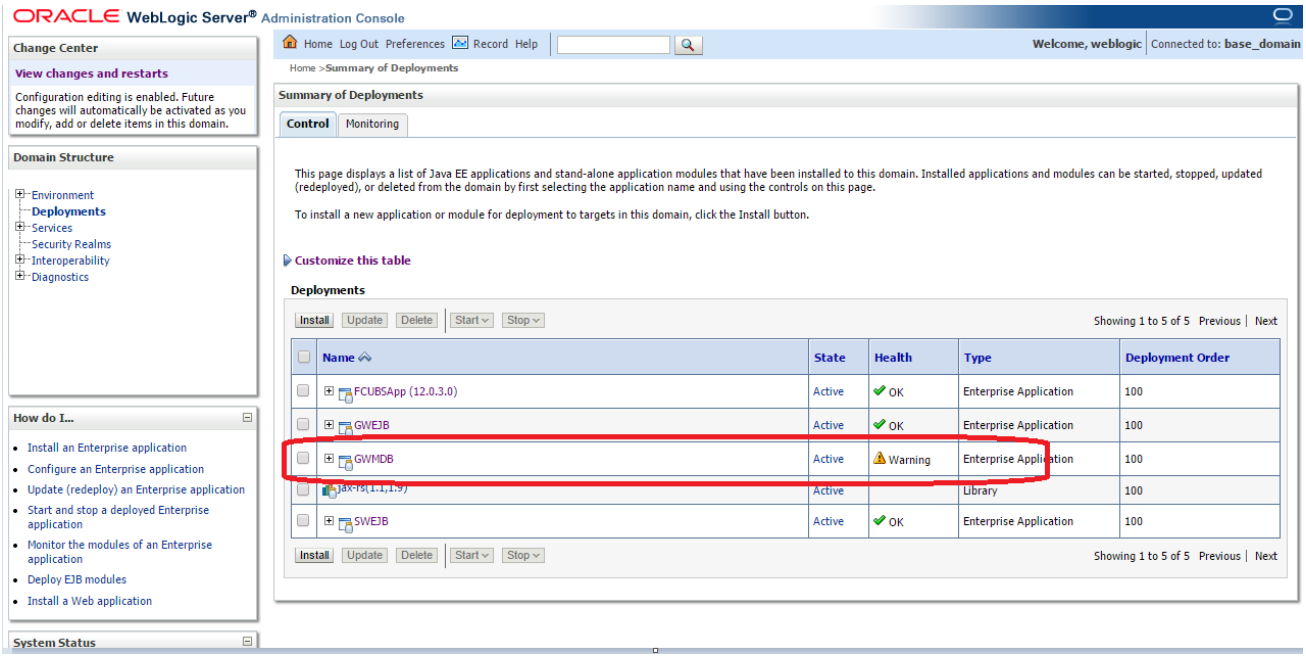
1) Foreign Server Creation is not required
2) Targets should be given accordingly during SubDeployment Creation

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.

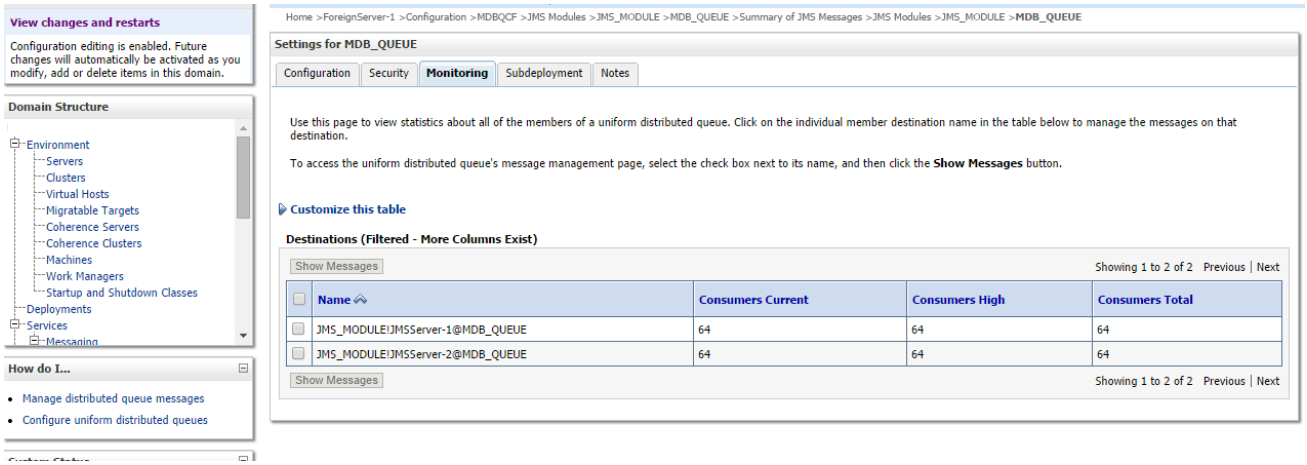
8.4 t3s Protocol

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.

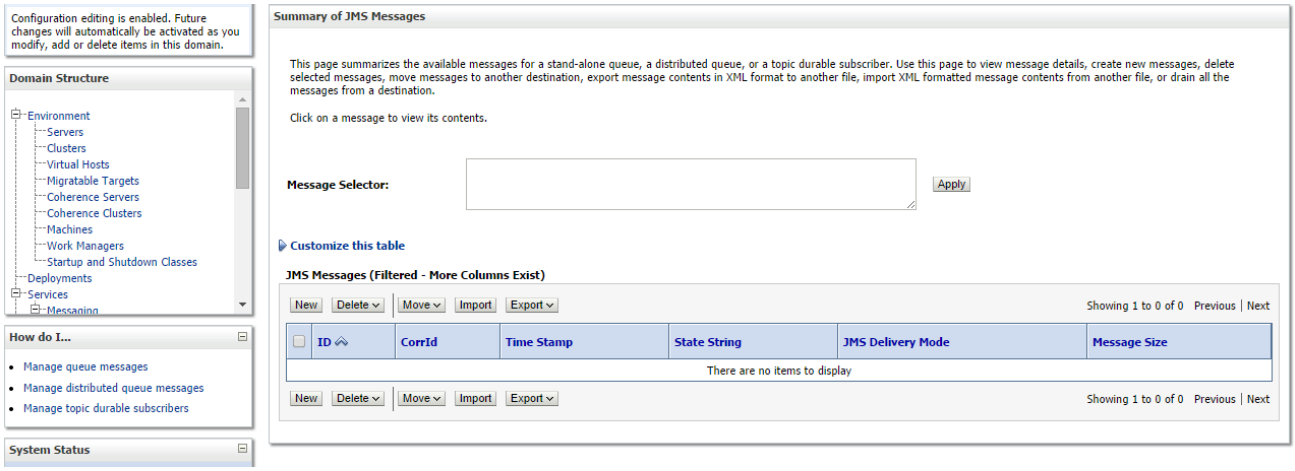
NOTE: when using the t3s protocol SSL Listen Port Enabled should be checked in server template and the port number used in the URL should be secure port.

8.5 How to Test the Deployment

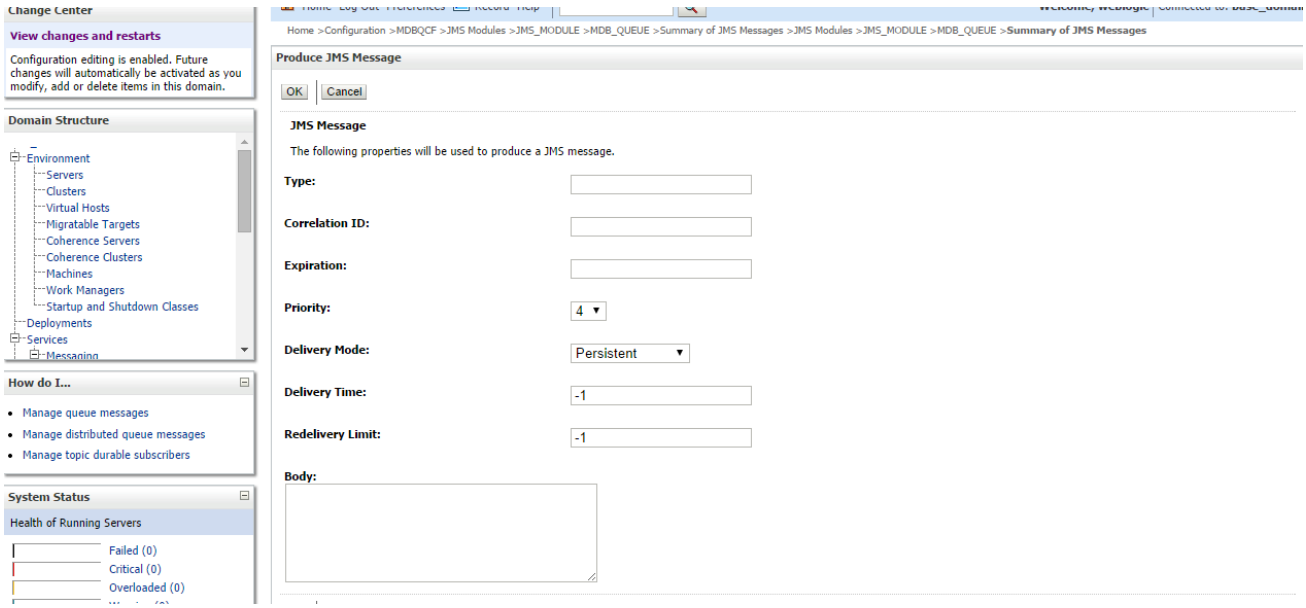
1) Navigate to Services → JMS Modules → JMS_MODULE → MDB_QUEUE → MONITORING



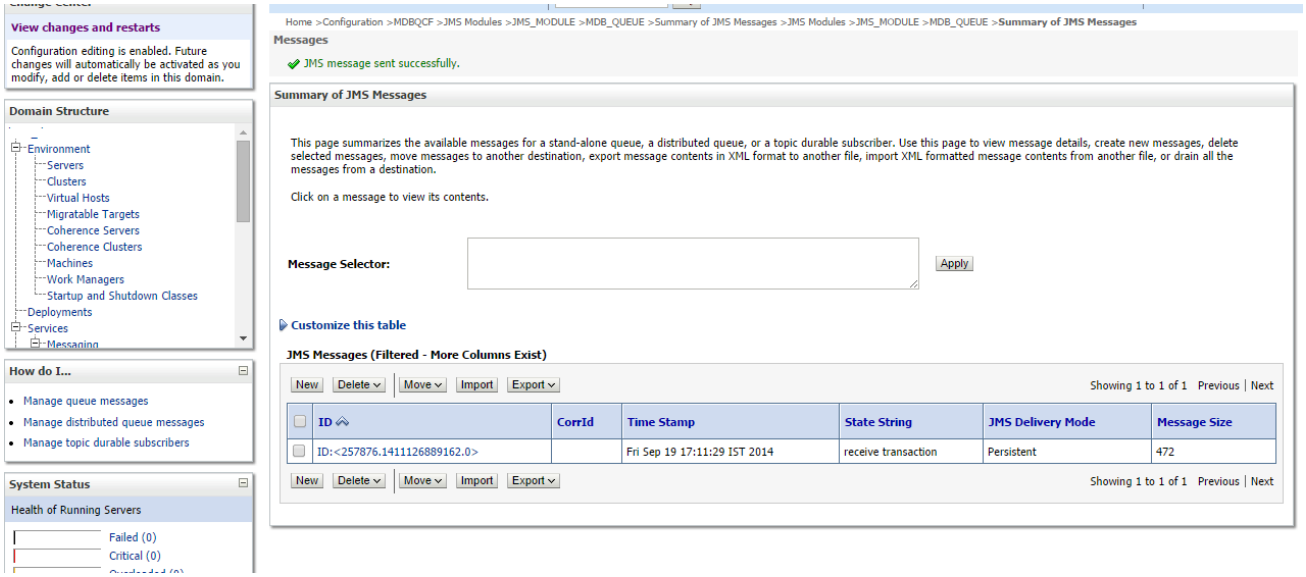
2) Select any one Server and Click on Show Messages



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 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.

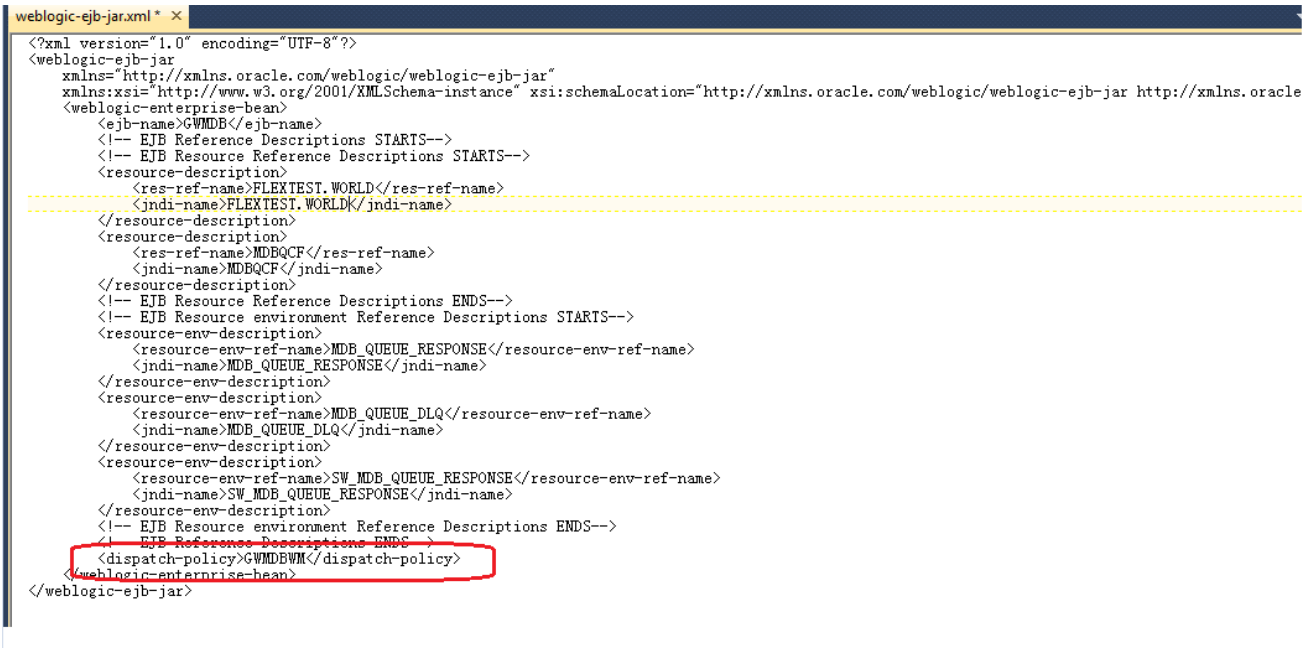
Steps to create custom work manager

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>

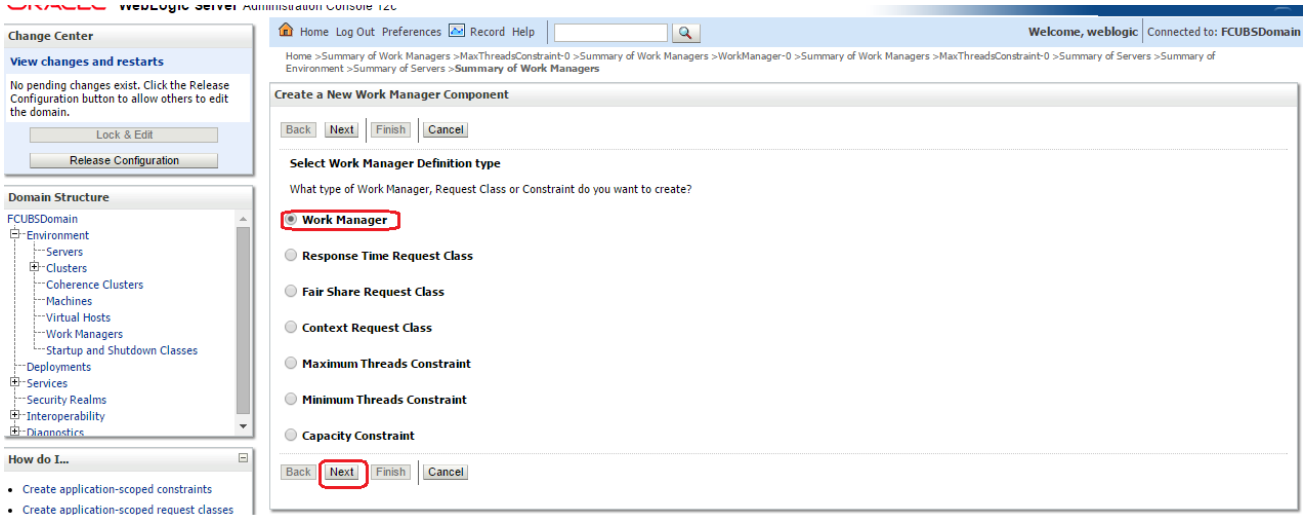


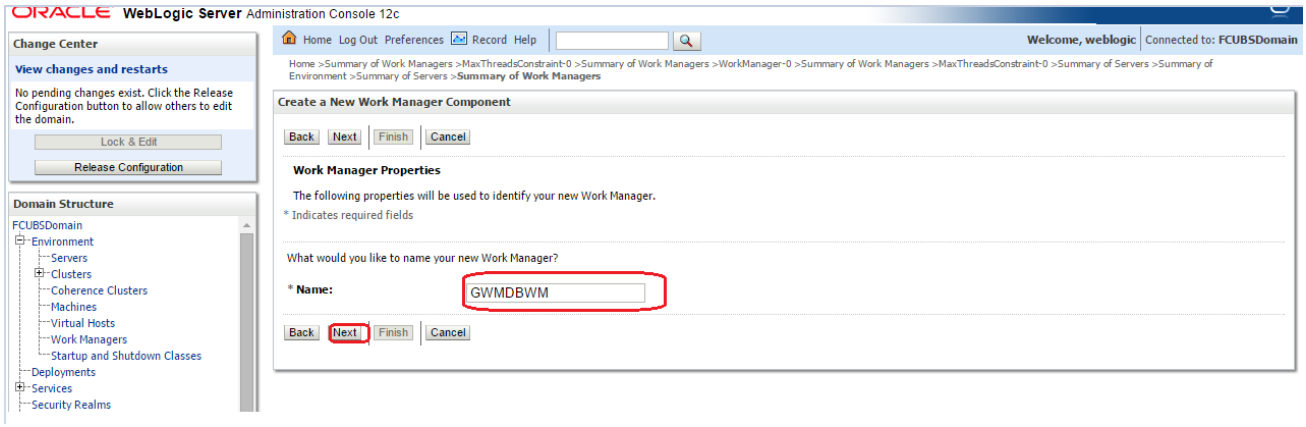
2) Remove if any of the below tags present in weblogic-ejb-jar.xml
max-beans-in-free-pool and initial-beans-in-free-pool

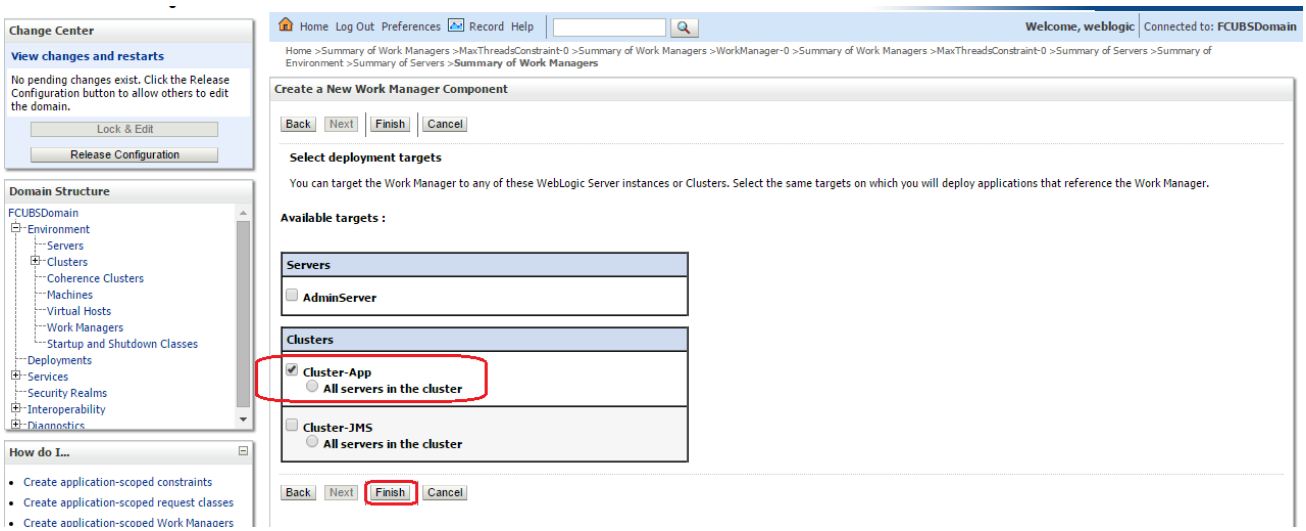
3) Save the ear file and redeploy the EAR file.

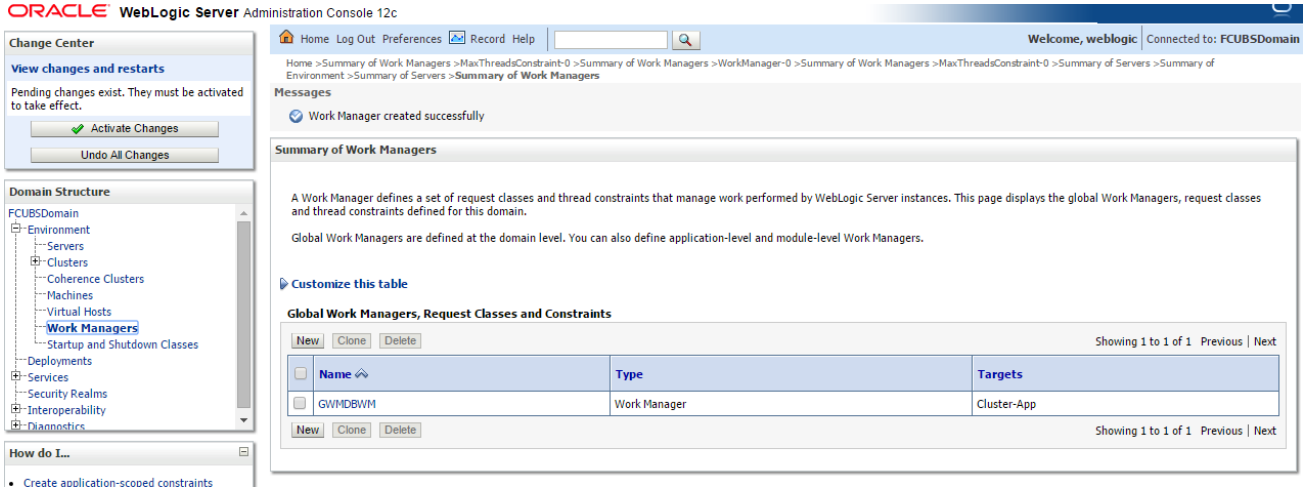
8.6.2 Work Manager Creation

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

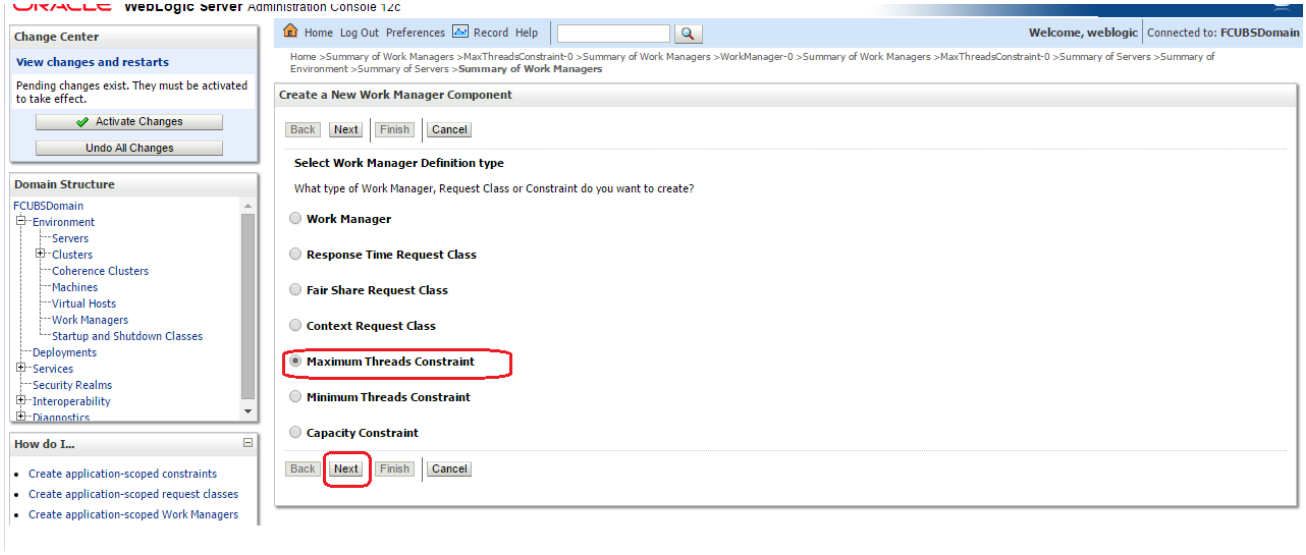


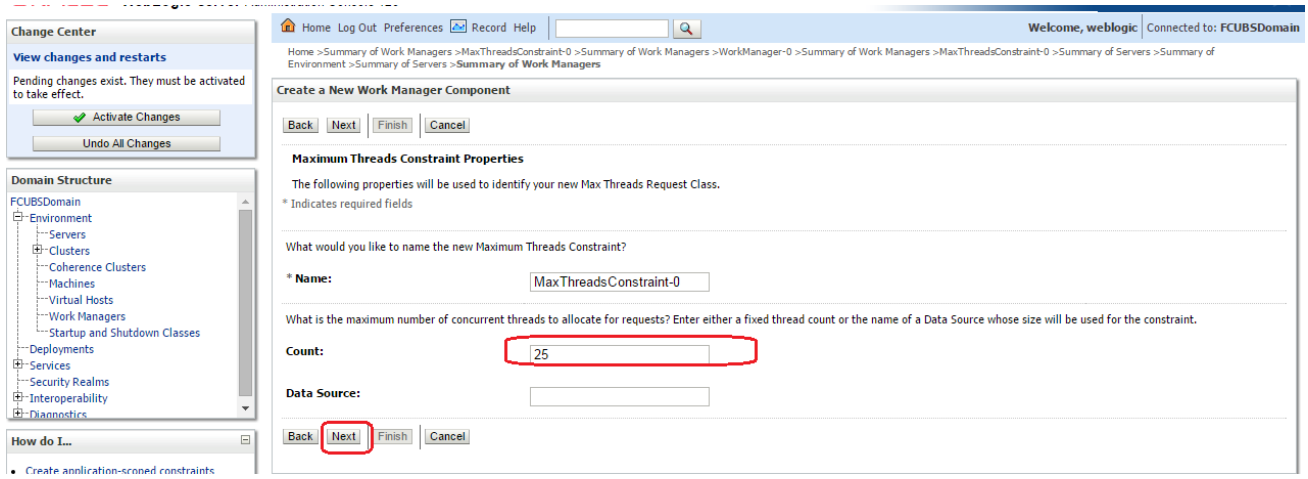


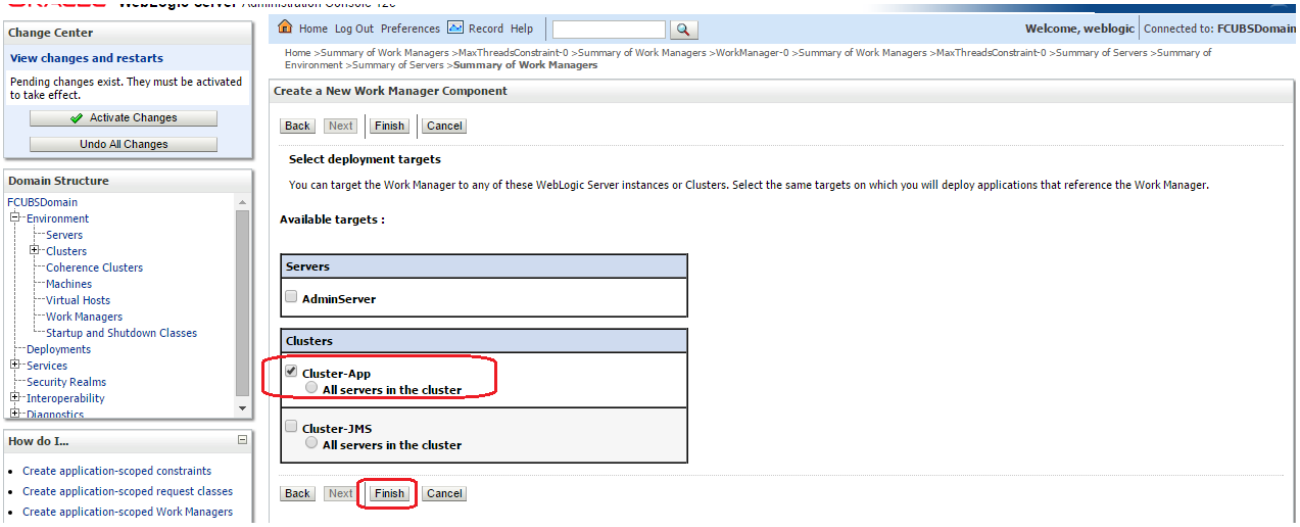


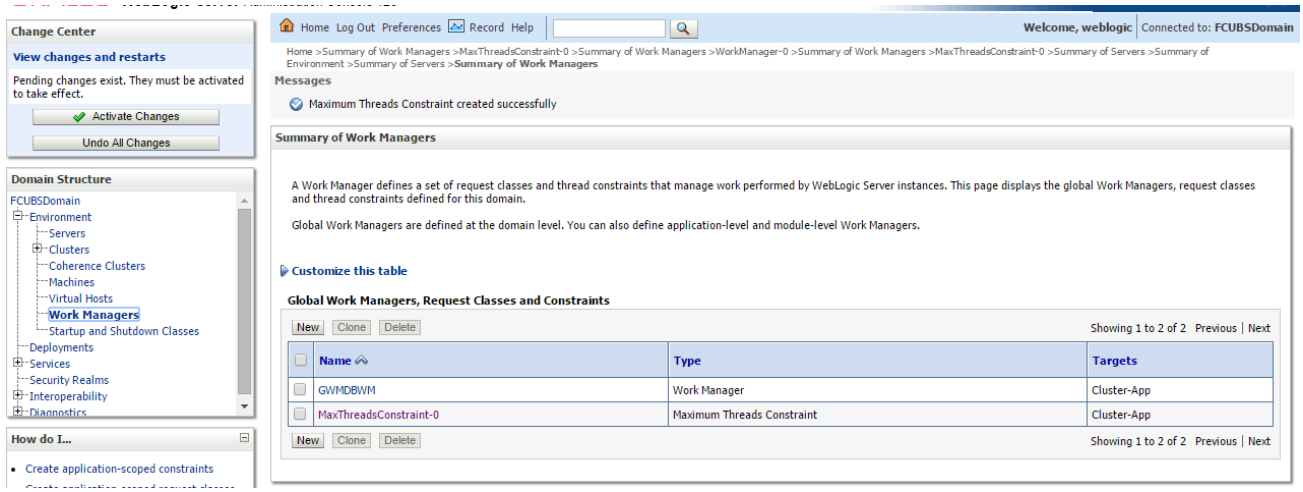


2) Create new Max Thread Constraint and in the Count field give the desired thread count

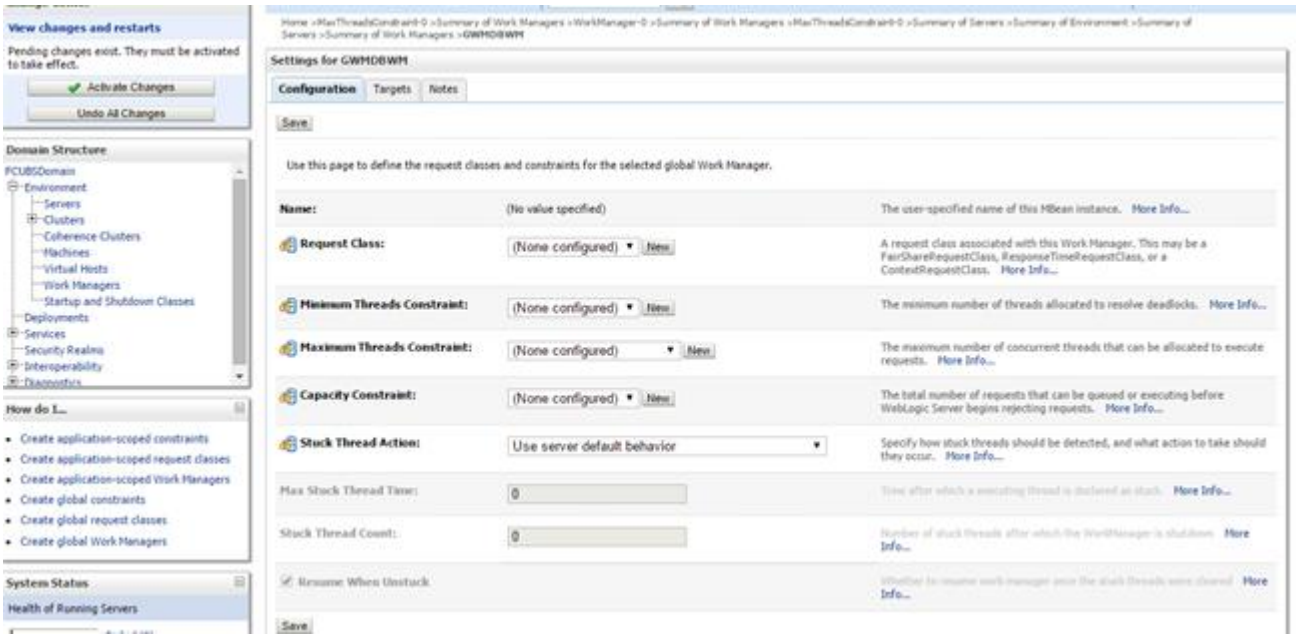


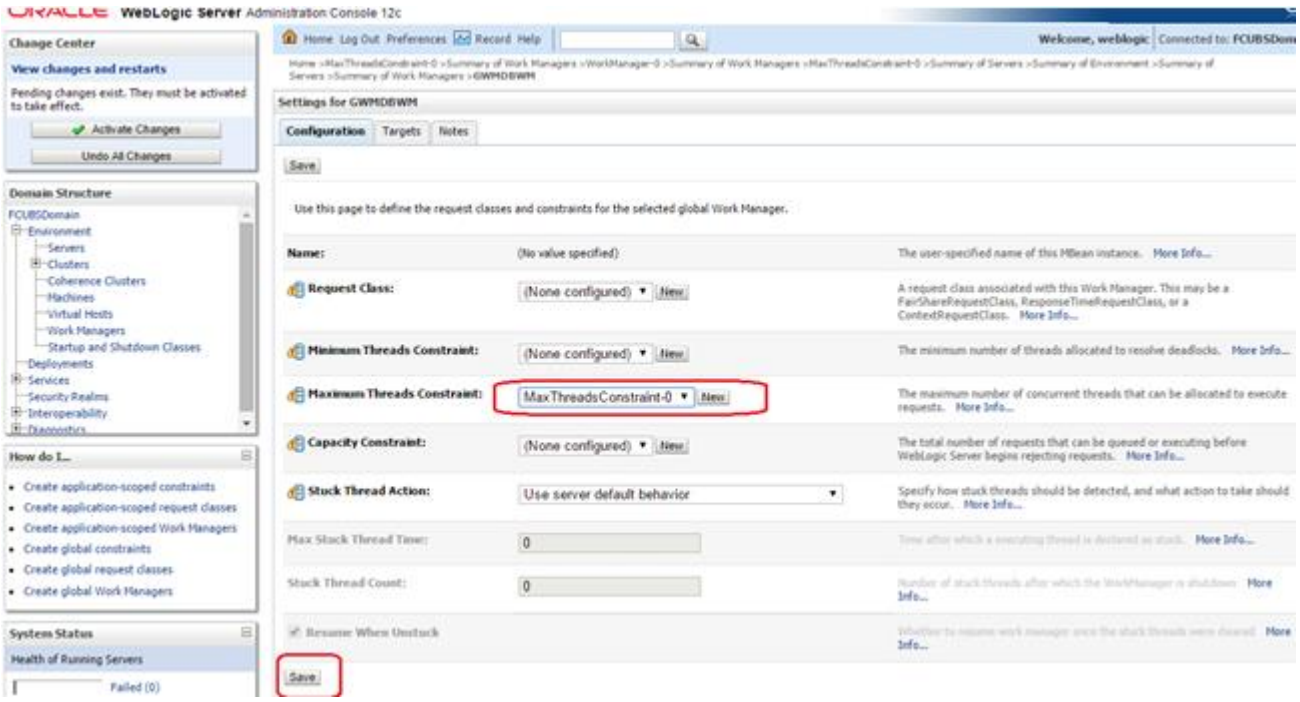






3) Modify the newly created workmanager and assign the Maximum Thread Constraint that is created in above step.





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

JMS Cluster Configuration 12c
[August] [2022]

Version 14.6.1.0.0

Oracle Financial Services Software Limited
Oracle Park
Off Western Express Highway
Goregaon (East)
Mumbai, Maharashtra 400 063
India

Worldwide Inquiries:
Phone: +91 22 6718 3000
Fax: +91 22 6718 3001
https://www.oracle.com/industries/financial-services/index.html

Copyright © [2007], [2022], Oracle and/or its affiliates. All rights reserved.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

U.S. GOVERNMENT END USERS: Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate failsafe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

This software or hardware and documentation may provide access to or information on content, products and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services.