

FCUBS JMS Configuration Using Websphere Default Messaging Provider

Oracle FLEXCUBE Universal Banking

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1. Purpose

The purpose of this document is to explain the steps required for JMS Configuration in cluster mode using WEBSHERE DEFAULT MESSAGING PROVIDER for Websphere 8.5.5

2. Introduction

The default messaging provider is installed and runs as part of WebSphere Application Server, and needs no further administration. WebSphere administrative console is used to configure JMS resources for applications and can manage messages and subscriptions associated with JMS destinations.

The default messaging provider is the Java™ Message Service (JMS) API implementation for messaging (connection factories, JMS destinations, and so on). The concrete destinations (queues and topic spaces) behind the default messaging provider interface are implemented in a service integration bus.

The default messaging provider is based on service integration technologies., this document deals with

- **Service Bus Creation**
A service integration bus consists of one or more bus members. A bus member can be an application server or a cluster. Each bus member will have one (or possibly more in the case of clusters) messaging engine that manages connections to the bus and messages.
- **JMS connection factories and service integration**
A JMS connection factory is used to create connections to JMS resources on a service integration bus.
- **JMS queue resources and service integration**
Creation of JMS queue resources provided by the default messaging provider for JMS point-to-point messaging and supported by a service integration bus.
- **Application access to JMS resources**
Describes the application access to Java Message Service (JMS) resources provided by the default messaging provider.

3. Pre-Requisites

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

3.1 Nodes

2 nodes are created

WebSphere, software

View: All tasks

Cell=ofss222565Cell01, Profile=Dmgr01

Nodes

Use this page to manage nodes in the application server environment. A node corresponds to a physical computer system with a distinct IP host address. The following table lists the managed and unmanaged nodes in this cell. The first node is the deployment manager. Add new nodes to the cell and to this list by clicking Add Node.

Preferences

Add Node Remove Node Force Delete Synchronize Full Resynchronize Stop

Select	Name	Host Name	Version	Discovery Protocol	Status
<input type="checkbox"/>	ofss220239Node02	ofss220239.in.oracle.com	Base 8.5.5.0	TCP	+
<input type="checkbox"/>	ofss222565CellManager01	ofss222565.in.oracle.com	ND 8.5.5.0	TCP	+
<input type="checkbox"/>	ofss222565Node03	ofss222565.in.oracle.com	ND 8.5.5.0	TCP	+

Total 3

3.2 Node Agents

Both the Node Agents are started.

WebSphere, software

View: All tasks

Cell=ofss222565Cell01, Profile=Dmgr01

Node agents

Use this page to manage node agents and application servers on the node that a node agent manages. The node agent process serves as an intermediary between the application servers on the node and the deployment manager. The node agent process runs on every node and is specialized to perform node-specific administration functions, such as server process monitoring, configuration synchronization, file transfer, and request routing.

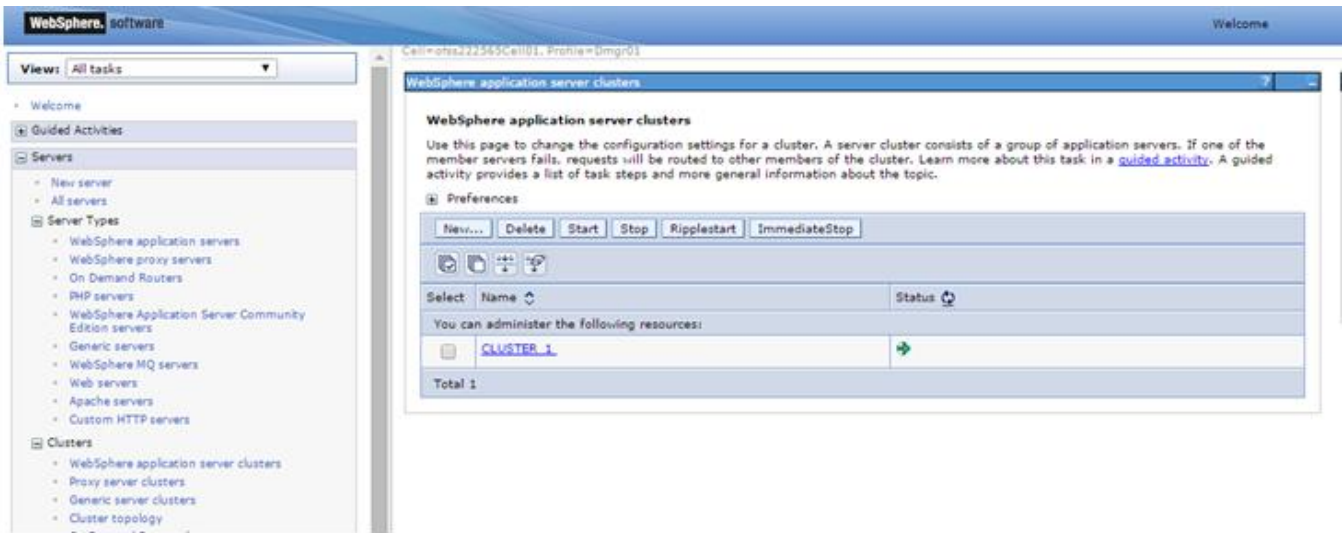
Preferences

Stop Restart Restart all Servers on Node

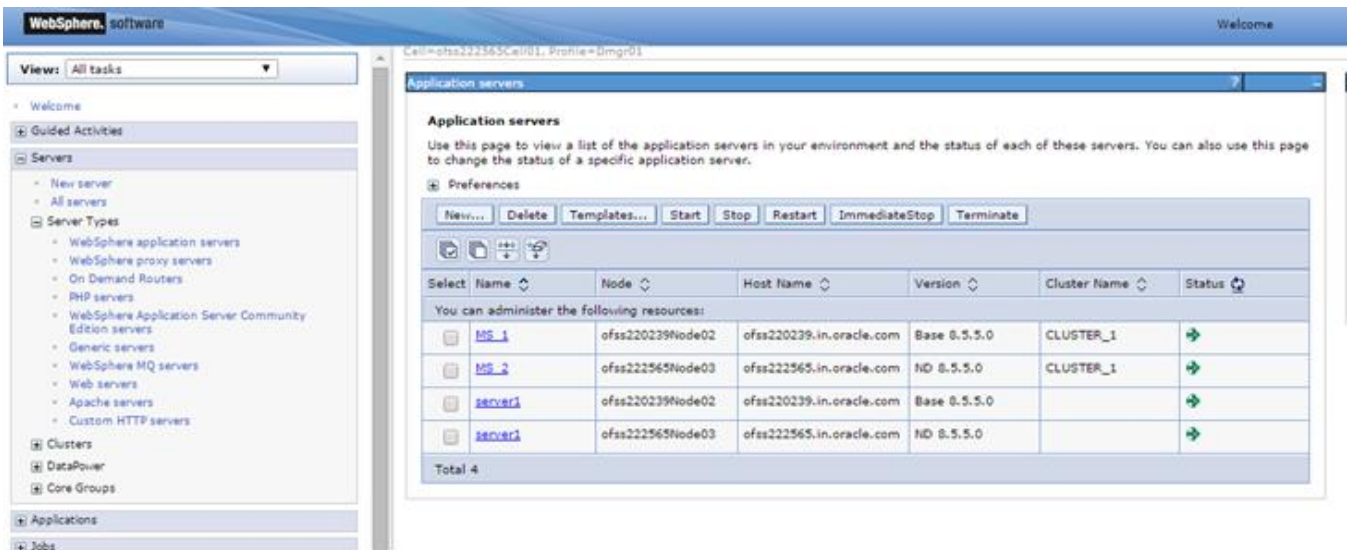
Select	Name	Node	Host Name	Version	Status
<input type="checkbox"/>	nodeagent	ofss220239Node02	ofss220239.in.oracle.com	Base 8.5.5.0	+
<input type="checkbox"/>	nodeagent	ofss222565Node03	ofss222565.in.oracle.com	ND 8.5.5.0	+

Total 2

3.3 Cluster



3.4 Managed Servers



3.5 DataSource

Ensure that DataSource required for the MDB ear is created with Target as Cluster_1

The screenshot shows the WebSphere Administration Console interface. The left sidebar contains a navigation tree with categories like Applications, Jobs, Services, Resources, JDBC, and Security. The main content area is titled 'Data sources' and contains the following information:

Data sources

Use this page to edit the settings of a datasource that is associated with your selected JDBC provider. The datasource object supplies your application with connections for accessing the database. Learn more about this task in a [guided activity](#). A guided activity provides a list of task steps and more general information about the topic.

Scope: Cell=ofss222565Cell01, Cluster=CLUSTER_1

Show scope selection drop-down list with the all scopes option

Scope specifies the level at which the resource definition is visible. For detailed information on what scope is and how it works, [see the scope settings help](#).

Cluster=CLUSTER_1

Preferences

New... Delete Test connection Manage state...

Select	Name	JNDI name	Scope	Provider	Description	Category
<input type="checkbox"/>	FLEXTTEST.WORLD	FLEXTTEST.WORLD	Cluster=CLUSTER_1	Oracle JDBC Driver (XA)	New JDBC Datasource	
Total 1						

3.6 Shared Folder

Shared folders for File Store Creation are required and this folder should be accessible across both the servers (eg, NFS mount). For fail over of messaging engines to another, all servers in cluster require a separate folder. If there are 4 Managed Servers in the clusters then 4 separate folders are required.

Eg,

/scratch/MessageStore/JMS_1/

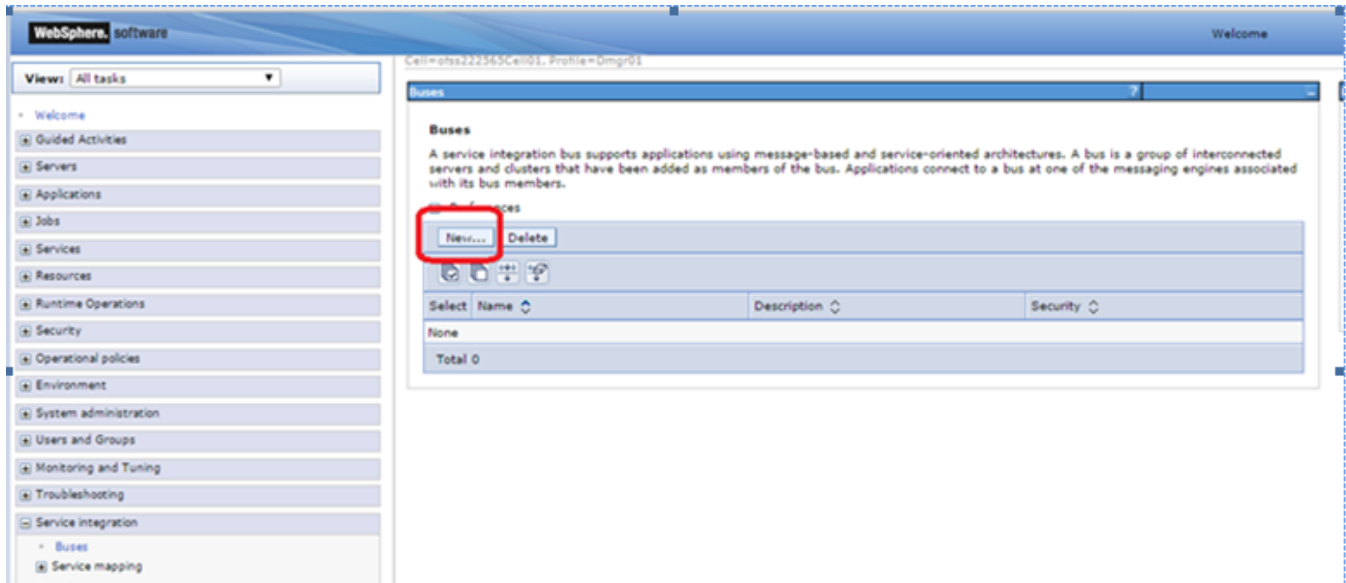
/scratch/MessageStore/JMS_2/

/scratch/ MessageStore /JMS_3/

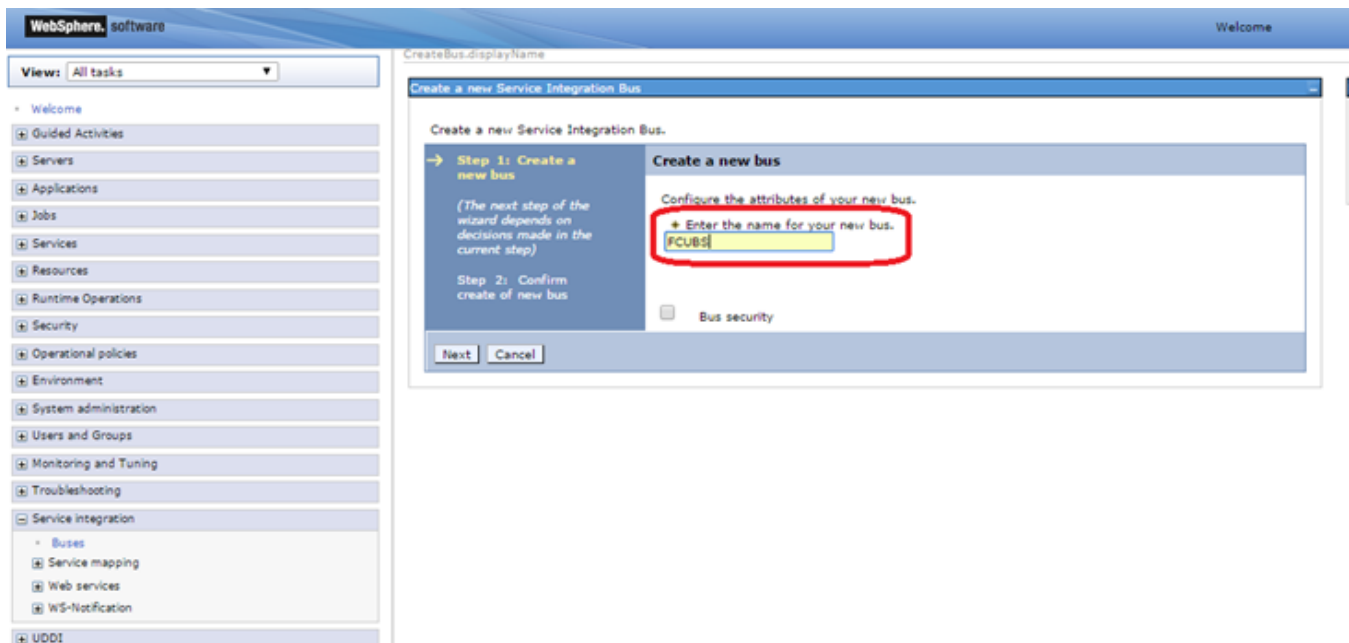
4. JMS Configuration

4.1 Service Integration Bus Creation

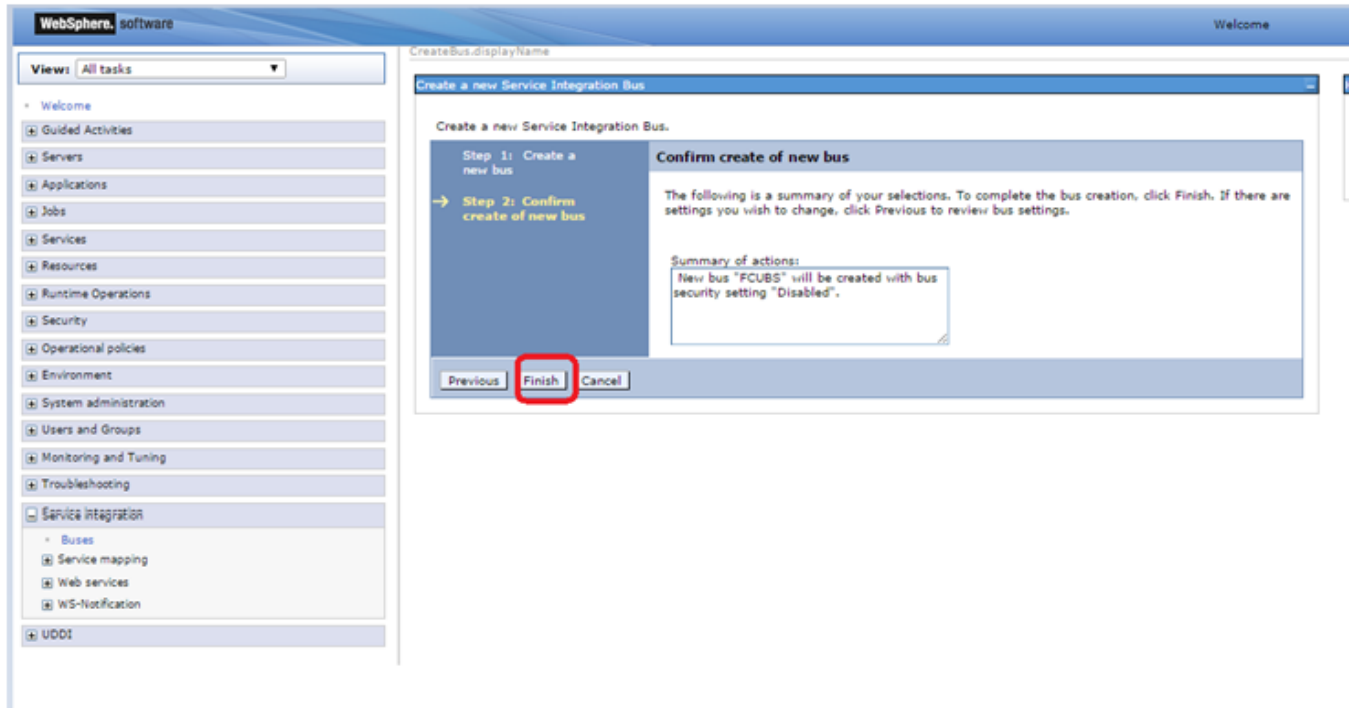
- 1) Navigate to Service Integration > Buses > Click on New



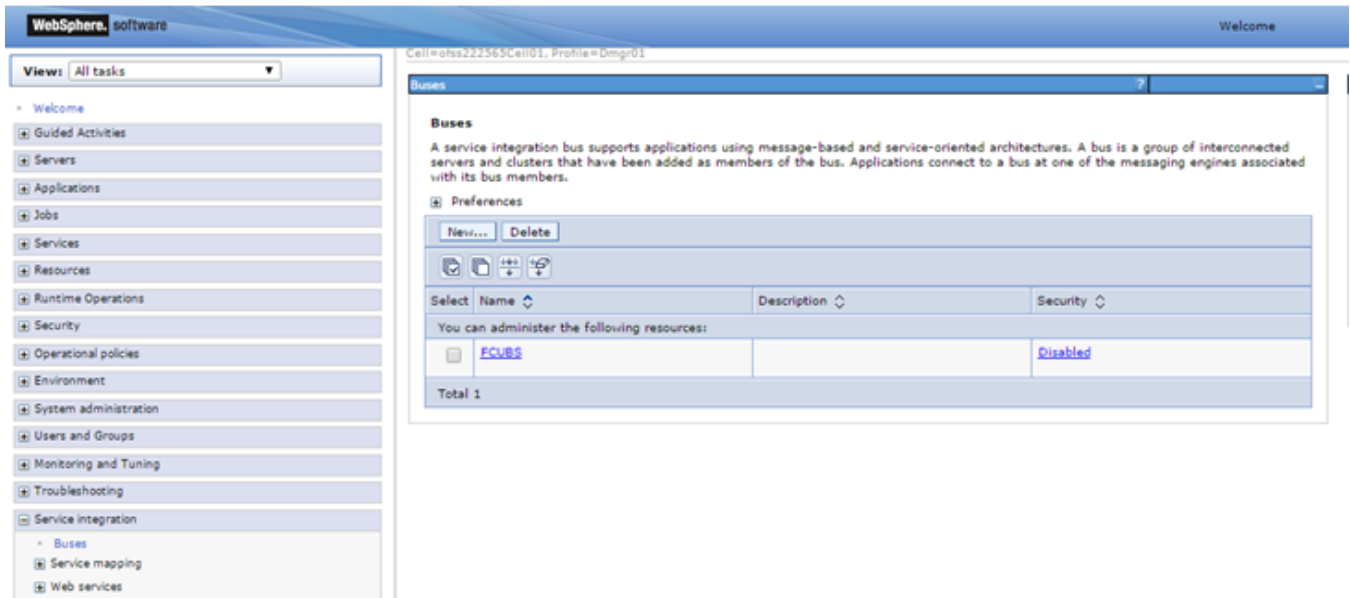
- 2) Enter Name for the new Bus, Uncheck "Bus Security" if security is not enabled during FCUBS property file build and click on Next



3) Click on Finish



4) New Bus FCUBS is created



4.2 Bus Member(File Store Creation)

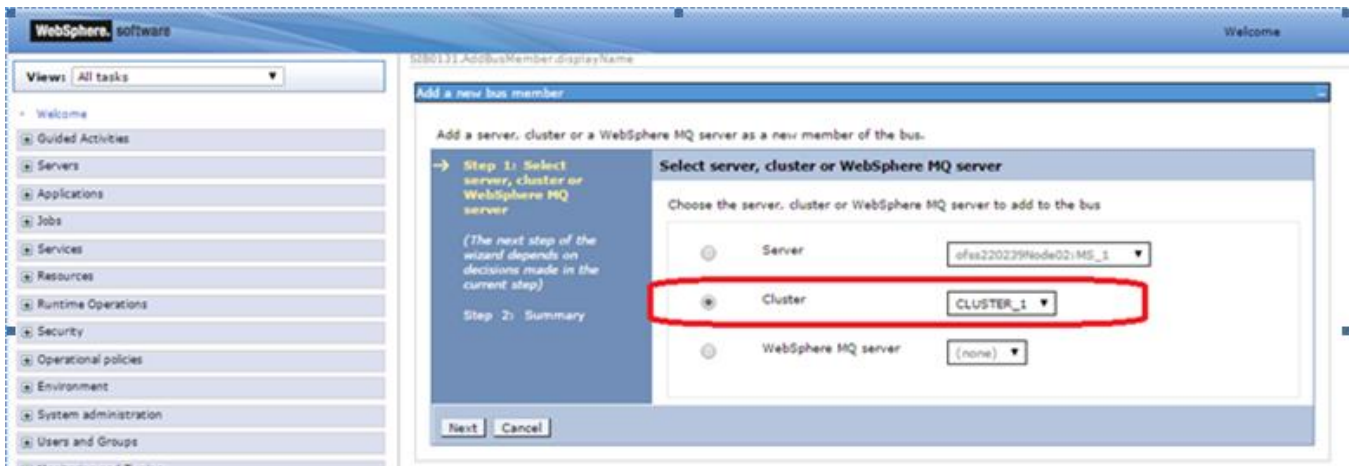
- 1) Navigate to Service Integration > Buses > Click on FCUBS(new bus Created) > Click on Bus Member under Topology

The screenshot shows the WebSphere software interface. On the left is a navigation menu with categories like 'Welcome', 'Servers', 'Applications', 'Jobs', 'Services', 'Resources', 'Runtime Operations', 'Security', 'Operational policies', 'Environment', 'System administration', 'Users and Groups', 'Monitoring and Tuning', 'Troubleshooting', 'Service integration', and 'UDDI'. The 'Service integration' section is expanded to show 'Buses', 'Service mapping', 'Web services', and 'WS-Notification'. The main content area is titled 'Buses > FCUBS' and contains a description of a service integration bus. Below the description are two tabs: 'Configuration' and 'Local Topology'. The 'Local Topology' tab is active, showing 'General Properties' (Name: FCUBS, UUID: D4AFF53950380C28, Description: empty) and 'Topology' (with 'Bus members' highlighted in a red box). Other sections include 'Destination resources' (Destinations, Mediations), 'Services' (Inbound services, Outbound services, WS-Notification services, Reliable messaging state), and 'Additional Properties' (Custom properties, Security, Web service gateway instance).

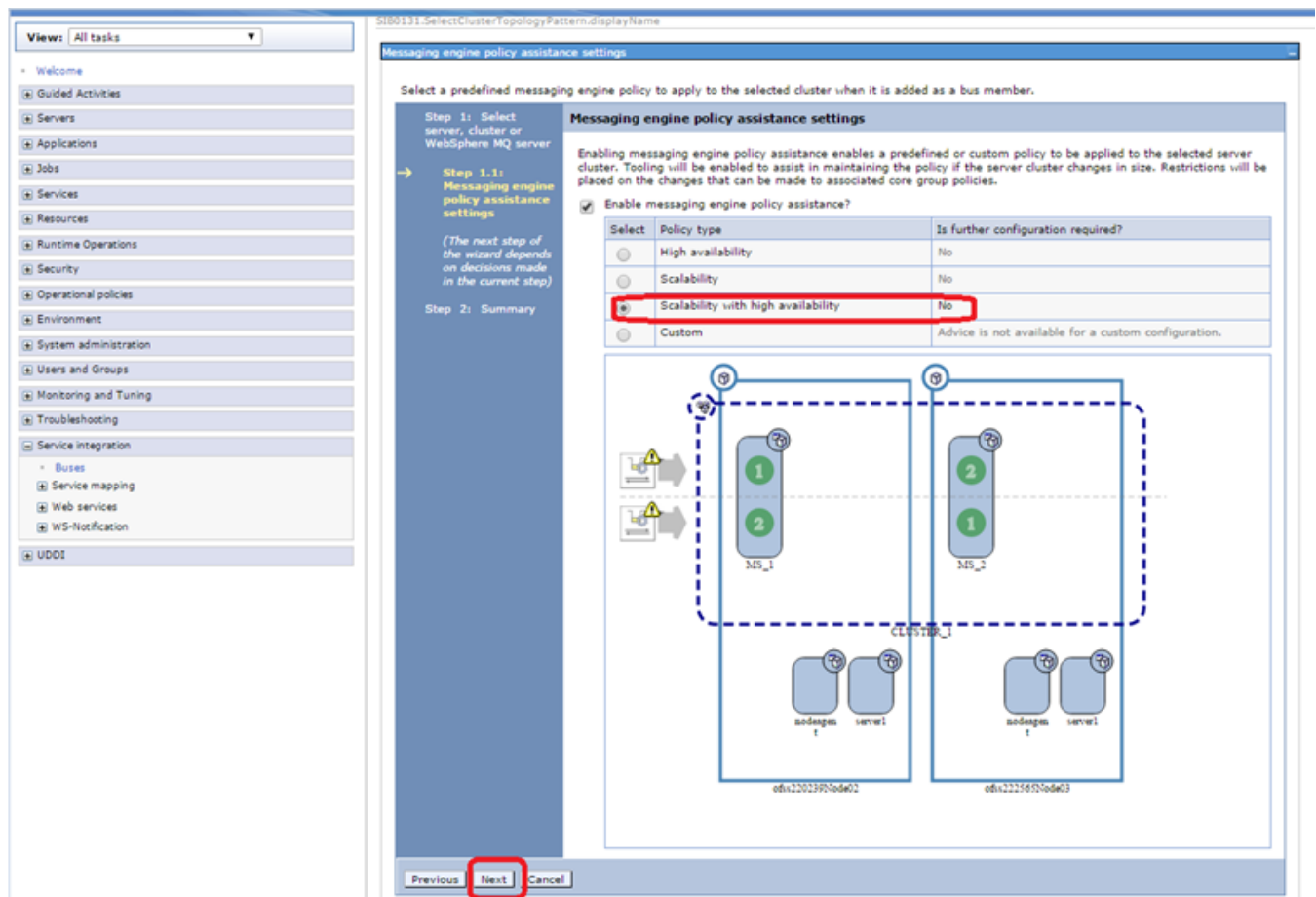
- 2) Click On Add

The screenshot shows the WebSphere software interface. The navigation menu is similar to the previous screenshot. The main content area is titled 'Buses > FCUBS > Bus members'. It contains a description: 'Bus members are the servers, WebSphere MQ servers and clusters that have been added to the bus.' Below the description are 'Add' and 'Remove' buttons, with the 'Add' button highlighted in a red box. There are also icons for refresh, search, and help. Below these is a table with columns: 'Select', 'Name', 'Type', and 'Messaging engine policy assistance'. The table is currently empty, showing 'None' and 'Total 0'.

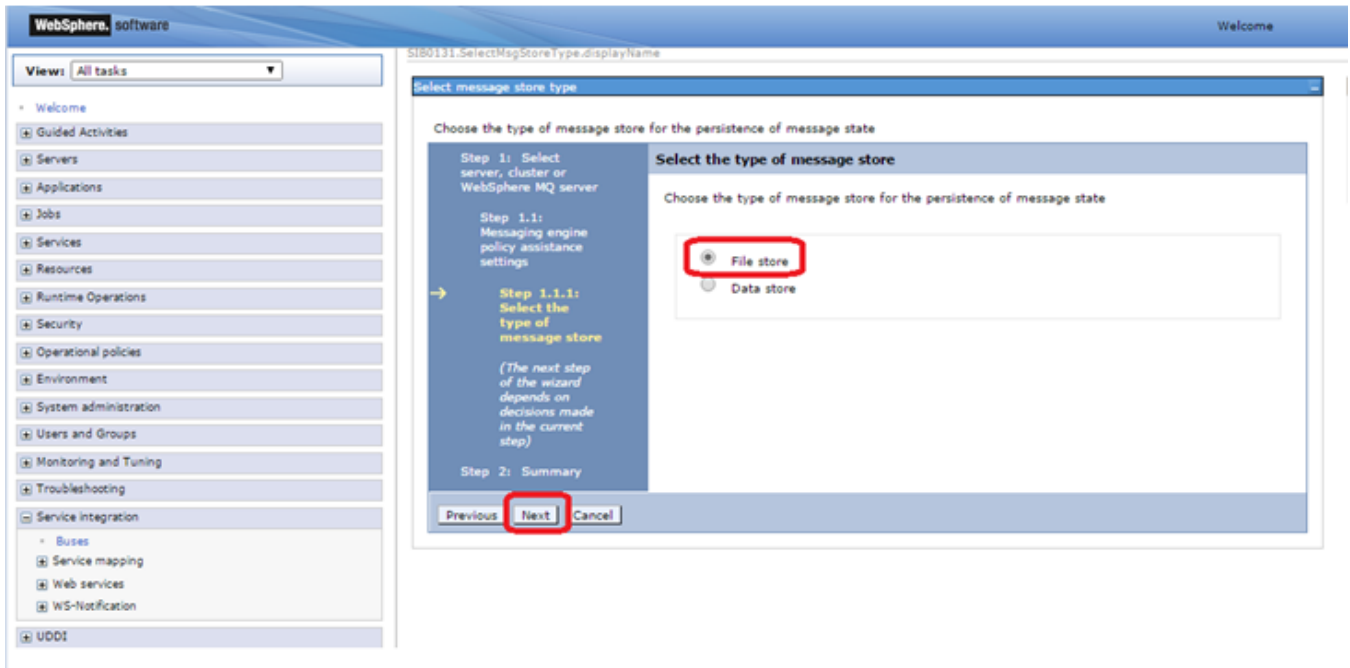
3) Select Cluster and Click on Next



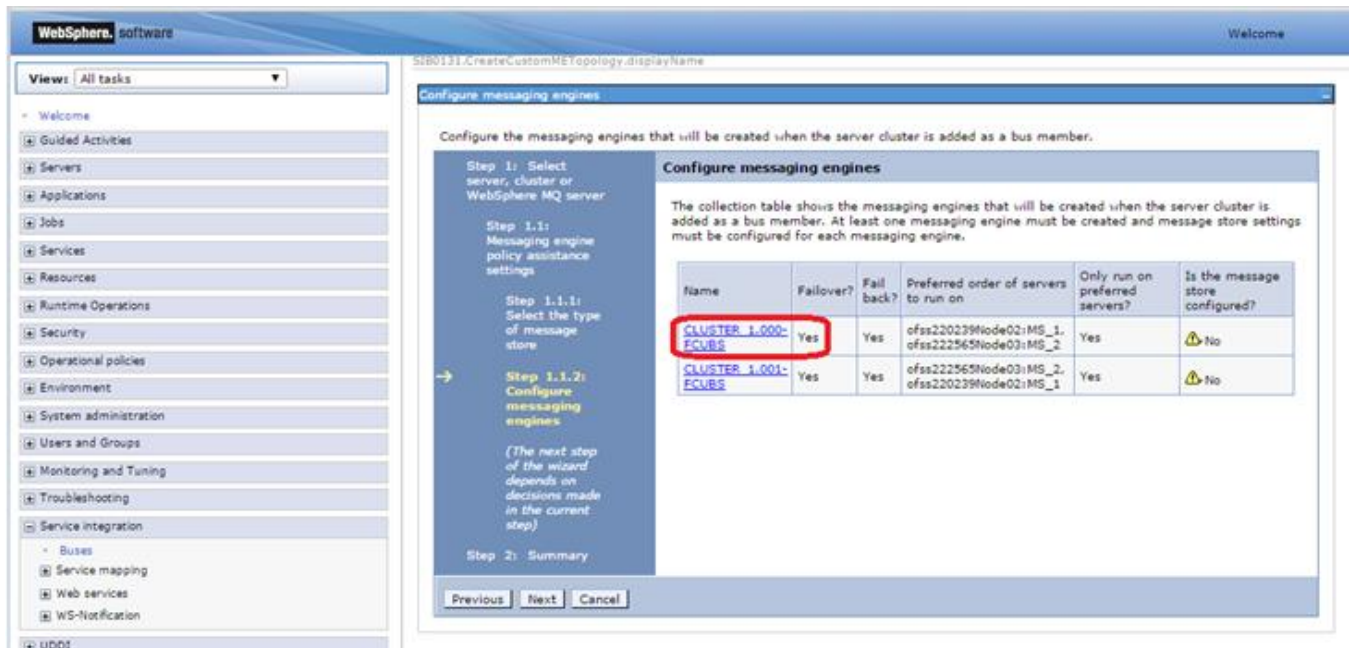
4) Select Scalability and High Availability Policy Type and Click on Next.



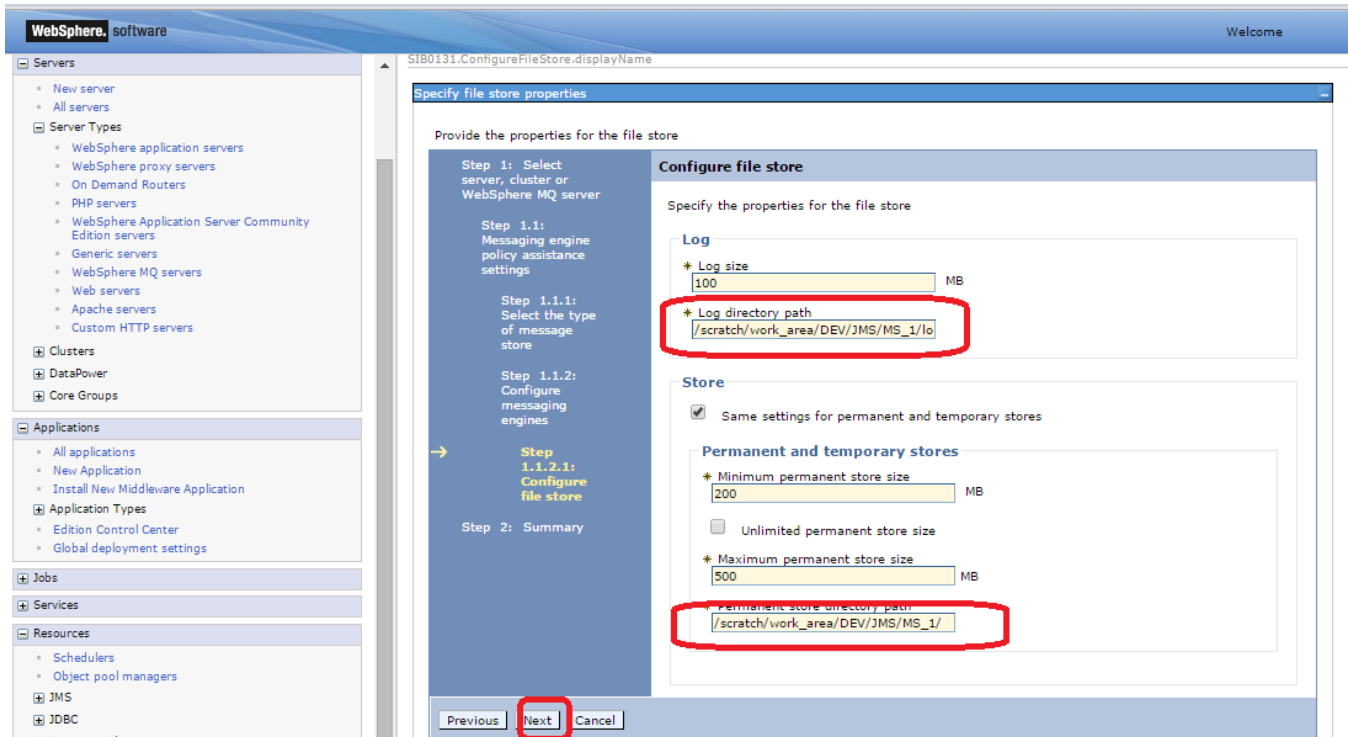
5) Select File Store and Click on Next



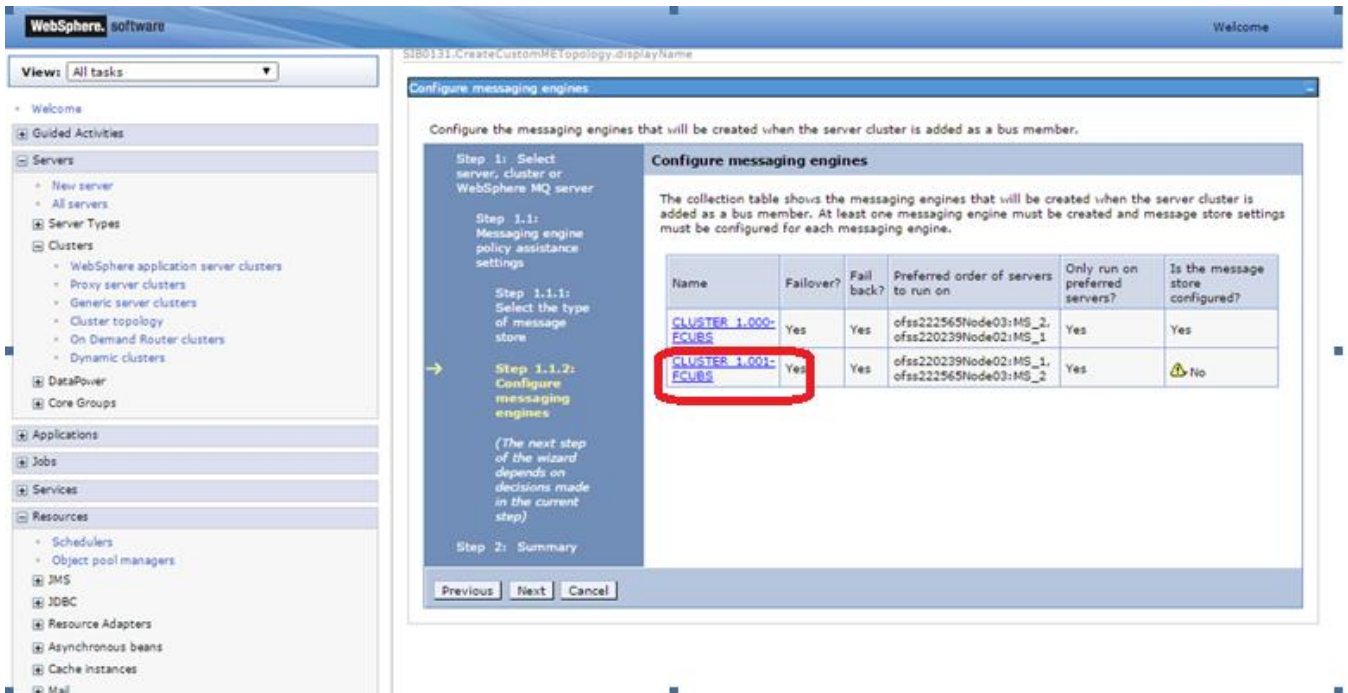
6) Select the Node 1 Message Engine



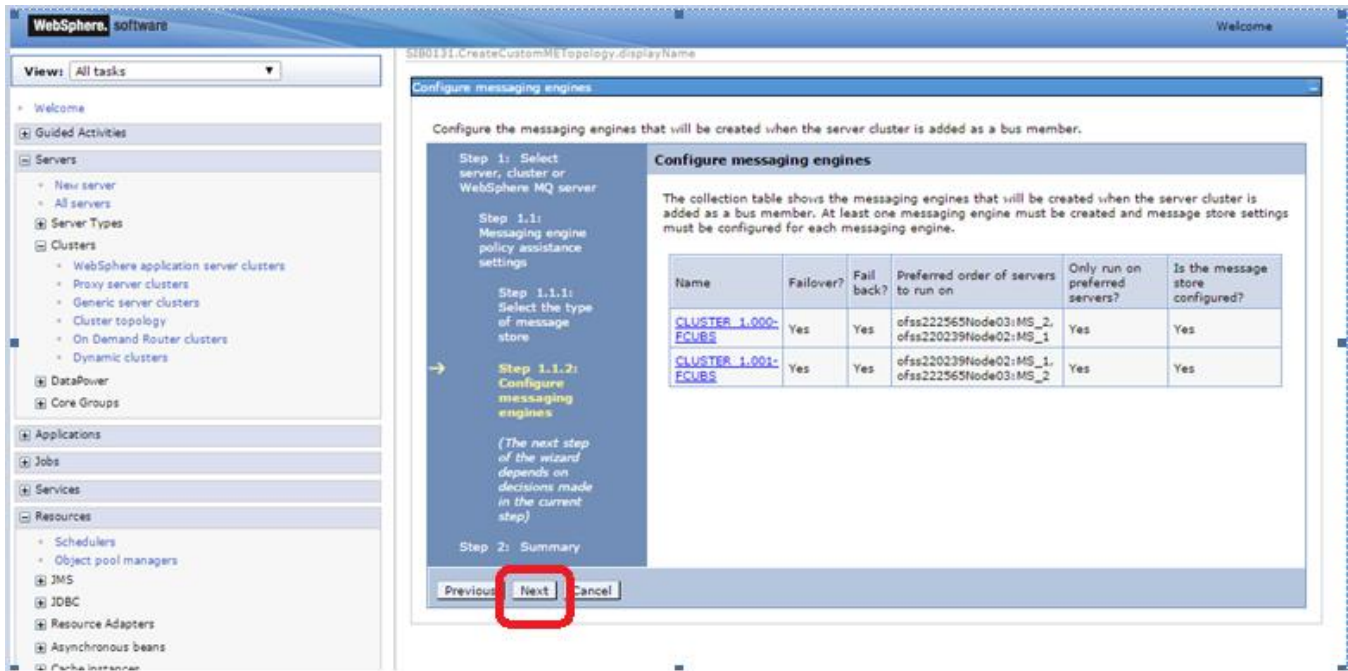
- 7) Enter the Log Directory Path and Permanent store directory path(shared path across the nodes) and Click on Next



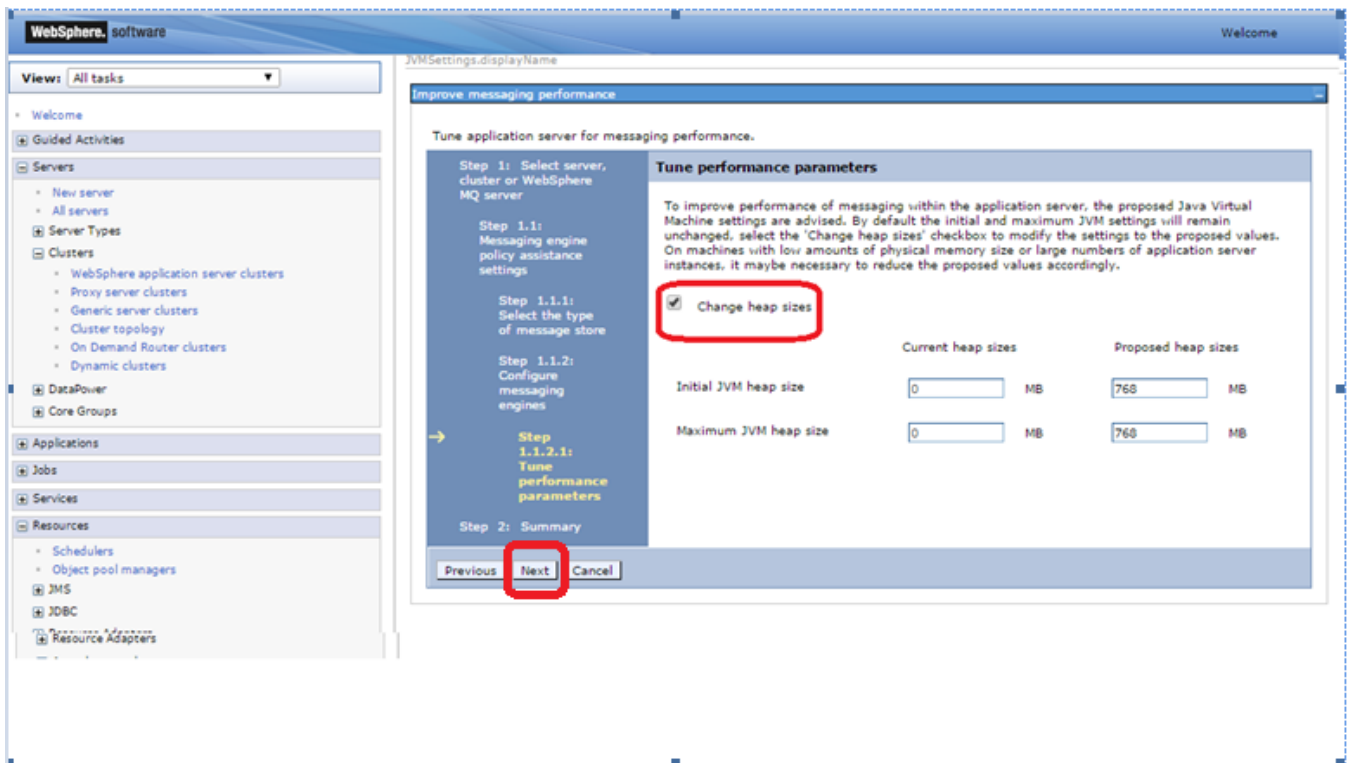
- 8) Click on other message engine and set the FileStore



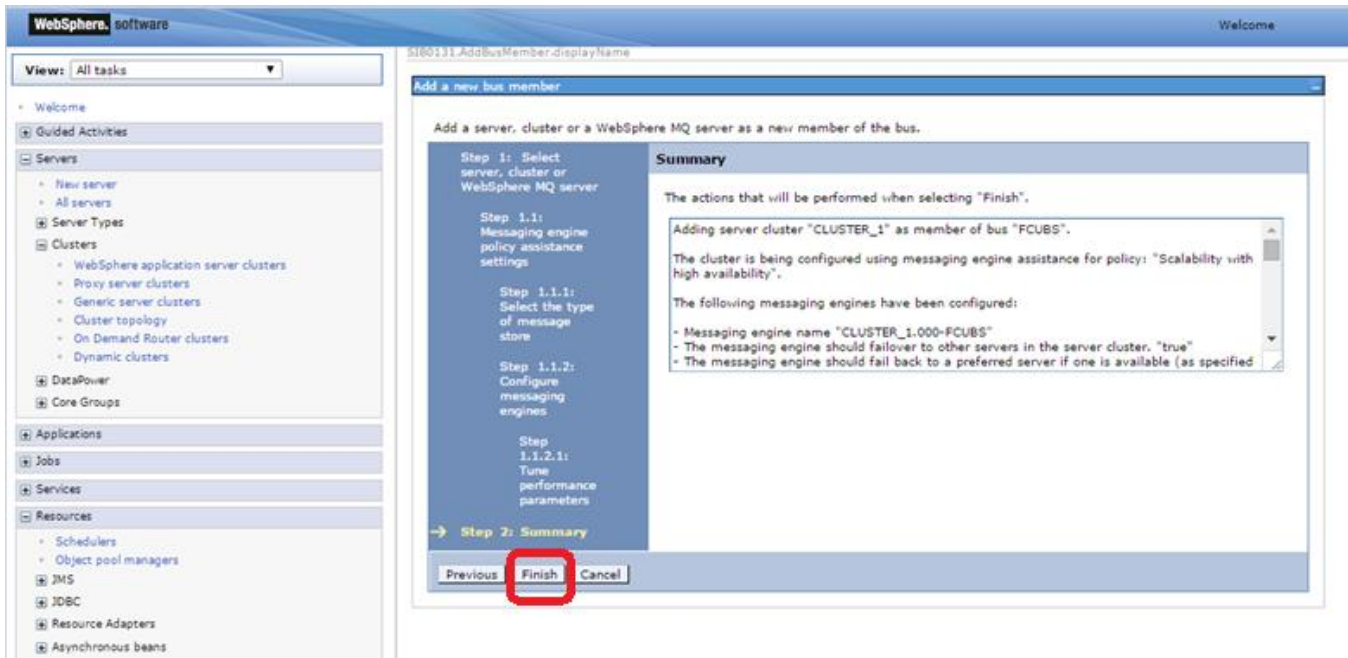
9) Click on Next after Setting FileStore for all messaging engines



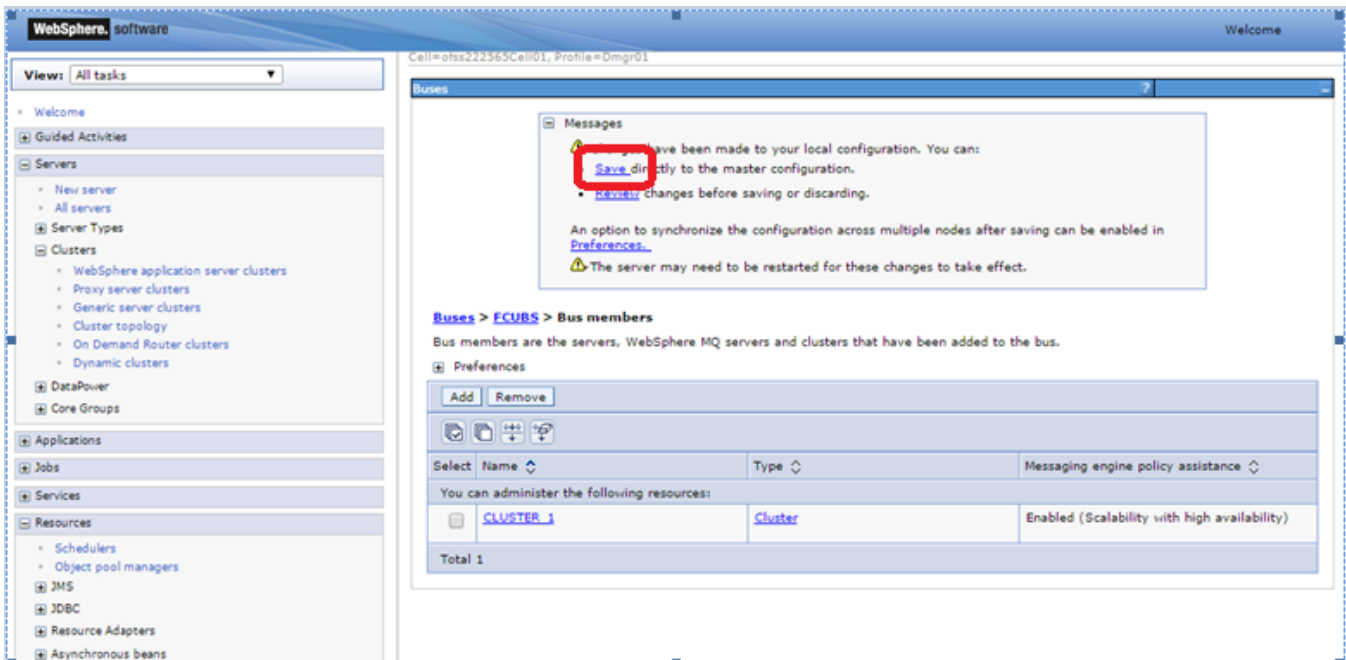
10) Select Change Heap Sizes and Click on Next



11) Click on Finish

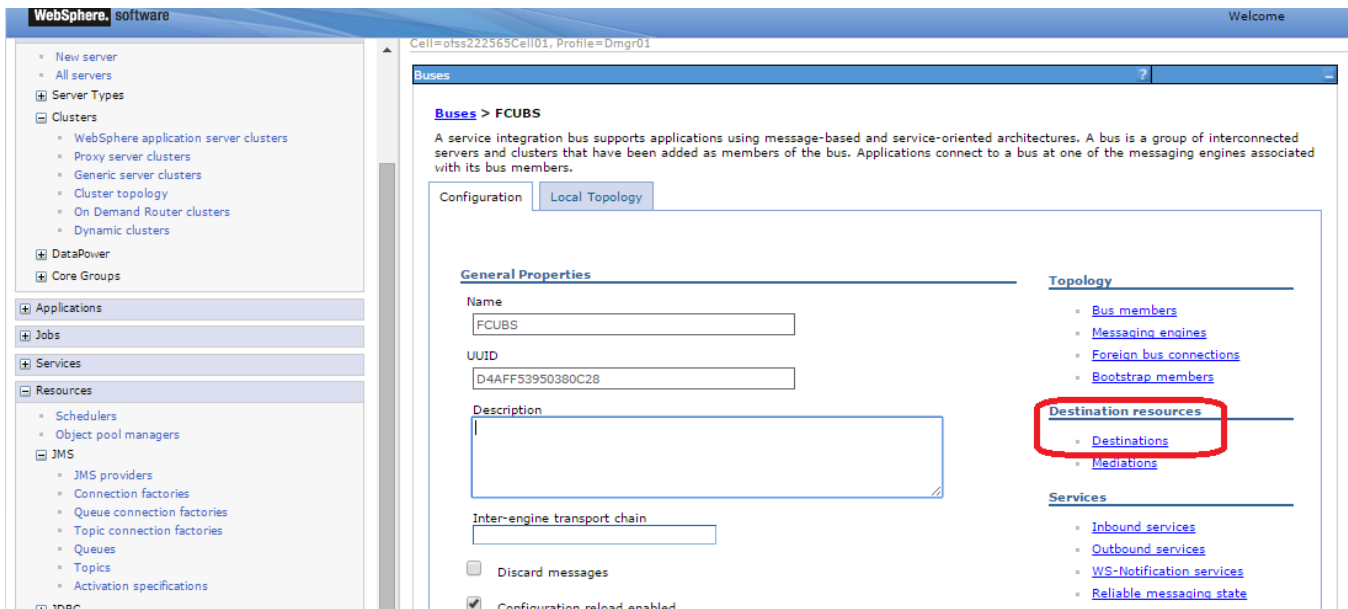


12) Click on Save

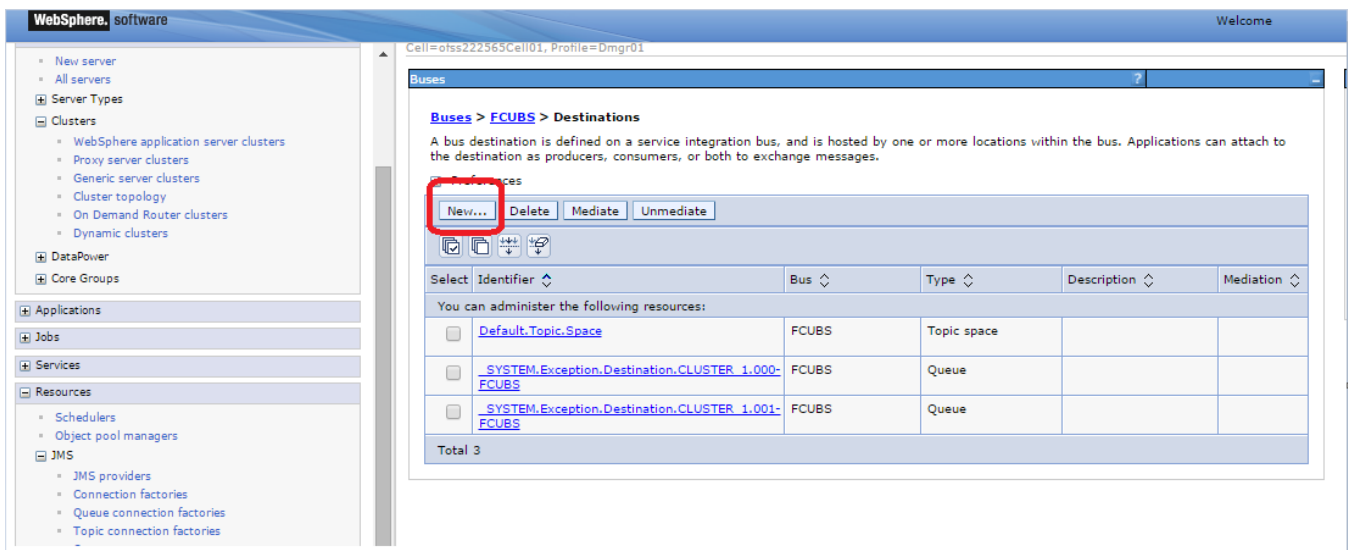


4.3 Destination Queue Creation

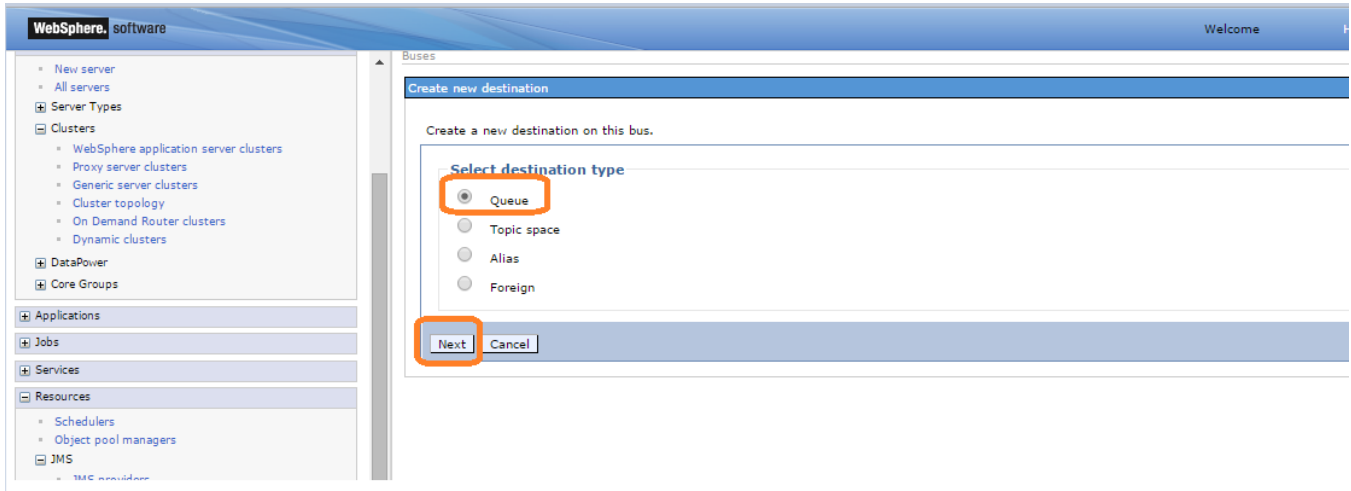
- 1) Navigate to Service Integration > Buses > Click on FCUBS(new bus Created) > Click on Destination under Destination Resources



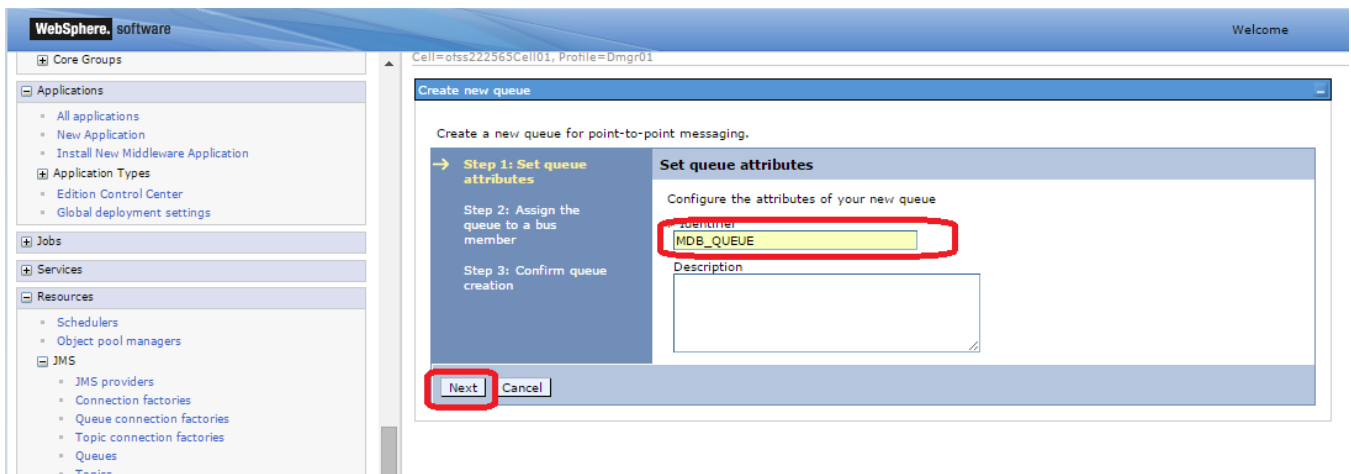
- 2) Click on New



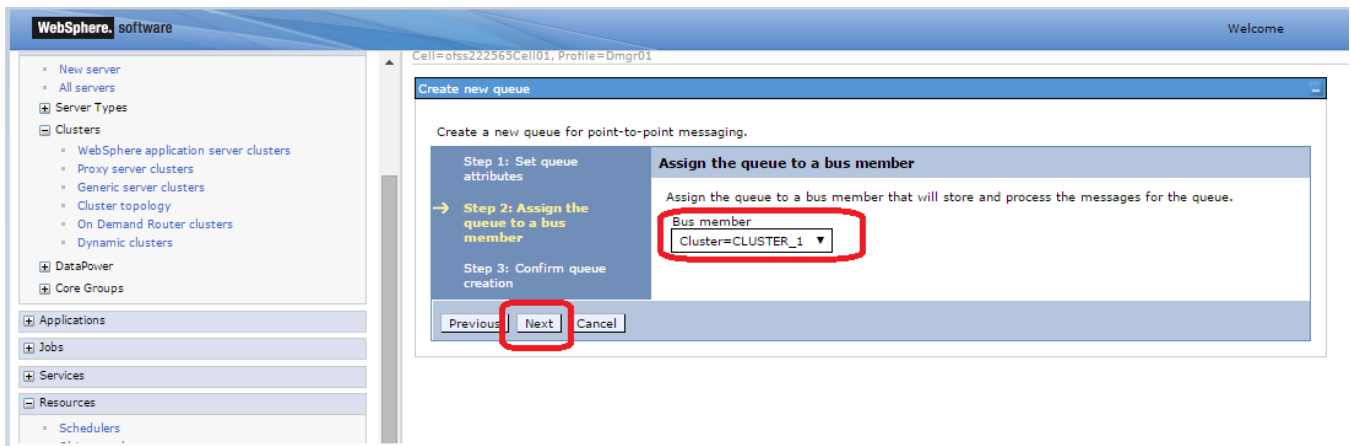
3) Select Queue and Click on Next



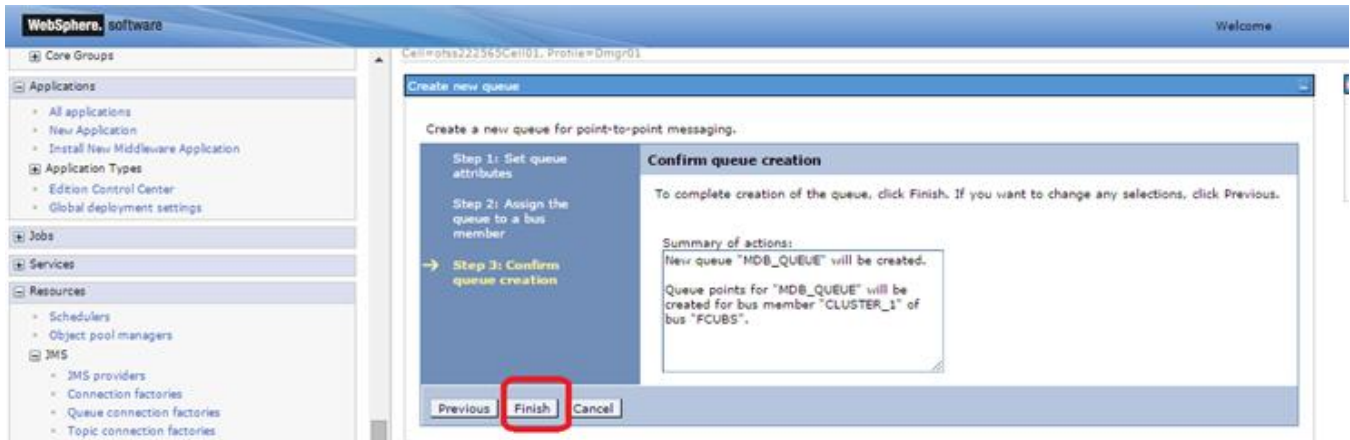
4) Enter Identifier as MDB_QUEUE and Click on Next



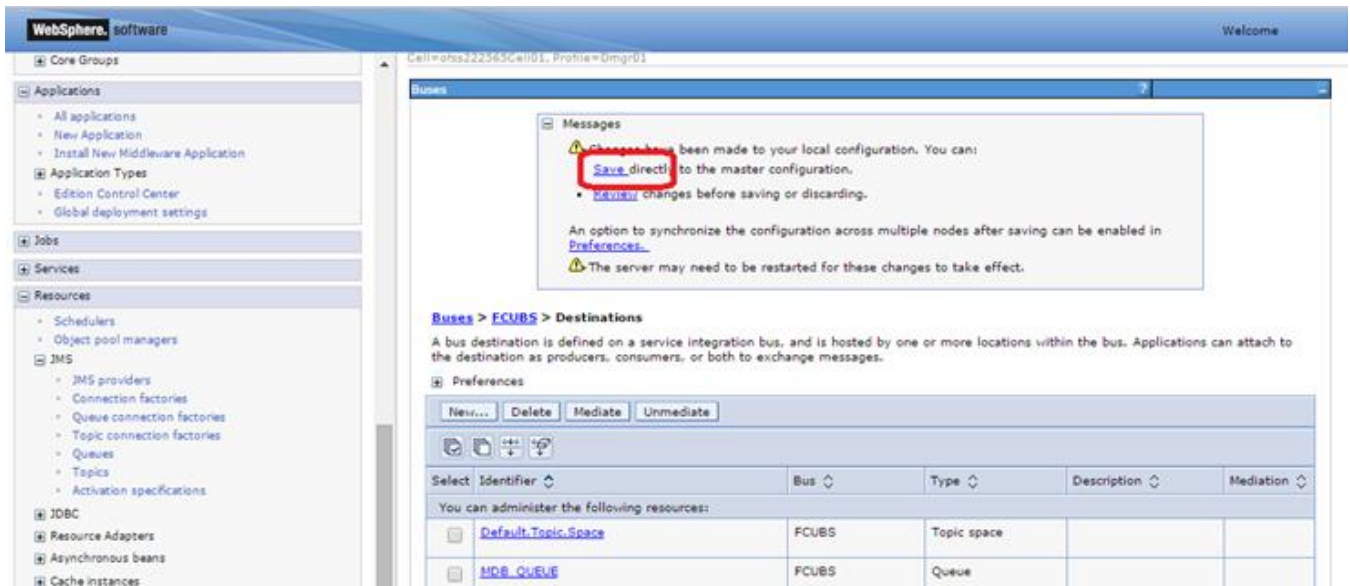
5) Select Bus Member as Cluster and Click on Next



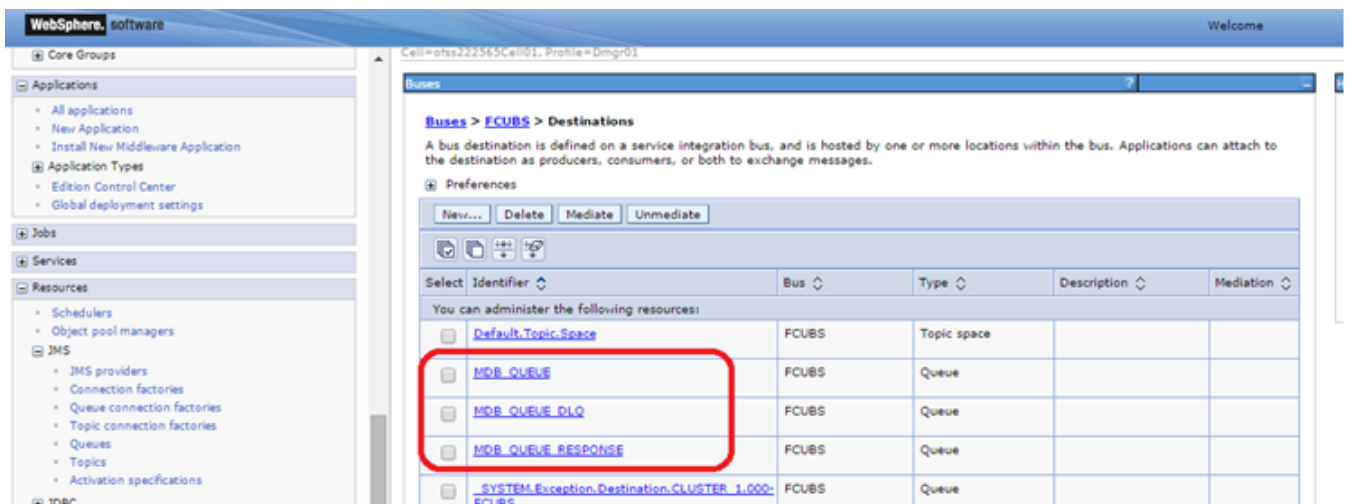
6) Click on Finish



7) Click on Save



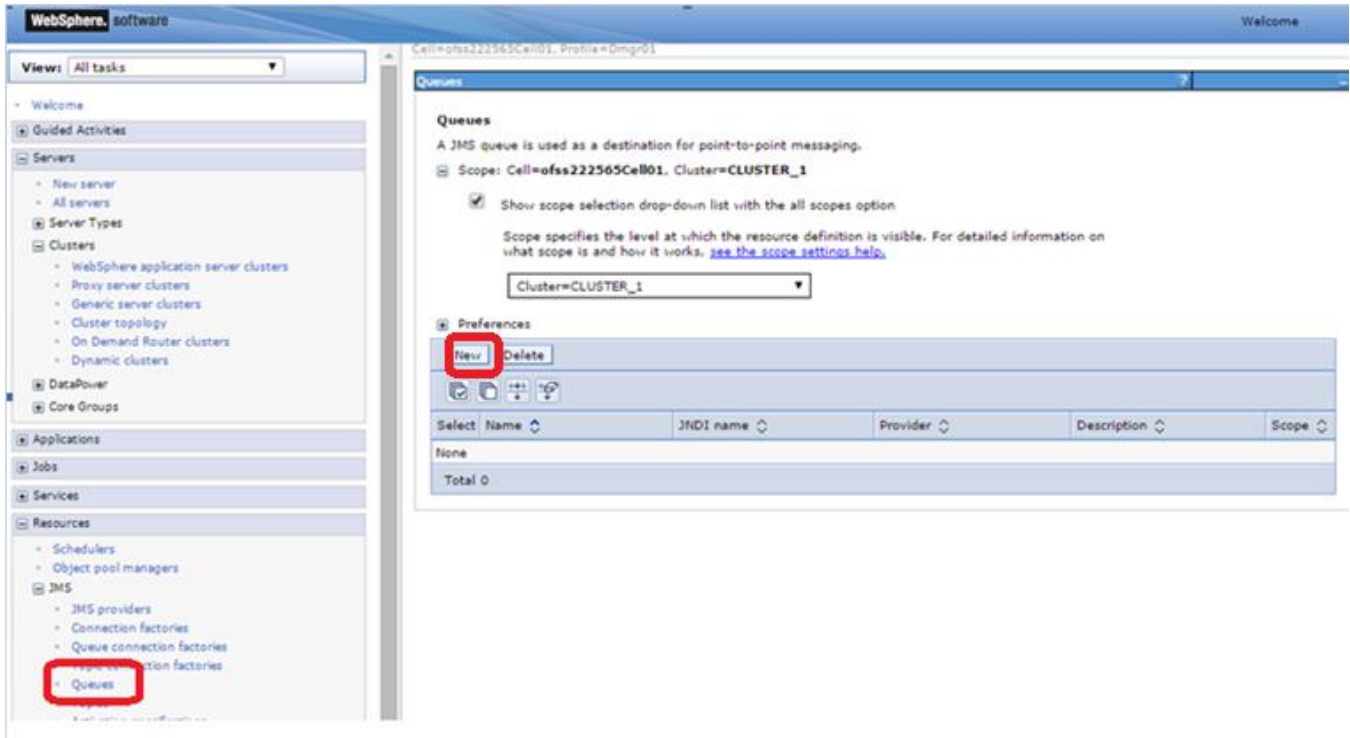
8) Similarly create Destinations for all the other Queue's required



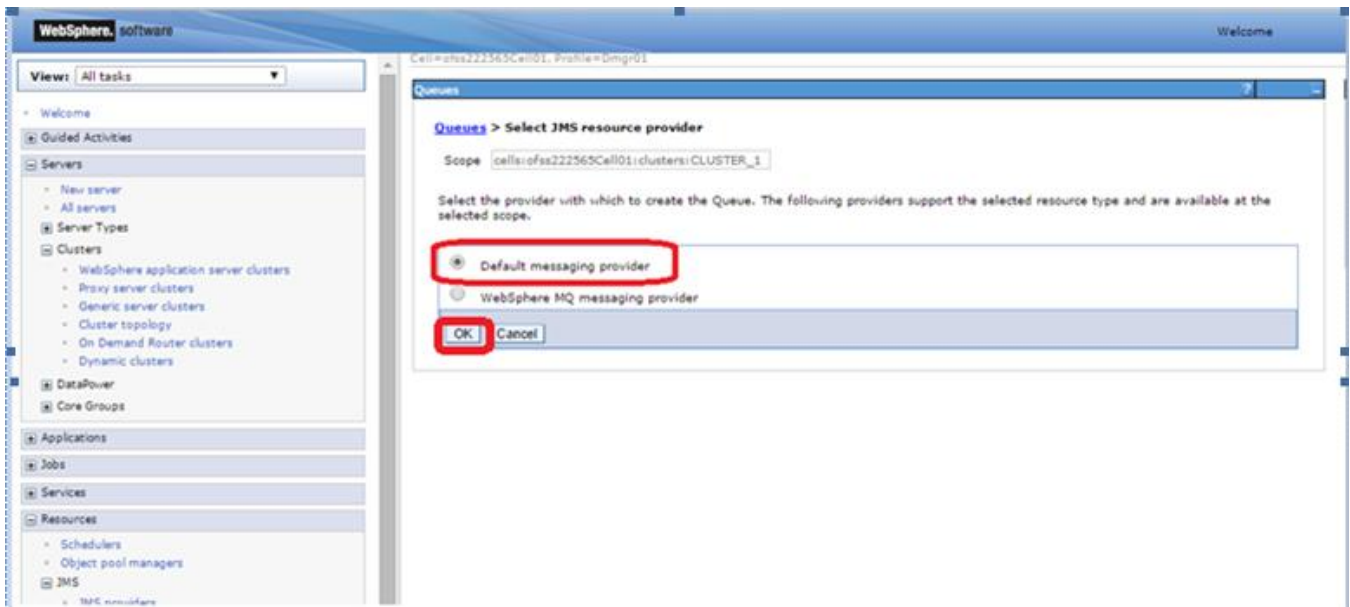
5. Resource Creation

5.1 Queue Creation

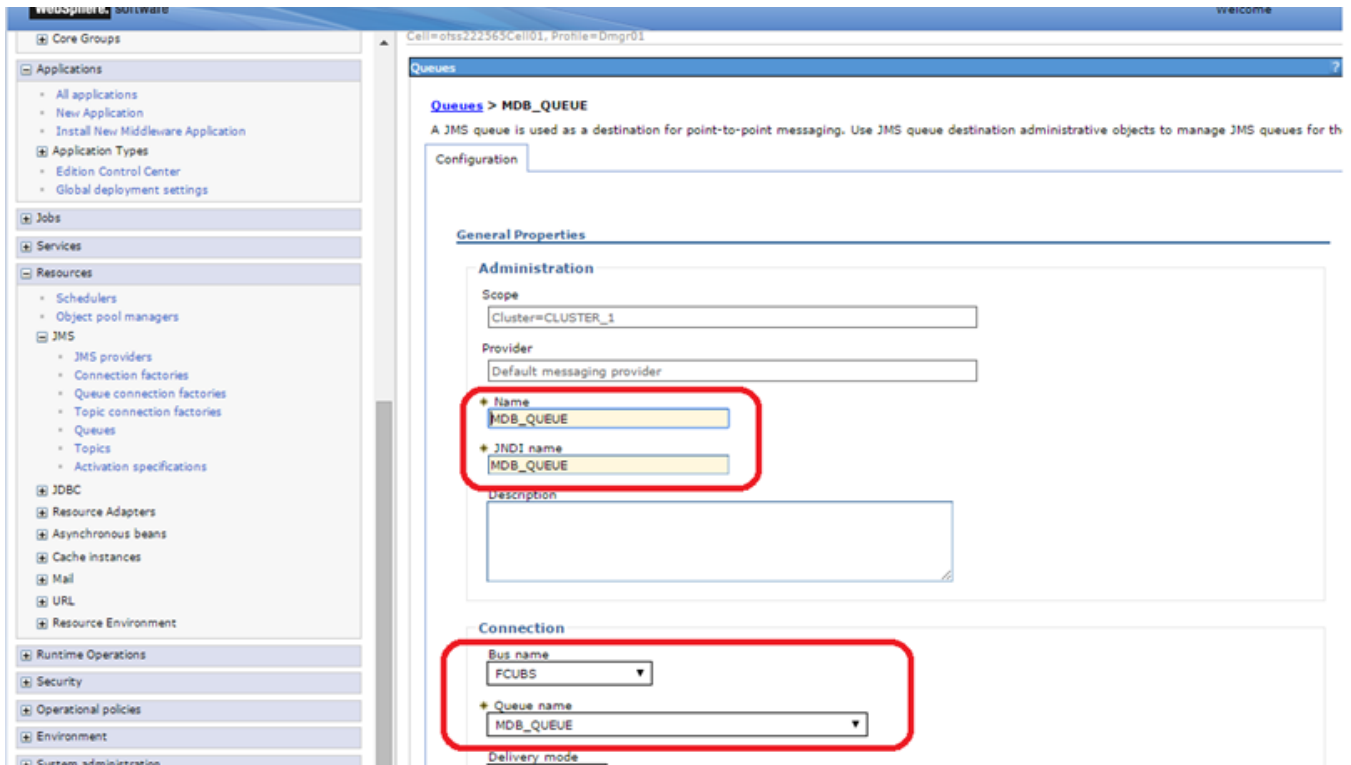
- 1) Navigate to Resources > JMS > Queues > Select Scope as Cluster and Click on New



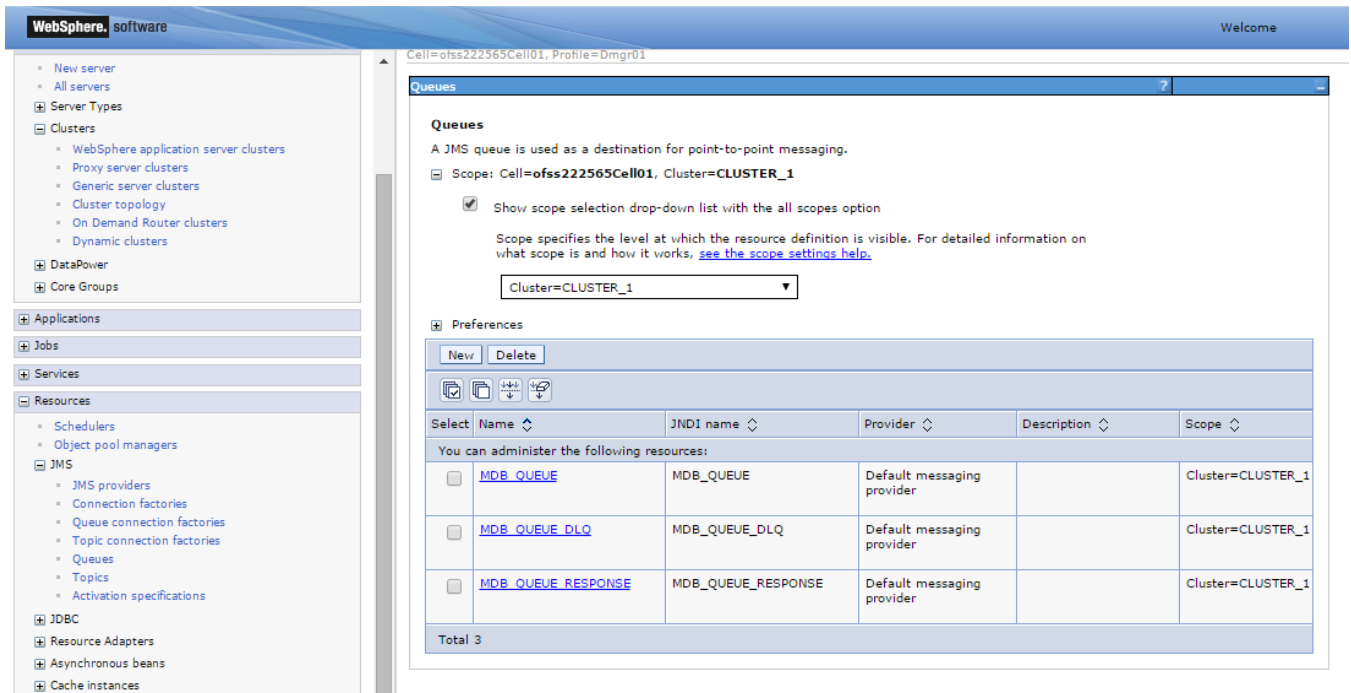
- 2) Select "Default messaging provider" and Click on OK



3) Enter The Name, JNDI Name. Select Bus and Queue Name accordingly and Click on OK

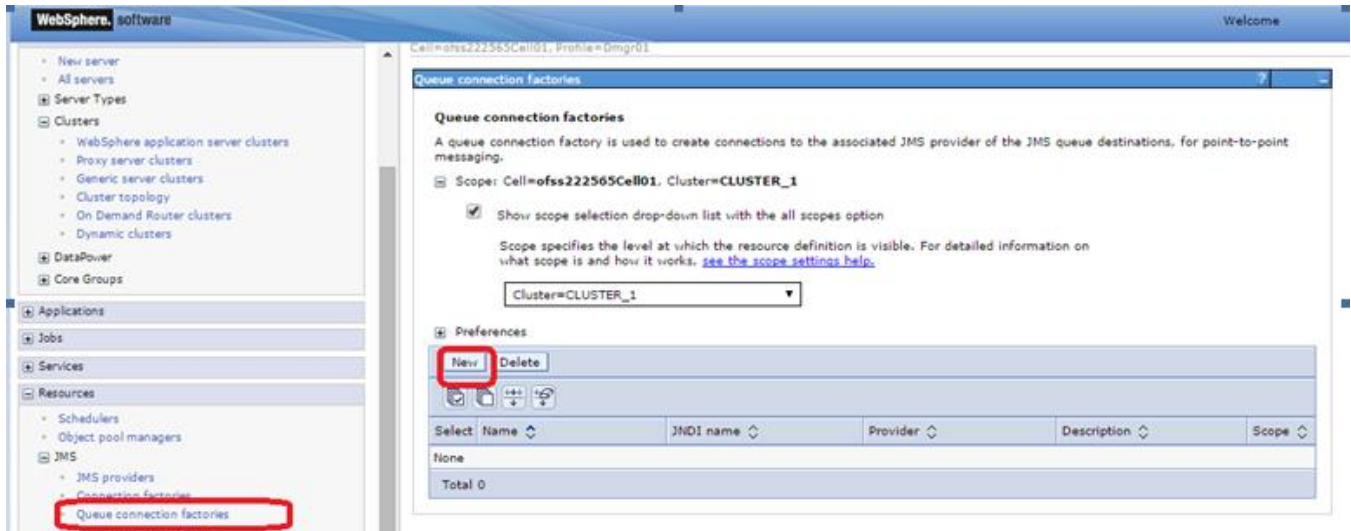


4) Similarly create other Queue's required

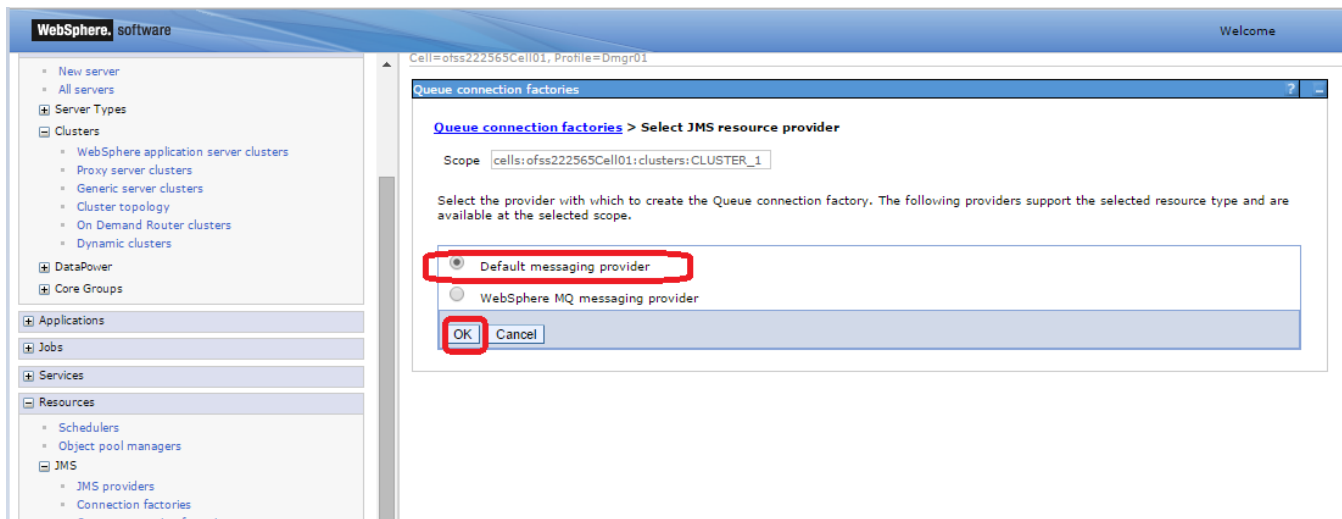


5.2 Connection Factory Creation

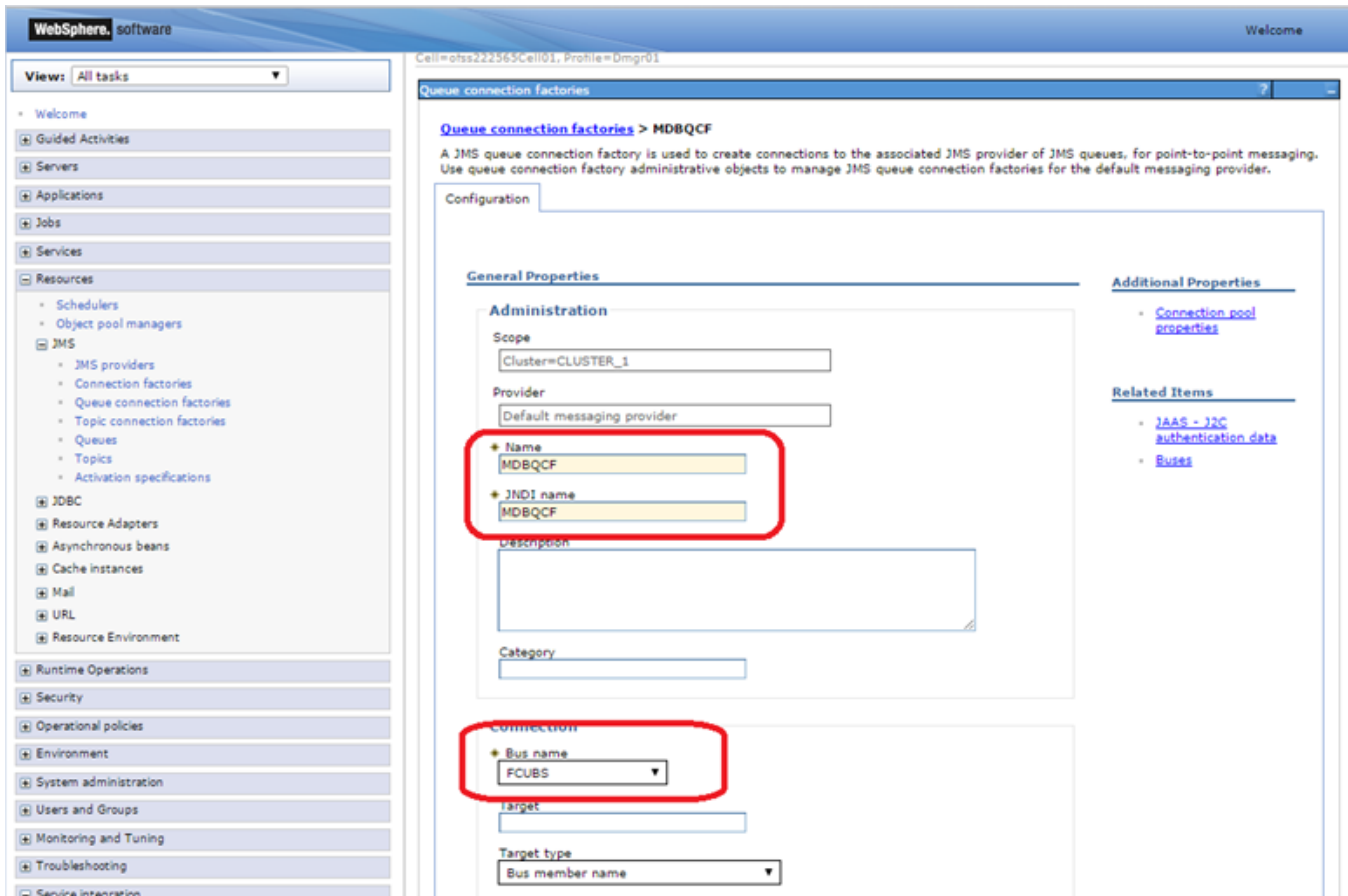
- 1) Navigate to Resources > JMS > Queue Connection Factory > Select Scope as Cluster and Click on New



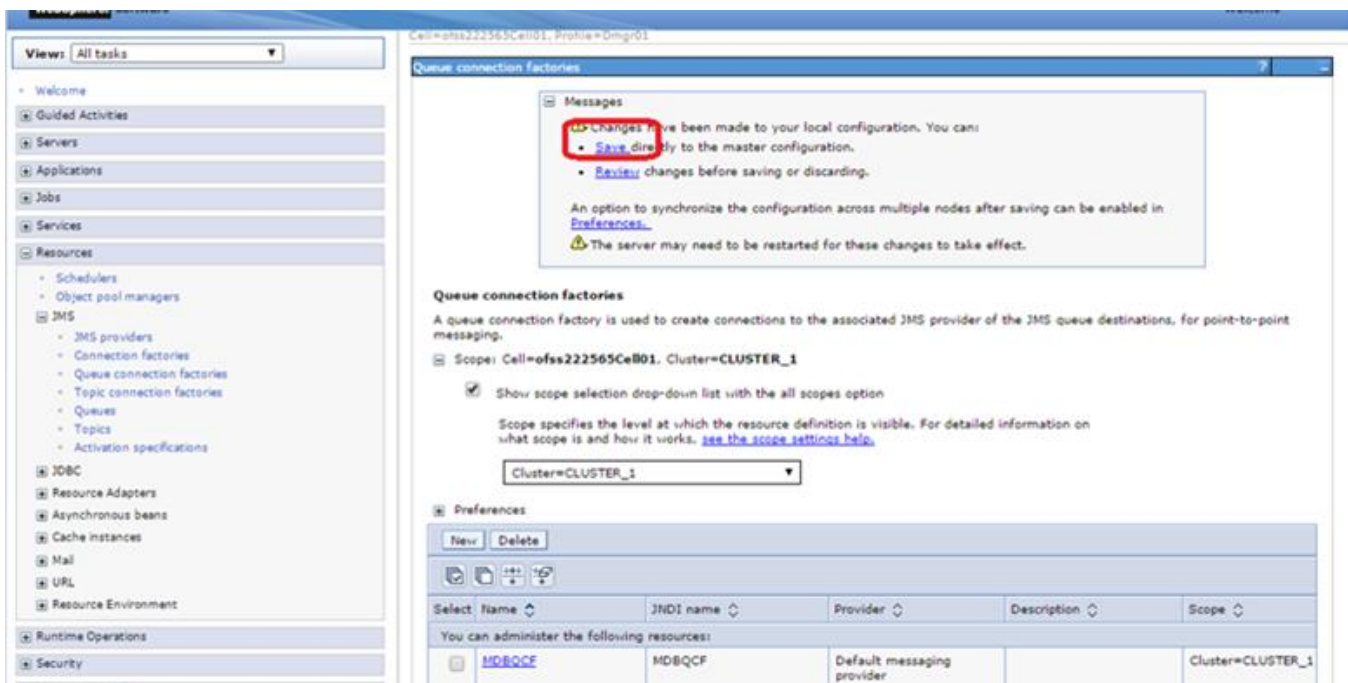
- 2) Select "Default messaging provider" and Click on OK



3) Enter Name, JNDI Name, Select Bus Name and Click on OK



4) Click on Save



5.2.1 Managed Servers SIB Ports

- 1) Navigate to Servers > Websphere Application Servers > SERVER_NAME > Click on Ports under Communications > Note down the port of SIB_ENDPOINT_ADDRESS

The screenshot shows the WebSphere Administration Console interface. The left sidebar contains a navigation tree with categories like Servers, Clusters, Applications, Jobs, Services, and Resources. The main content area displays the 'Ports' configuration for an application server. A table lists various ports with columns for 'Select', 'Port Name', 'Host', 'Port', and 'Transport Details'. The 'SIB_ENDPOINT_ADDRESS' row is highlighted with a red rectangle.

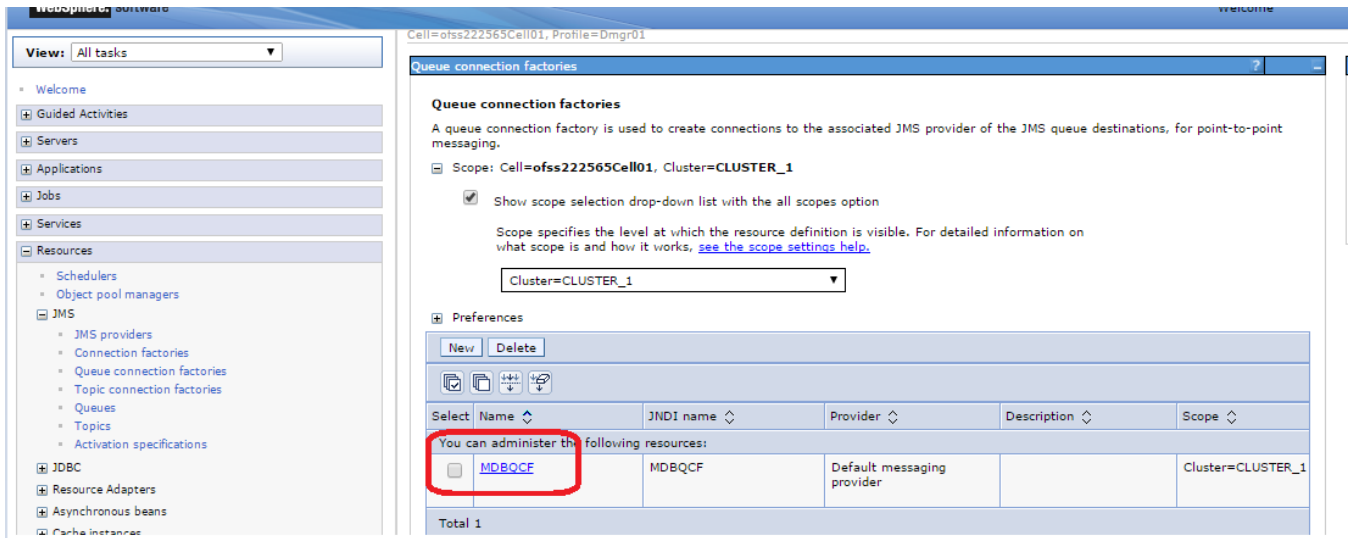
Select	Port Name	Host	Port	Transport Details
<input type="checkbox"/>	BOOTSTRAP_ADDRESS	ofss220239.in.oracle.com	9614	No associated transports
<input type="checkbox"/>	CSIV2_SSL_MUTUALAUTH_LISTENER_ADDRESS	ofss220239.in.oracle.com	9431	No associated transports
<input type="checkbox"/>	CSIV2_SSL_SERVERAUTH_LISTENER_ADDRESS	ofss220239.in.oracle.com	9430	No associated transports
<input type="checkbox"/>	DCS_UNICAST_ADDRESS	*	9362	View associated transports
<input type="checkbox"/>	IPC_CONNECTOR_ADDRESS	localhost	9640	No associated transports
<input type="checkbox"/>	ORB_LISTENER_ADDRESS	ofss220239.in.oracle.com	9108	No associated transports
<input type="checkbox"/>	OVERLAY_TCP_LISTENER_ADDRESS	*	11024	No associated transports
<input type="checkbox"/>	OVERLAY_UDP_LISTENER_ADDRESS	*	11023	No associated transports
<input type="checkbox"/>	SAS_SSL_SERVERAUTH_LISTENER_ADDRESS	ofss220239.in.oracle.com	9429	No associated transports
<input type="checkbox"/>	SIB_ENDPOINT_ADDRESS	*	7284	View associated transports
<input type="checkbox"/>	SIB_ENDPOINT_SECURE_ADDRESS	*	7293	View associated transports
<input type="checkbox"/>	SIB_MQ_ENDPOINT_ADDRESS	*	5565	View associated transports
<input type="checkbox"/>	SIB_MQ_ENDPOINT_SECURE_ADDRESS	*	5585	View associated transports
<input type="checkbox"/>	SIP_DEFAULTHOST	*	5074	View associated transports

- 2) Similarly navigate to all other managed servers in the cluster and note down the port of SIB_ENDPOINT_ADDRESS
- 3) Prepare the "Provider Endpoint" String as below

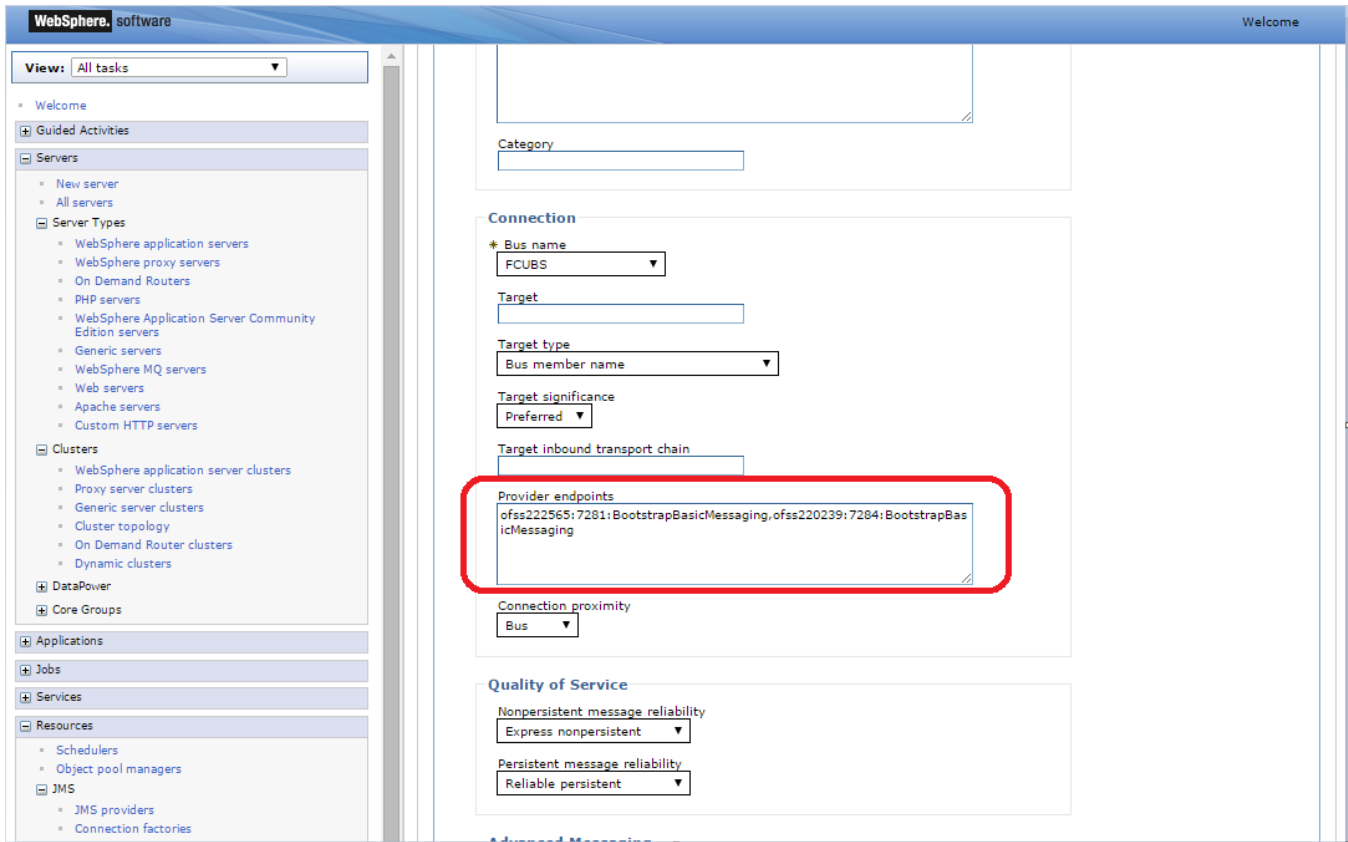
```
<hostname1/IP Address1>:<PORT of SIB_ENDPOINT_ADDRESS>:BootstrapBasicMessaging
```

In this case the Provider Endpoint String would be
ofss222565:7281:BootstrapBasicMessaging,ofss220239:7284:BootstrapBasicMessaging

- 4) Navigate to Resources > JMS > Queue Connection Factory > Click on newly created connection factory



- 5) Update the Provider endpoints as prepared above and Click on OK



5.3 JMS Activation Specifications for Cluster

- 1) Navigate to Resources > JMS > JMS Providers > Click Default messaging provider for the cluster created

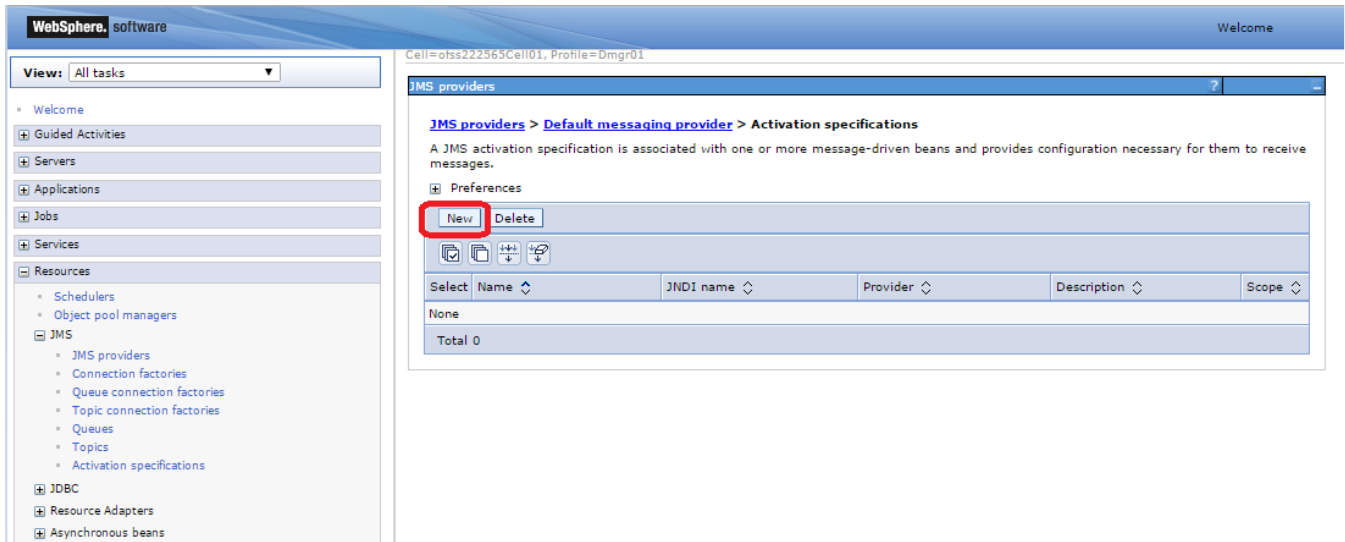
The screenshot shows the WebSphere administration console. On the left is a navigation tree with 'Resources' expanded to 'JMS' > 'JMS providers'. The main area displays the 'JMS providers' configuration page. It includes a 'Scope' dropdown set to 'All scopes' and a 'Preferences' section with 'New' and 'Delete' buttons. Below is a table of providers:

Select	Name	Description	Scope
	Default messaging provider	Default messaging provider	Node=ofss222565Node03,Server=server1
	Default messaging provider	Default messaging provider	Node=ofss222565CellManager01
	Default messaging provider	Default messaging provider	Node=ofss220239Node02,Server=server1
	Default messaging provider	Default messaging provider	Node=ofss222565Node03
	Default messaging provider	Default messaging provider	Node=ofss220239Node02
	Default messaging provider	Default messaging provider	Node=ofss222565Node03,Server=MS_2
	Default messaging provider	Default messaging provider	Cell=ofss222565Cell01
	Default messaging provider	Default messaging provider	Node=ofss220239Node02,Server=MS_1
	Default messaging provider	Default messaging provider	Node=ofss222565CellManager01,Server=dmgr
	Default messaging provider	Default messaging provider	Cluster=CLUSTER_1

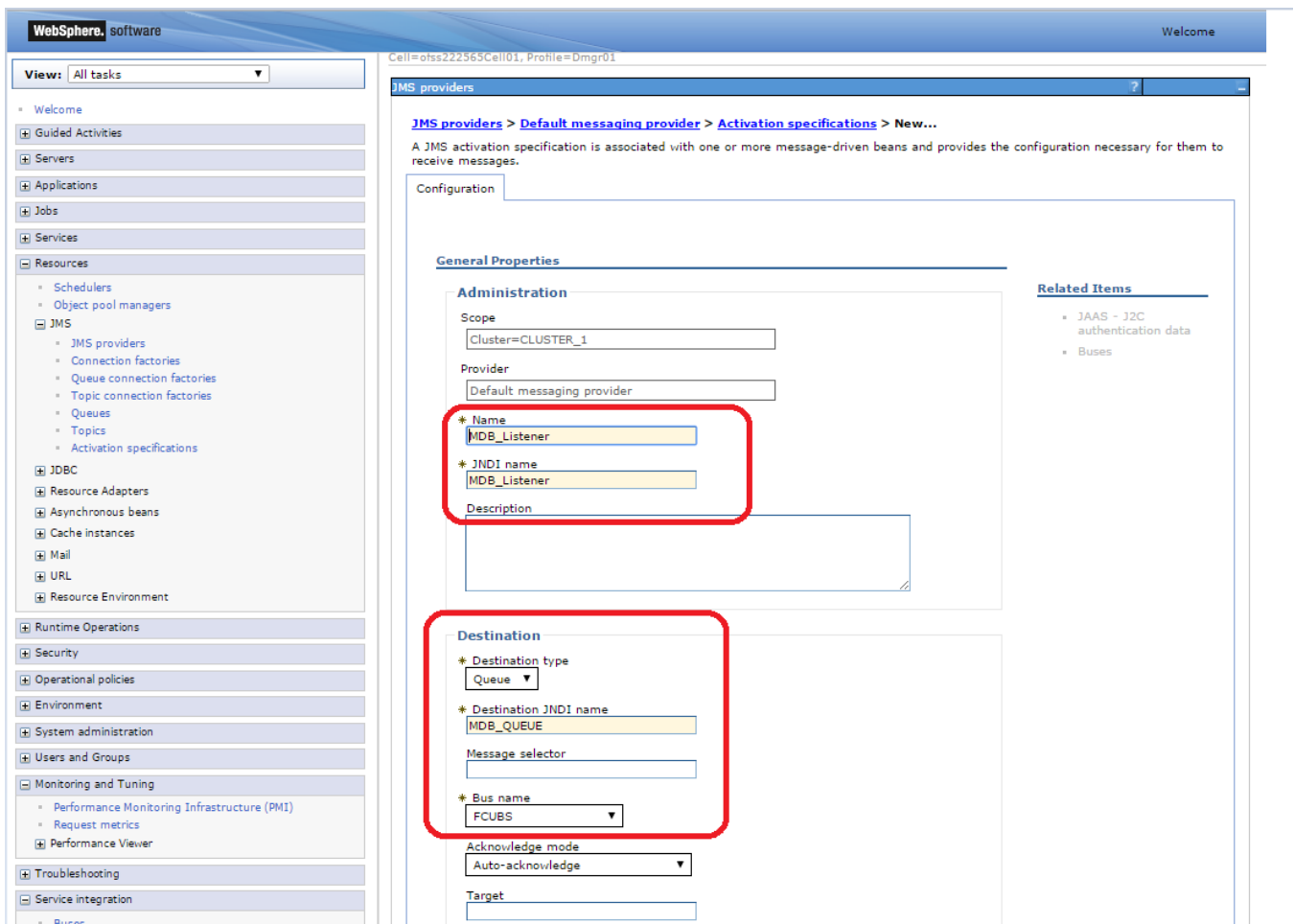
- 2) Under Additional Properties, click Activation specifications

The screenshot shows the configuration details for a 'Default messaging provider'. The 'General Properties' section includes fields for 'Scope' (Cluster=CLUSTER_1), 'Name' (Default messaging provider), and 'Description' (Default messaging provider). The 'Additional Properties' section lists several links: 'Connection factories', 'Queue connection factories', 'Topic connection factories', 'Queues', 'Topics', and 'Activation specifications'. The 'Activation specifications' link is highlighted with a red box.

3) Click on New



4) Enter Name, JNDI Name, Select Destination Type as Queue and Enter Queue Name, Select Bus and Click on OK



5) Click on Save

WebSphere, software Welcome

Cell=otss222565Cell01, Profile=Dmgr01

View: All tasks

- Welcome
- Guided Activities
- Servers
- Applications
- Jobs
- Services
- Resources
 - Schedulers
 - Object pool managers
 - JMS
 - JMS providers
 - Connection factories
 - Queue connection factories
 - Topic connection factories
 - Queues
 - Topics
 - Activation specifications
 - JDBC
 - Resource Adapters
 - Asynchronous beans
 - Cache instances
 - Mail
 - URL
 - Resource Environment

JMS providers

Messages

Changes have been made to your local configuration. You can:

- **Save directly** to the master configuration.
- Review changes before saving or discarding.

An option to synchronize the configuration across multiple nodes after saving can be enabled in [Preferences](#).

⚠ The server may need to be restarted for these changes to take effect.

JMS providers > Default messaging provider > Activation specifications

A JMS activation specification is associated with one or more message-driven beans and provides configuration necessary for them to receive messages.

Preferences

New Delete

Select	Name	JNDI name	Provider	Description	Scope
<input type="checkbox"/>	MDB_Listener	MDB_Listener	Default messaging provider		Cluster=CLUSTER_1

Total 1

6. Application Deployment

- 1) Deploy the EAR with Target as Cluster_1. Except below step rest is usual way of deploying the EAR.
- 2) During deployment give the Activation Specification Created above in the Activation Specification.

The screenshot shows the WebSphere Administration Console interface. The main window displays the configuration for 'Message Driven Bean listener bindings' under the 'MDB Gateway' application. A table lists the bean configuration, and the 'Listener Bindings' section shows the 'Activation Specification' radio button selected and highlighted with a red box. The 'Target Resource JNDI Name' field is filled with 'MDB_Listener'.

Select	Module	Bean	URI	Messaging type	Listener Bindings
<input type="checkbox"/>	GW_MDB_Bean.jar	GWMDB	GW_MDB_Bean.jar;META-INF/ejb-jar.xml	javax.jms.MessageListener	<input type="radio"/> Listener port <input checked="" type="radio"/> Activation Specification Target Resource JNDI Name <input type="text" value="MDB_Listener"/> Destination JNDI name <input type="text"/> ActivationSpec authentication alias <input type="text"/>

6.1 Restart Servers

Restart the Admin and Managed Servers.

7. Frequently Asked Questions

7.1 How to Test the Deployment

- 1) Send a sample message from the any third party application by connecting to `iiop://<hostname or ip>:<BOOTSTRAP_ADDRESS>`
eg: `iiop://ofss222565:9811`
- 2) Verify at backend or in the MDB log if the message is processed successfully.

Or

- 1) Use the below java program to send a sample message.
- 2) Set Java Home
- 3) Set `$WAS_HOME/runtimes/com.ibm.ws.ejb.thinclient_8.5.0.jar`, `$WAS_HOME/runtimes/com.ibm.ws.sib.client.thin.jms_8.5.0.jar` and `javaee.jar` in the CLASSPATH.
- 4) Change the URL, USER, PASSWORD, messageText in the Java Program and Compile.
- 5) Run the program and verify at backend or in MDB log.

```
import java.util.Hashtable;
import javax.jms.JMSEException;
import javax.jms.Queue;
import javax.jms.QueueConnection;
import javax.jms.QueueConnectionFactory;
import javax.jms.QueueSender;
import javax.jms.QueueSession;
import javax.jms.Session;
import javax.naming.Context;
import javax.naming.InitialContext;
import javax.naming.NamingException;
import javax.jms.TextMessage;

public class JMSQueueTest {
    public JMSQueueTest() {
        super();
    }
    private Context ctx;
    private InitialContext initialContext;
    private QueueConnectionFactory queueCF;
    private QueueConnection queueConn;
    private QueueSession queueSession;
    private Queue queue;
    private QueueSender queueSender;
    private final static String JNDI_FACTORY =
"com.ibm.websphere.naming.WsnInitialContextFactory";
    private final static String JMS_FACTORY = "MDBQCF";
    private final static String QUEUE = "MDB_QUEUE";
    private final static String URL = "iiop://ofss222565:9811";
    private TextMessage txtMessage;
```

```

private static String USER = "wasadmin";
private static String PASSWORD = "wasadmin123";
private static String messageText = "Hello!";
private InitialContext getInitialContext(String url) throws Exception {
    Hashtable envHash = new Hashtable();
    envHash.put(Context.INITIAL_CONTEXT_FACTORY, JNDI_FACTORY);
    envHash.put(Context.PROVIDER_URL, url);
    envHash.put(Context.SECURITY_PRINCIPAL, USER);
    envHash.put(Context.SECURITY_CREDENTIALS, PASSWORD);
    try {
        return new InitialContext(envHash);
    } catch (NamingException e) {
        e.printStackTrace();
    }
    return new InitialContext(envHash);
}
private void init(Context ctx, String queueName) {
    try {
        ctx = getInitialContext(URL);
        queueCF = (QueueConnectionFactory)ctx.lookup(JMS_FACTORY);
        queueConn = queueCF.createQueueConnection();
        queueSession =
queueConn.createQueueSession(false, Session.SESSION_TRANSACTED);
        queue = (Queue)ctx.lookup(queueName);
        queueSender = queueSession.createSender(queue);
        txtMessage = queueSession.createTextMessage();
        queueConn.start();
    } catch (Exception e) {
        e.printStackTrace();
    }
}
private void close() throws JMSEException {
    queueSender.close();
    queueSession.close();
    queueConn.close();
}
private void sendMessage(String message) throws JMSEException {
    txtMessage.setText(messageText);
    queueSender.send(txtMessage);
}
public static void main(String[] args) throws Exception {
    JMSQueueTest jmsq = new JMSQueueTest();
    InitialContext ico = jmsq.getInitialContext(URL);
    try {
        jmsq.init(ico, QUEUE);
        jmsq.sendMessage(messageText);
    } catch (JMSEException jmse) {
        jmse.printStackTrace();
    } finally {
        jmsq.close();
    }
}
}

```

7.2 Warning during Bus Member Creation

During Bus member creation Warning is shown in “Is Further configuration Required?”

The screenshot shows the WebSphere software interface. On the left is a navigation pane with categories like Servers, Applications, Jobs, Services, Resources, Runtime Operations, Security, Operational policies, Environment, System administration, Users and Groups, Monitoring and Tuning, Troubleshooting, Service integration, and UDDI. The main area displays the 'Messaging engine policy assistance settings' dialog. The dialog title is 'Select a predefined messaging engine policy to apply to the selected cluster when it is added as a bus member.' It contains a table with the following data:

Select	Policy type	Is further configuration required?
<input checked="" type="radio"/>	High availability	The current configuration has a single point of failure because there is only a single node. Consider adding a cluster member configured on a separate node.
<input type="radio"/>	Scalability	No
<input type="radio"/>	Scalability with high availability	The current configuration has a single point of failure because there is only a single node. Consider adding a cluster member configured on a separate node.
<input type="radio"/>	Custom	Advice is not available for a custom configuration.

Below the table is a diagram of a cluster named 'CLUSTER_1' with two nodes: 'nodeagen' and 'server1'. A dashed box highlights a single node 'MIS_2' with a warning icon, indicating the current configuration has a single point of failure.

Examine the resulting diagram and the messages for the selected messaging engine policy type. Act on the messages as follows:

- 1) To add a server or a node, go back and change the cluster topology before you continue with the current procedure.
- 2) To add or remove messaging engines, under Additional Properties, click Messaging engines and use the options on the resulting pane.
- 3) To correct messaging engine policies, under Additional Properties, click Messaging engine policy maintenance and use the options on the resulting pane.

When the "Is further configuration required" column for the selected messaging engine policy type displays No, the configuration is complete.

7.3 Message Engines Not Getting Started

Message engine fail to start and gives SIB Service Bus Unavailable error.

- 1) Ensure that shared folders are empty
- 2) Restart the Managed Servers
- 3) Check the Status of message engines

7.4 Cannot Establish Connection Error

When a message is received on the Queue it throws below error

Caused by: `com.ibm.websphere.sib.exception.SIResourceException: CWSIC1001E: A client attempted to connect with a remote messaging engine but the connection cannot be completed. Ensure the messaging engine is started: exception com.ibm.ws.sib.jfapchannel.JFapConnectFailedException: CWSIJ0063E: A network connection to host name localhost/127.0.0.1, port 7,276 cannot be established.`

- 1) Ensure that Provider EndPoint contains the SIB_ENDPOINT_ADDRESS of all the servers comma separated
- 2) Eg: <hostname1>:<port1>:BootstrapBasicMessaging, <hostname2>:<port 2>:BootstrapBasicMessaging,
- 3) Restart the servers after making changes

7.5 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. Also the FCUBS application needs to be deployed.

7.6 What other modules uses JMS Queue's

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

- EMS for swift messages
- GI for upload
- ELCM
- BIP

8. References

- 1) GATEWAY_Applications_WAS.doc
- 2) Resource_Creation_WAS.doc
- 3) FCUBS_Application_WAS.doc
- 4) http://129.33.205.81/support/knowledgecenter/SSAW57_8.5.5/com.ibm.websphere.nd.iseries.doc/ae/welc6topmanaging.html
- 5) http://publib.boulder.ibm.com/infocenter/wsdoc400/v6r0/index.jsp?topic=/com.ibm.websphere.pmc.iseries.doc/tasks/tjn9999_.html



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