

Cluster Creation on Websphere Application Server 8.5
Oracle FLEXCUBE Universal Banking
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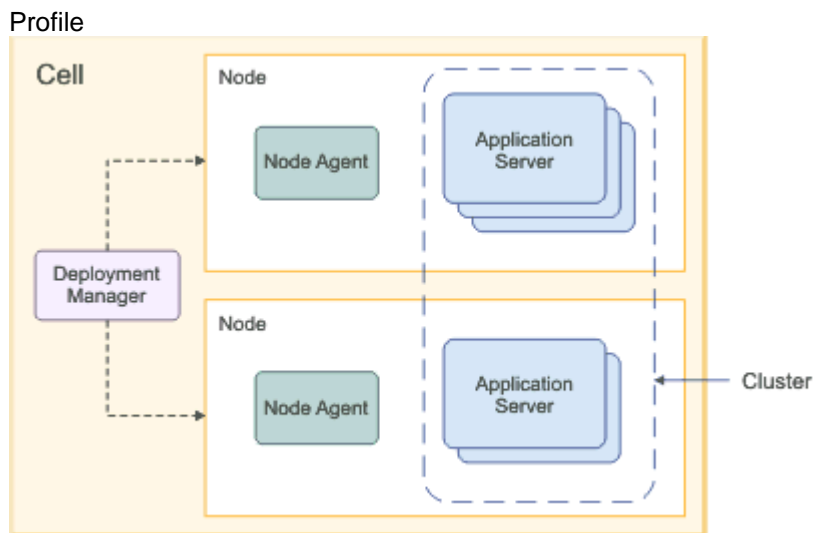
1. Purpose

This document explains steps to create Cluster on Websphere Application Server 8.5 and also setup the proxy.

2. Introduction to Websphere

IBM websphere application server cluster deployment contains the below key elements

- Cell
- Nodes
 - Deployment Manager Node- “DMGR”
 - Node- “NodeXX”
 - Node Agent- “NAXX”
- Profiles
- Cluster
- Cluster Members
- Data Sources



- Cell: A cell is a grouping of nodes into a single administrative domain. In a Network Deployment environment, a cell can consist of multiple nodes (and node groups), which are all administered from a single point, the deployment manager.
- Node: A node is an administrative grouping of application servers for configuration and operational management within one operating system instance
- Node Agent: In distributed server configurations, each node has a node agent that works with the deployment manager to manage administration processes. A node agent is created automatically when you add (federate) a stand-alone node to a cell.

- Cluster: A cluster is a logical collection of application server processes that provides workload balancing and high availability. Application servers that belong to a cluster are members of that cluster and must all have identical application components deployed on them.
- A profile is a Websphere runtime environment formed by collection of User data and Product files. Product Files are shared application binaries for Websphere. User data is set of user customizations for a specific runtime environment.

Prominent profile types are:

- Stand-alone Application Server: An application server environment runs Enterprise Application. Application server is managed from its own administrative console and functions independently from other application server.
- Deployment Manager: A Deployment Manager manages operations for a logical group or cell of other servers. It is the central administration point of a cell that consists of multiple nodes and node groups in a distributed server configuration. The deployment manager uses the node agent to manage the application servers within one node. A deployment manager provides management capability for multiple federated nodes and can manage nodes that span multiple systems and platforms. A node can only be managed by a single deployment manager and must be federated to the cell of that deployment manager.

Note ** Deployment Manager is part of Network Deployment Edition of Websphere.

3. Pre-requisites:

Before proceeding with the cluster setup ensure that the below resources are created

- JDBC Provider
- Datasource
- Queue Connection Factory
- JMS Queue

The instructions for resource creation are available in document <installer>\Docs\WEBSPPHERE\Resource_Creation_WAS.doc

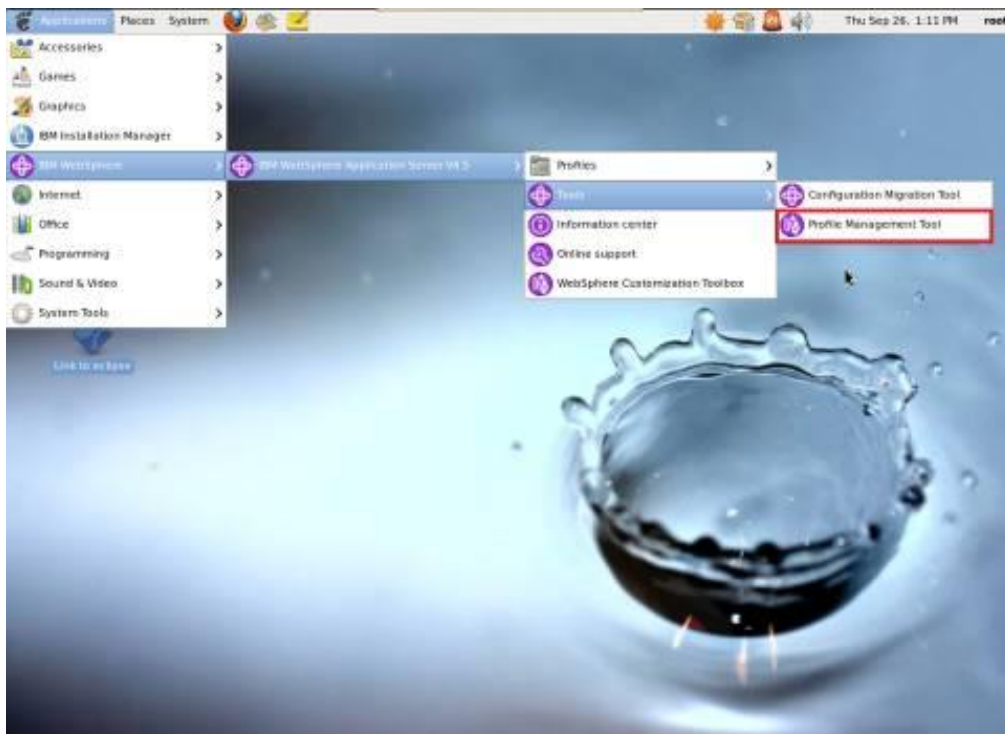
- For SSL configuration in Websphere, refer to the document SSL_Configuration_WAS.doc
- For application deployment, refer to document FCUBS_Application_WAS.doc
- For deployment of Gateway applications, refer to document GATEWAY_Applications_WAS.doc

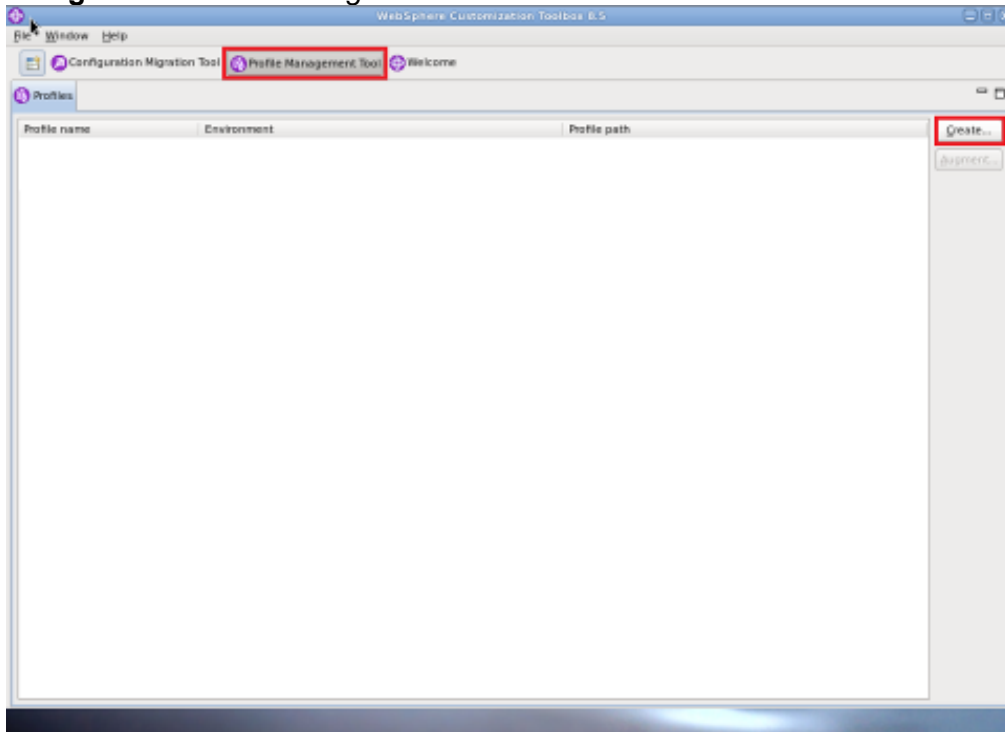
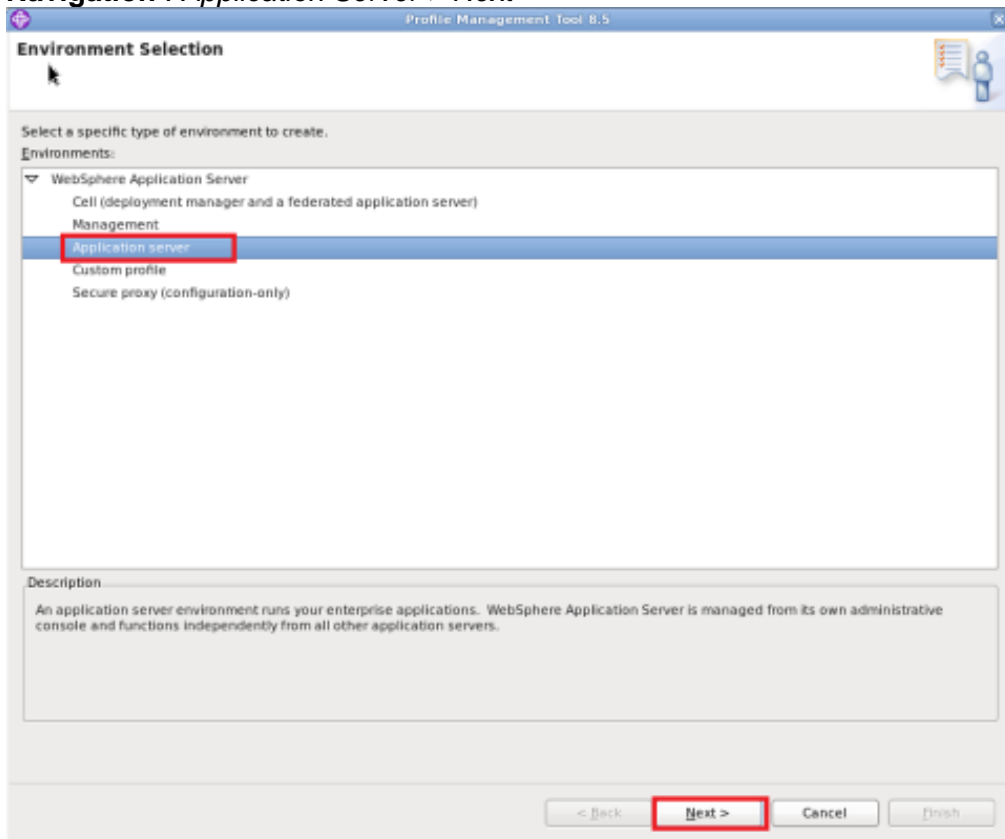
4. Steps involved for Clustering

4.1 Create Profile

Go to Profile Management Tool

Navigation: IBM WebSphere > *IBM WebSphere Application Server V8.5* > *Tools* > *Profile Management Tool*



Navigation : Profile Management Tool > Create**Navigation : Application Server > Next**

Navigation : Typical profile creation > Next

Profile Creation Options

Choose the profile creation process that meets your needs. Pick the Typical option to allow the Profile Management Tool to assign a set of default configuration values to the profile. Pick the Advanced option to specify your own configuration values for the profile.

Typical profile creation

Create an application server profile that uses default configuration settings. The Profile Management Tool assigns unique names to the profile, node, and host. The tool also assigns unique port values. The administrative console and the default application will be installed. You can optionally select whether to enable administrative security. The tool might create a system service to run the application server depending on the operating system of your machine and the privileges assigned to your user account.

Note: Default personal certificates expire in one year. Select Advanced profile creation to create a personal certificate with a different expiration.

Advanced profile creation

Create application server using default configuration settings or specify your own values for settings such as the location of the profile and names of the profile, node, and host. You can assign your own port values. You can optionally choose whether to deploy the administrative console and Sample applications, and create a Web server definition. You might have the option to run the application server as a system service depending on the operating system of your machine and the privileges assigned to your user account.

< Back **Next >** Cancel Finish

Navigation: Enable administrative security > Next

Administrative Security

Choose whether to enable administrative security. To enable security, supply a user name and password for logging into administrative tools. This administrative user is created in a repository within the application server. After profile creation finishes, you can add more users, groups, or external repositories.

Enable administrative security

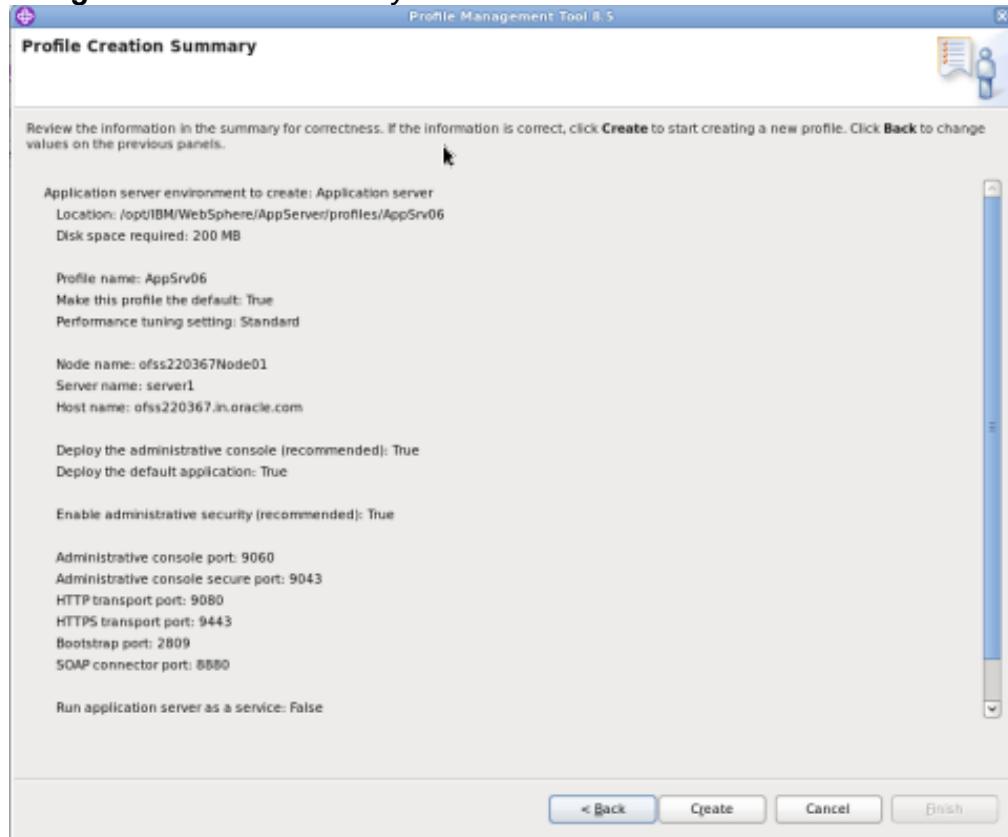
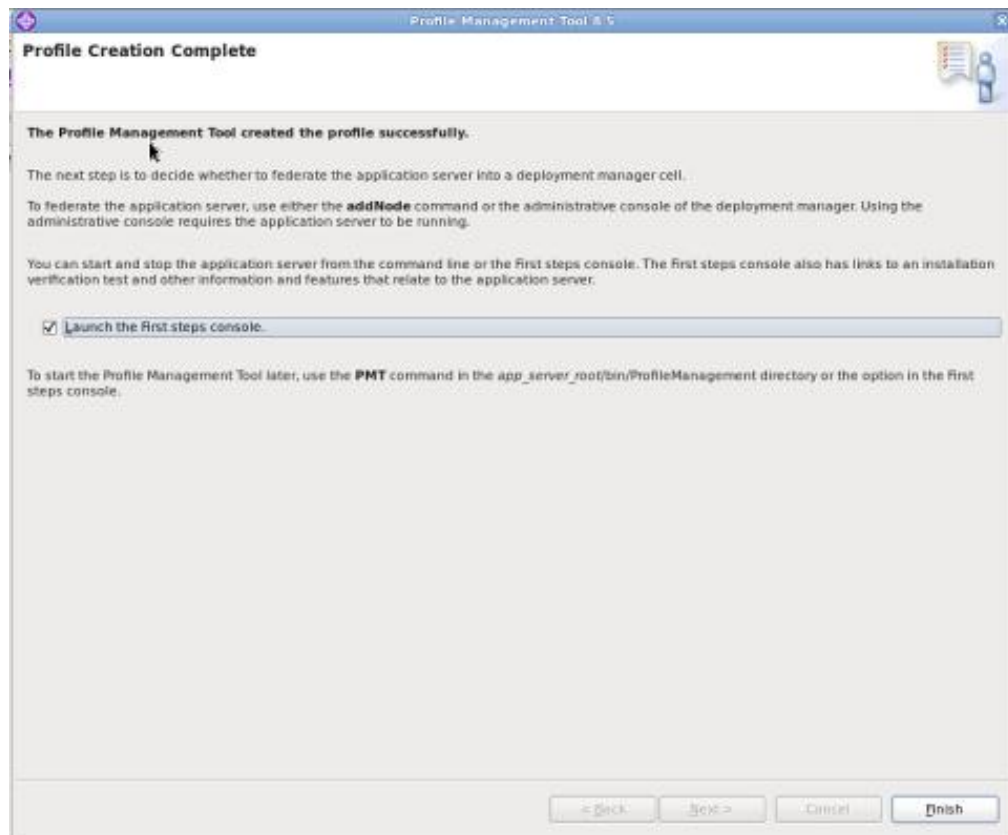
User name:
websphere

Password:

Confirm password:

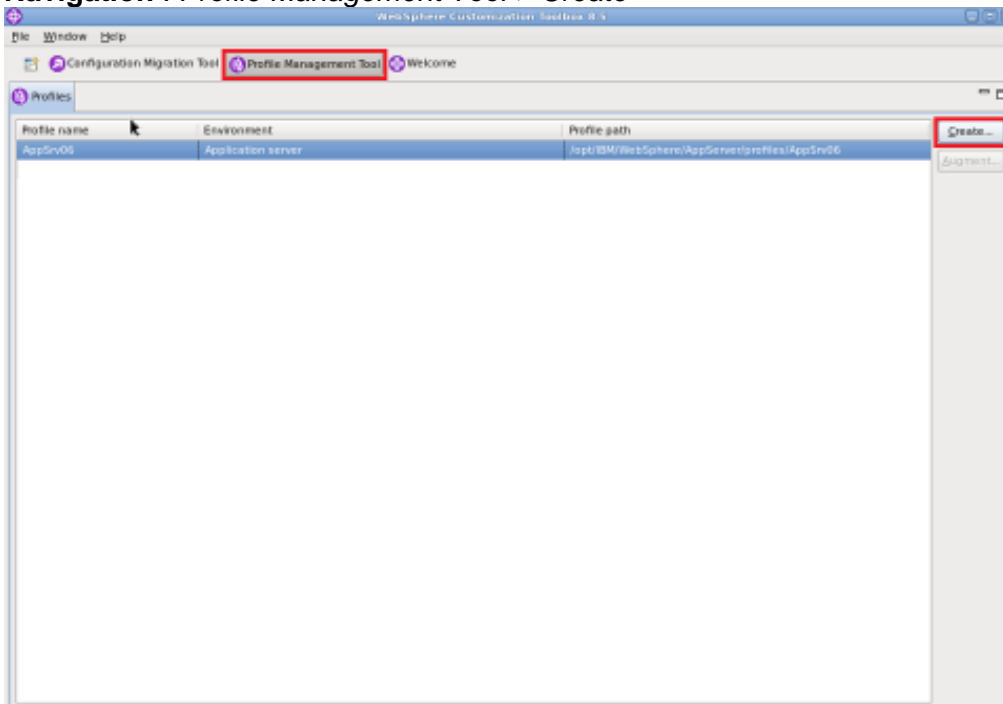
See the information center for more information about administrative security.
[View the online information center](#)

< Back **Next >** Cancel Finish

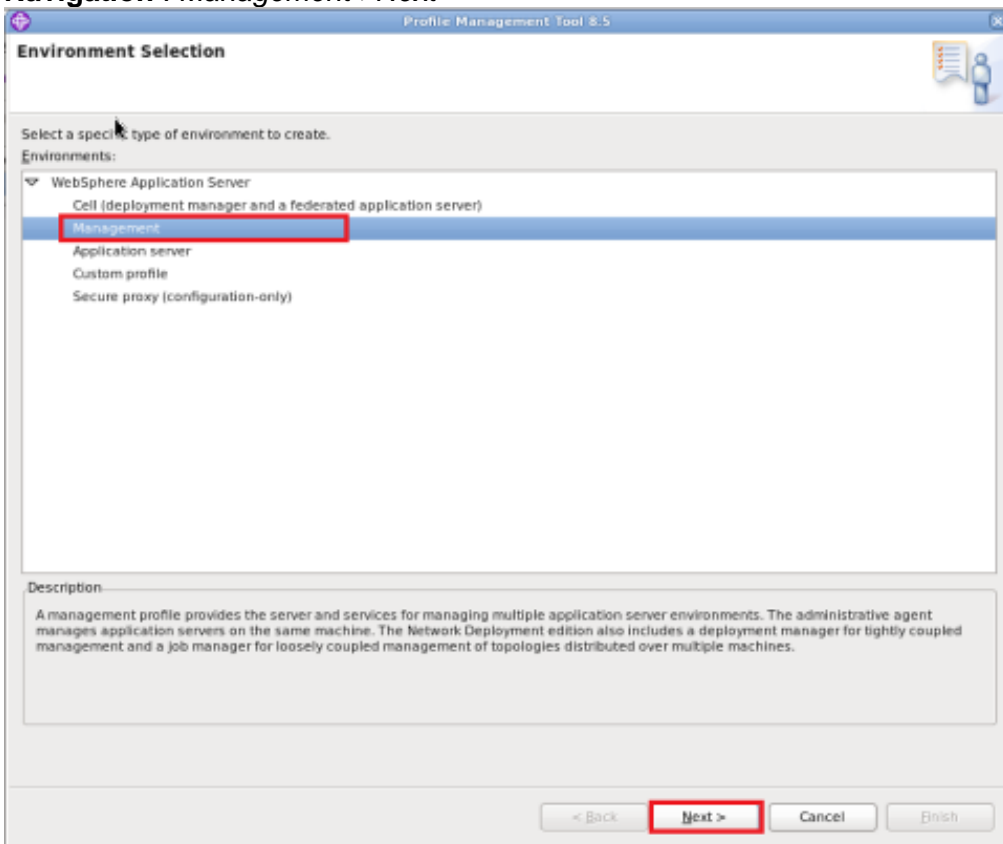
Navigation : Create Summary**Navigation : Finish**

4.1.1 Create Deployment Manager Profile

Navigation : *Profile Management Tool > Create*



Navigation : *Management >Next*



Navigation : *Deployment Manager > Next*

Profile Management Tool 8.5

Server Type Selection

Select the type of server to be created within this management profile

Administrative agent
An administrative agent provides management capability for multiple stand-alone application servers. An administrative agent can manage only the application servers that exist within the same installation on one machine.

Deployment manager
A deployment manager provides management capability for multiple federated nodes. A deployment manager can manage nodes that span multiple systems and platforms. The nodes that are managed by a deployment manager can only be managed by a single deployment manager and must be federated to the cell of that deployment manager.

Job manager
A job manager provides management capability for multiple stand-alone application servers, administrative agents, and deployment managers. The job manager can manage nodes that span multiple systems and platforms. The nodes that are managed by one job manager also can be managed by other job managers.

< Back **Next >** Cancel Finish

Navigation : *Typical profile creation > Next*

Profile Management Tool 8.5

Profile Creation Options

Choose the profile creation process that meets your needs. Pick the Typical option to allow the Profile Management Tool to assign a set of default configuration values to the profile. Pick the Advanced option to specify your own configuration values for the profile.

Typical profile creation
Create a deployment manager profile that uses default configuration settings. The Profile Management Tool assigns unique names to the profile, node, host, and cell. The tool also assigns unique port values. The administrative console will be installed and you can optionally select whether to enable administrative security. The tool might create a system service to run the deployment manager depending on the operating system of your machine and the privileges assigned to your user account.
Note: Default personal certificates expire in one year. Select Advanced profile creation to create a personal certificate with a different expiration.

Advanced profile creation
Create a deployment manager using default configuration settings or specify your own values for settings such as the location of the profile and names of the profile, node, host, and cell. You can assign your own port values. You can optionally choose whether to deploy the administrative console. You might have the option to run the deployment manager as a system service depending on the operating system of your machine and the privileges assigned to your user account.

< Back **Next >** Cancel Finish

Navigation : Enable administrative security > Next

Administrative Security

Choose whether to enable administrative security. To enable security, supply a user name and password for logging into administrative tools. This administrative user is created in a repository within the application server. After profile creation finishes, you can add more users, groups, or external repositories.

Enable administrative security

User name:

Password:

Confirm password:

See the information center for more information about administrative security.
[View the online information center](#)

< Back **Next >** Cancel Finish

Navigation : Create

Profile Creation Summary

Review the information in the summary for correctness. If the information is correct, click **Create** to start creating a new profile. Click **Back** to change values on the previous panels.

Application server environment to create: Management
 Server type: Deployment manager
 Location: /opt/IBM/WebSphere/AppServer/profiles/Dmgr04
 Disk space required: 30 MB

Profile name: Dmgr04
 Make this profile the default: False

Cell name: ofss220367Cell01
 Node name: ofss220367CellManager01
 Host name: ofss220367.in.oracle.com

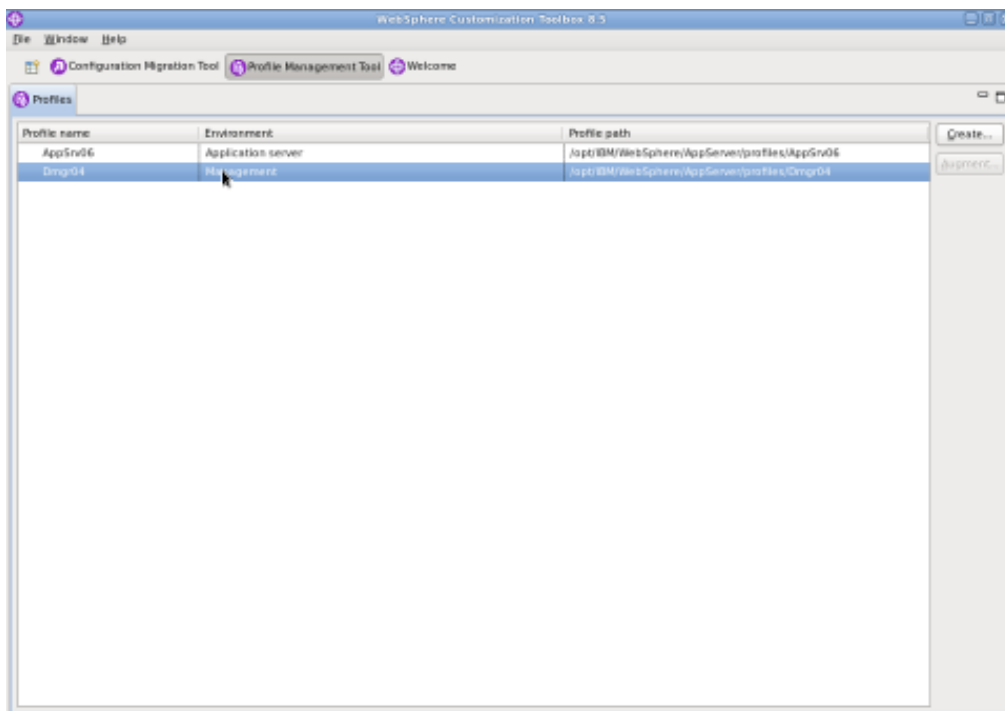
Deploy the administrative console (recommended): True

Enable administrative security (recommended): True

Administrative console port: 9061
 Administrative console secure port: 9044
 Deployment manager bootstrap port: 9809
 Deployment manager SOAP connector port: 8879

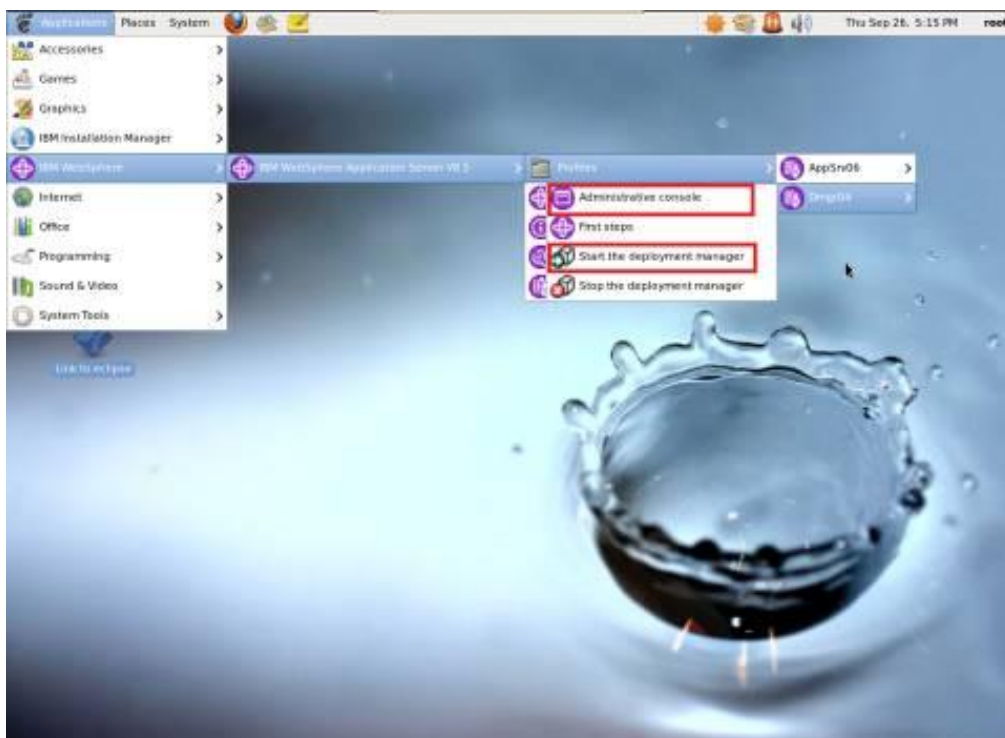
Run deployment manager as a service: False

< Back **Create** Cancel Finish



Start Deployment Manager & Open Administrative Console

Navigation : IBM WebSphere > IBM WebSphere Application Server V8.5 > Profiles > Dmgr[i]>Start the deployment *manager* > *Administrative console*



Log into Deployment Manger Console

Navigation : *System administration > Nodes > Add Node*

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 |
|----------|------------------------|-------------------------|------------|--------------------|--------|
| | ohs220367CellManager01 | ohs220367.in.oracle.com | ND 8.5.0.0 | TCP | |
| Total: 1 | | | | | |

4.2 Create Node

Navigation : *System administration > Nodes > Add Node*

The screenshot displays the WebSphere software administration console. The left-hand navigation pane shows a tree structure with 'System administration' expanded to 'Nodes'. The main content area is titled 'Add Node' and contains the following text:

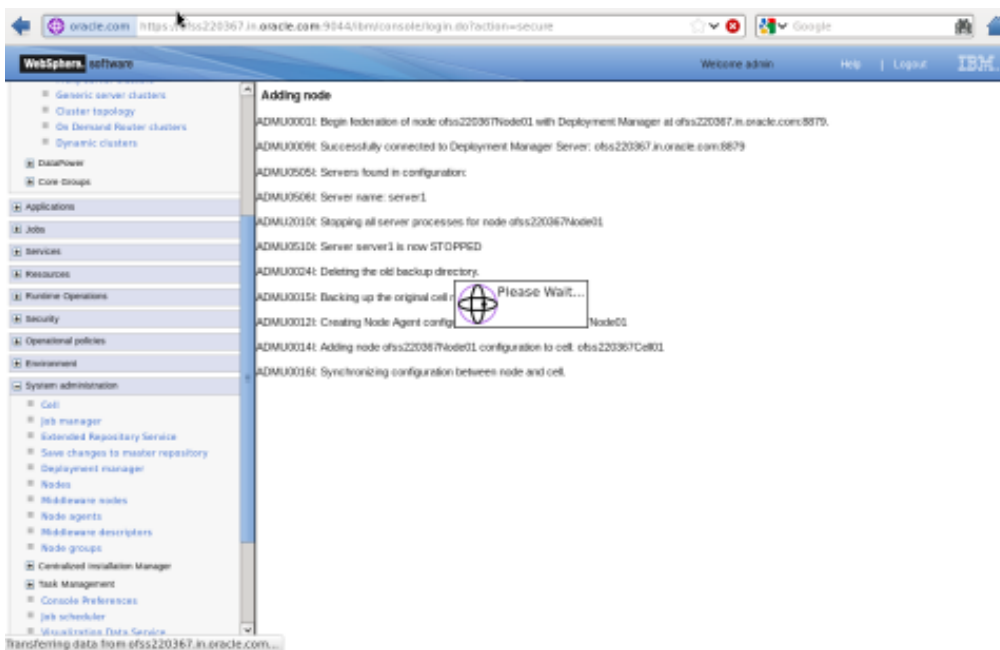
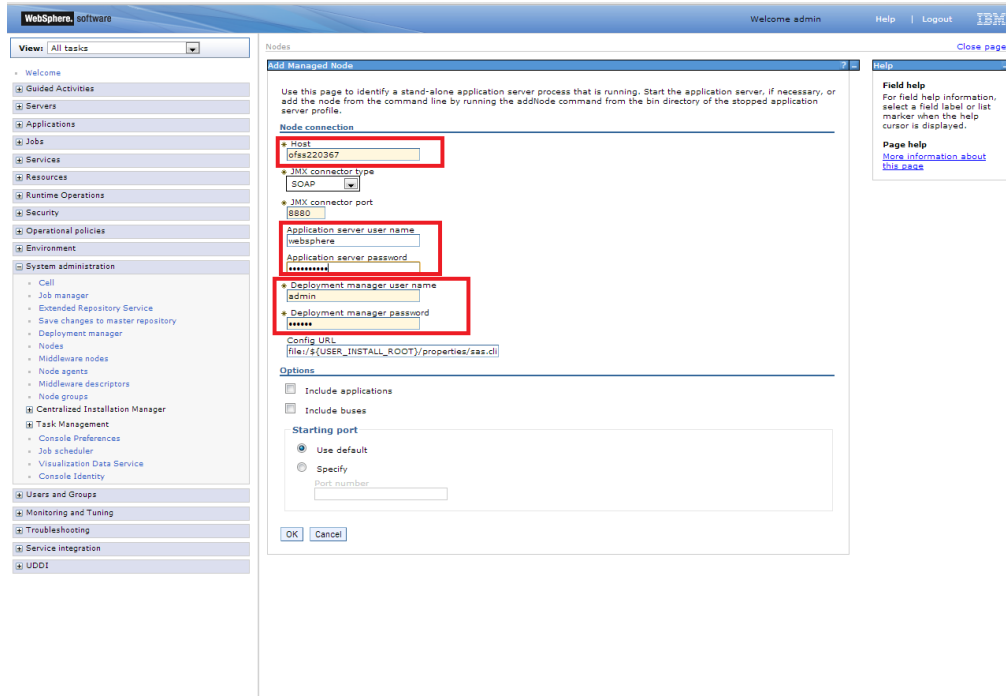
Use this page to add either a managed or an unmanaged node.

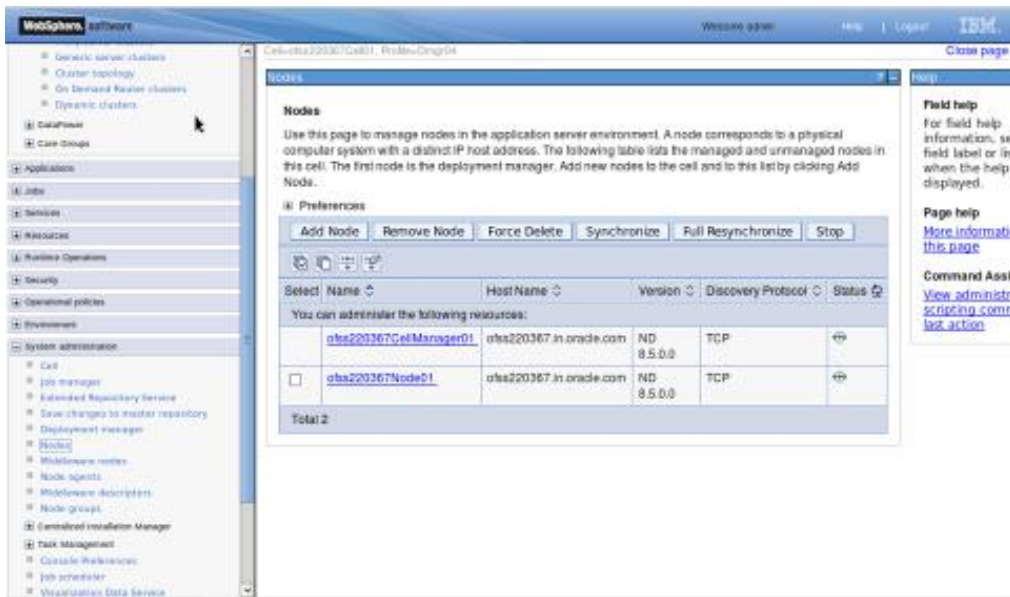
- Managed node**
 Specifies the creation of a managed node. A managed node contains an application server process that runs within the deployment manager cell. The managed node is associated with a node agent process that maintains the configuration for the node and controls its operation. Choosing this option results in running the add node utility to federate an existing stand-alone application server.
- Unmanaged node**
 Specifies the creation of an unmanaged node. An unmanaged node represents a node in the topology that does not have an application server process or a node agent process. Unmanaged nodes are for other server processes, such as web servers that exist on their own node in the topology.
- Recover an existing node**
 Specifies to replace a damaged node in the cell. First, create a new profile to replace the damaged node and give it the same profile and node names. Then use this option to replace the damaged node in the cell with the new node.

At the bottom of the dialog, there are two buttons: 'Next' and 'Cancel'. The 'Next' button is highlighted with a red box.

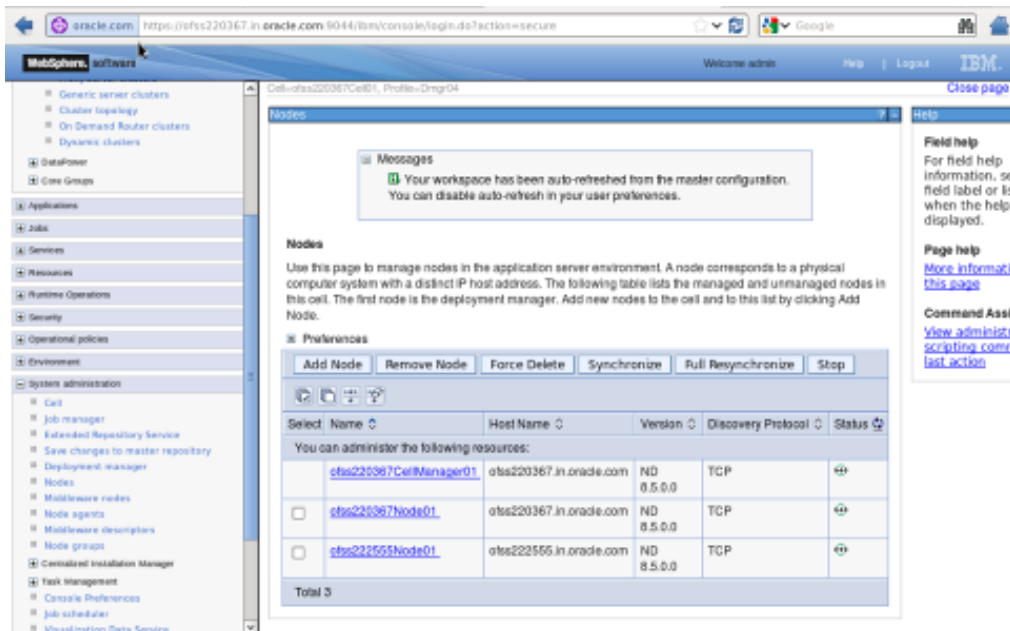
Provide the following field information and Click 'OK'

- Host : Host Machine with running Application Server
- JMX Connector type : SOAP
- JMX Connector Port : SOAP_CONNECTOR_ADDRESS of Application Server
- Application server user name : Application server user id
- Application server password : Application server password
- Deployment manager user name : Deployment manager user id
- Deployment manager password : Deployment manager password





Create necessary number of nodes following same instructions above:



4.2.1 Start Node Agents

Navigation : *System administration> Node agents>Restart*

The screenshot shows the IBM WebSphere software administration console. The main content area is titled 'Node agents' and contains the following information:

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

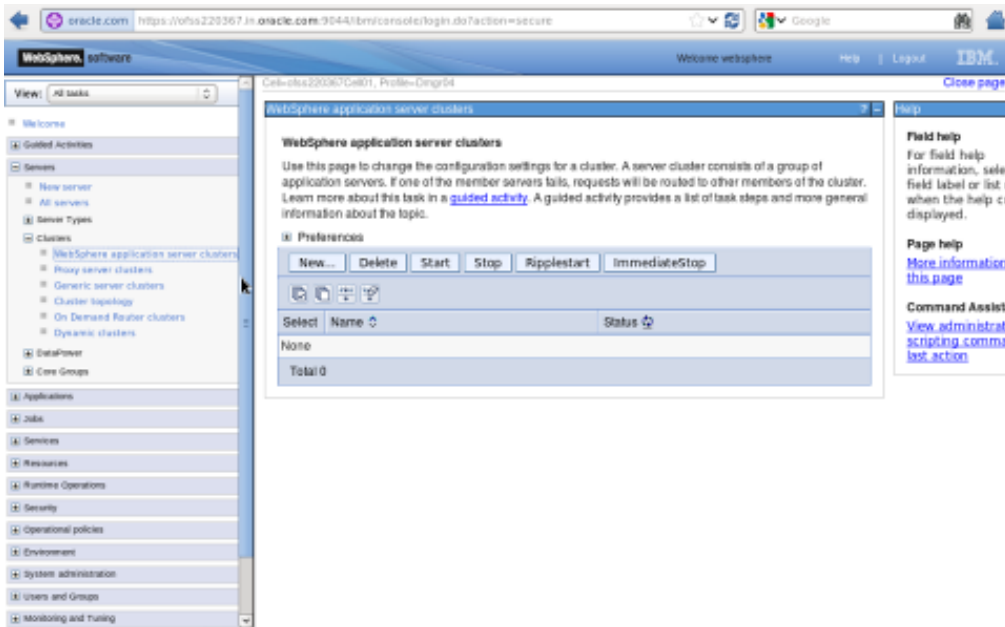
| Select | Name | Node | Host Name | Version | Status |
|--------------------------|---------------------------|------------------|--------------------------|------------|--------|
| <input type="checkbox"/> | nodeagent | otss222555Node01 | otss222555.in.oracle.com | ND 8.5.0.0 | |
| <input type="checkbox"/> | nodeagent | otss220367Node01 | otss220367.in.oracle.com | ND 8.5.0.0 | |
| Total 2 | | | | | |

Field help
For field help information, select field label or list n when the help is displayed.

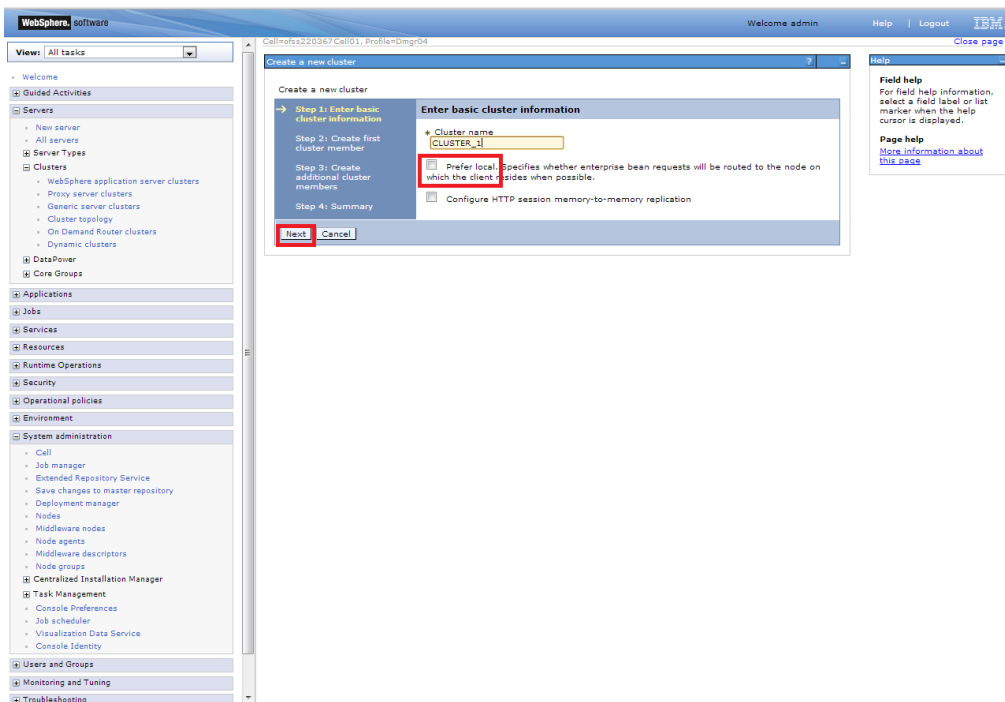
Page help
[More information this page](#)

4.3 Create Cluster

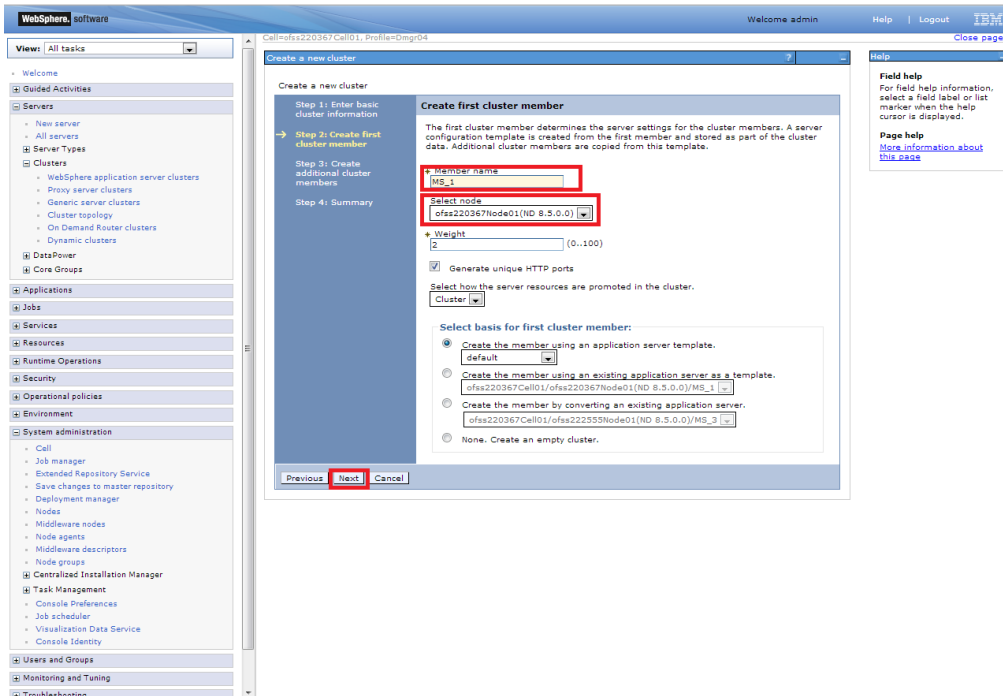
Navigation: Servers>Clusters> WebSphere application server clusters > New



Navigation : Uncheck [Prefer Local] > Next

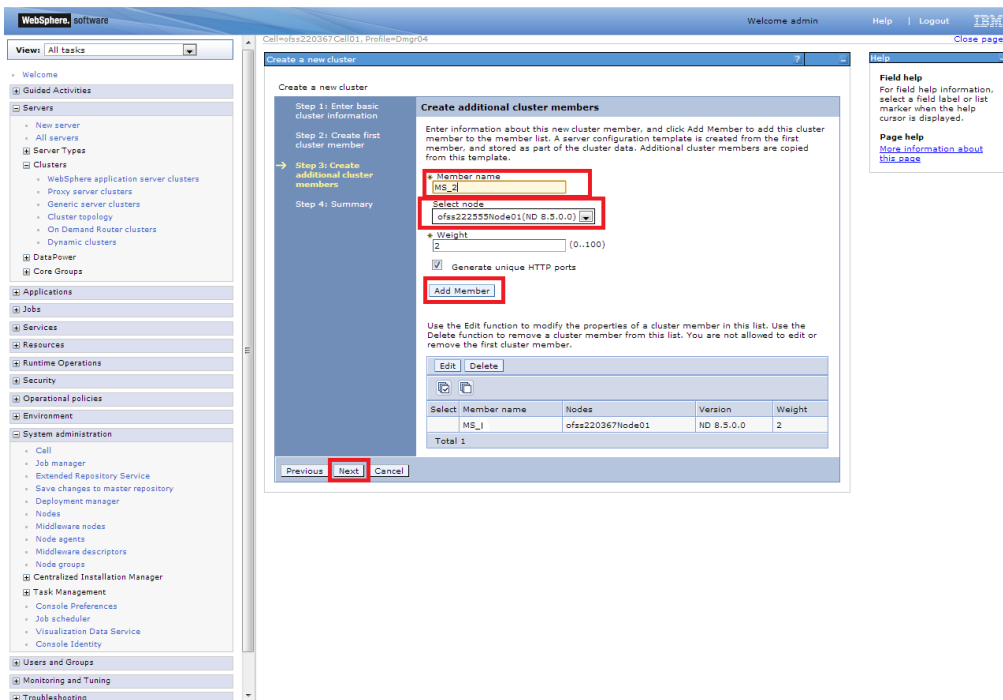


4.3.1 Add Cluster Members



Add required number of cluster members

Navigation : Add Member > Next



Navigation : Next

The screenshot shows the 'Create a new cluster' wizard in the 'Next' step. The left sidebar contains a navigation tree with 'Clusters' expanded. The main content area is titled 'Create a new cluster' and shows the following steps:

- Step 1: Enter basic cluster information
- Step 2: Create first cluster member
- Step 3: Create additional cluster members** (highlighted)
- Step 4: Summary

The 'Create additional cluster members' section includes:

- Member name:
- Select node:
- Weight: (0..100)
- Generate unique HTTP ports
-

Below this is a table of cluster members:

| Select | Member name | Nodes | Version | Weight |
|--------------------------|-------------|-----------------|------------|--------|
| <input type="checkbox"/> | MS_1 | ofs220367Node01 | ND 8.5.0.0 | 2 |
| <input type="checkbox"/> | MS_2 | ofs222555Node01 | ND 8.5.0.0 | 2 |
| Total 2 | | | | |

Buttons at the bottom include 'Previous', 'Next', and 'Cancel'. A 'Help' sidebar on the right contains 'Field help' and 'Page help' sections.

Navigation : Finish

The screenshot shows the 'Create a new cluster' wizard in the 'Finish' step. The left sidebar is the same as in the previous step. The main content area is titled 'Create a new cluster' and shows the following steps:

- Step 1: Enter basic cluster information
- Step 2: Create first cluster member
- Step 3: Create additional cluster members
- Step 4: Summary** (highlighted)

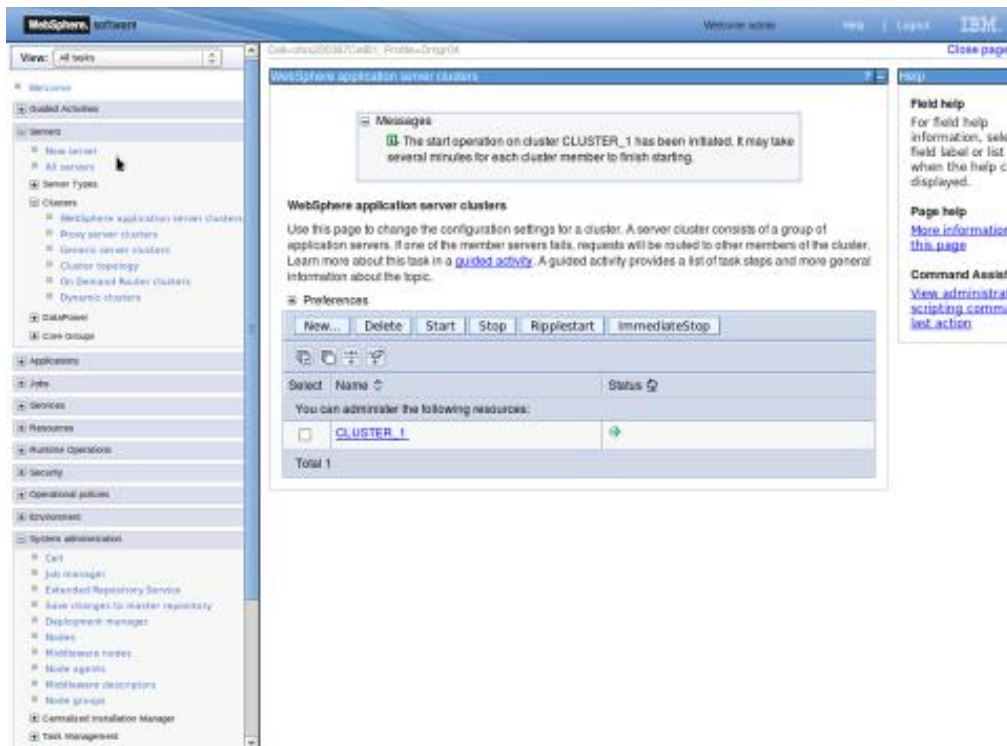
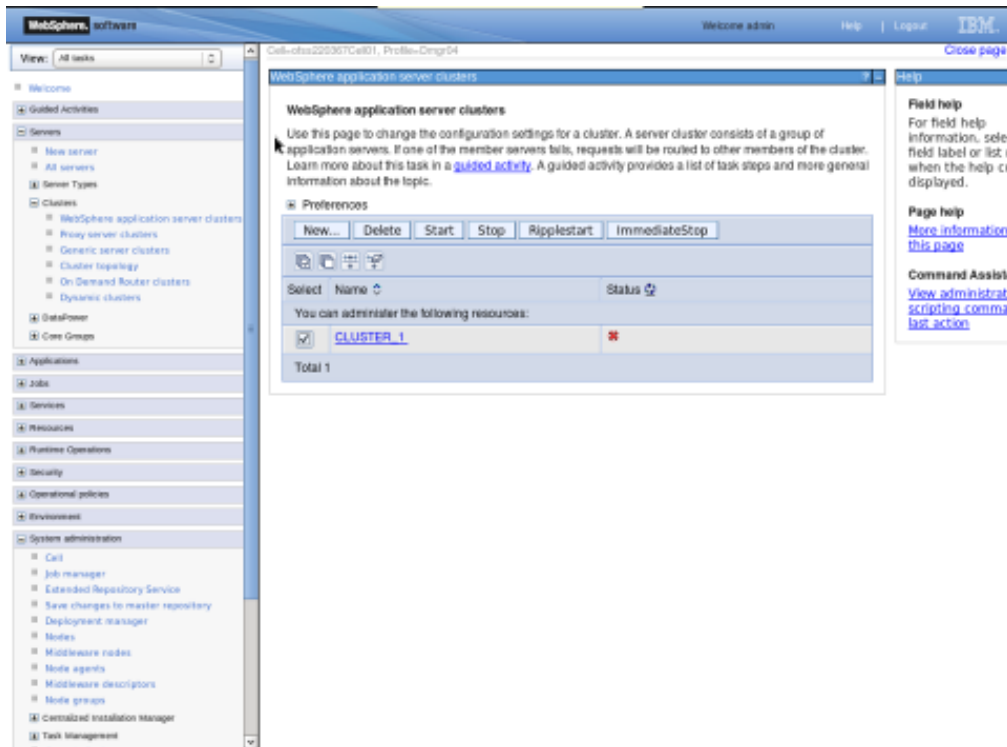
The 'Summary' section includes:

- Summary of actions:
- Options table:

| Options | Values |
|--|---|
| Cluster Name | CLUSTER_1 |
| Core Group | DefaultCoreGroup |
| Node group | DefaultNodeGroup |
| Prefer local | false |
| Configure HTTP session memory-to-memory replication | false |
| Server name | MS_1 |
| Node | ofs220367Node01(ND 8.5.0.0) |
| Weight | 2 |
| Clone Template | default |
| Clone Basis | Create the member using an application server template. |
| Select how the server resources are promoted in the cluster. | cluster |
| Generate unique HTTP ports | true |
| Server name | MS_2 |
| Node | ofs220367Node01(ND 8.5.0.0) |
| Weight | 2 |
| Clone Template | Version 8.5 member template |
| Generate unique HTTP ports | true |

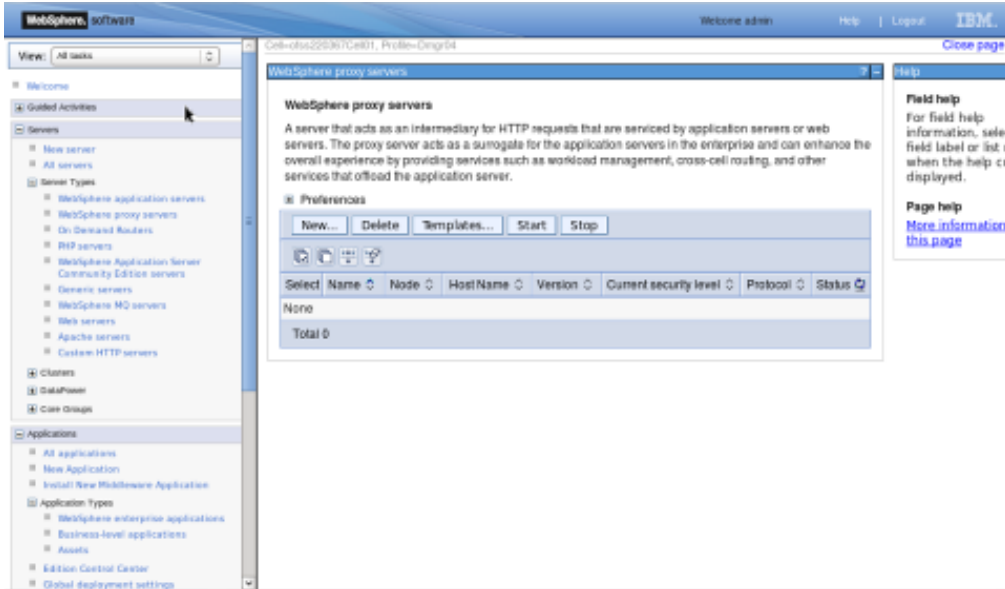
Buttons at the bottom include 'Previous', 'Finish', and 'Cancel'. A 'Help' sidebar on the right contains 'Field help' and 'Page help' sections.

4.3.2 Start Cluster

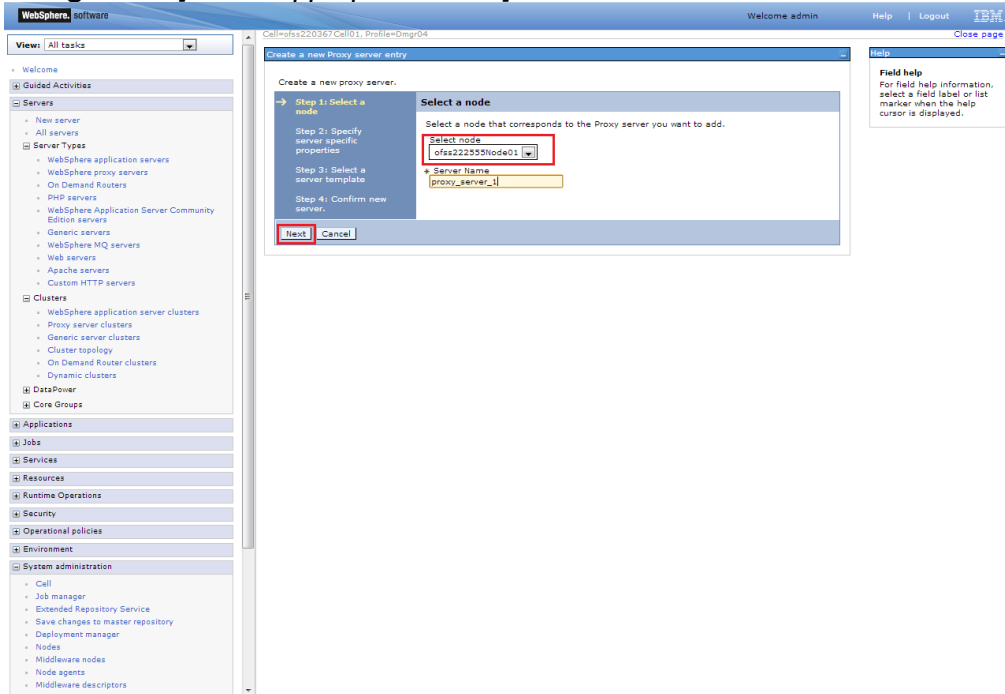


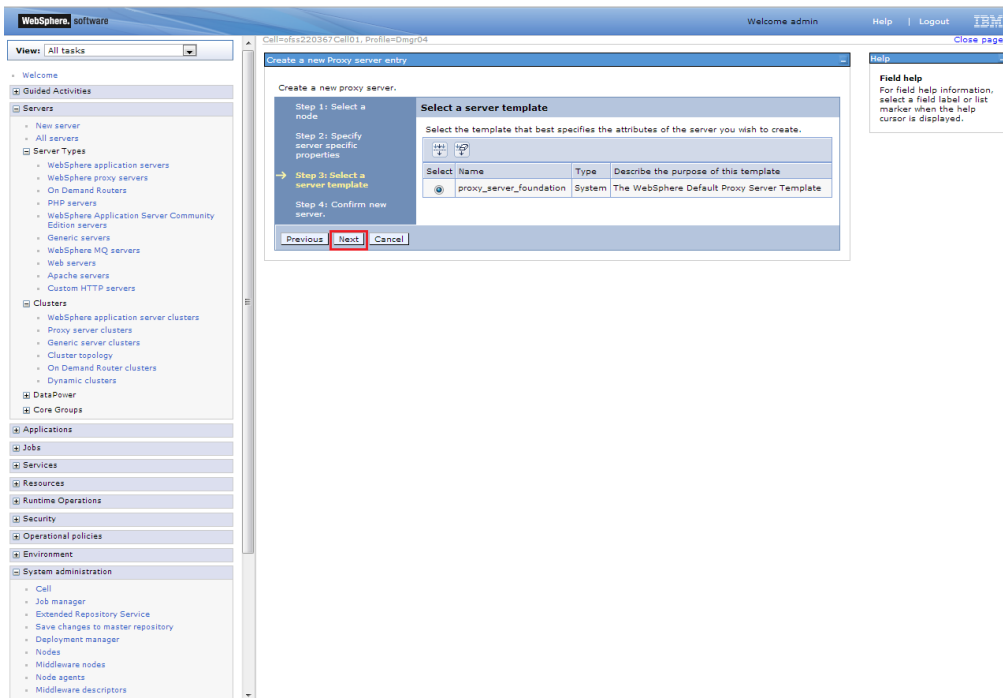
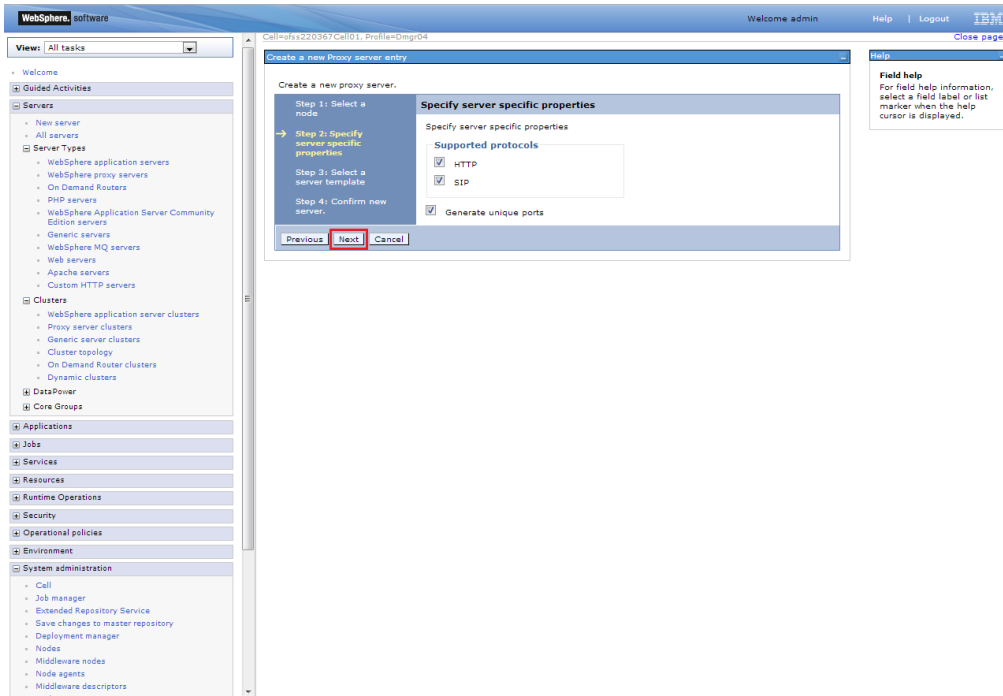
4.4 Create Proxy Server

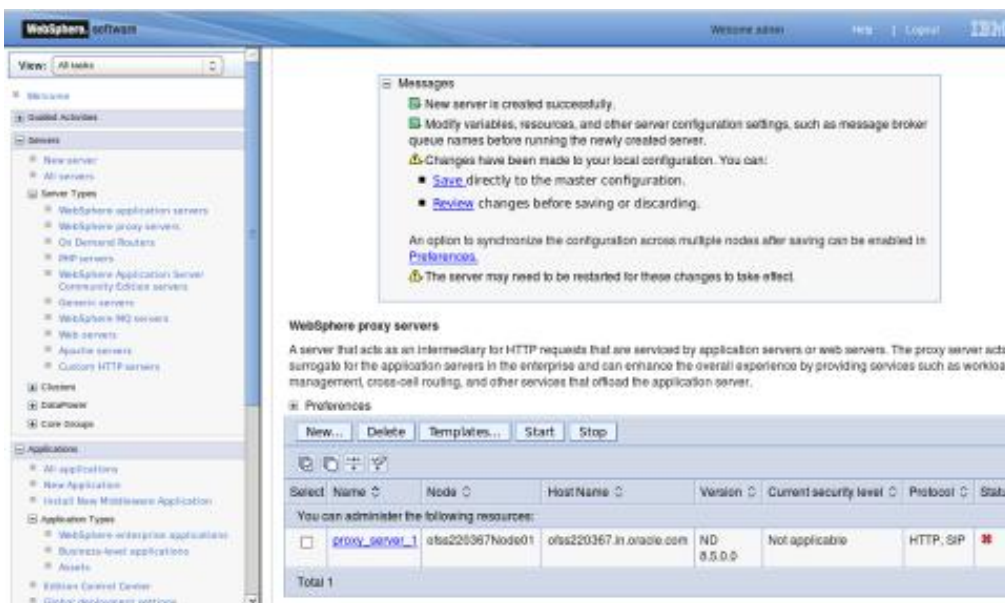
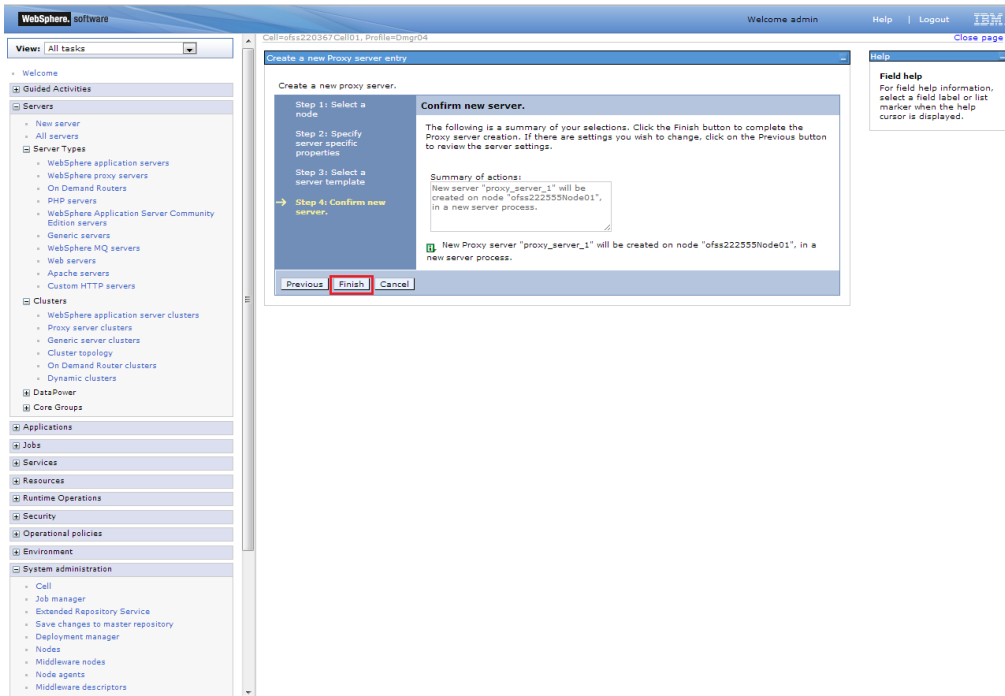
Navigation : Servers > Server Types > WebSphere proxy servers > New



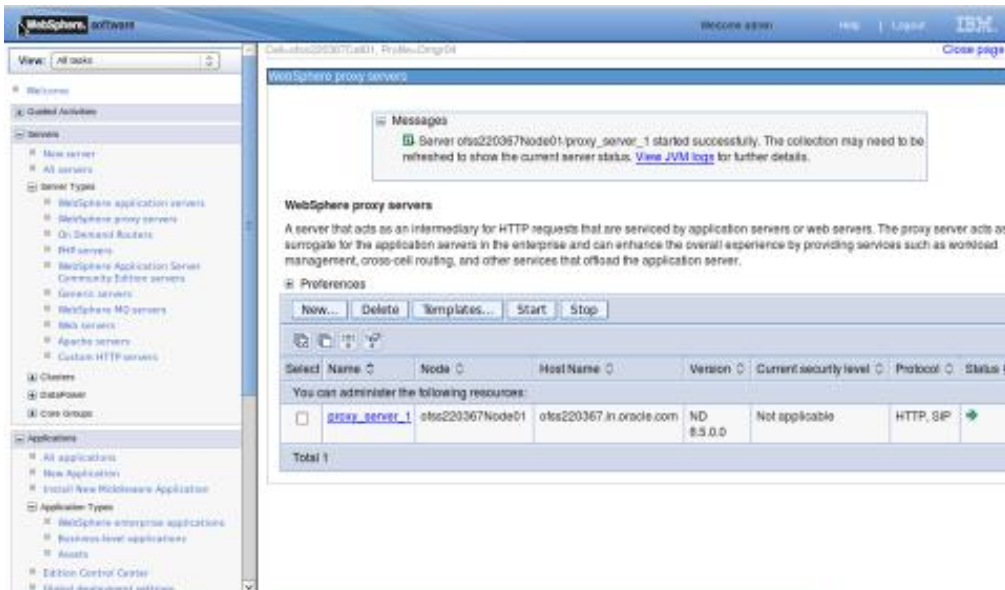
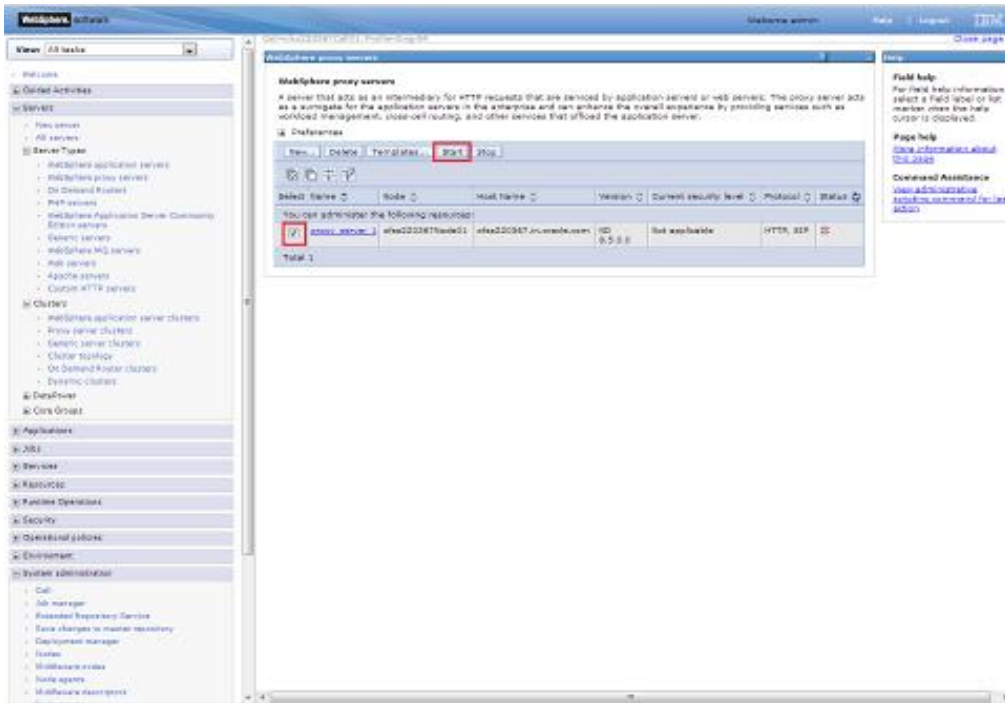
Navigation : [Select appropriate Node] > Next





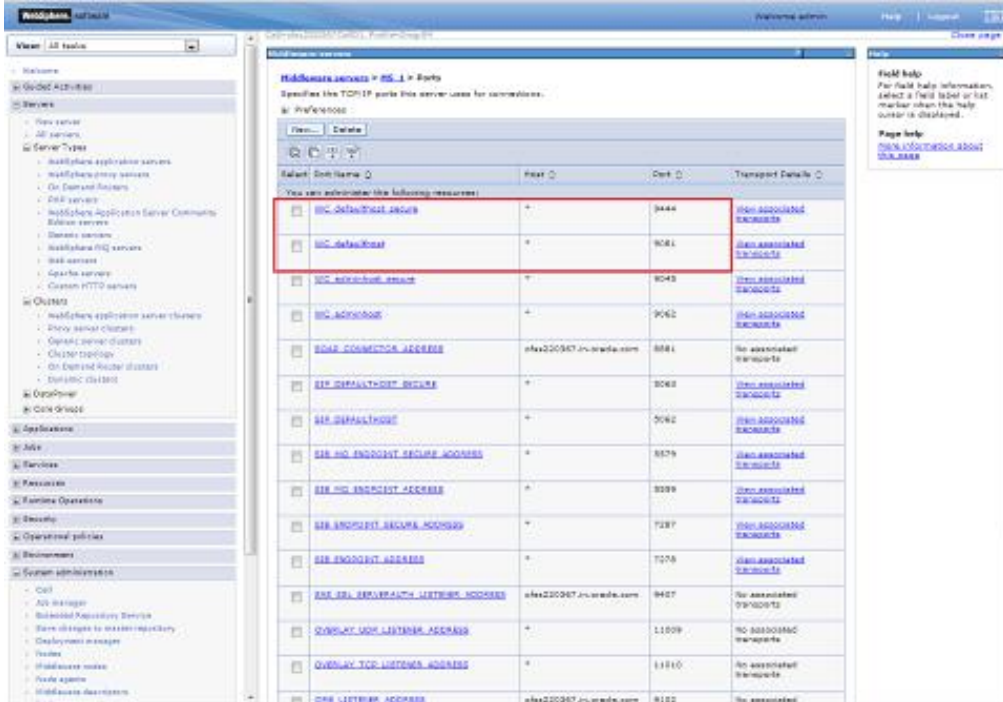


4.4.1 Start Proxy Server

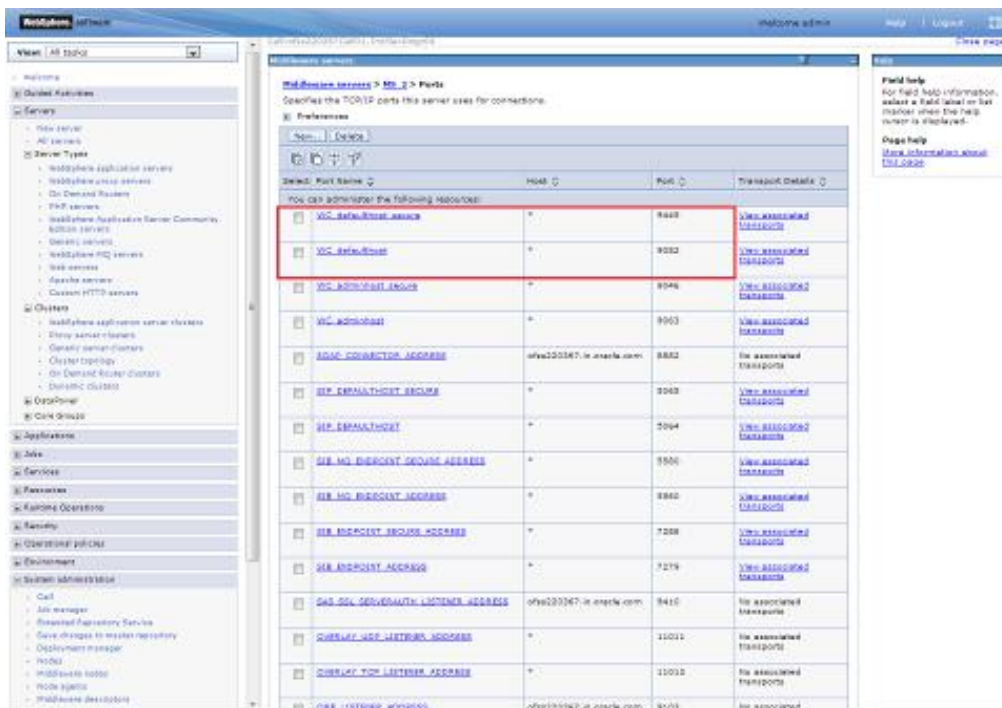


4.5 Configure Virtual Host

Make a note of “WC_defaulthost”/”WS_defaulthost_secure” port for server MS1 : 9081/9444



Make a note of “WC_defaulthost”/”WS_defaulthost_secure” for MS2 : 9082/9445



4.5.1 Virtual Host Setup

Navigation : *Environment > Virtual hosts > proxy_host*

The screenshot shows the Oracle WebSphere Administration Console interface. On the left, a navigation tree is visible with 'Virtual hosts' selected under the 'Environment' category. The main content area is titled 'Virtual Hosts' and contains a description: 'Use this page to create a virtual host with a unique set of web access ports. Such a configuration lets a single host machine respond to multiple host machines. Each virtual host has a logical name and a list of one or more domain name systems (DNS) aliases by which it is known.' Below this is a 'Preferences' section with 'Name' and 'Delete' buttons. A table lists resources for 'proxy_host':

| Select | Name |
|--------------------------|--------------|
| <input type="checkbox"/> | admin_host |
| <input type="checkbox"/> | default_host |
| <input type="checkbox"/> | proxy_host |

The table indicates a 'Total 3' resources. On the right side, there are links for 'Field help', 'Page help', and 'Command Assistance'.

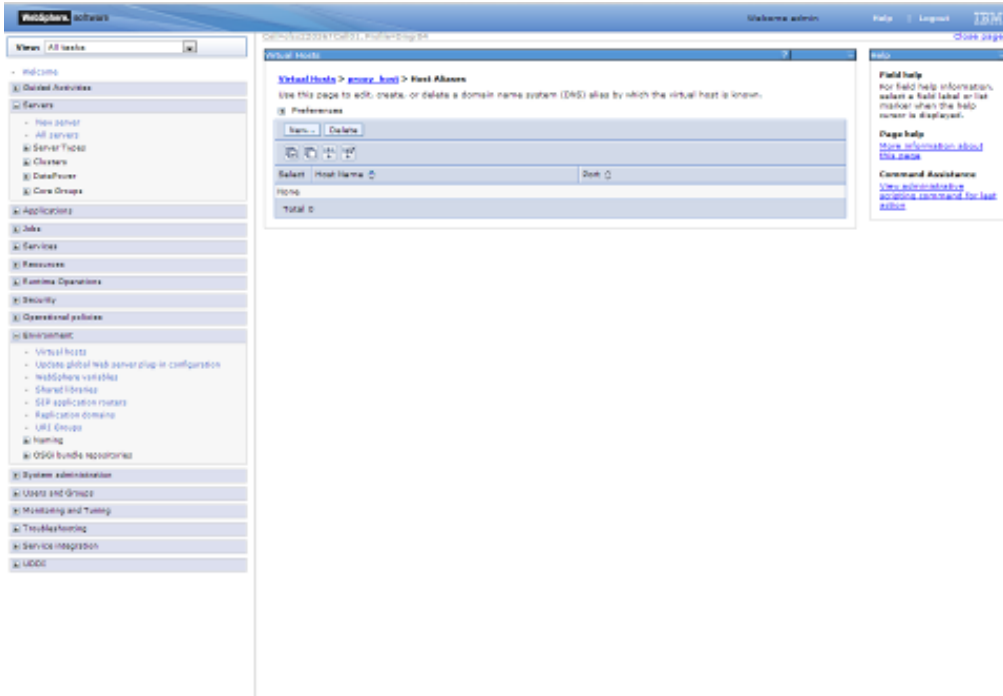
Navigation : *Host Aliases*

The screenshot shows the Oracle WebSphere Administration Console interface. On the left, a navigation tree is visible with 'Host Aliases' selected under the 'Virtual hosts' category. The main content area is titled 'Host Aliases' and contains a description: 'Use this page to create a virtual host with a unique set of web access ports. Such a configuration lets a single host machine respond to multiple host machines. Each virtual host has a logical name and a list of one or more domain name systems (DNS) aliases by which it is known.' Below this is a 'Configurations' section with 'General Properties' and 'Additional Properties' tabs. The 'General Properties' tab shows a table of aliases:

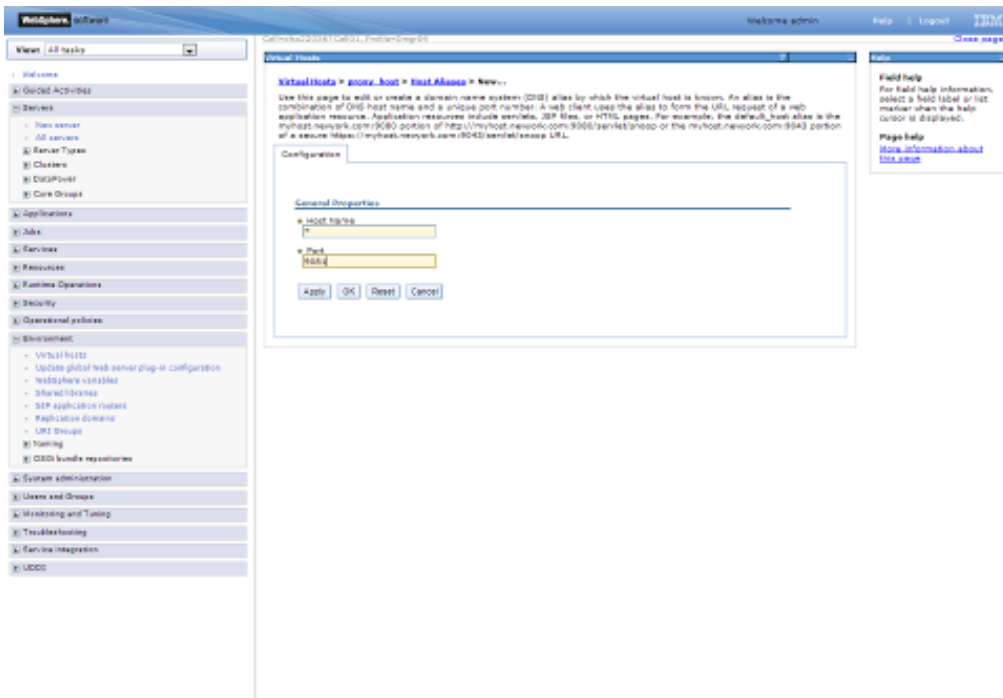
| Name | Host Alias |
|--------------|---------------|
| admin_host | 192.168.1.100 |
| default_host | 192.168.1.101 |

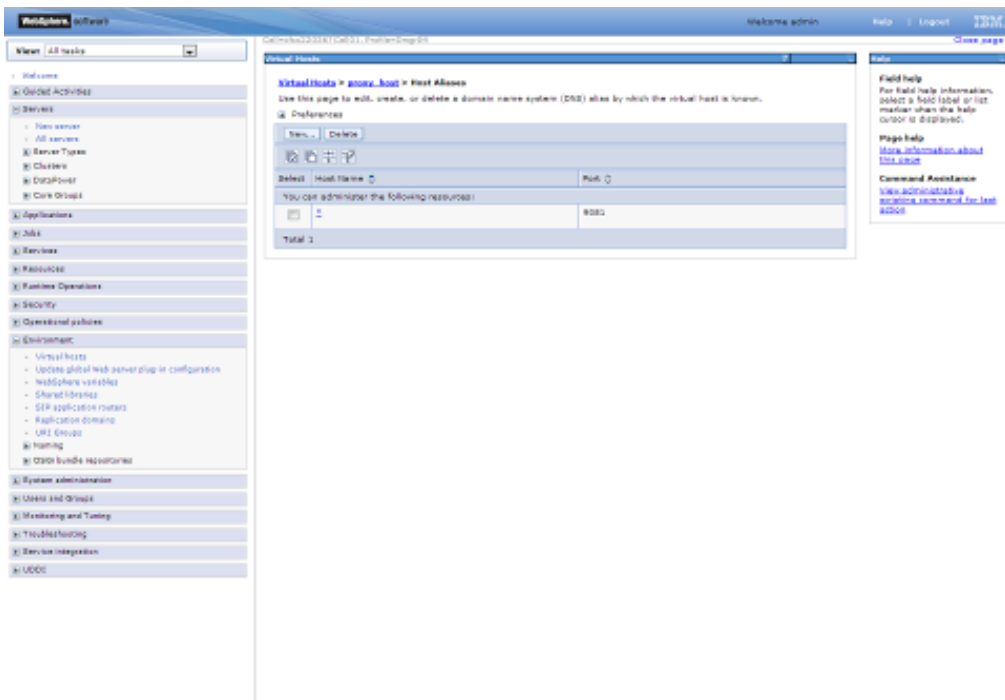
At the bottom of the configuration area are buttons for 'Apply', 'OK', 'Cancel', and 'Done'. On the right side, there are links for 'Field help', 'Page help', and 'Command Assistance'.

Navigation : Environment>Virtual hosts>proxy_host>Host Aliases > New

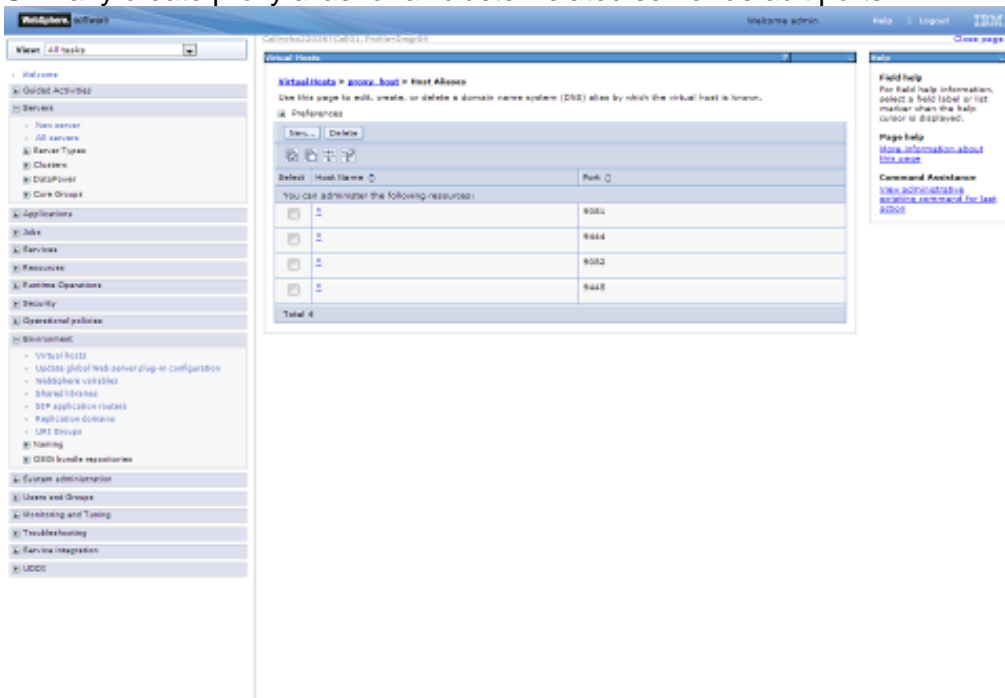


Create New Alias for default port in managed server <<9081>>:





Similarly create proxy alias for all cluster related server default ports



5. Create Resources in Cluster Scope

JDBC Provider :

The screenshot shows the 'JDBC provider' configuration page in the WebSphere Admin Console. The left-hand navigation pane is expanded to 'Resources' > 'JDBC' > 'JDBC providers'. The main content area displays the configuration for a selected JDBC provider. The 'Scope' dropdown menu is highlighted with a red box and contains the text 'Cluster=CLUSTER_1'. Below this, there is a table listing resources associated with the provider.

| Select | Name | Scope | Description |
|--------------------------|-------------------------|-------------------|-------------------------|
| <input type="checkbox"/> | Oracle JDBC Driver | Cluster=CLUSTER_1 | Oracle JDBC Driver |
| <input type="checkbox"/> | Oracle JDBC Driver (XA) | Cluster=CLUSTER_1 | Oracle JDBC Driver (XA) |
| Total 2 | | | |

Datasource :

The screenshot shows the 'Datasource' configuration page in the WebSphere Admin Console. The left-hand navigation pane is expanded to 'Resources' > 'JDBC' > 'Data sources'. The main content area displays the configuration for a selected datasource. The 'Scope' dropdown menu is highlighted with a red box and contains the text 'Cluster=CLUSTER_1'. Below this, there is a table listing resources associated with the datasource.

| Select | Name | JDBC name | Scope | Provider | Description | Category |
|--------------------------|--------------------|----------------|-------------------|-------------------------|---------------------|----------|
| <input type="checkbox"/> | CLUSTER DataSource | jdbc/clusterDS | Cluster=CLUSTER_1 | Oracle JDBC Driver (XA) | Non JDBC DataSource | |
| <input type="checkbox"/> | CLUSTER DS | jdbc/DS | Cluster=CLUSTER_1 | Oracle JDBC Driver | Non JDBC DataSource | |
| Total 2 | | | | | | |

Queue Connection Factory

The screenshot shows the 'Queue Connection Factory' configuration page in the Oracle WebSphere Administration Console. The left-hand navigation pane is expanded to 'Resources' > 'JMS' > 'Queue Connection Factories'. The main content area displays the configuration for a Queue Connection Factory. The 'Scope' dropdown menu is highlighted with a red box and contains the text 'Cluster=CLUSTER_1'. Below this, there is a table listing the JMS providers:

| Selected | Name | JMS Name | Provider | Description | Scope |
|--------------------------|-------------|-------------|---------------------------------|-------------|-------------------|
| <input type="checkbox"/> | EMQJCF | EMQJCF | WebSphere MQ messaging provider | | Cluster=CLUSTER_1 |
| <input type="checkbox"/> | MQ_QCF | MQ_QCF | WebSphere MQ messaging provider | | Cluster=CLUSTER_1 |
| <input type="checkbox"/> | MQSCQCF | MQSCQCF | WebSphere MQ messaging provider | | Cluster=CLUSTER_1 |
| <input type="checkbox"/> | WebSphereMQ | WebSphereMQ | WebSphere MQ messaging provider | | Cluster=CLUSTER_1 |

The total count at the bottom of the table is 'Total: 4'.

JMS Queue:

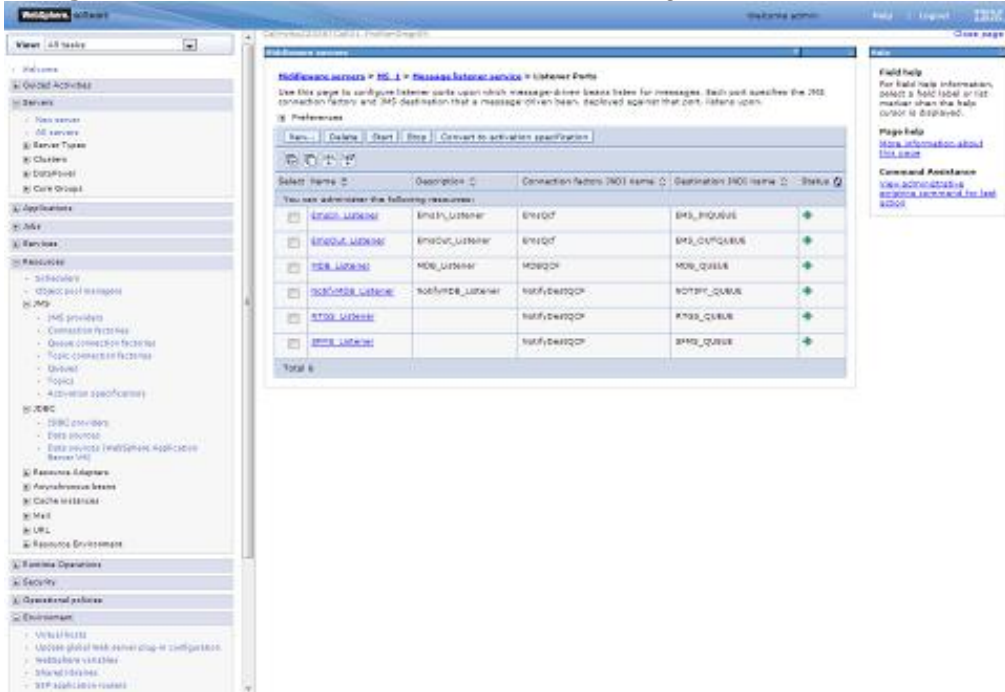
The screenshot shows the 'JMS Queue' configuration page in the Oracle WebSphere Administration Console. The left-hand navigation pane is expanded to 'Resources' > 'JMS' > 'Queues'. The main content area displays the configuration for a JMS Queue. The 'Scope' dropdown menu is highlighted with a red box and contains the text 'Cluster=CLUSTER_1'. Below this, there is a table listing the JMS queues:

| Selected | Name | JMS Name | Provider | Description | Scope |
|--------------------------|-------------------|-------------------|---------------------------------|--------------|-------------------|
| <input type="checkbox"/> | EMQ_QUEUE | EMQ_QUEUE | WebSphere MQ messaging provider | | Cluster=CLUSTER_1 |
| <input type="checkbox"/> | EMQ_OUTQUEUE | EMQ_OUTQUEUE | WebSphere MQ messaging provider | | Cluster=CLUSTER_1 |
| <input type="checkbox"/> | MQ_QUEUE | MQ_QUEUE | WebSphere MQ messaging provider | | Cluster=CLUSTER_1 |
| <input type="checkbox"/> | MQ_QUEUE_INQ | MQ_QUEUE_INQ | WebSphere MQ messaging provider | | Cluster=CLUSTER_1 |
| <input type="checkbox"/> | MQ_QUEUE_RESPONSE | MQ_QUEUE_RESPONSE | WebSphere MQ messaging provider | | Cluster=CLUSTER_1 |
| <input type="checkbox"/> | NOTIFY_DEST_QUEUE | NOTIFY_DEST_QUEUE | WebSphere MQ messaging provider | | Cluster=CLUSTER_1 |
| <input type="checkbox"/> | NOTIFY_QUEUE | NOTIFY_QUEUE | WebSphere MQ messaging provider | NOTIFY Queue | Cluster=CLUSTER_1 |
| <input type="checkbox"/> | NOTIFY_QUEUE_OUT | NOTIFY_QUEUE_OUT | WebSphere MQ messaging provider | | Cluster=CLUSTER_1 |

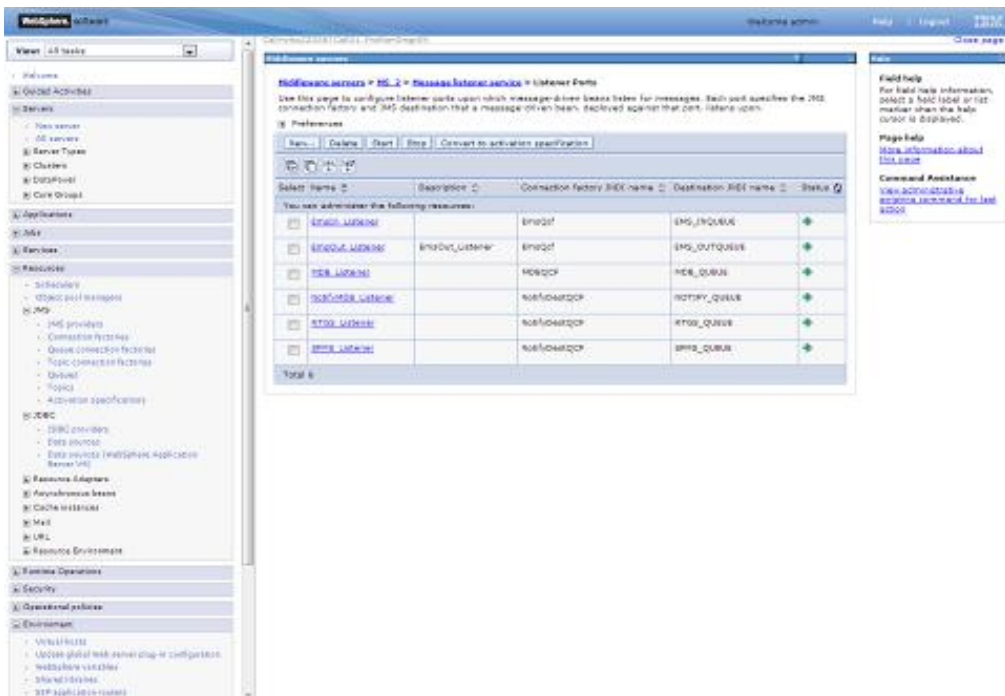
The total count at the bottom of the table is 'Total: 8'.

Create Message Listeners for individual Servers in Cluster

Navigation : *Middleware servers > MS_1 > Message listener service > Listener Ports*

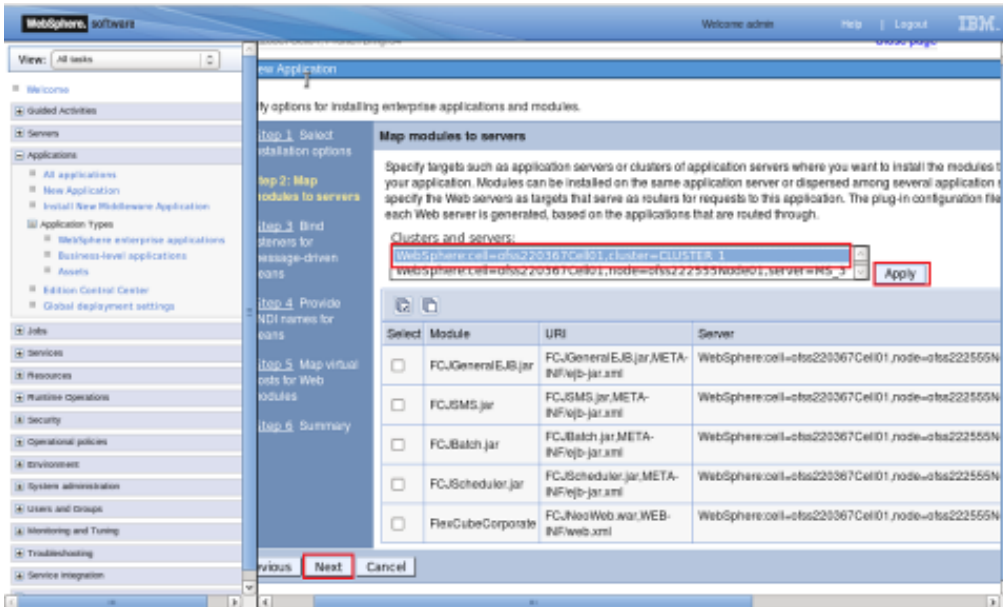


Navigation : *Middleware servers > MS_2 > Message listener service > Listener Ports*

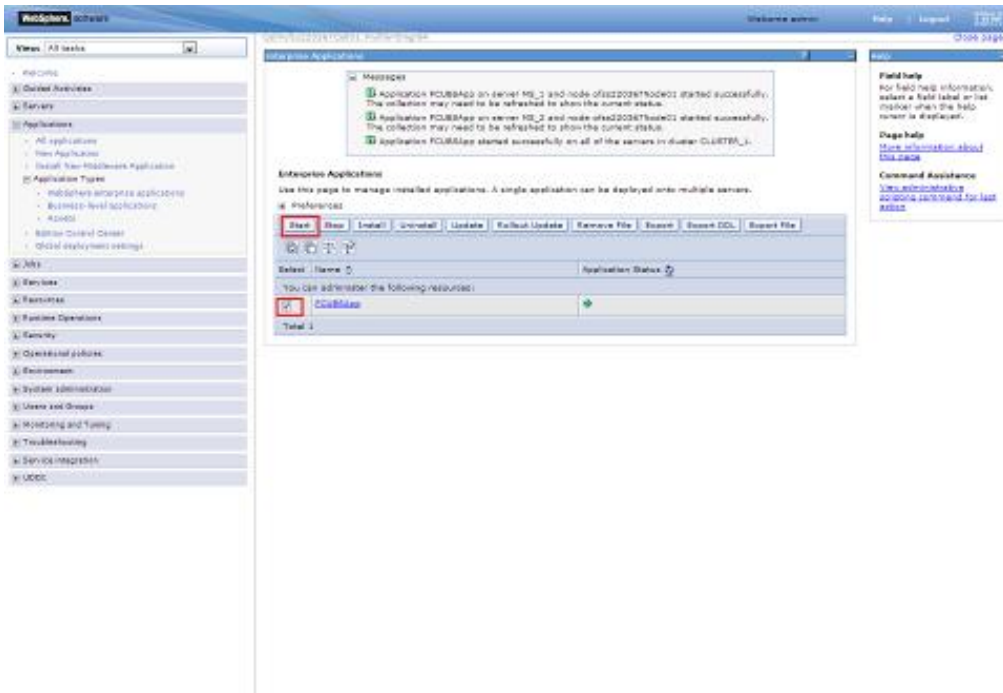


6. Deploy Application to Cluster

While deploying ensure the application is installed to Cluster



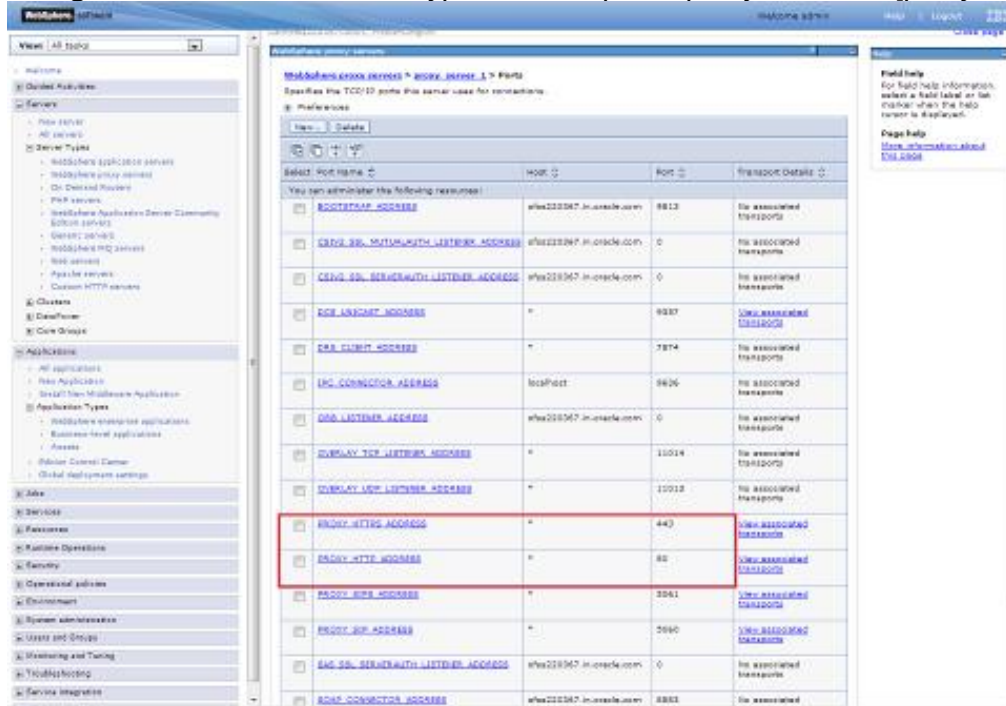
Start FCUBS application



6.1.1 Test the application

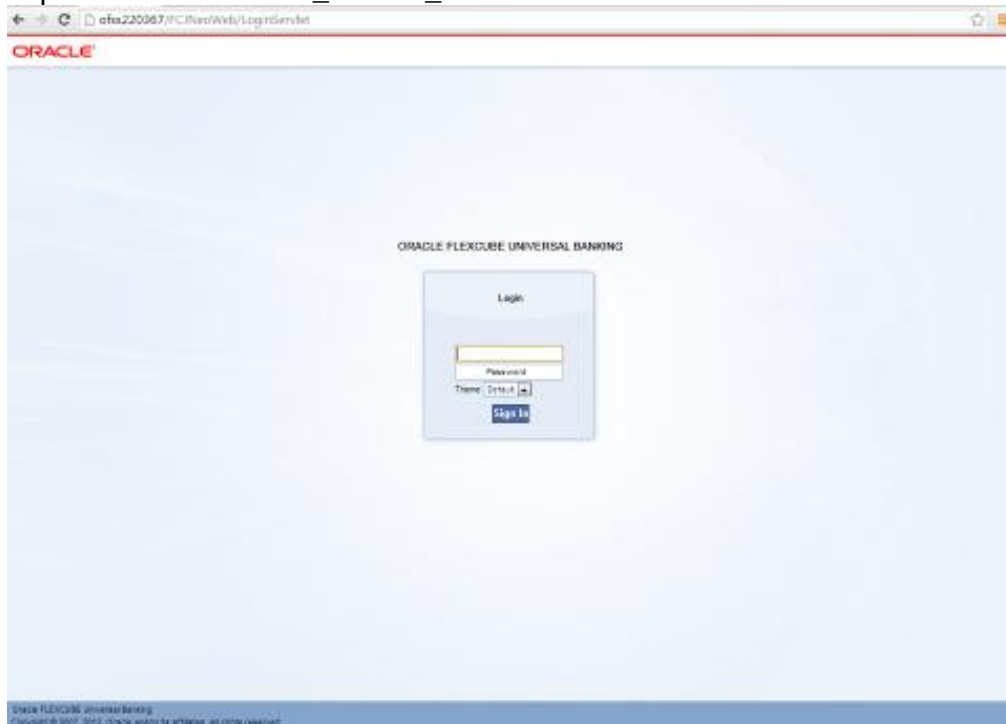
Make a note of the ports `PROXY_HTTPS_ADDRESS/PROXY_HTTP_ADDRESS` to access the application.

Navigation : *Servers > Server Types > WebSphere proxy servers > [proxy_server_1] > Ports*



Launch Application:

URL : `http://<host>:<PROXY_HTTP_ADDRESS>/FCJNeoWeb` or
`https://<host>:<PROXY_HTTPS_ADDRESS>/FCJNeoWeb`





FCUBS_Cluster_Creation_WAS8.5
[May] [2016]
Version 12.2.0.0.0

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