Oracle® Banking Trade Finance

Configuring JMS on Weblogic Server 12c

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ORACLE

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Preface

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

- Purpose
- Documentation Accessibility
- Critical Patches
- Conventions
- Screenshot Disclaimer
- Diversity and Inclusion
- Weblogic 12c New Features
- Components Diagram & Data Flow

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.

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Conventions

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Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Screenshot Disclaimer

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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.

Figure 1 Architecture Previous to 12c

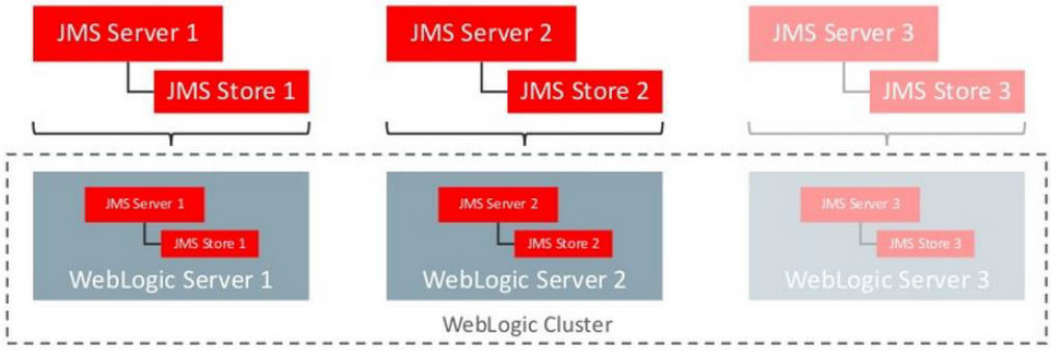
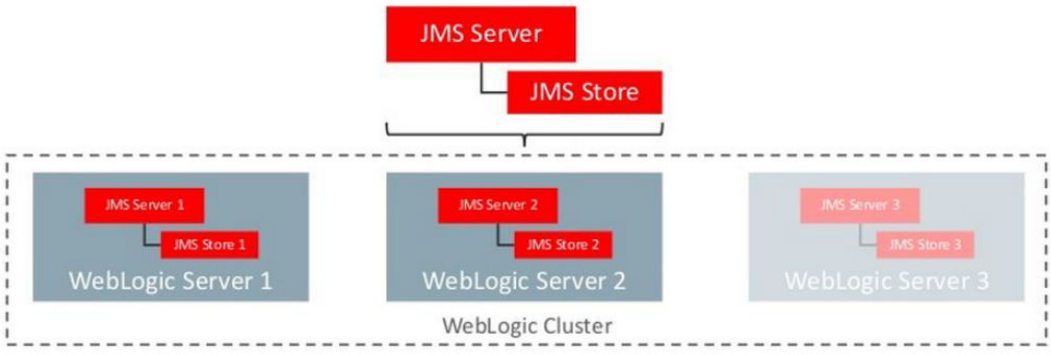
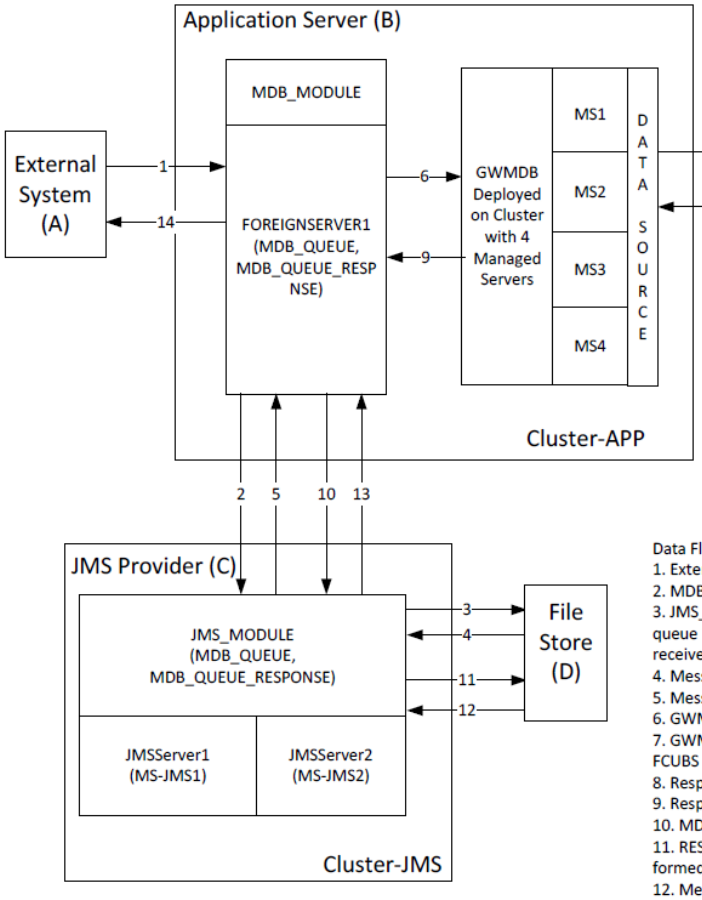


Figure 2 Architecture in 12c



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

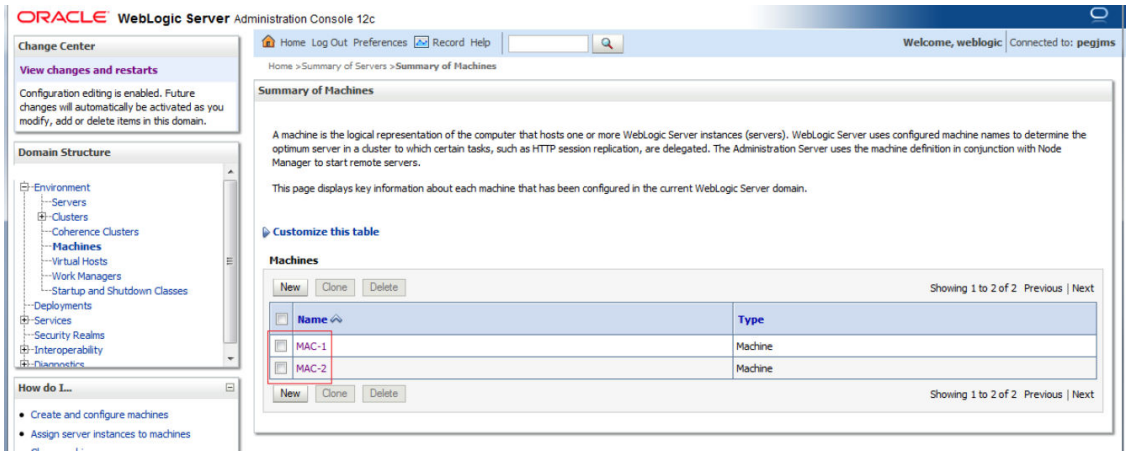
1
Pre-Requisites

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

- Machines
- Dynamic Clusters and Managed Servers
- DataSource
- Shared Folder

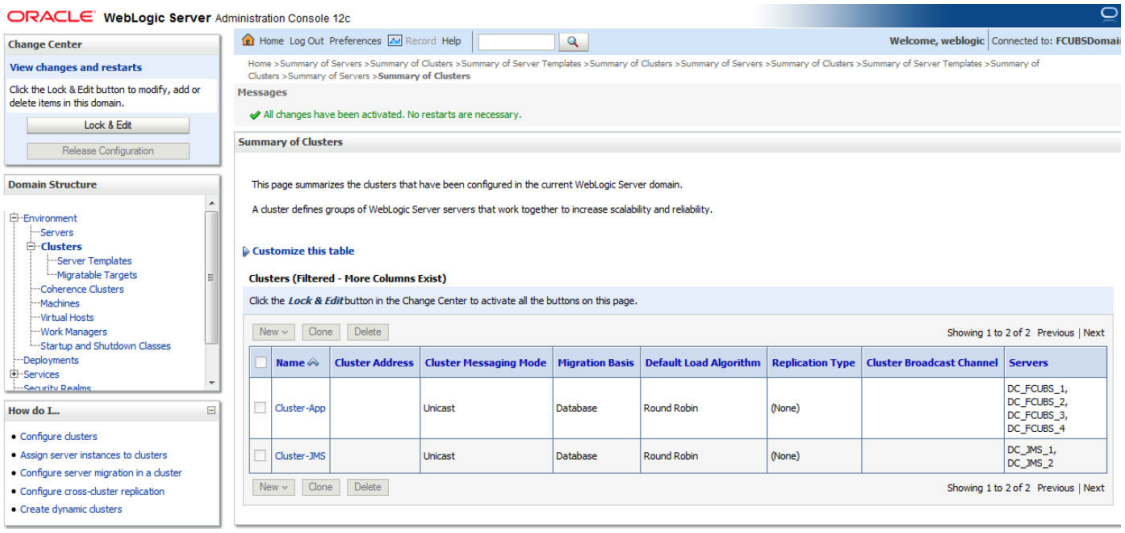
1.1 Machines

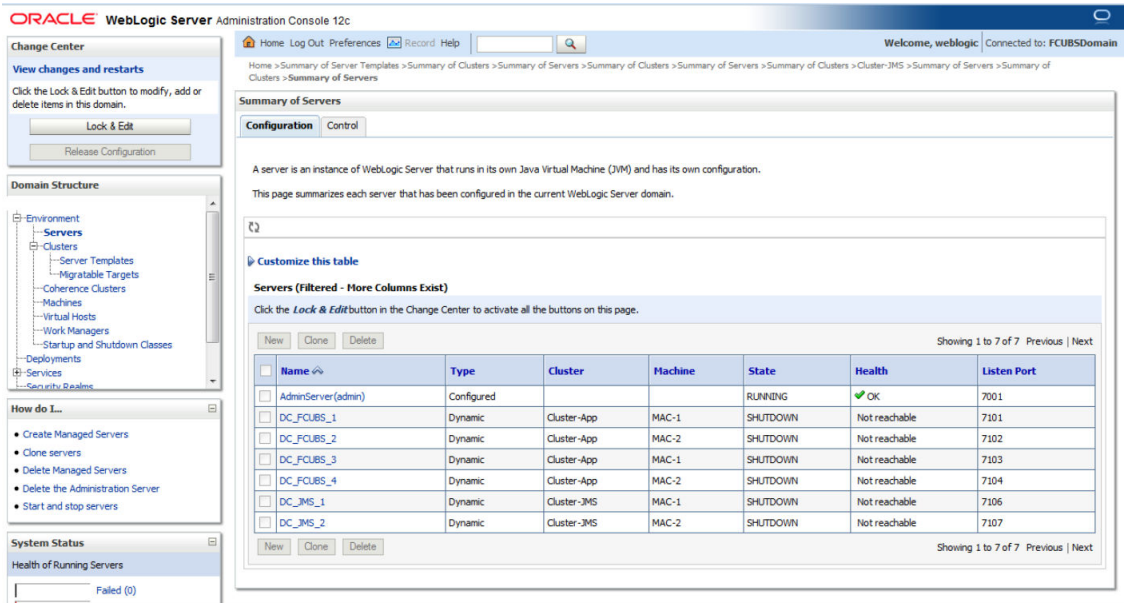
Figure 1-1 MAC-1 & MAC-2



1.2 Dynamic Clusters and Managed Servers

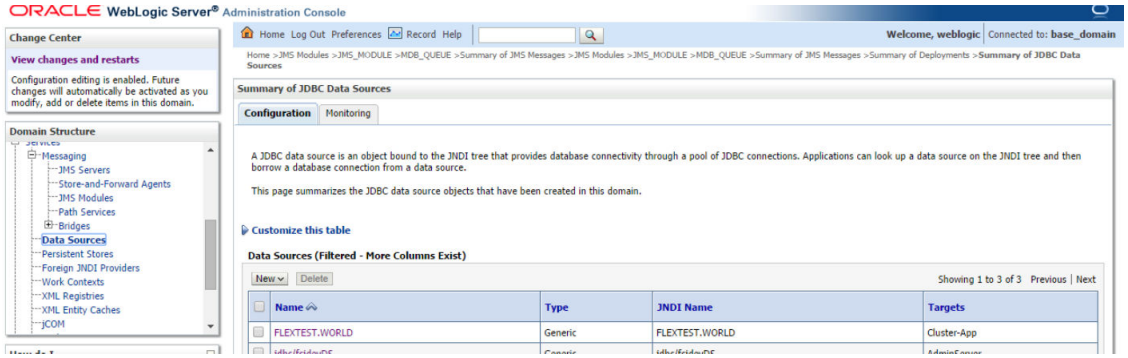
Ensure Dynamic cluster for FCUBS (4 Managed Servers) and Dynamic cluster for JMS Deployment (2 Managed Servers).





1.3 DataSource

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



1.4 Shared Folder

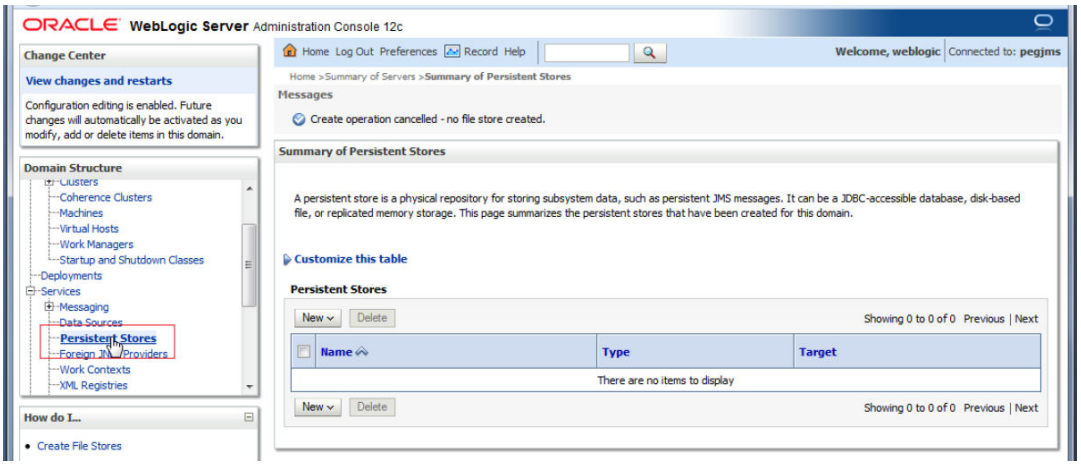
A shared folder for File Store Creation is required and this folder should be accessible across both the servers (eg, NFS mount).

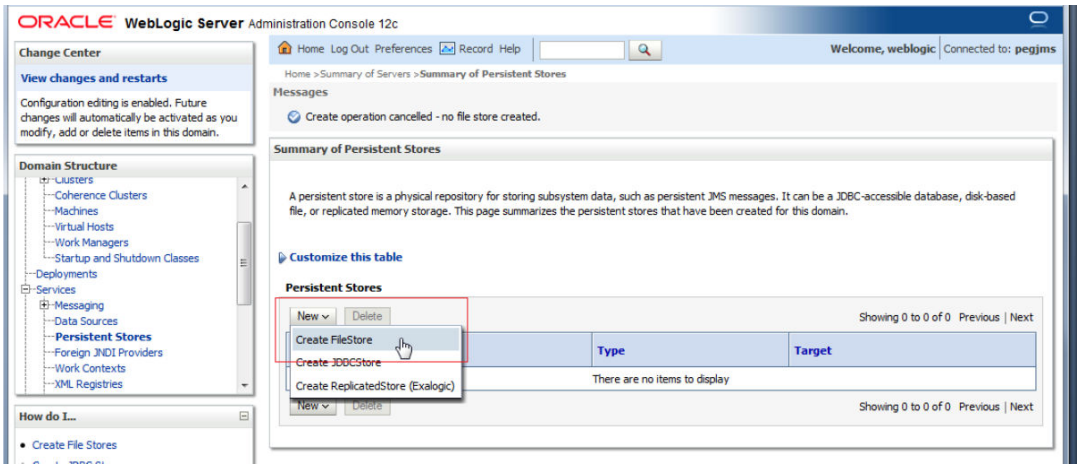
2
JMS Configuration

- Persistence Store Creation
- JMS Server Creation
- Cluster Configuration for Service Migration

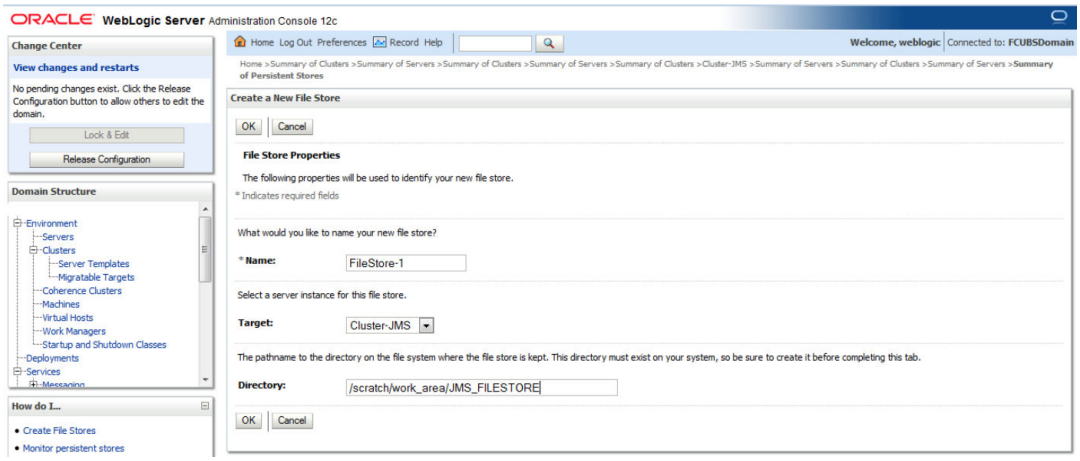
2.1 Persistence Store Creation

1. Navigate to Services Persistent StoresNew **Create** FileStore.

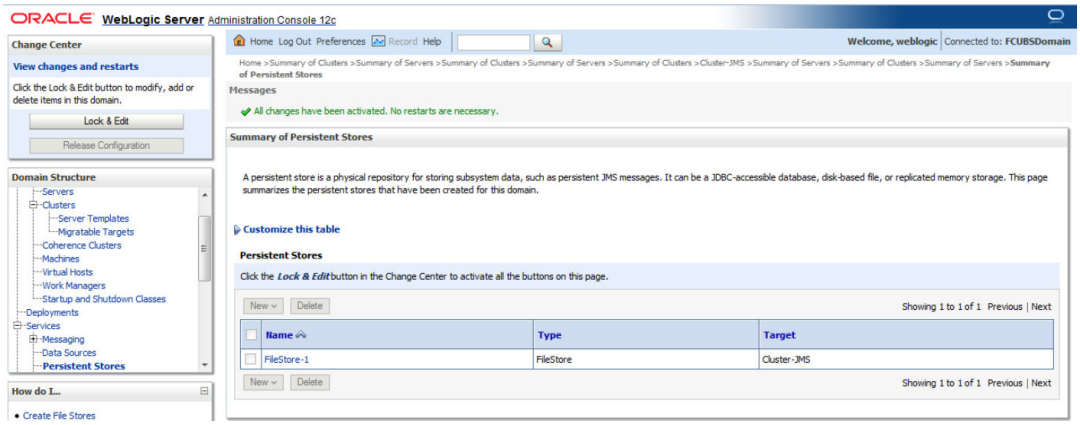




2. Select **Cluster-JMS** under target drop-down and Click on **OK**.

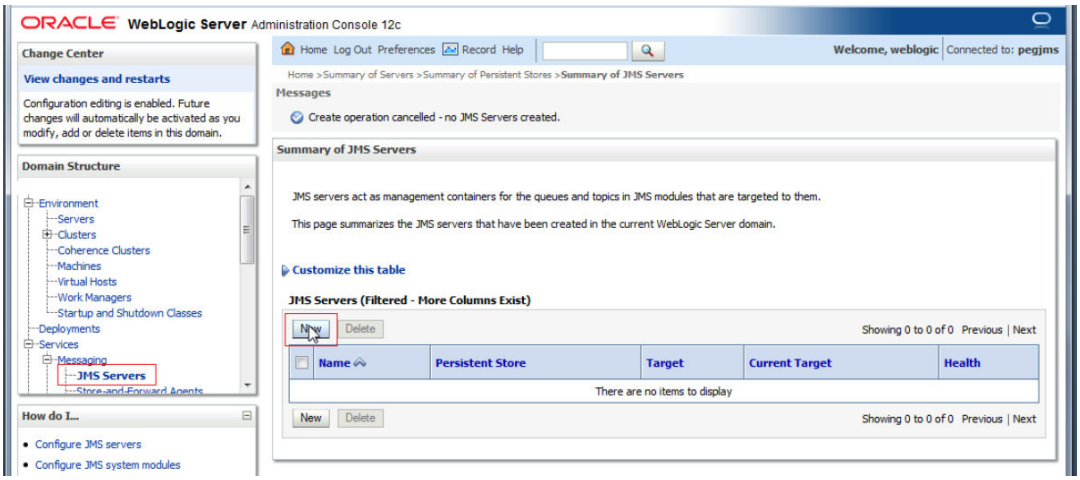


3. **FileStore-1** is created.

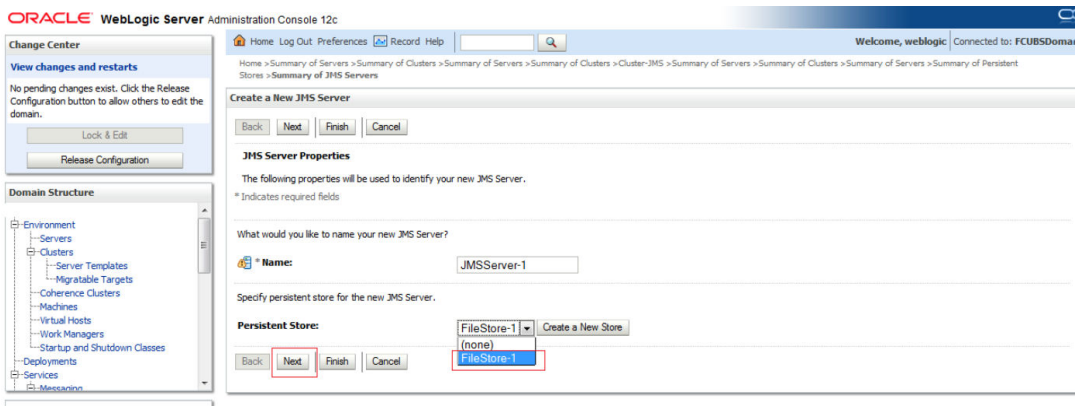


2.2 JMS Server Creation

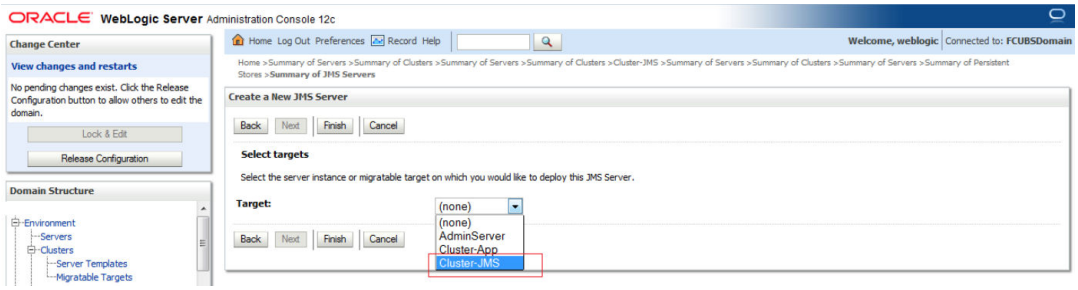
1. Navigate to Services Messaging JMS Servers Click on **New**.

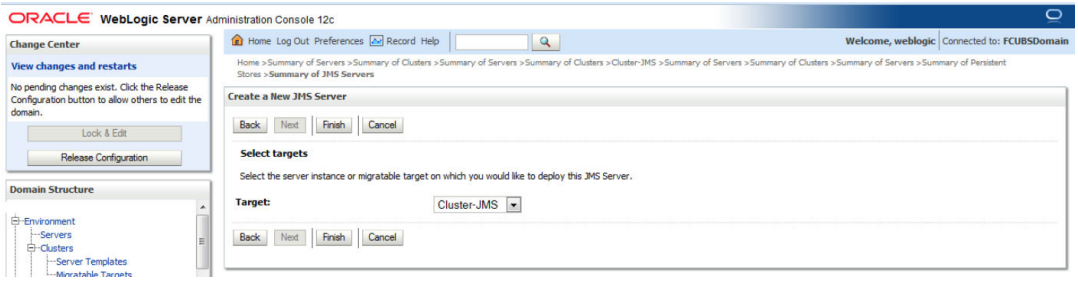


2. Select FileStore-1, Click **Next**.

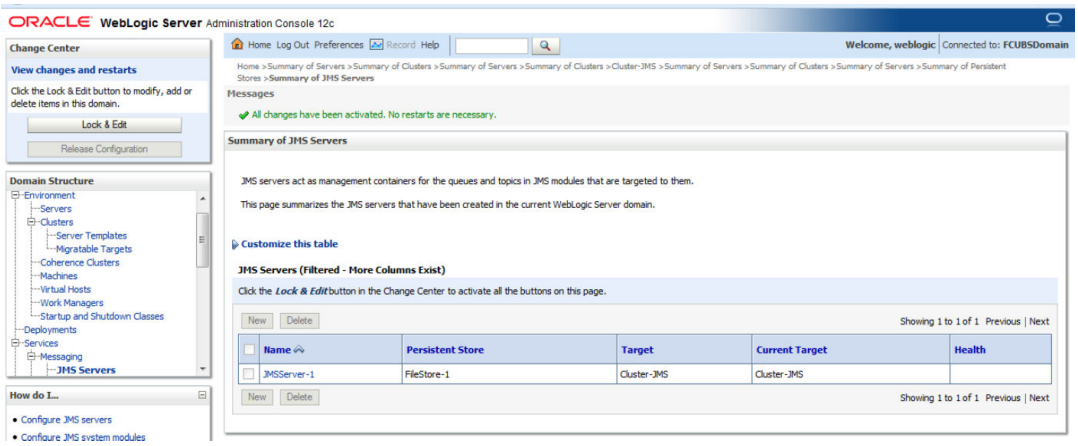


3. Select Target as Cluster-JMS and click on **Finish**.





4. JMS-Server-1 is created.

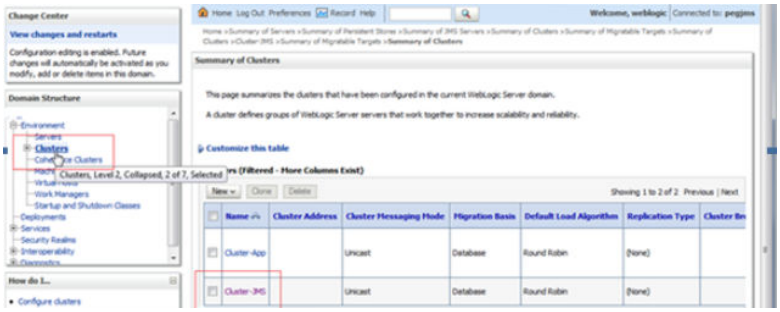


5. In NFS below filestores can be seen.

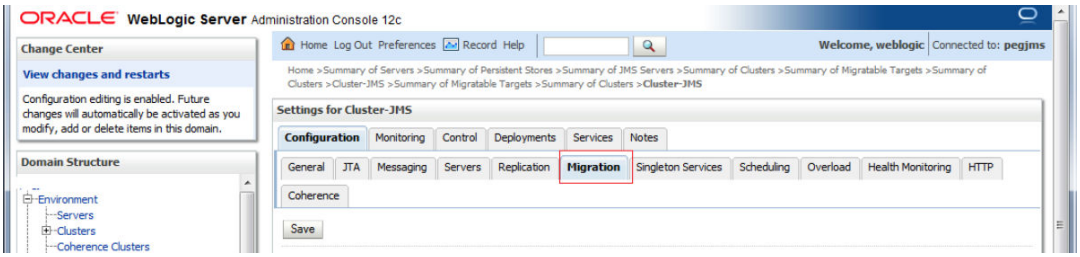
```
[root@           JMS_FILESTORE]# ll
total 2056
-rw-r----- 1 wl12c oinstall 1049088 Jun 16 14:10 FILESTORE-1@DC_JMS_1000000.DAT
-rw-r----- 1 wl12c oinstall 1049088 Jun 16 14:10 FILESTORE-1@DC_JMS_2000000.DAT
[root@           JMS_FILESTORE]# pwd
/scratch/work_area/JMS_FILESTORE
[root@           JMS_FILESTORE]#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

2.3 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**.

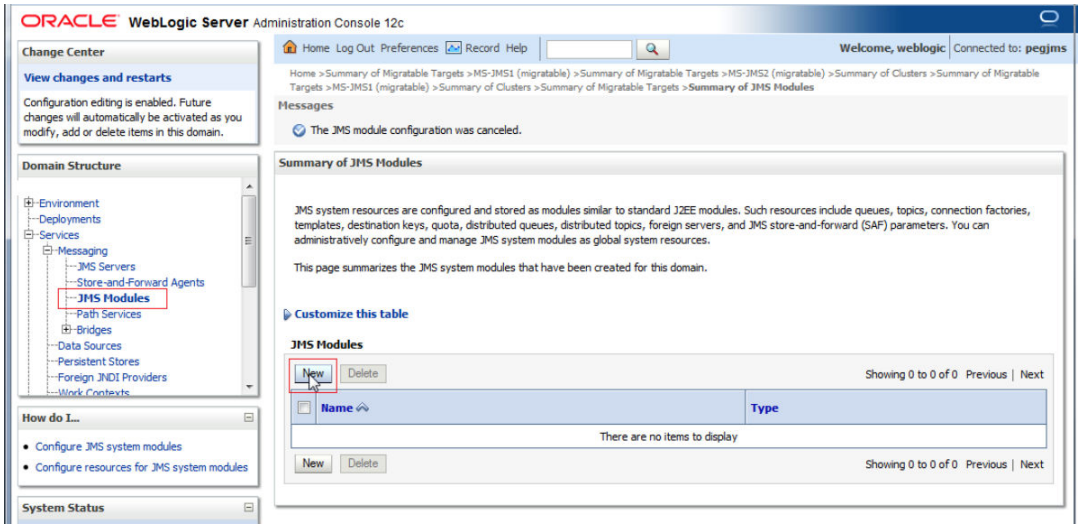
3

JMS Module Creation

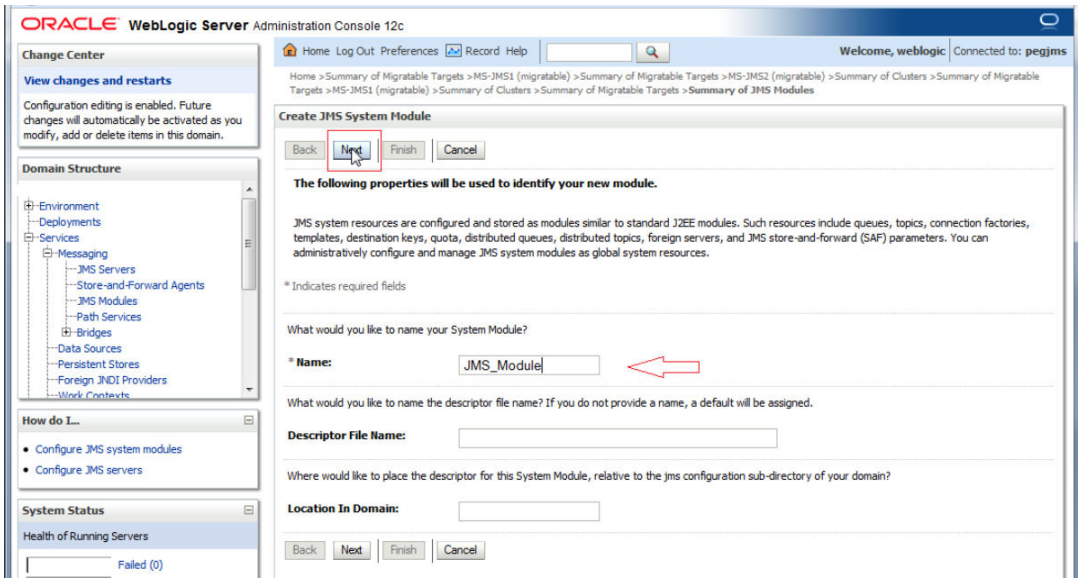
- Module Creation
- Sub Deployment Creation
- Resource Creation

3.1 Module Creation

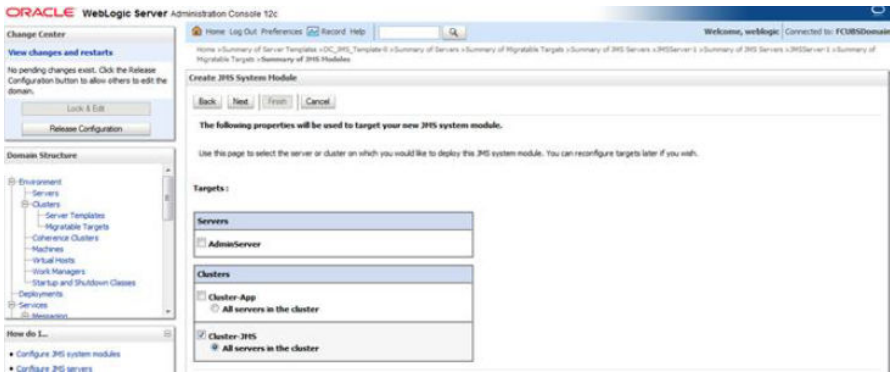
1. Navigate to Services Messaging JMS Modules and Click on **New**.



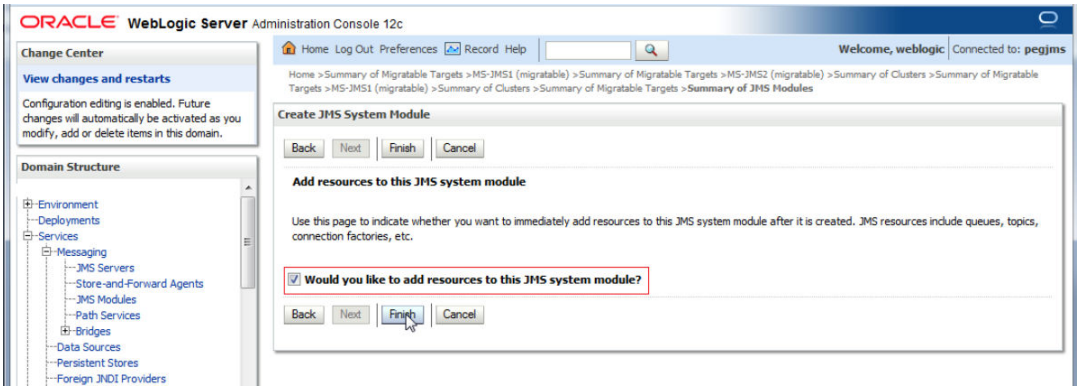
2. Enter name as JMS_MODULE and Click on **Next**.



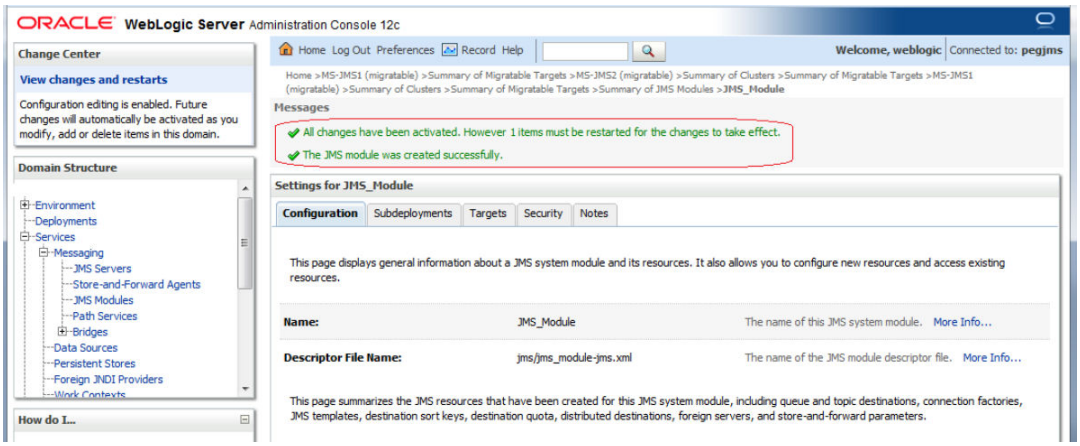
3. Select Target as Cluster-JMS and Click on **Next**.



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

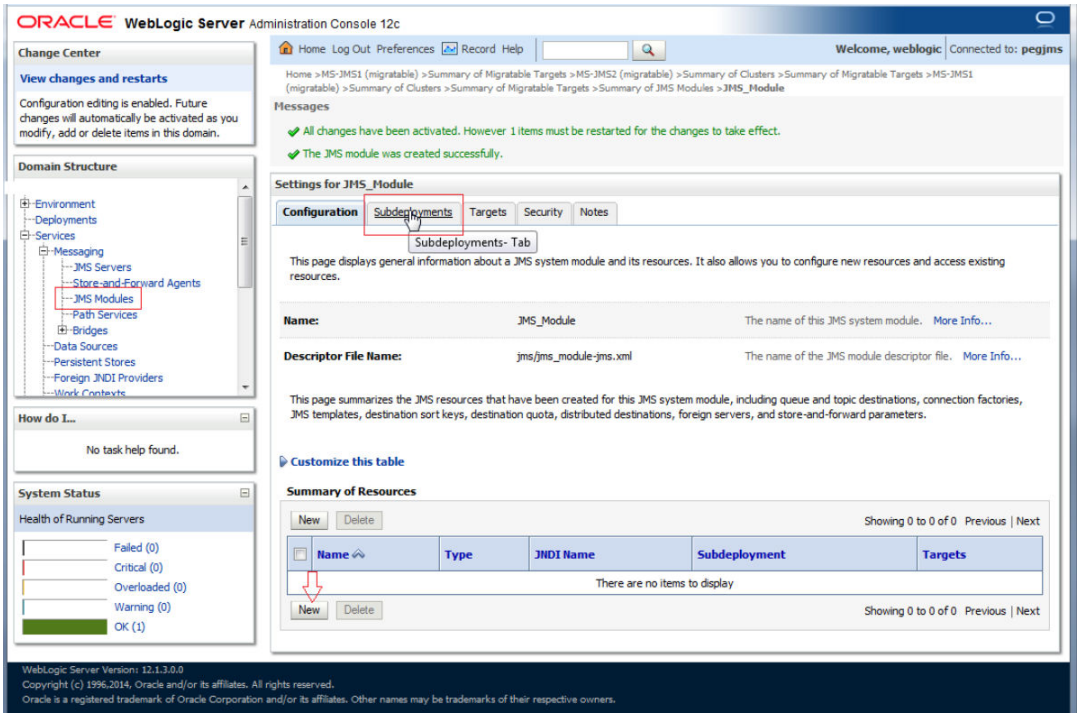


5. JMS_MODULE is created.

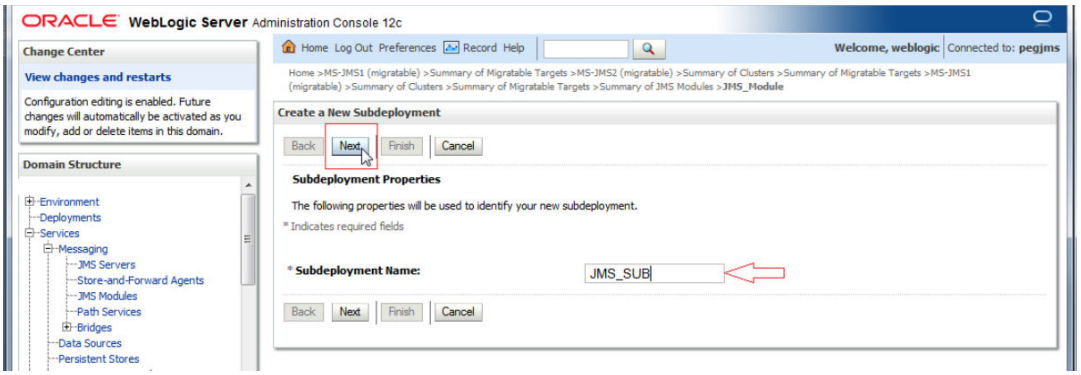


3.2 Sub Deployment Creation

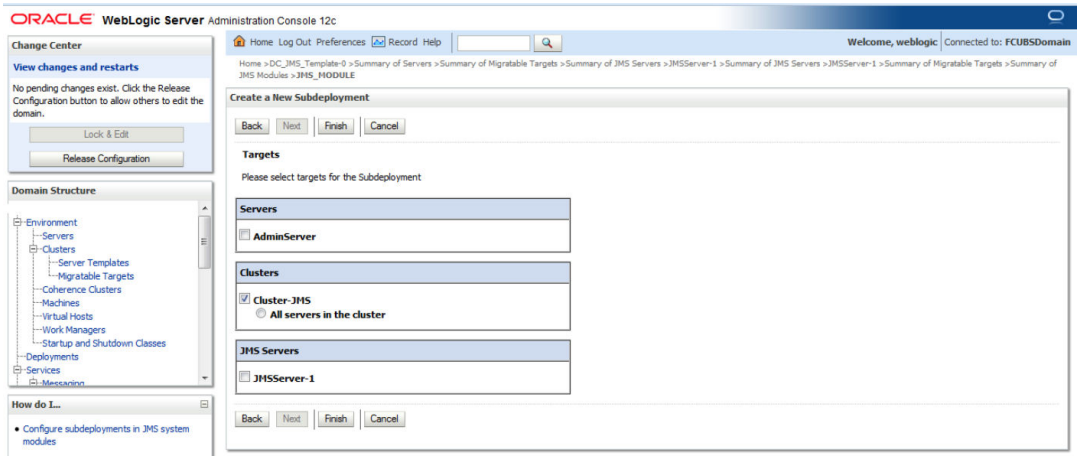
1. In JMS_MODULE, Click on **SubDeployment** tab, Click on **New**.



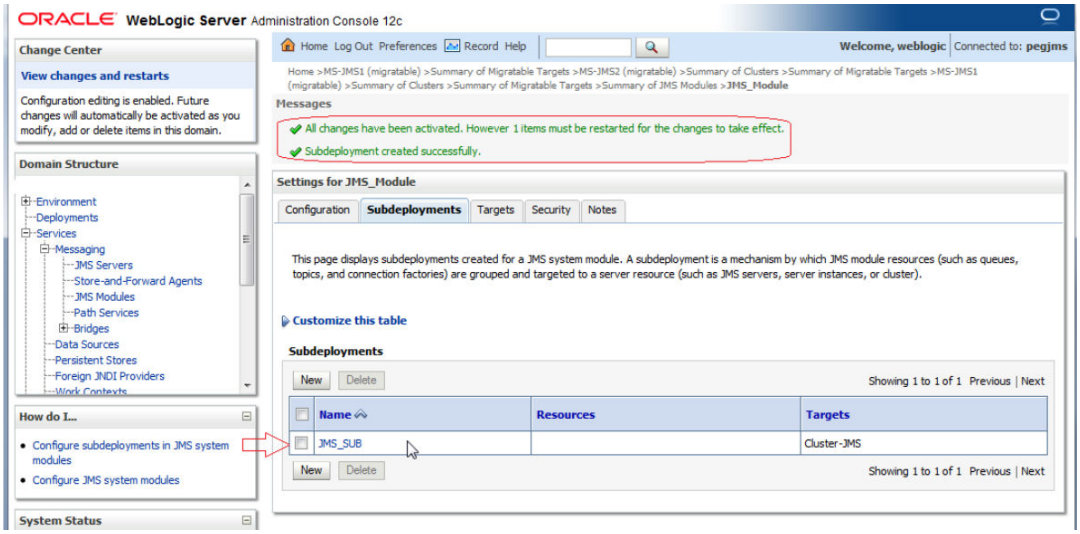
2. Enter name as JMS_SUB and click on **Next**.



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



4. Sub-Deployment is created

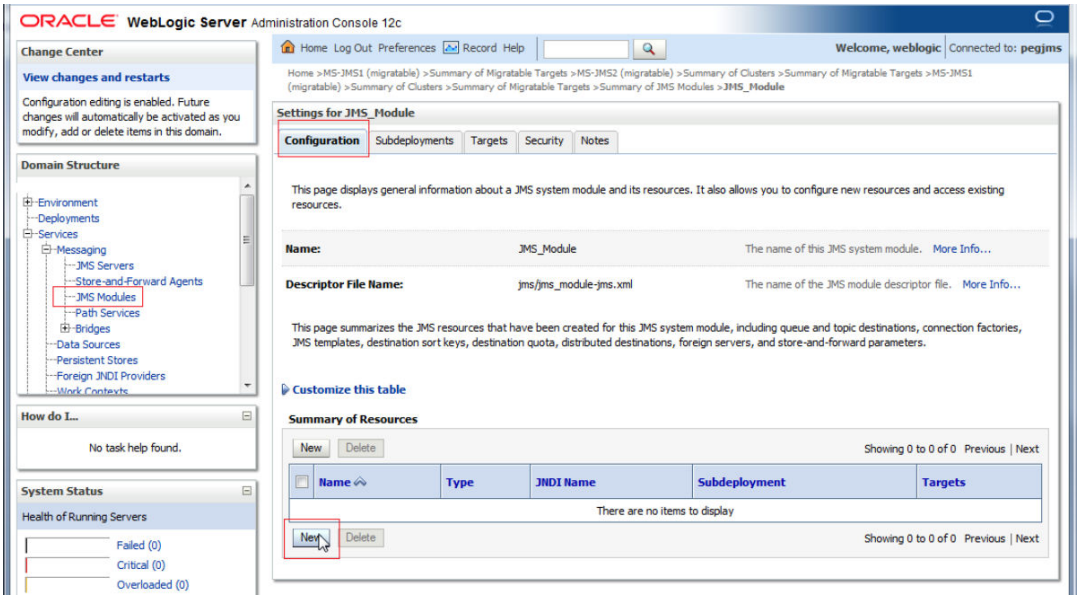


3.3 Resource Creation

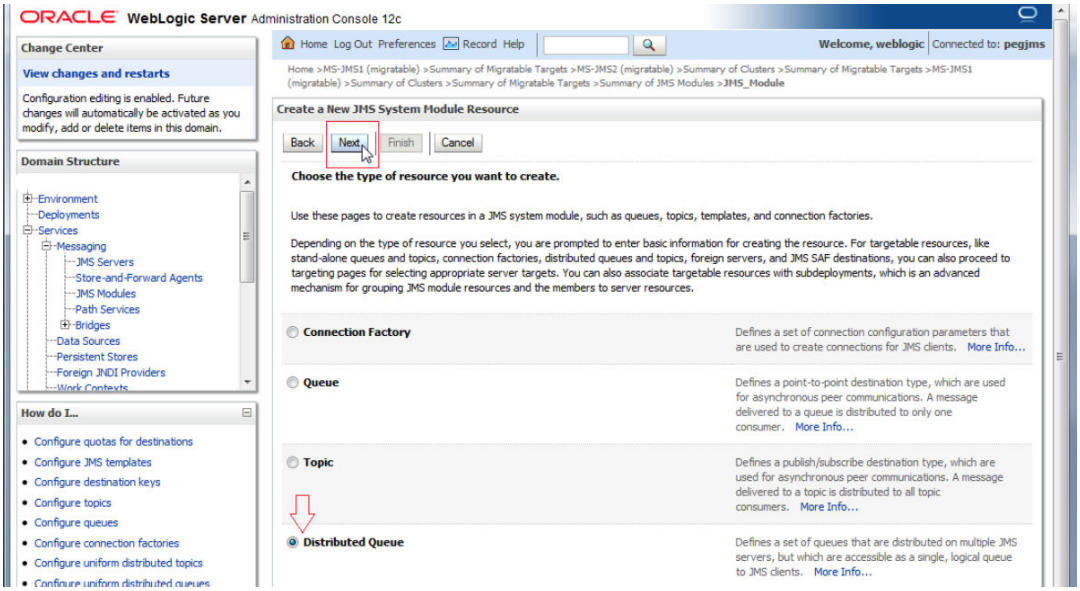
- Queue Creation
- Connection Factory Creation

3.3.1 Queue Creation

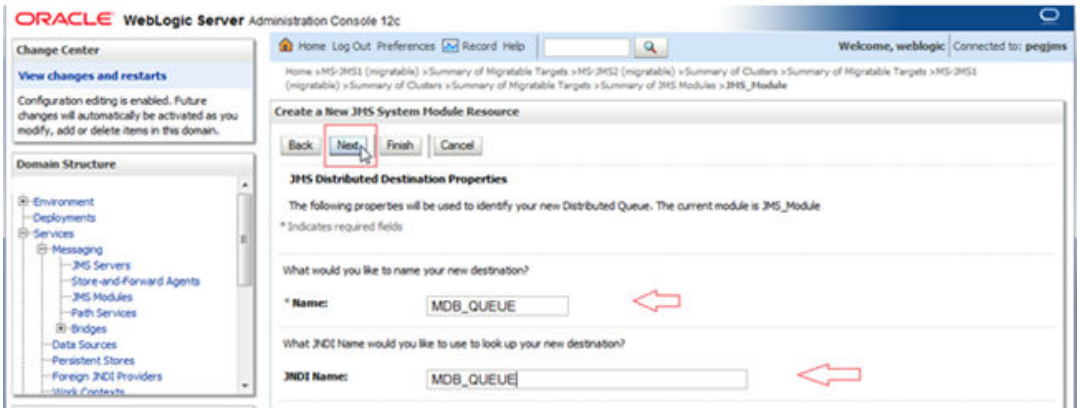
1. In JMS_MODULE Click on **New**.



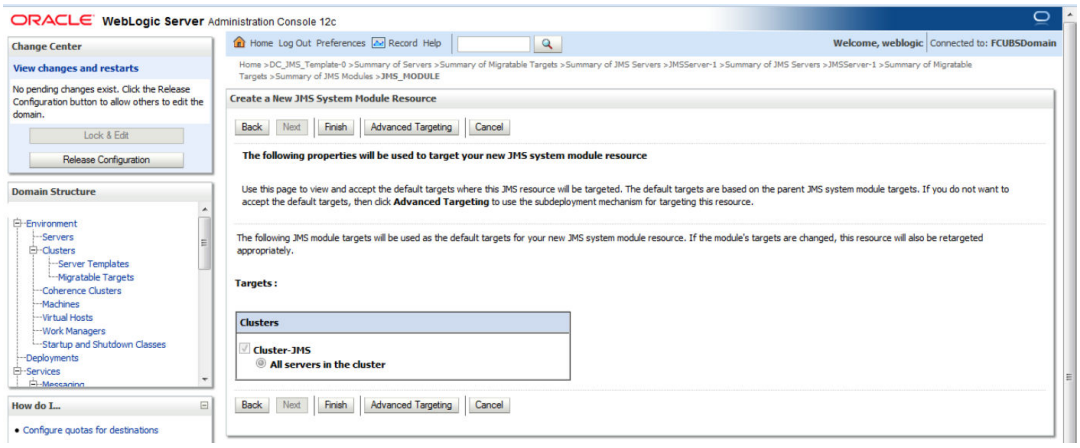
2. Select Distributed Queue and Click on **Next**.



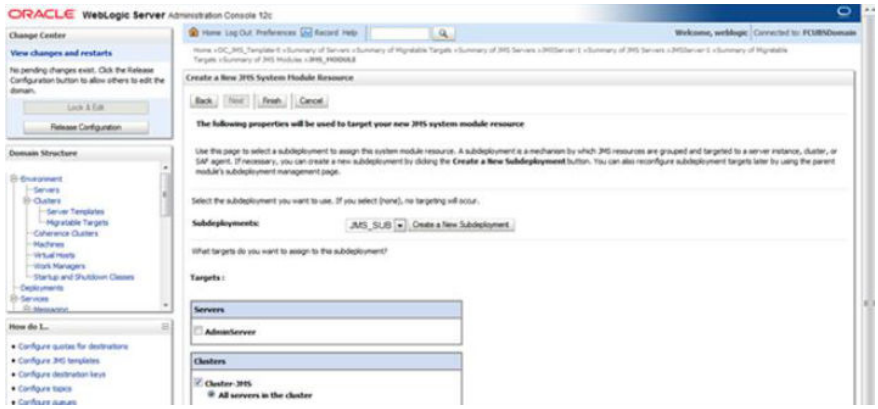
3. Enter the queue name and Click on **Next**.



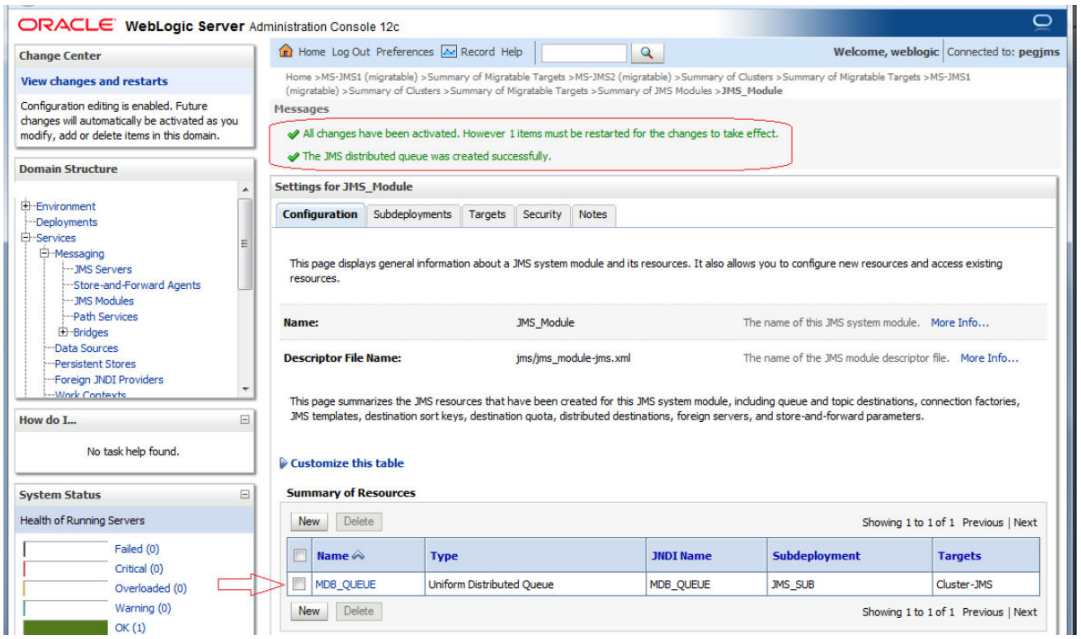
4. Click on **Advance Targeting**.



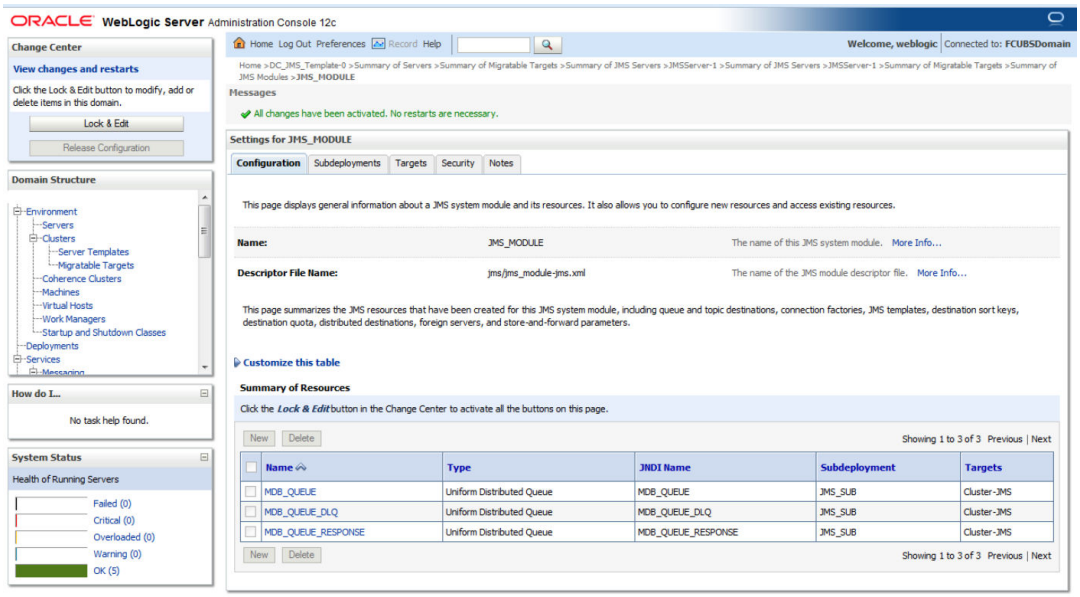
5. Select Subdeployement as JMS_SUB and Click on **Finish**.



6. MDB_QUEUE is created

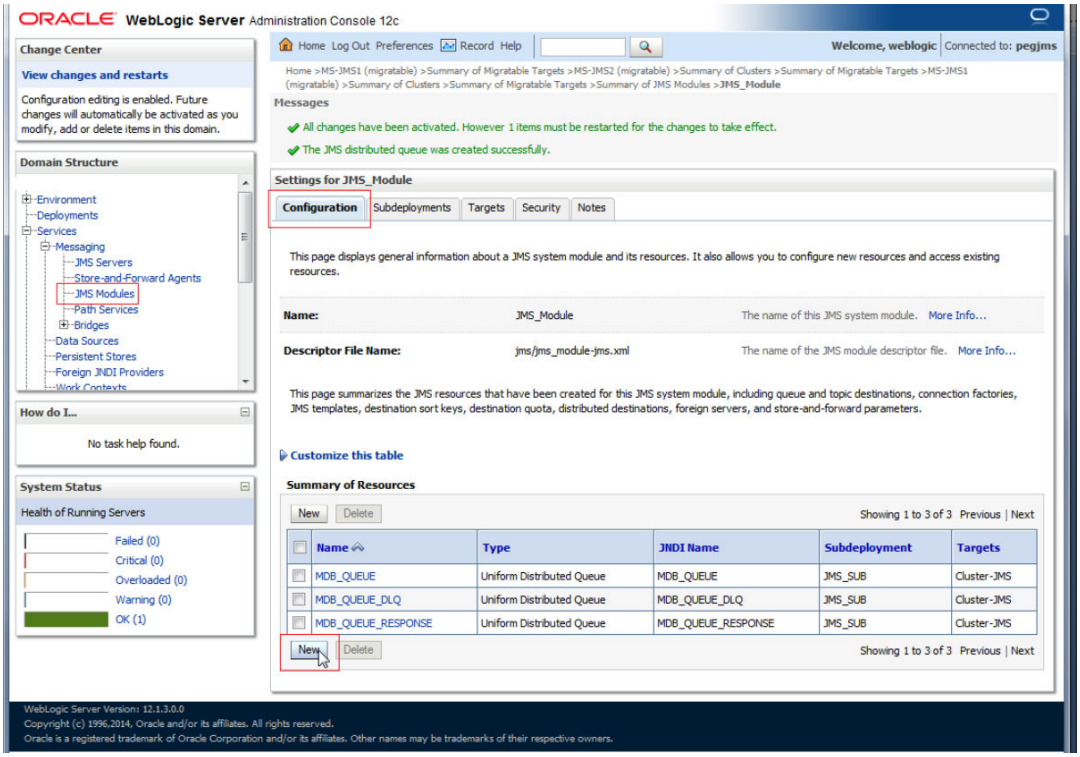


7. Similarly Create MDB_QUEUE_RESPONSE and MDB_QUEUE_DLQ

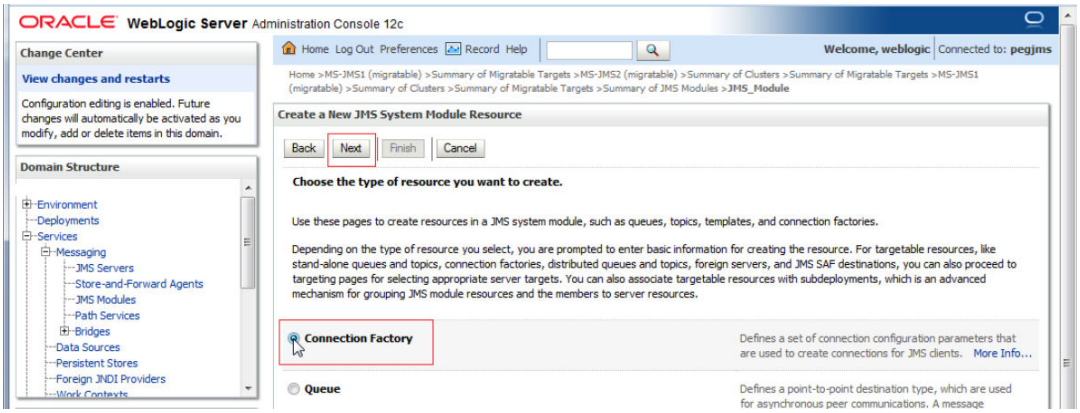


3.3.2 Connection Factory Creation

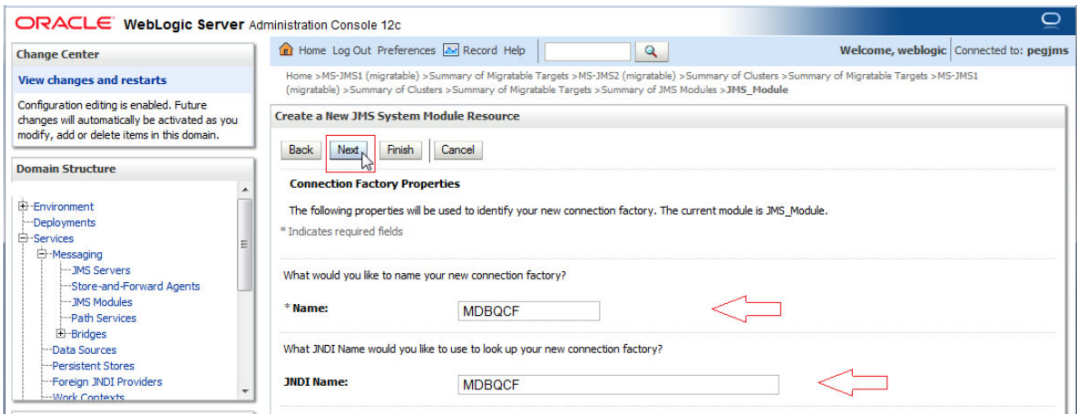
1. In JMS_MODULE, Click on **New**.



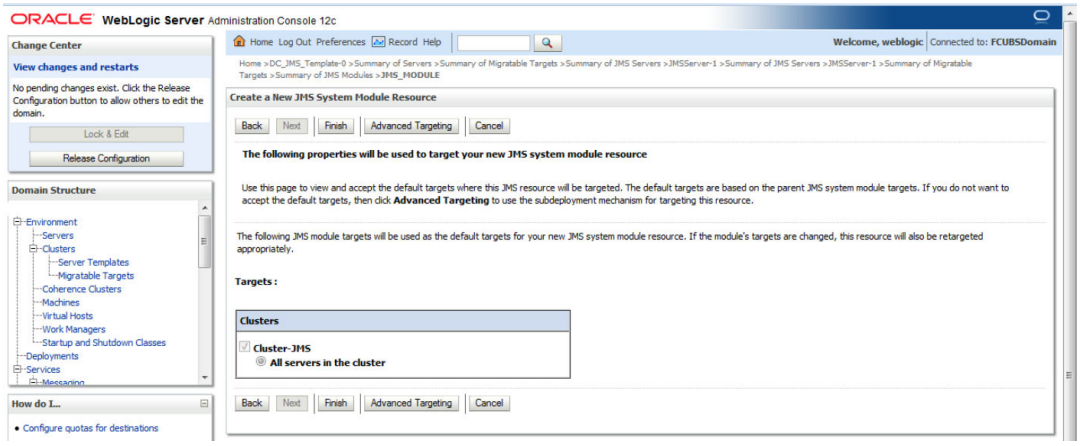
2. Select Connection Factory and click on **Next**.



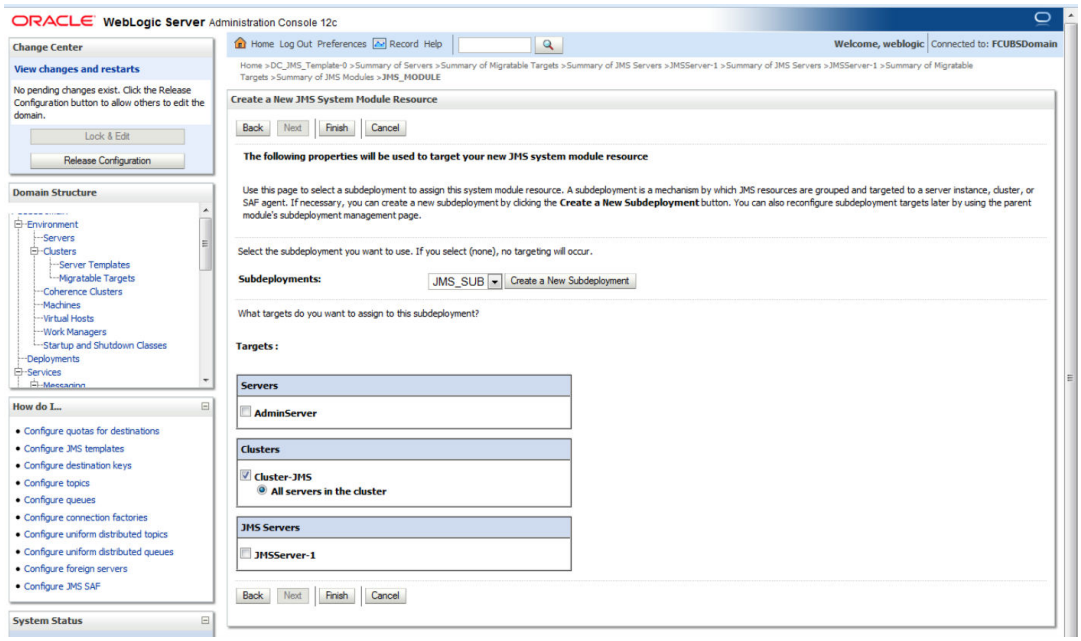
3. Enter the Name and Click on **Next**.



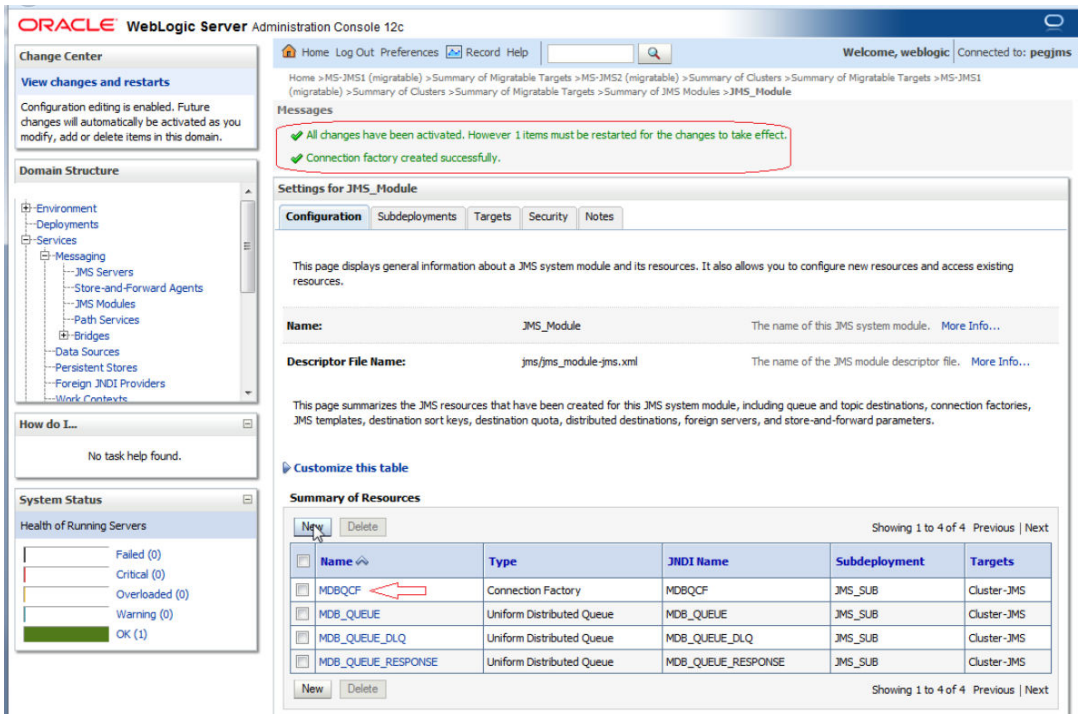
4. Click on **Advance Targeting**.



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



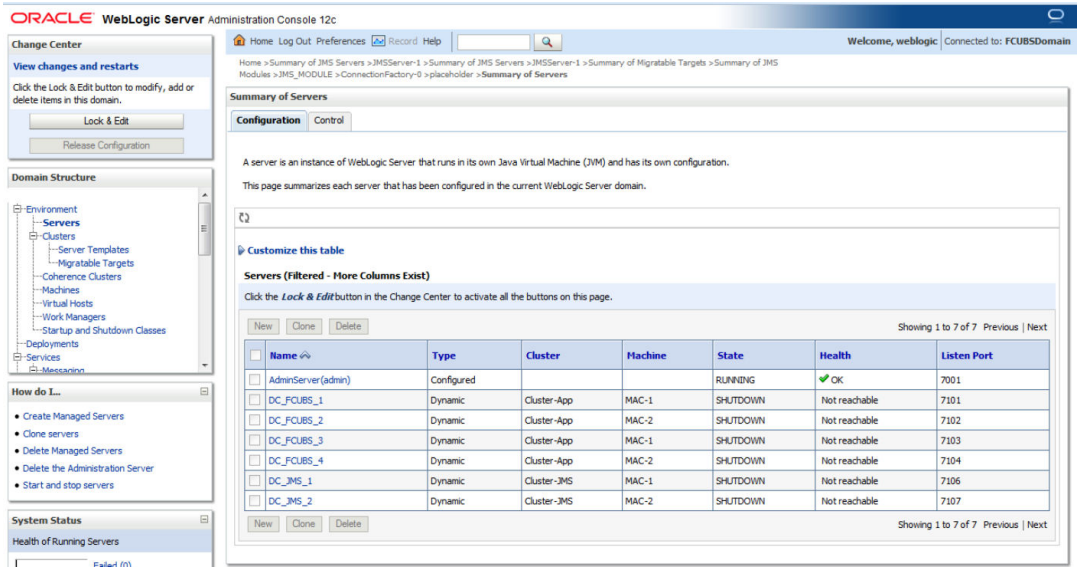
6. Connection Factory is **Created**.



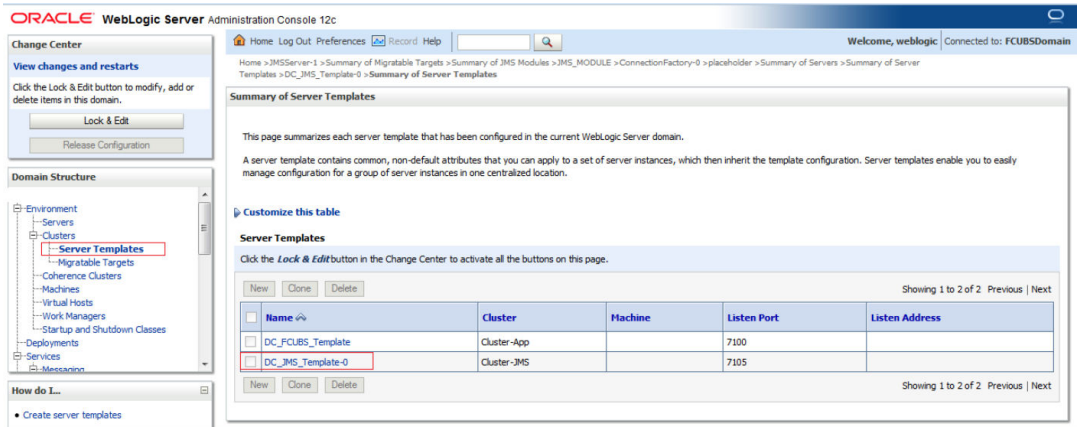
4

Server Restart

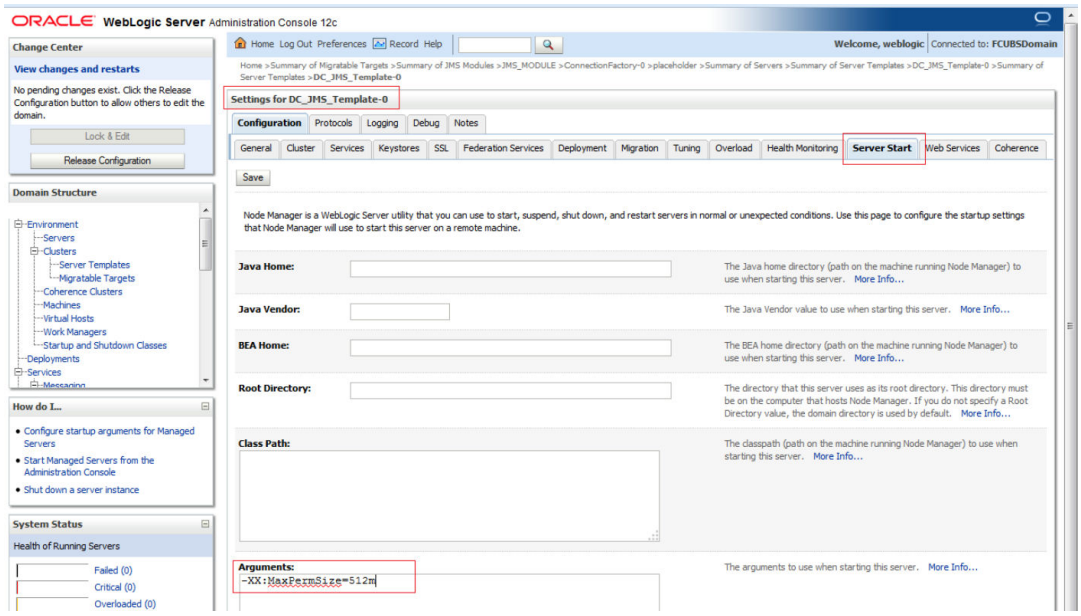
1. Increase the heap size of both DC_JMS_1 and DC_JMS_2 cluster.



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.

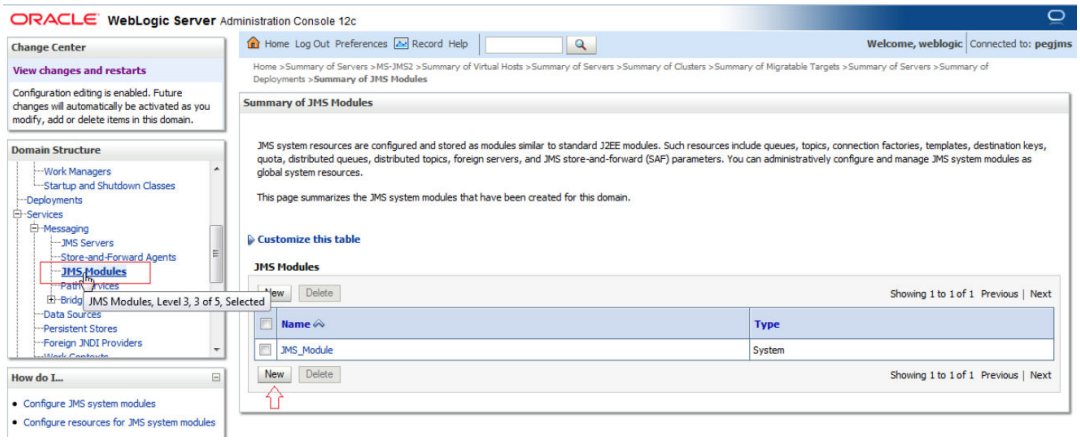
5

Foreign Server Creation

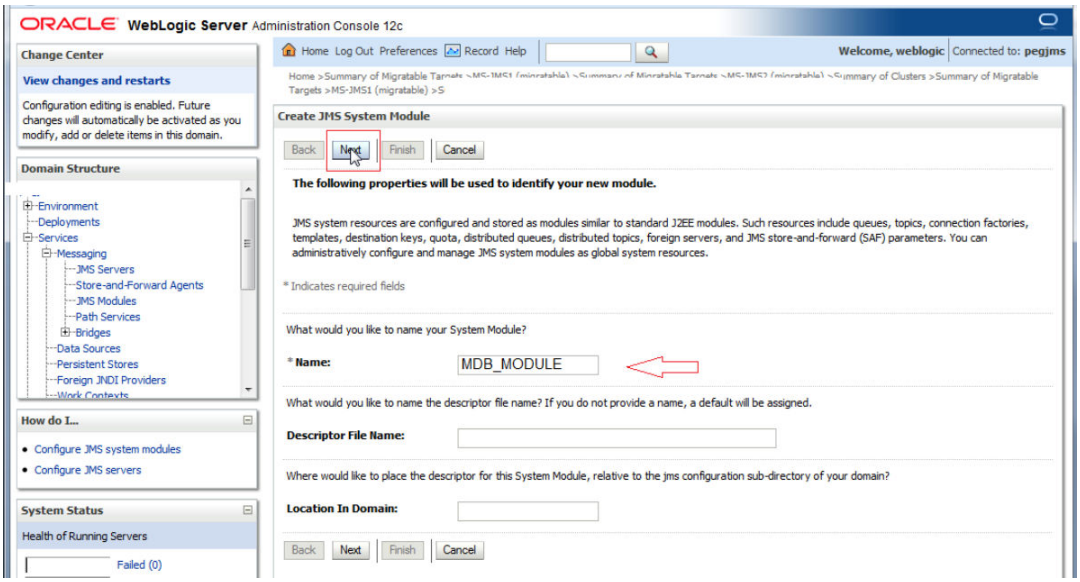
- Module Creation
- Foreign Server Creation
- Foreign Server Configuration

5.1 Module Creation

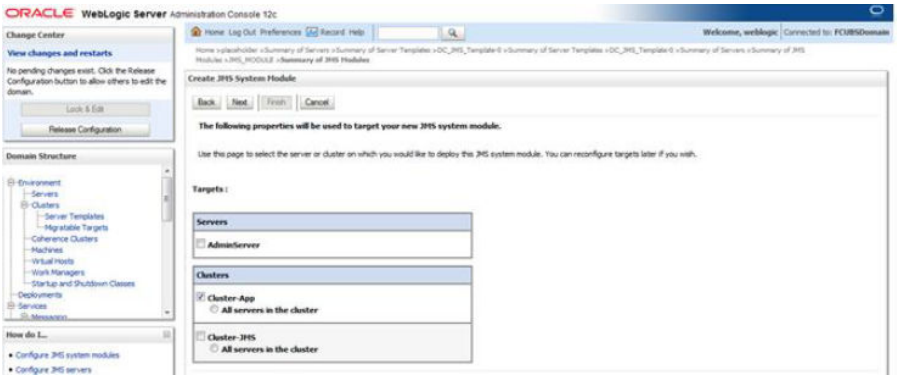
1. JMS_Modules and Click on **New**.



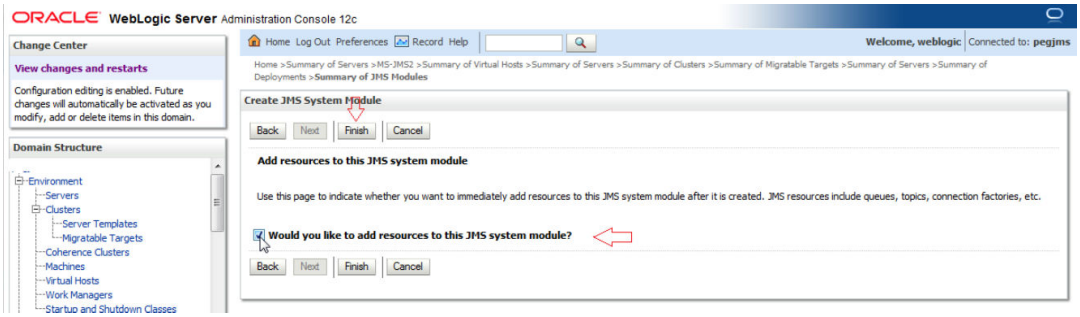
2. Enter name as **MDB_MODULE** and click on **Next**.



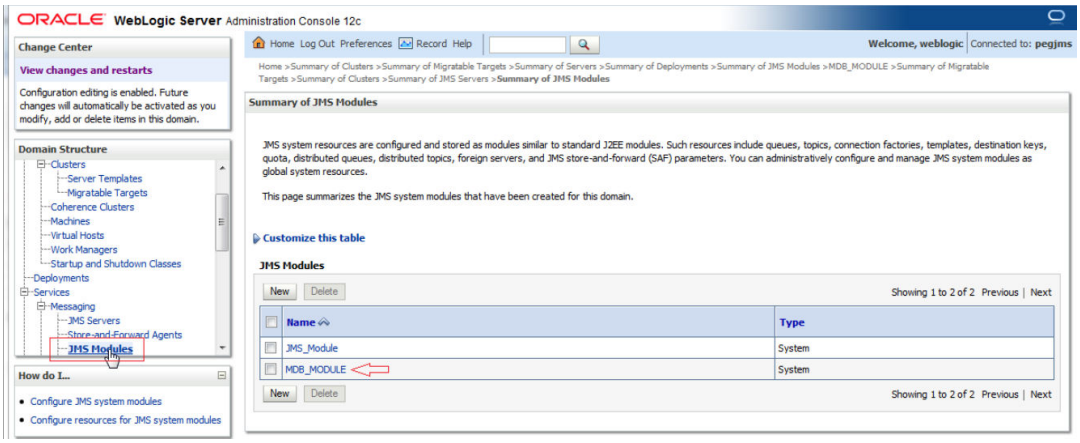
3. Select target as **Cluster-App** and click on **Next**.



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

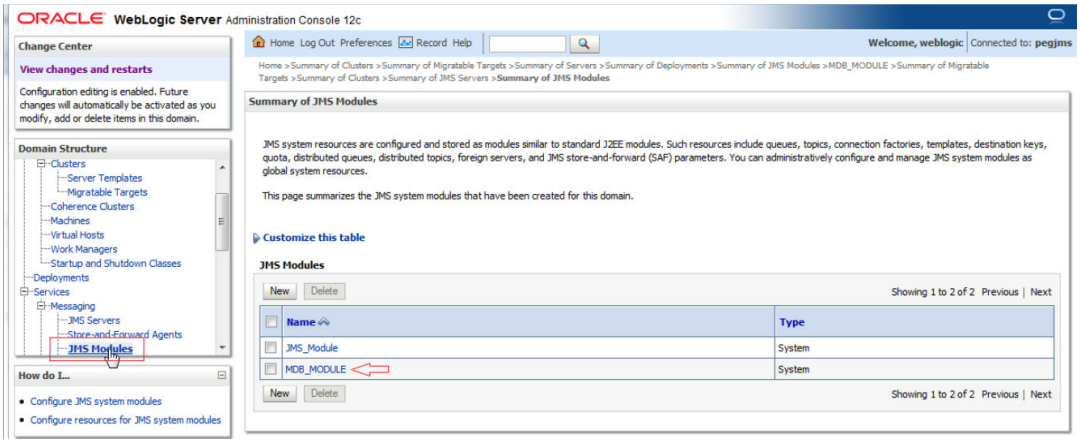


5. MDB_MODULE is created.

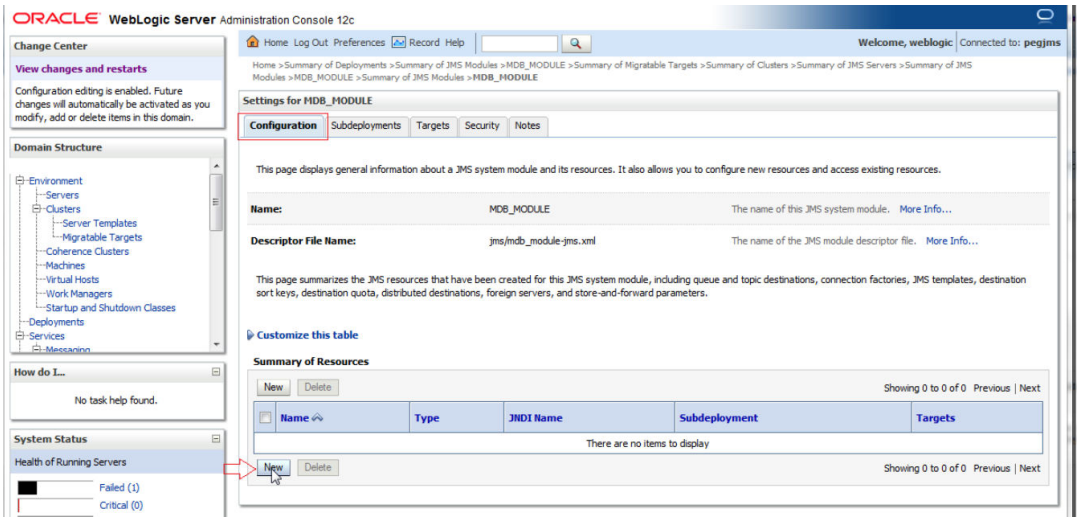


5.2 Foreign Server Creation

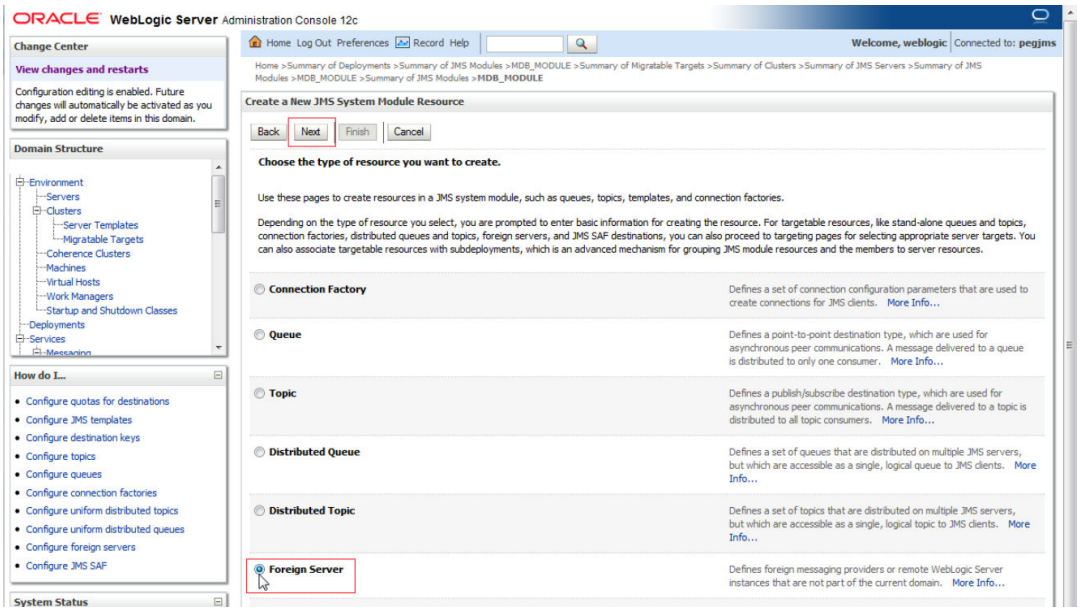
1. In MDB_MODULE, Click on New Resource, Select **Foreign Server**.



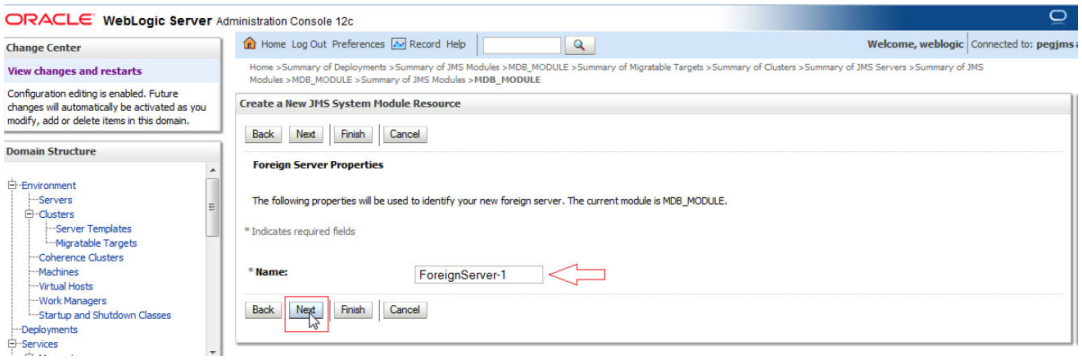
2. Click on Configuration **New**.



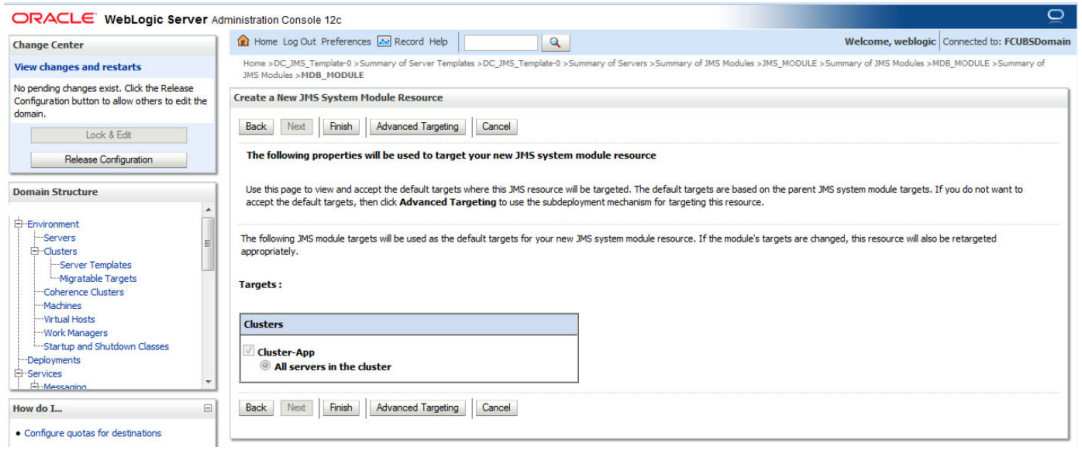
3. Select **Foreign Server** and Click on **Next**.



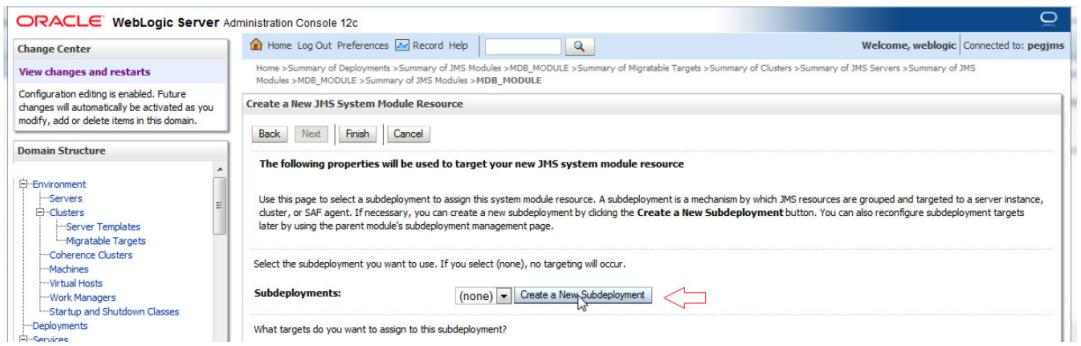
4. Enter name and Click on **Next**.



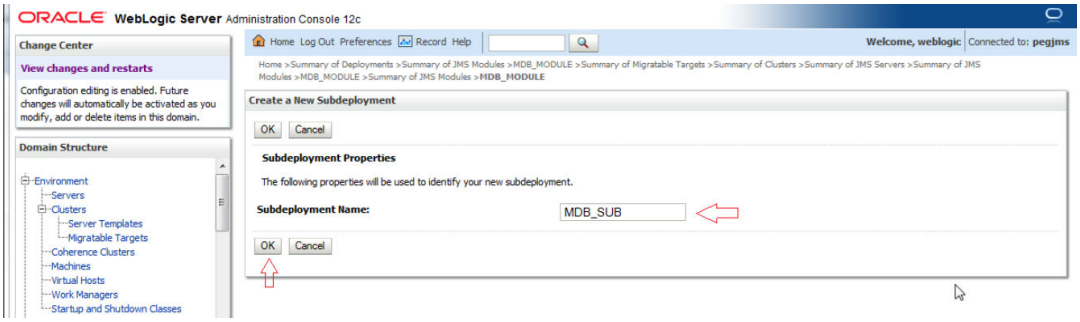
5. Click on **Advanced Targeting**.



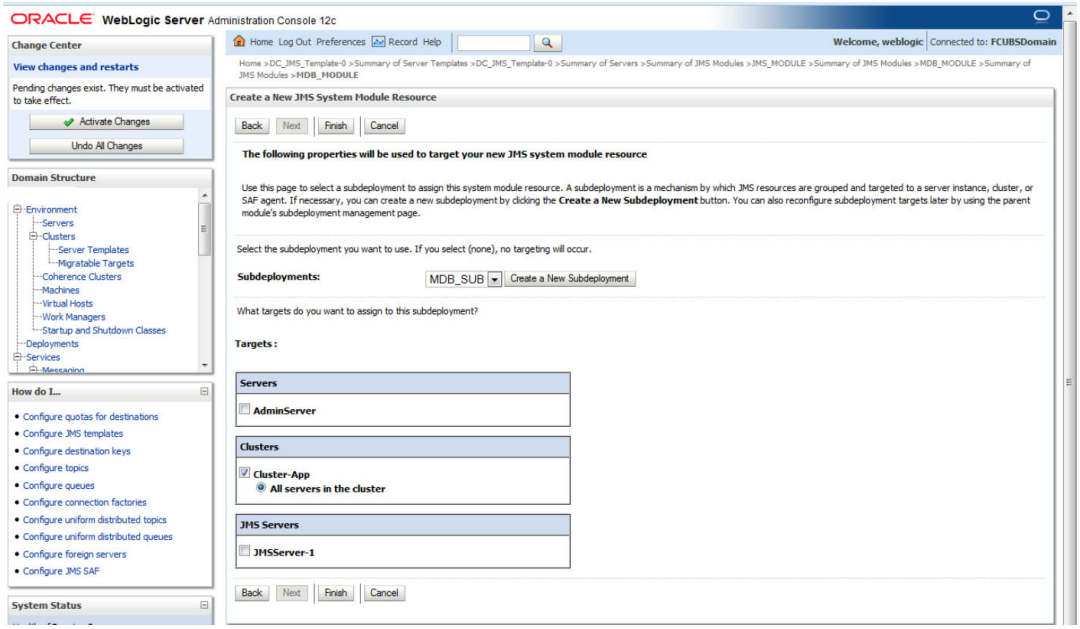
6. Click on Create New Subdeployment.



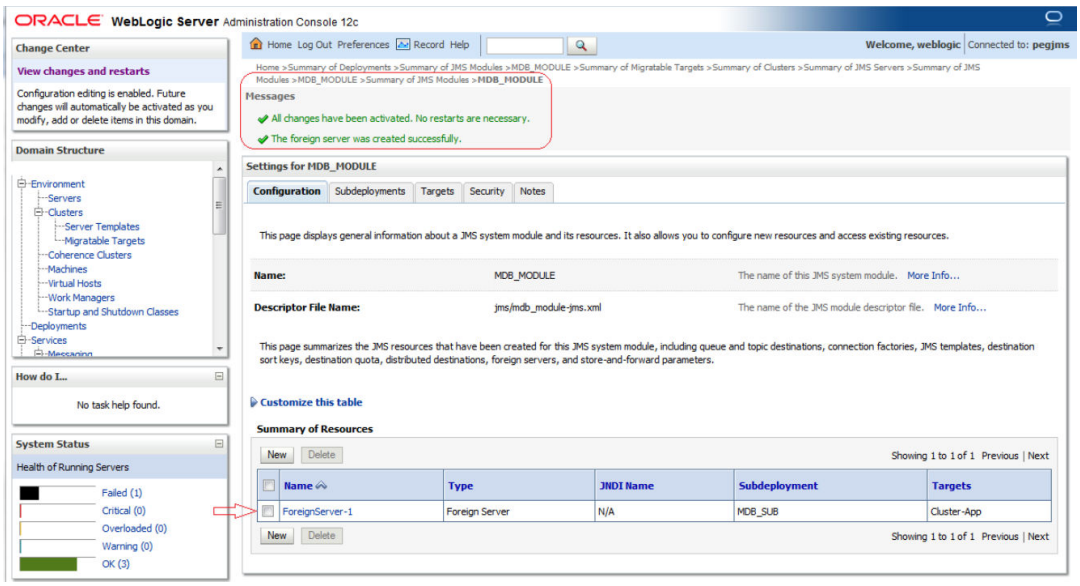
7. Enter Name as **MDB_SUB** and Click on **OK**.



8. Select Target as **Cluster-App** and Click on **Finish**.

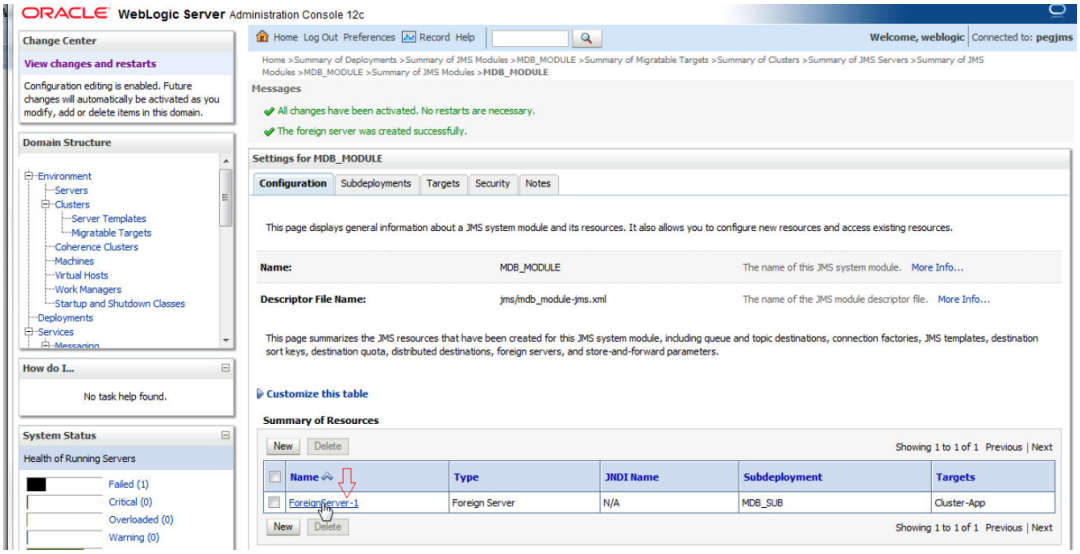


9. Foreign Server is created.

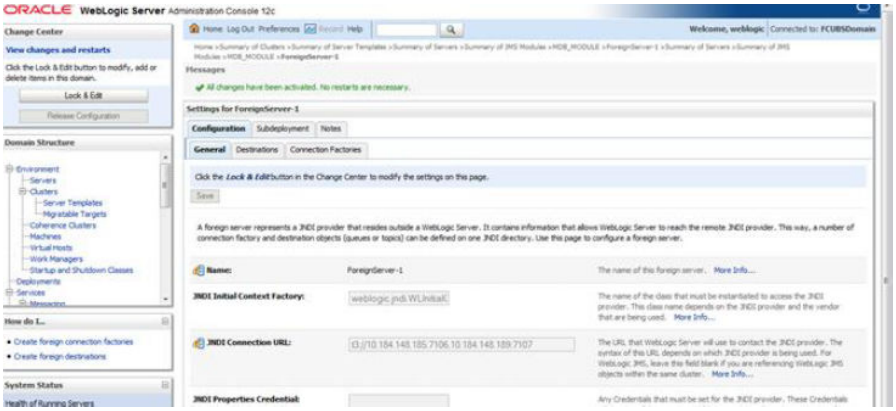


5.3 Foreign Server Configuration

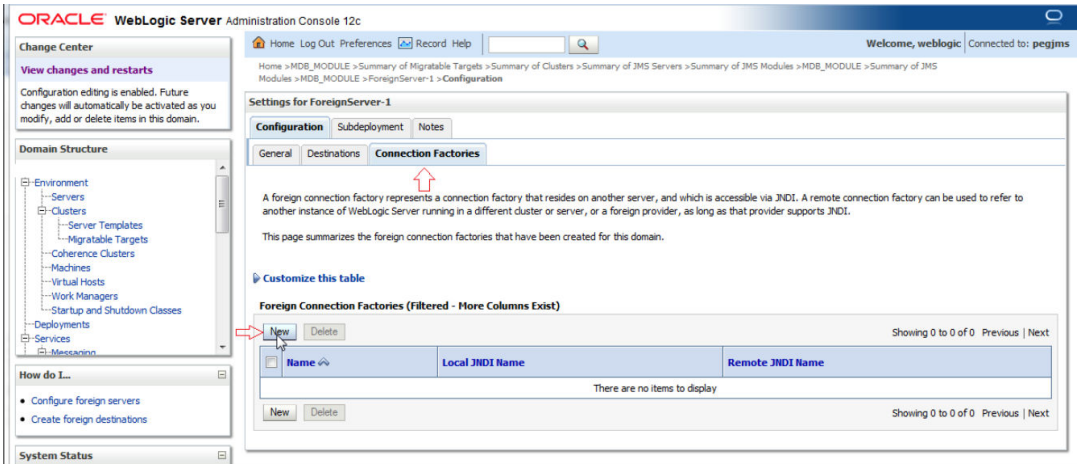
1. Click on **ForeignServer-1**.



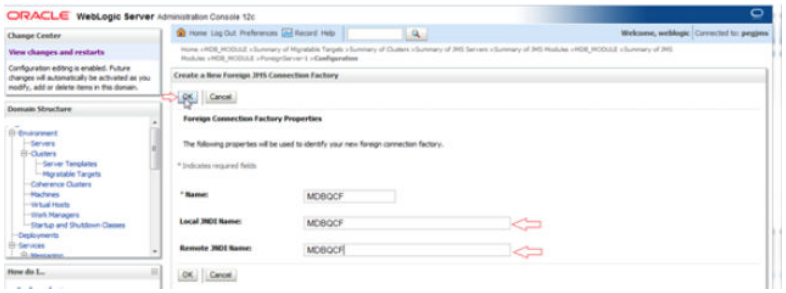
2. Enter the JNDI URL as Cluster URL(JMS Managed Servers) and Click on **Save**.



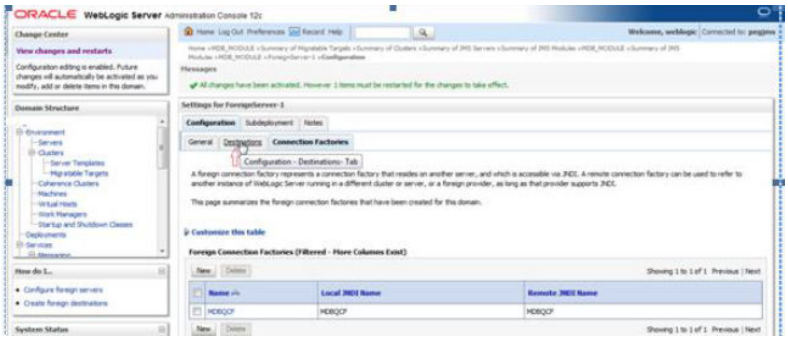
3. Click on **Connection Factories** tab.



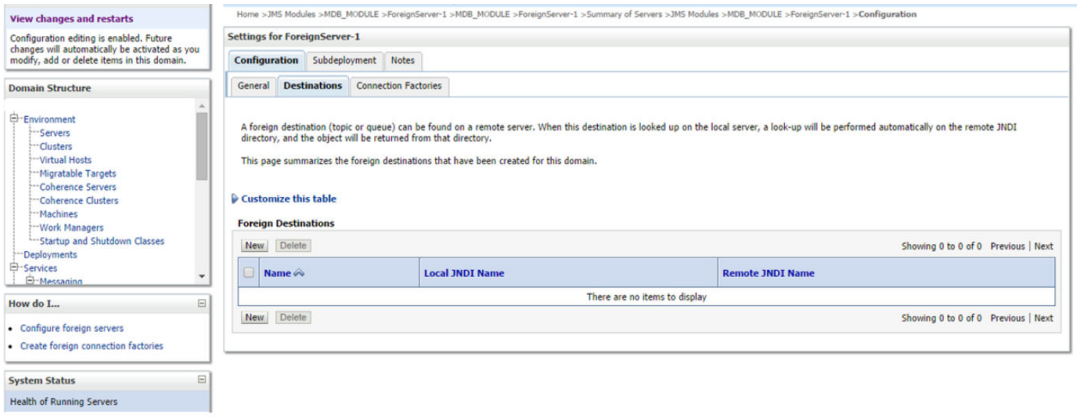
4. Create **MDBQCF** Connection Factory.

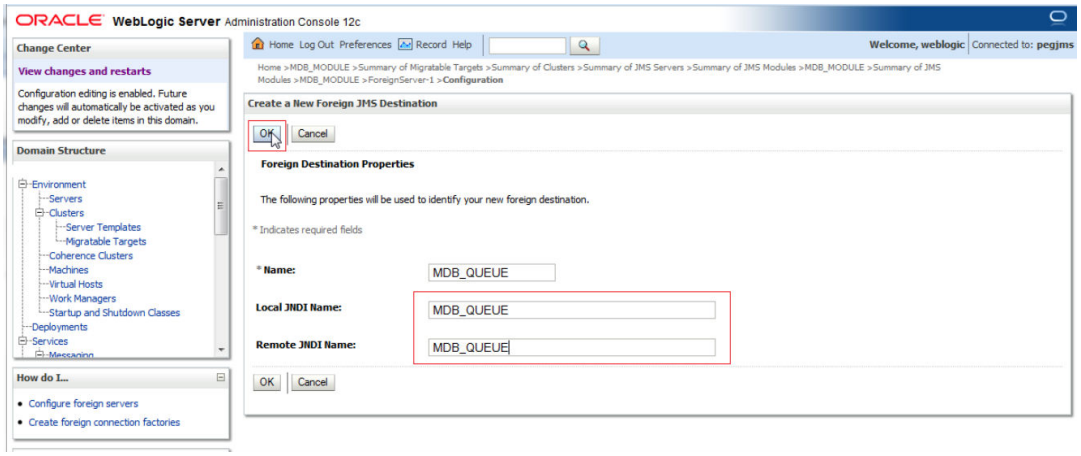


5. Click on **Destination** tab.

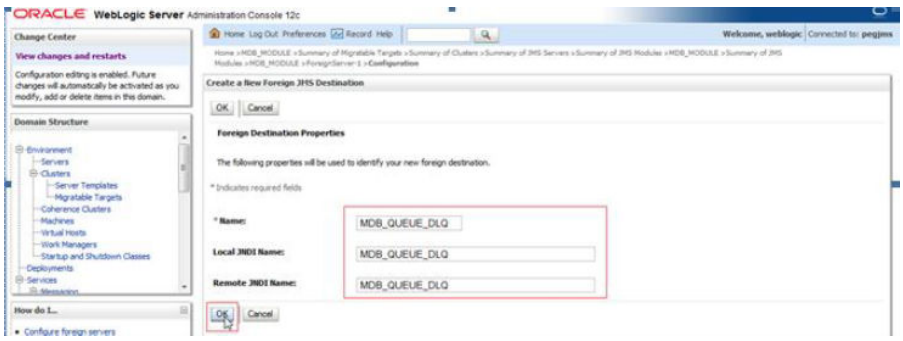


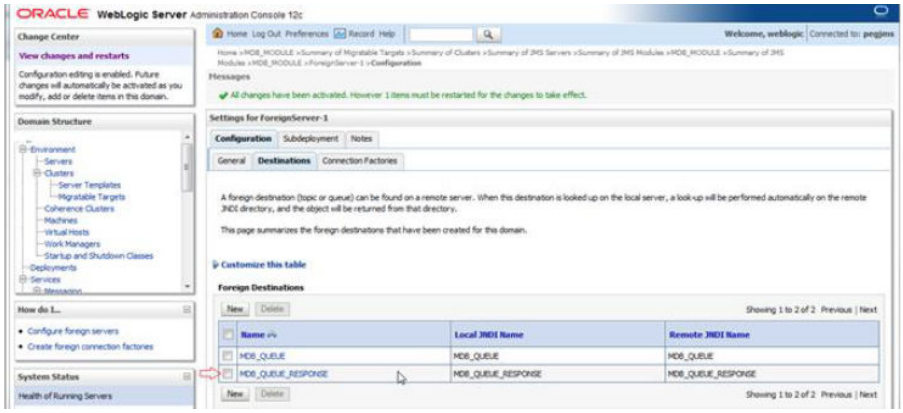
6. Create **MDB_QUEUE**.

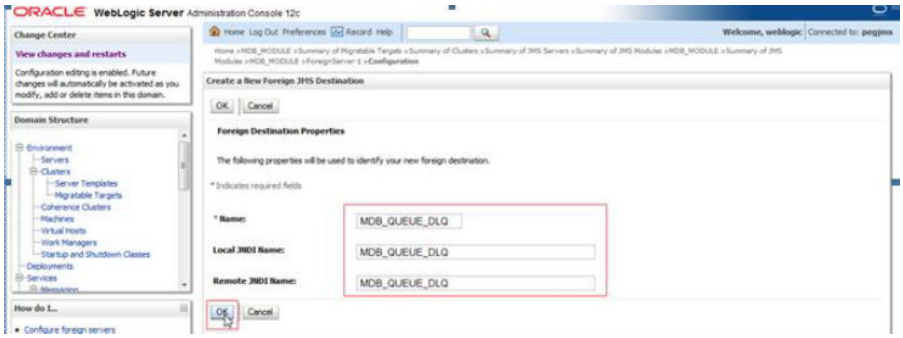


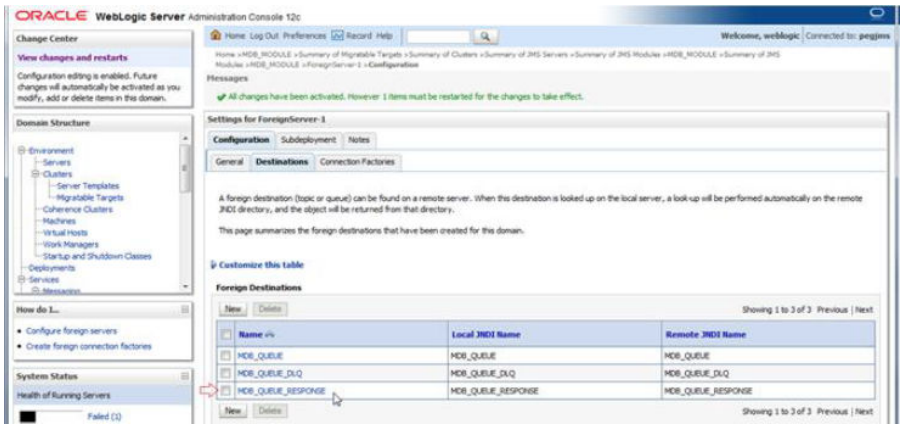


7. Similarly Create **MDB_QUEUE_RESPONSE, MDB_QUEUE_DLQ**.







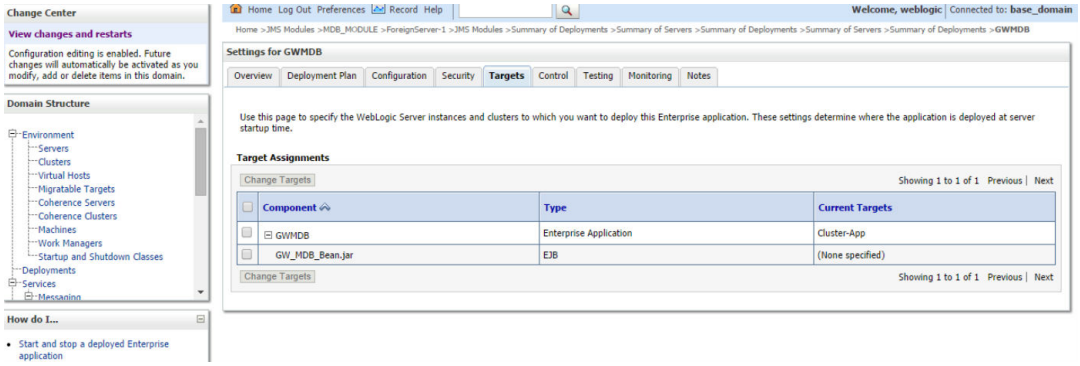


8. After all the resources are created, **Restart** the Admin and Managed Servers.

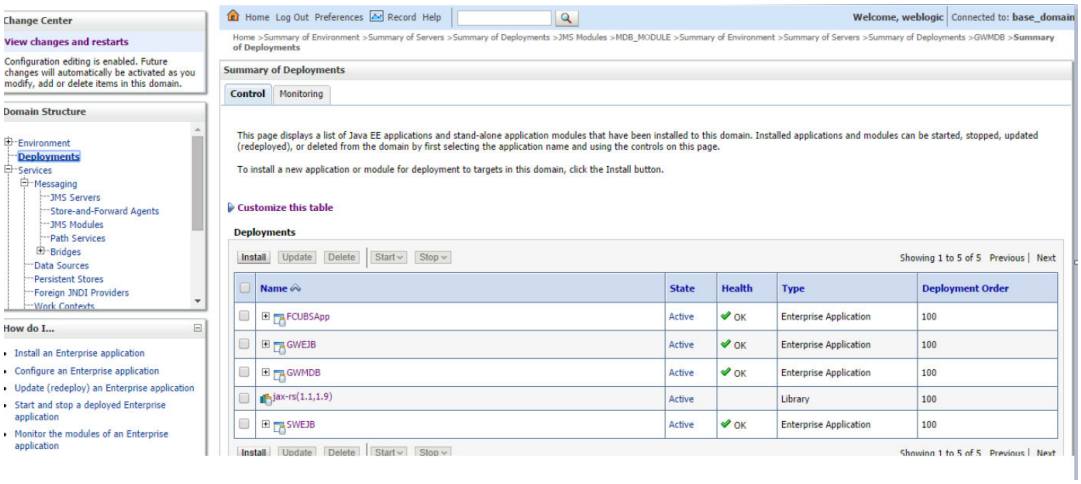
6

Application Deployment

1. Deploy the EAR with Target as Cluster-App.



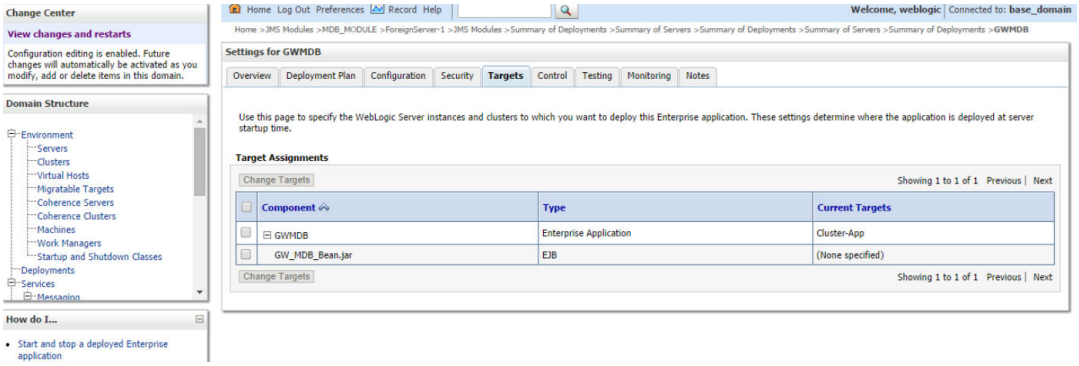
2. Health Should be OK if JMS is configured properly, otherwise Warning will be displayed.



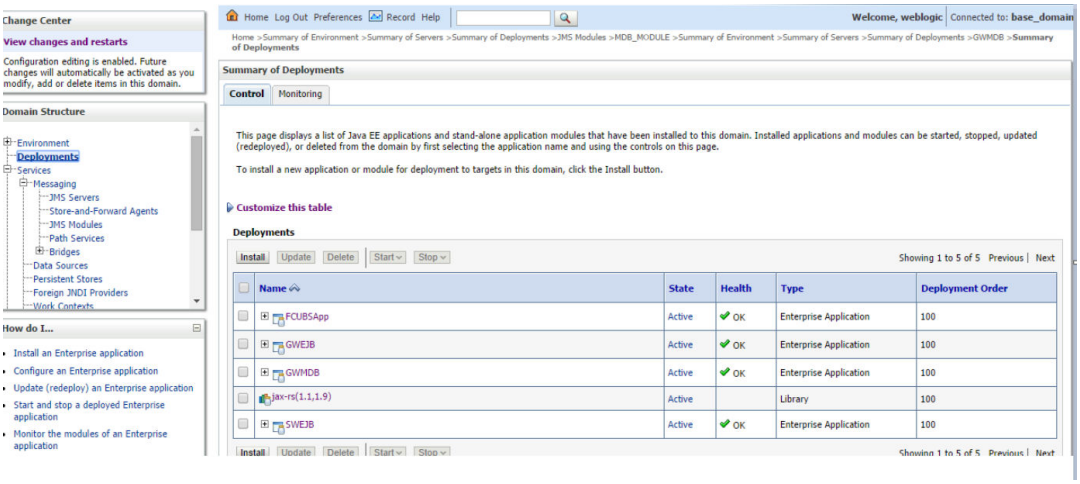
7

Frequently Asked Questions

1. Deploy the EAR with Target as Cluster-App.



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



- Application and JMS Cluster Deployed on Same Cluster
- Application Shows Warning upon Restart of Managed Servers
- Securing File Store Data
- t3s Protocol
- How to Test the Deployment
- Increase Maximum Number of Message-Driven Bean Threads
- How High Availability is Achieved
- How to setup for Scheduler/Notifications
- What other modules uses JMS Queue's
- References

7.1 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.

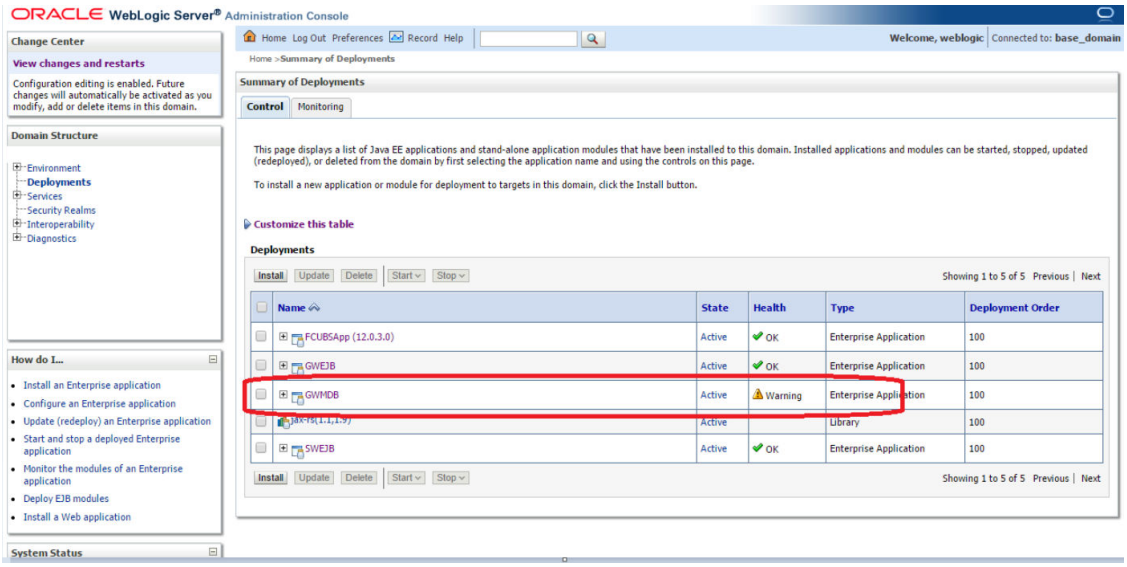
1. Foreign Server Creation is not required.
2. Targets should be given accordingly during SubDeployment Creation.

7.2 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**.

7.3 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.

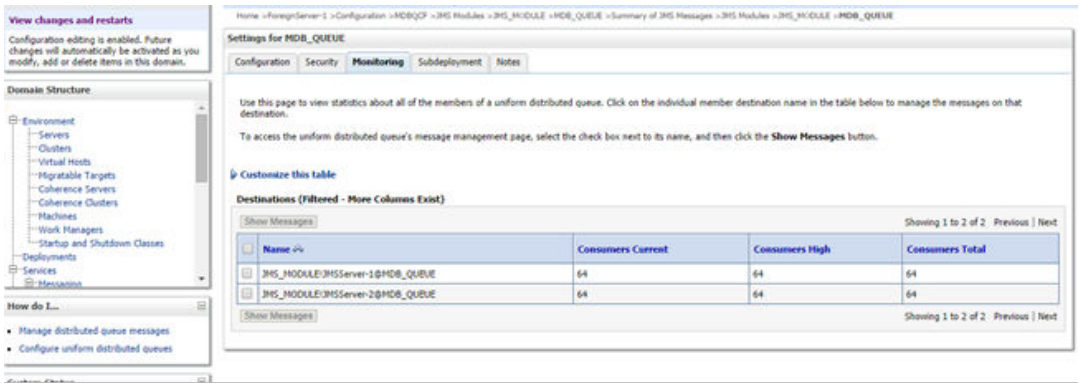
7.4 t3s Protocol

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.

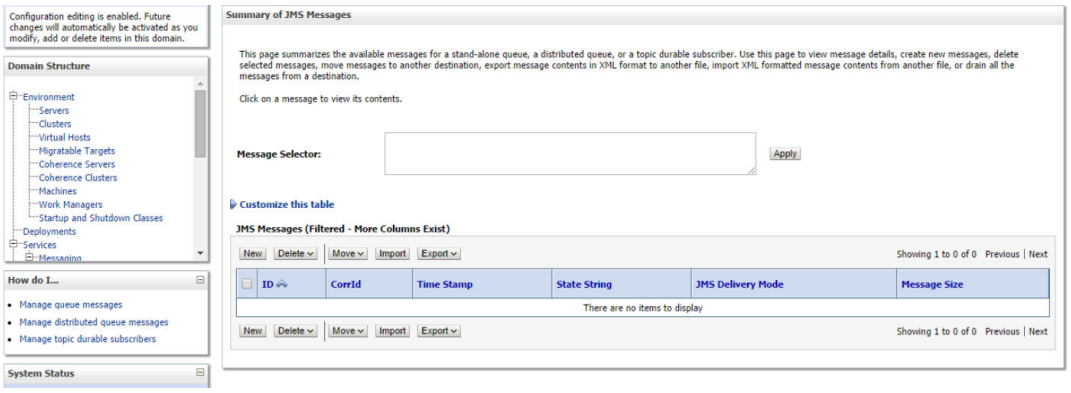
> **Note:**
>
> when using the t3s protocol SSL Listen Port Enabled should be checked in server template and the port number used in the URL should be secure port.

7.5 How to Test the Deployment

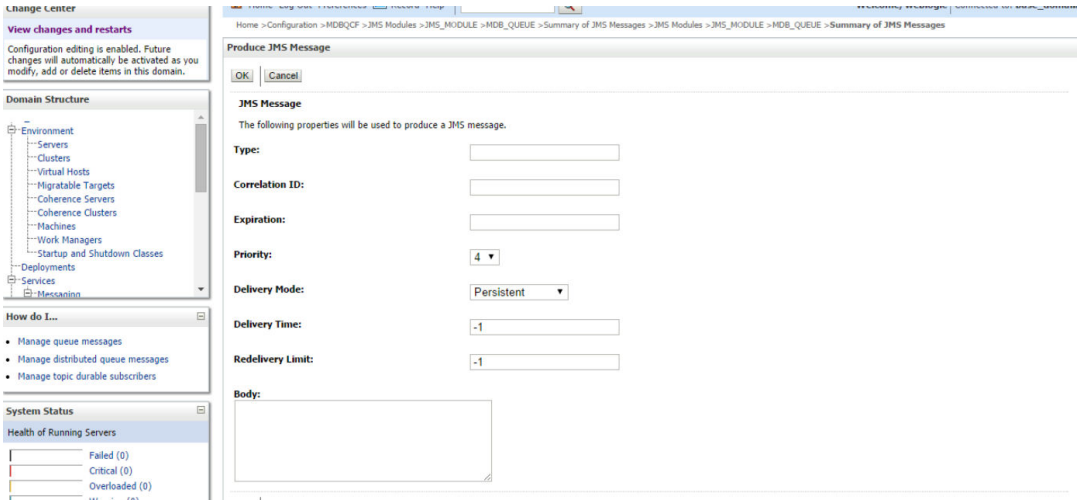
1. Navigate to Services JMS Modules JMS_MODULE MDB_QUEUE MONITORING.



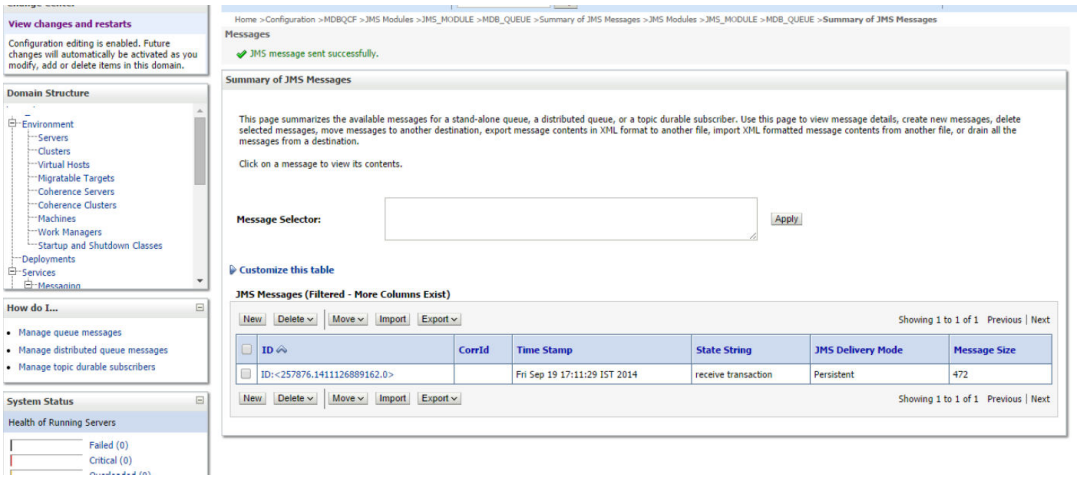
2. Select any one Server and Click on **Show Messages**.



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.

7.6 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

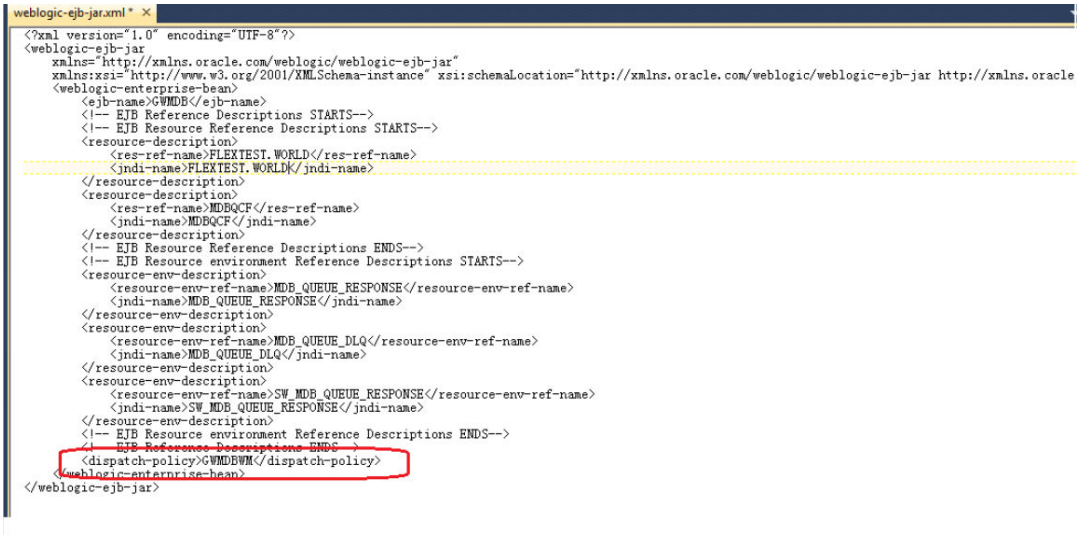
1. Modify the MDB deployment description and deploy the EAR.
2. Create Custom Workmanager and add constraints to limit the number of the max MDB threads

- Modify weblogic-ejb-jar.xml
- Work Manager Creation

7.6.1 Modify weblogic-ejb-jar.xml

1. Add below line to the weblogic-ejb-jar.xml of the MDB Ear.

   <dispatch-policy>GWMDBWM</dispatch-policy>



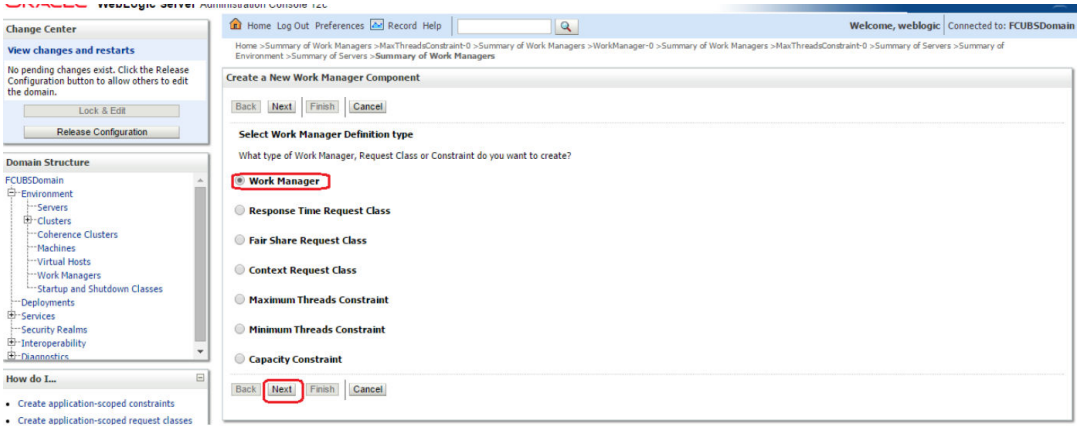
2. Remove if any of the below tags present in weblogic-ejb-jar.xml

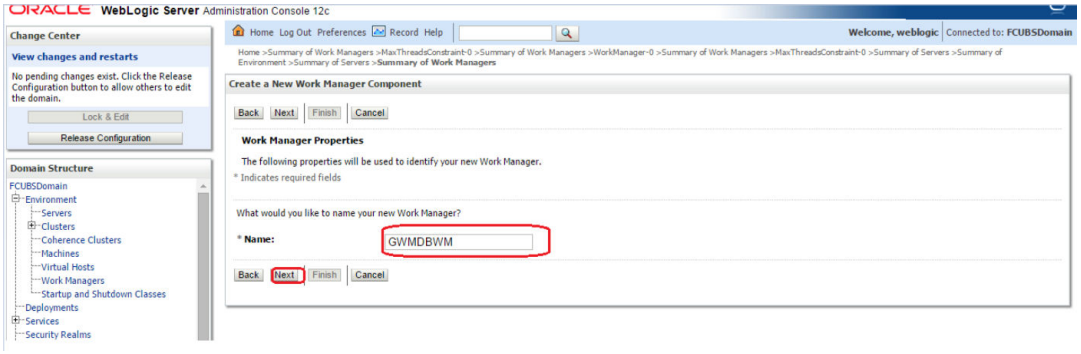
   max-beans-in-free-pool and initial-beans-in-free-pool

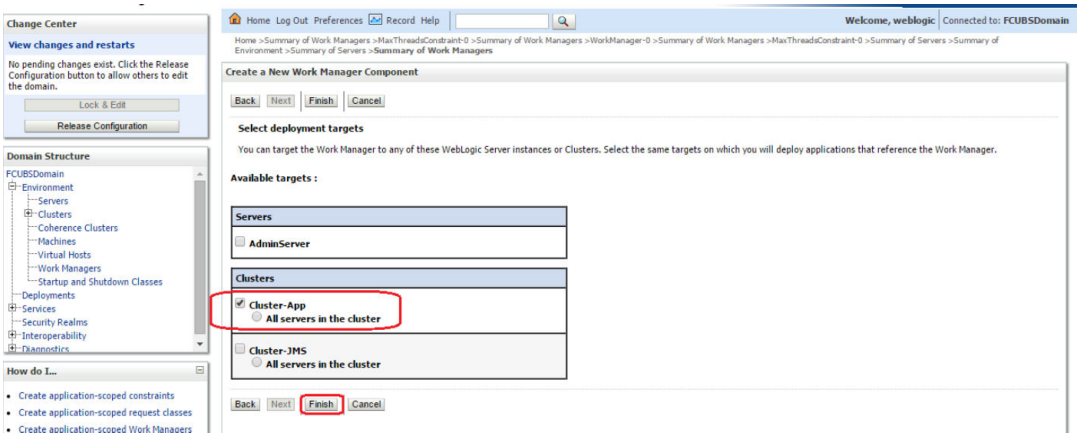
3. Save the ear file and redeploy the EAR file.

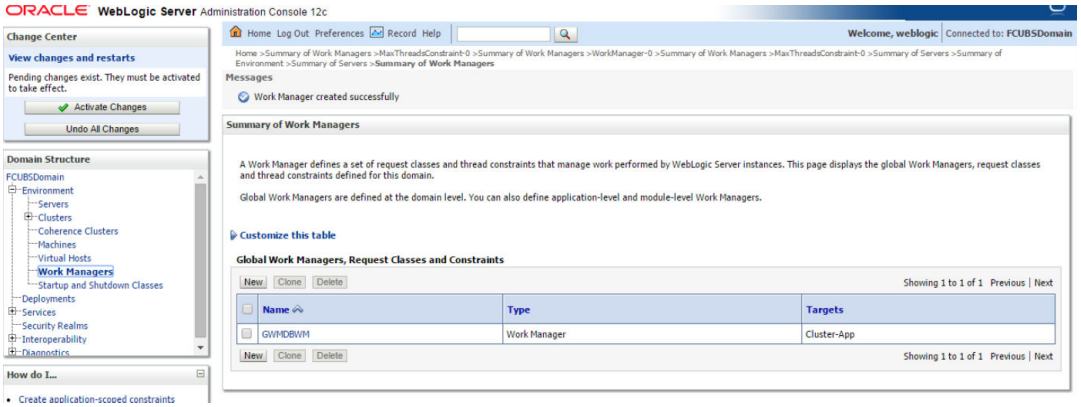
7.6.2 Work Manager Creation

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:

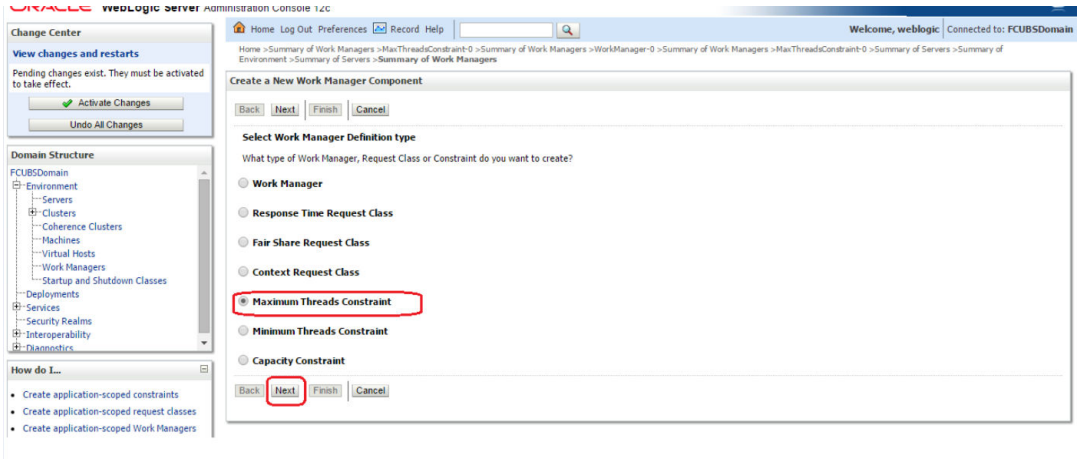


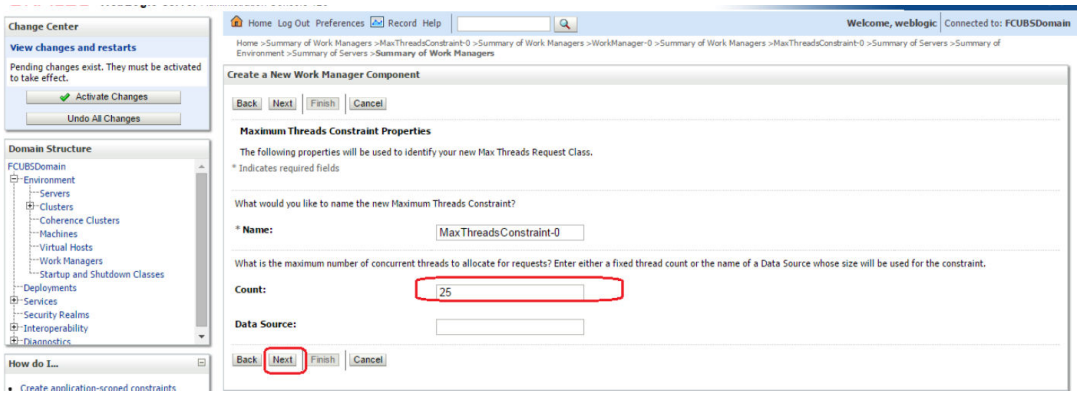






2. Create new Max Thread Constraint and in the Count field give the desired thread count.


Change Center
View changes and restarts
Pending changes exist. They must be activated to take effect.
Activate Changes
Undo All Changes
Domain Structure
FCUBSDomain
Environment
Servers
Clusters
Coherence Clusters
Machines
Virtual Hosts
Work Managers
Startup and Shutdown Classes
Deployments
Services
Security Realms
Interoperability
Diagnostics
How do I...
Create application-scoped constraints
Create application-scoped request classes
Create application-scoped Work Managers
Home Log Out Preferences Record Help
Welcome, weblogic Connected to: FCUBSDomain
Create a New Work Manager Component
Back Next Finish Cancel
Select Work Manager Definition type
What type of Work Manager, Request Class or Constraint do you want to create?
Work Manager
Response Time Request Class
Fair Share Request Class
Context Request Class
Maximum Threads Constraint
Minimum Threads Constraint
Capacity Constraint
Back Next Finish Cancel


Change Center
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Clusters
Coherence Clusters
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Virtual Hosts
Work Managers
Startup and Shutdown Classes
Deployments
Services
Security Realms
Interoperability
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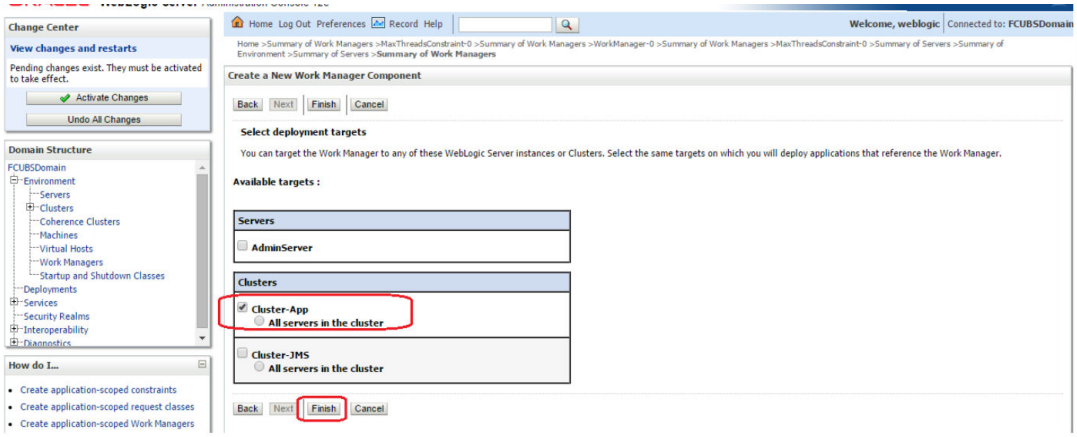
How do I...
Home Log Out Preferences Record Help
Welcome, weblogic Connected to: FCUBSDomain
Create a New Work Manager Component
Back Next Finish Cancel
Maximum Threads Constraint Properties
The following properties will be used to identify your new Max Threads Request Class.
* Indicates required fields
What would you like to name the new Maximum Threads Constraint?
* Name: MaxThreadsConstraint-0
What is the maximum number of concurrent threads to allocate for requests? Enter either a fixed thread count or the name of a Data Source whose size will be used for the constraint.
Count: 25
Data Source:
Back Next Finish Cancel


Change Center
View changes and restarts
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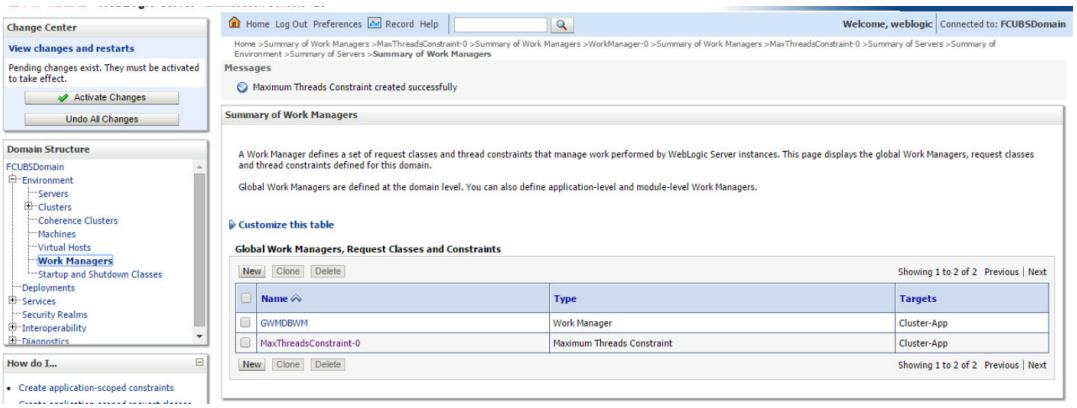
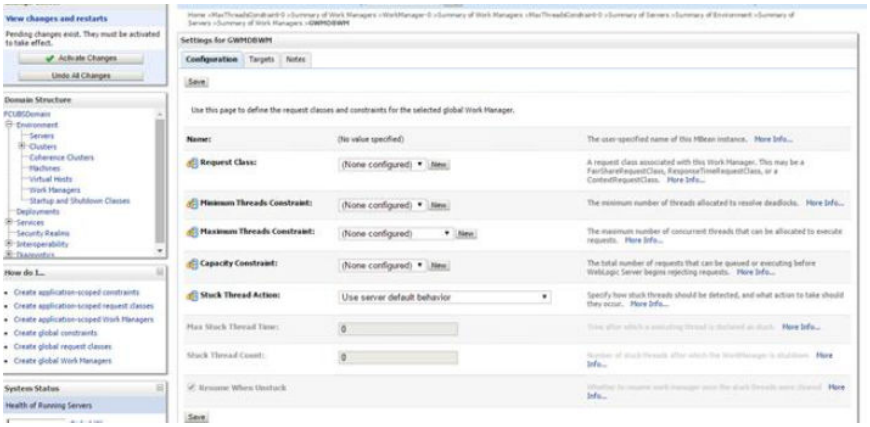
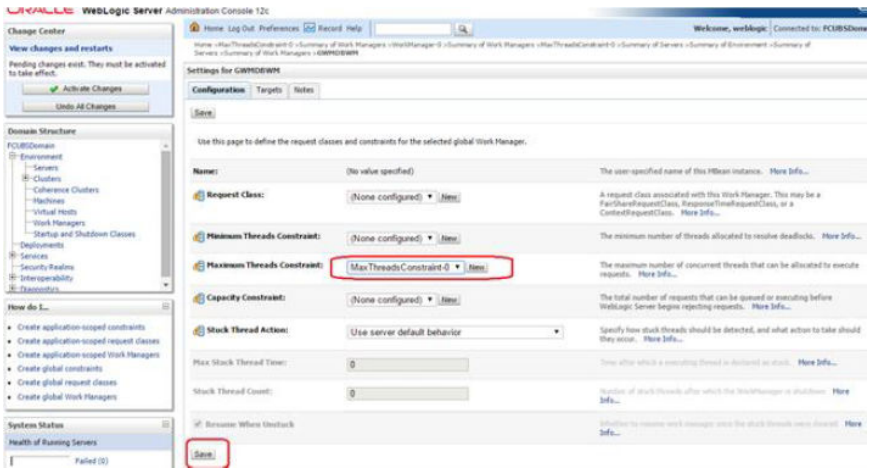
Coherence Clusters
Machines
Virtual Hosts
Work Managers
Startup and Shutdown Classes
Deployments
Services
Security Realms
Interoperability
Diagnostics
How do I...
Create application-scoped constraints
Create application-scoped request classes
Create application-scoped Work Managers
Home Log Out Preferences Record Help
Welcome, weblogic Connected to: FCUBSDomain
Create a New Work Manager Component
Back Next Finish Cancel
Select deployment targets
You can target the Work Manager to any of these WebLogic Server instances or Clusters. Select the same targets on which you will deploy applications that reference the Work Manager.
Available targets :
Servers
AdminServer
Clusters
Cluster-App
All servers in the cluster
Cluster-JMS
All servers in the cluster
Back Next Finish Cancel



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.

7.7 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.

7.8 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.

7.9 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

7.10 References

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