

Cluster Creation on Websphere Application Server 8.5
Oracle FLEXCUBE Universal Banking
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Table of Contents

1. PURPOSE	3
2. INTRODUCTION TO WEBSPHERE	3
3. PRE-REQUISITES:	4
4. STEPS INVOLVED FOR CLUSTERING	5
4.1 CREATE PROFILE	5
4.1.1 Create Deployment Manager Profile	9
4.2 CREATE NODE	14
4.2.1 Start Node Agents	17
4.3 CREATE CLUSTER	18
4.3.1 Add Cluster Members	19
4.3.2 Start Cluster	21
4.4 CREATE PROXY SERVER	22
4.4.1 Start Proxy Server	25
4.5 CONFIGURE VIRTUAL HOST	26
4.5.1 Virtual Host Setup	27
5. CREATE RESOURCES IN CLUSTER SCOPE	30
6. DEPLOY APPLICATION TO CLUSTER	33
6.1.1 Test the application	34

1. Purpose

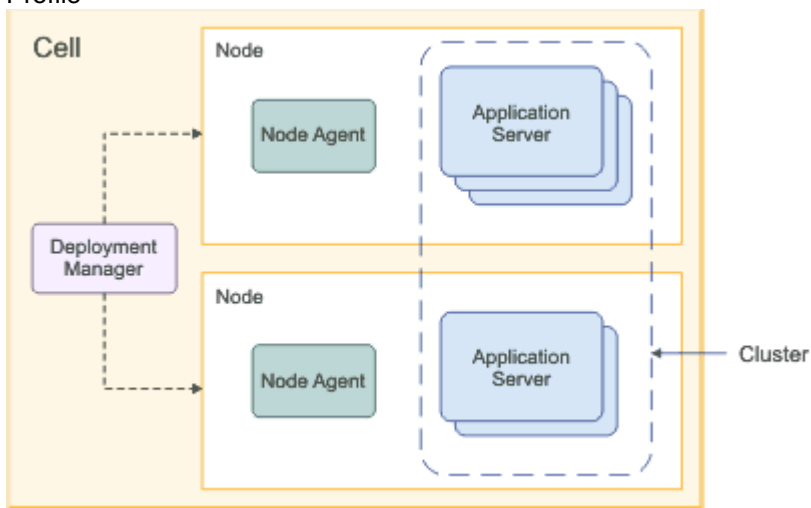
This document explains steps to create Cluster on Websphere Application Server 8.5 and also setup the proxy.

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

Profile



- 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

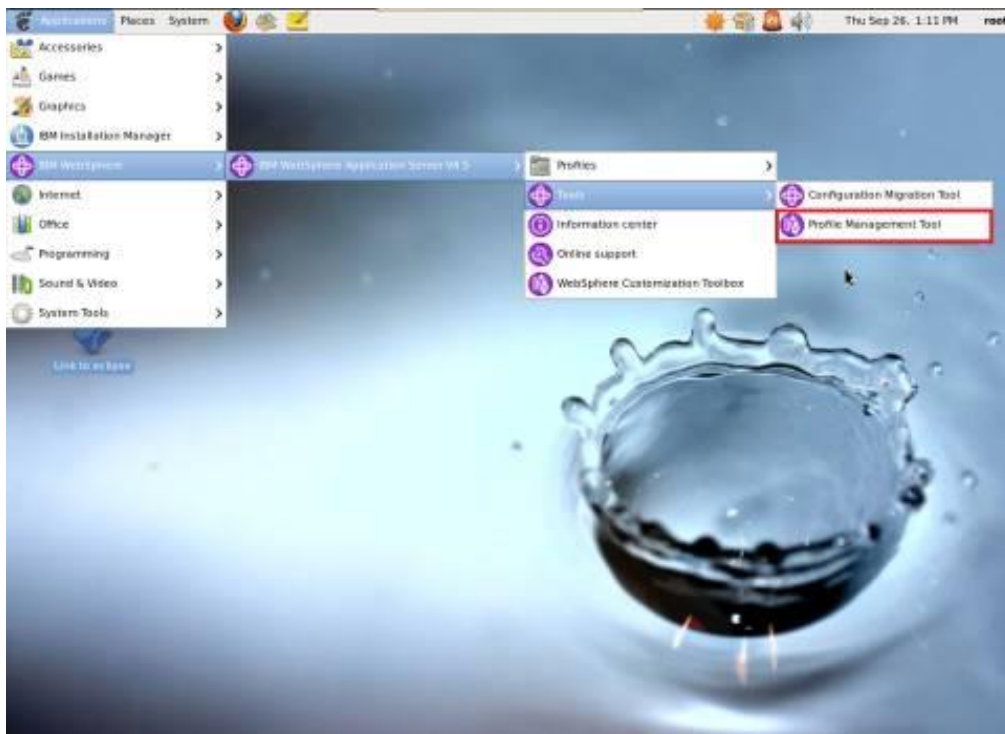
- For SSL configuration in Websphere, refer to the document SSL_Configuration_WAS.doc
- For application deployment, refer to document FCUBS_Application_WAS.doc
- For deployment of Gateway applications, refer to document GATEWAY_Applications_WAS.doc

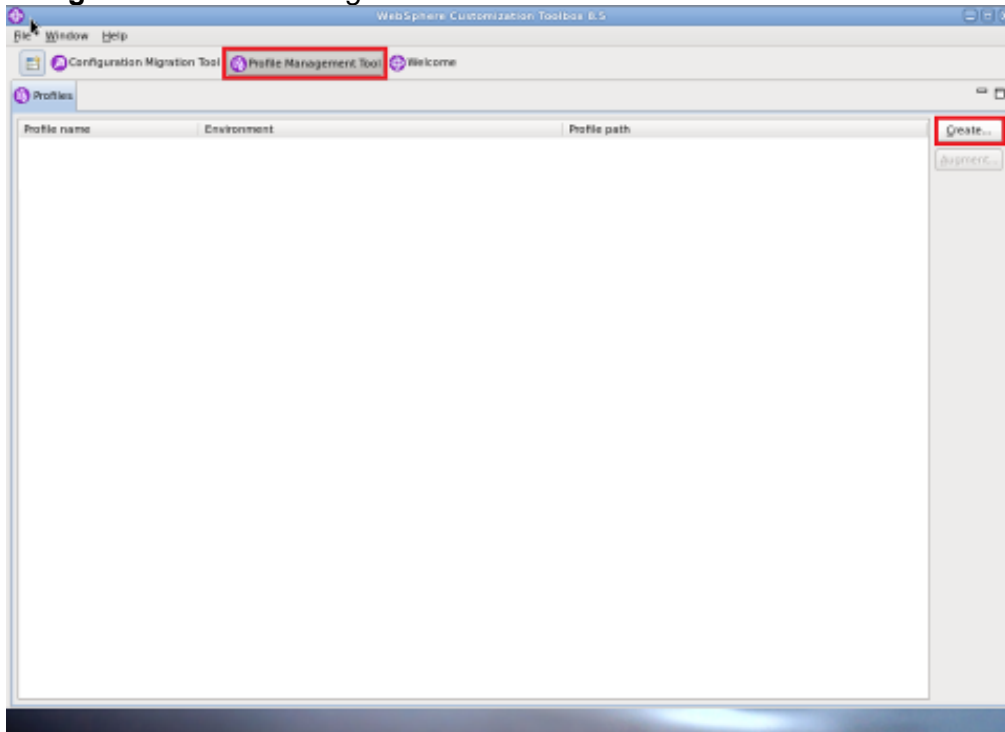
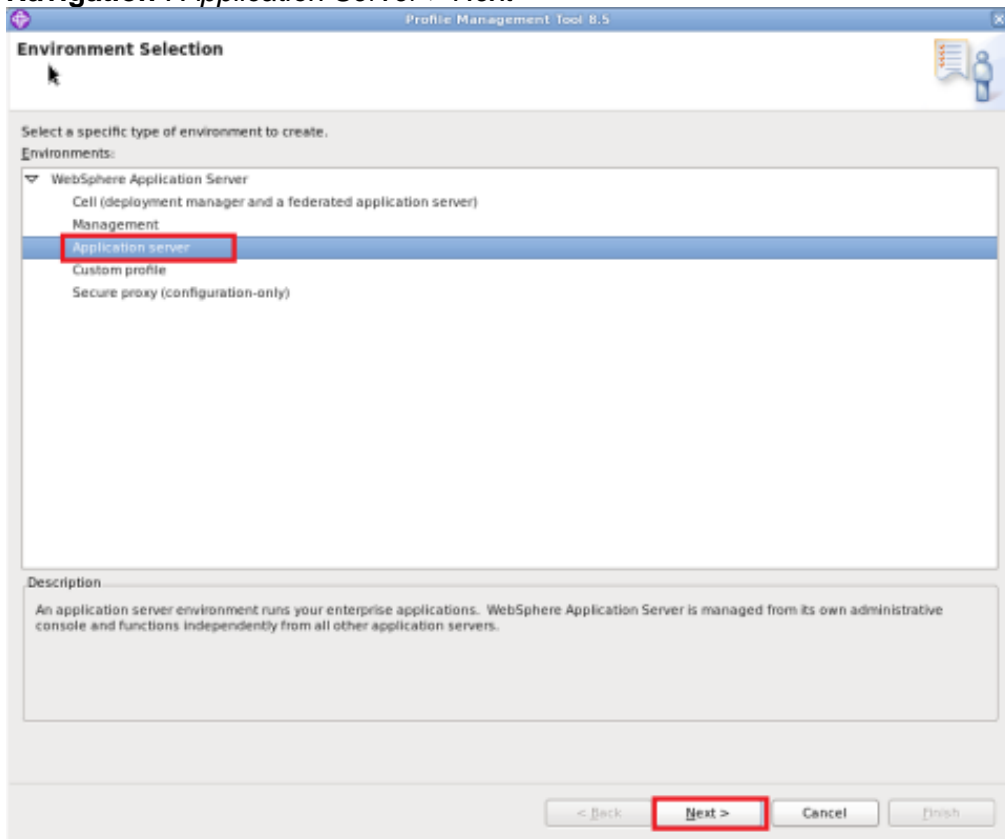
4. Steps involved for Clustering

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

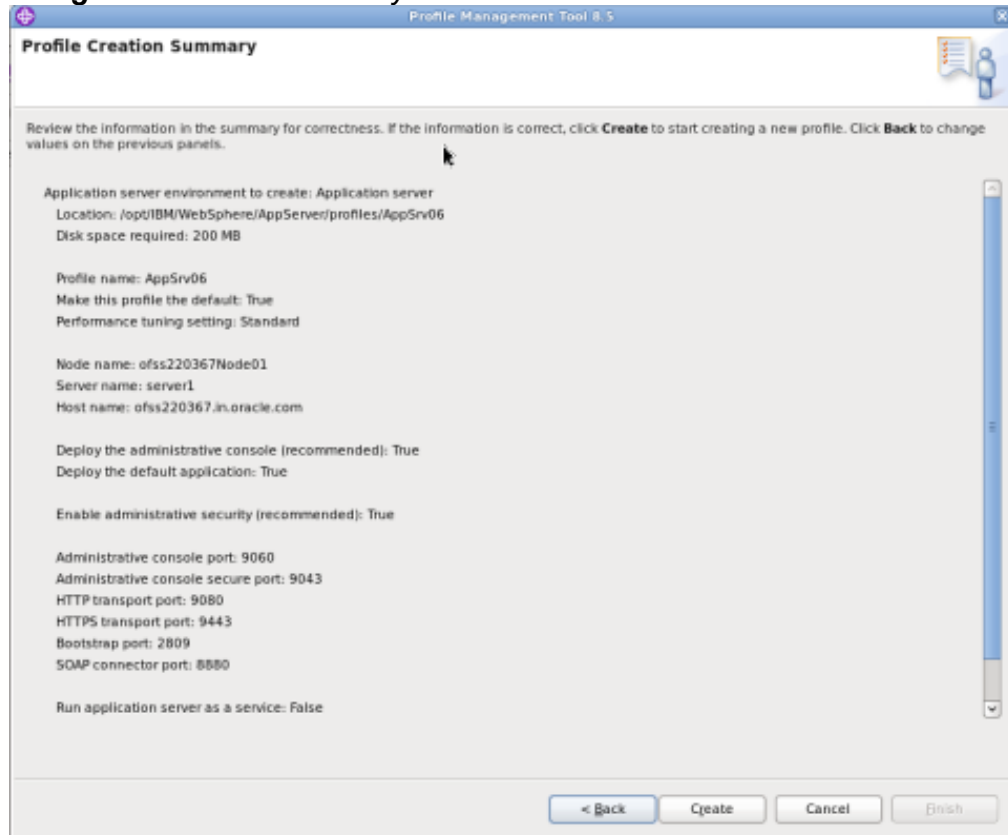
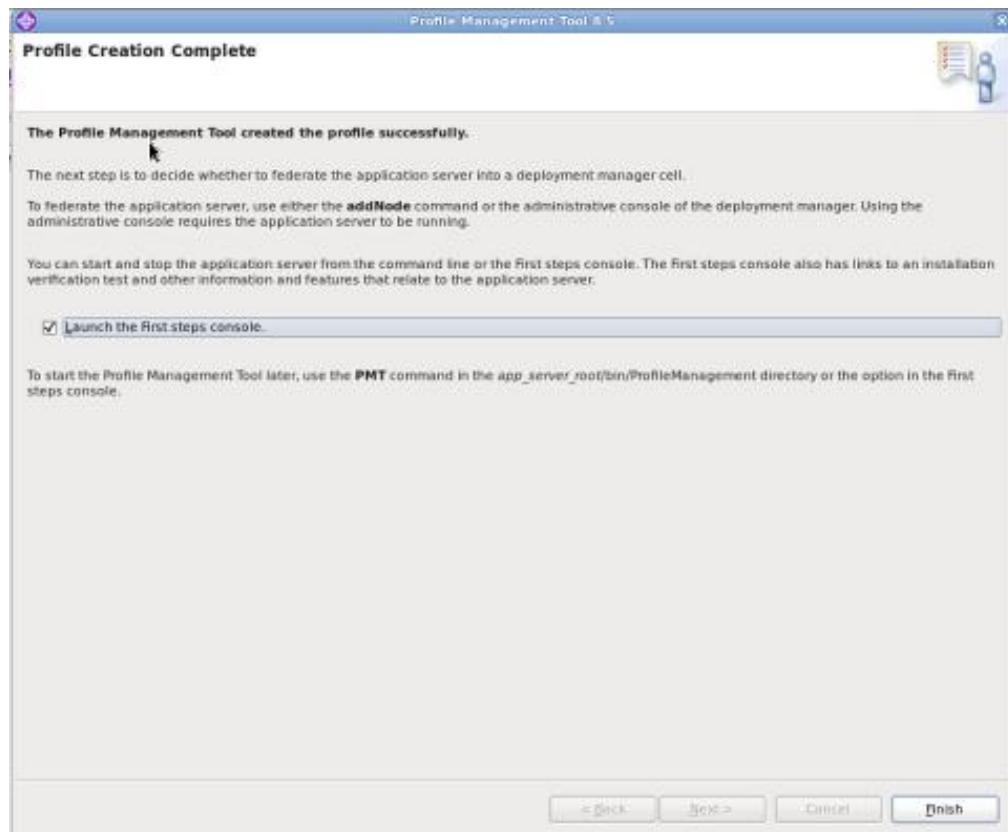
User name:
websphere

Password:

Confirm password:

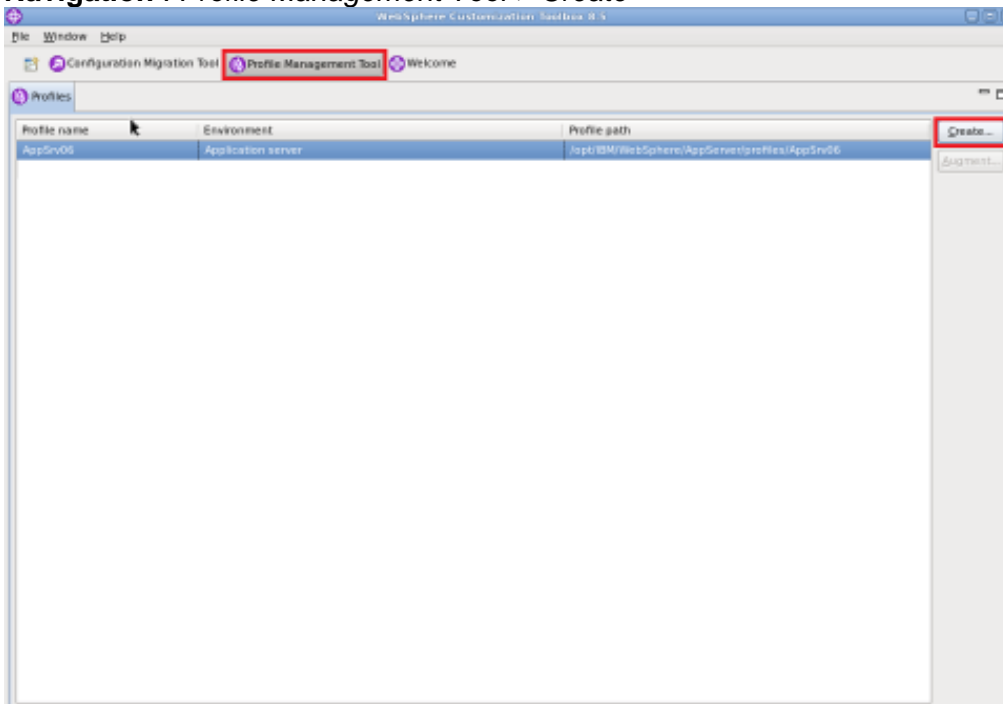
See the information center for more information about administrative security.
[View the online information center](#)

< Back **Next >** Cancel Finish

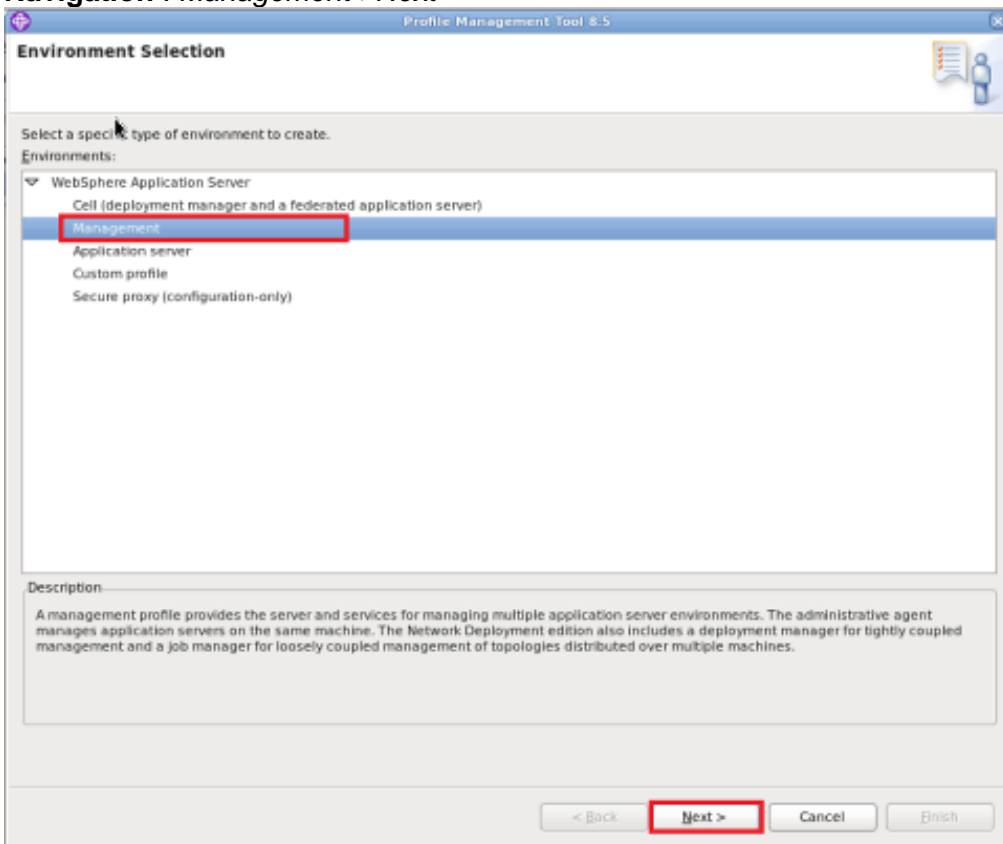
Navigation : Create Summary**Navigation : Finish**

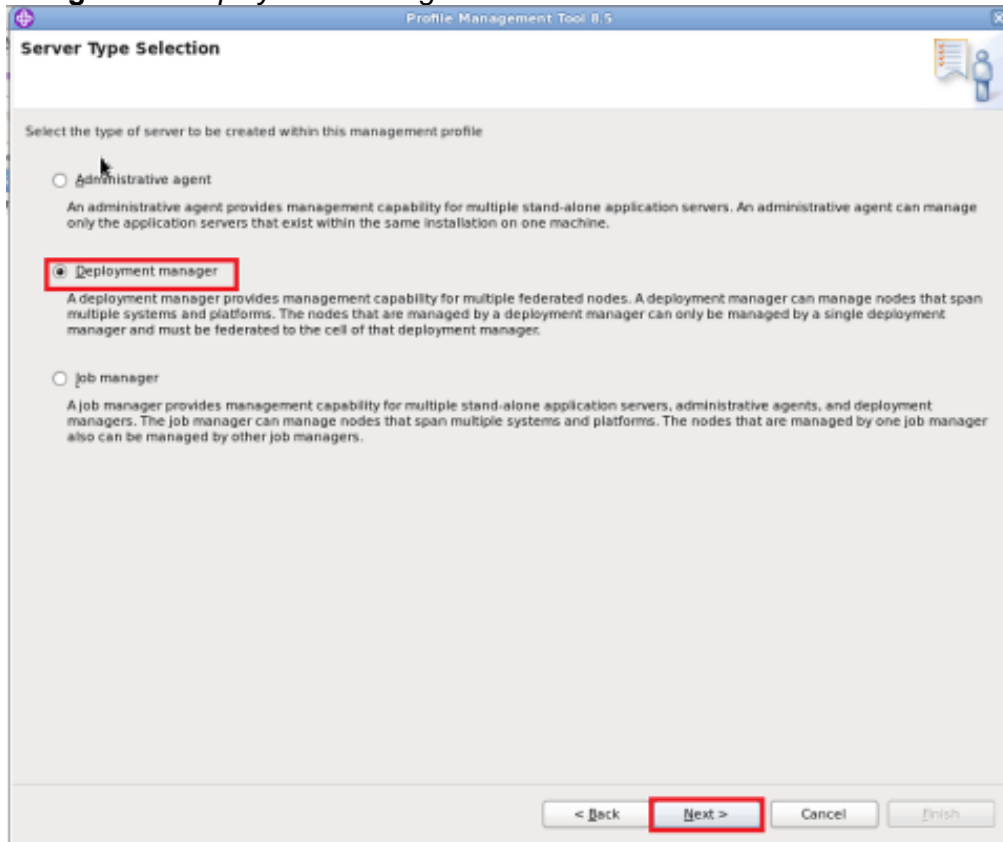
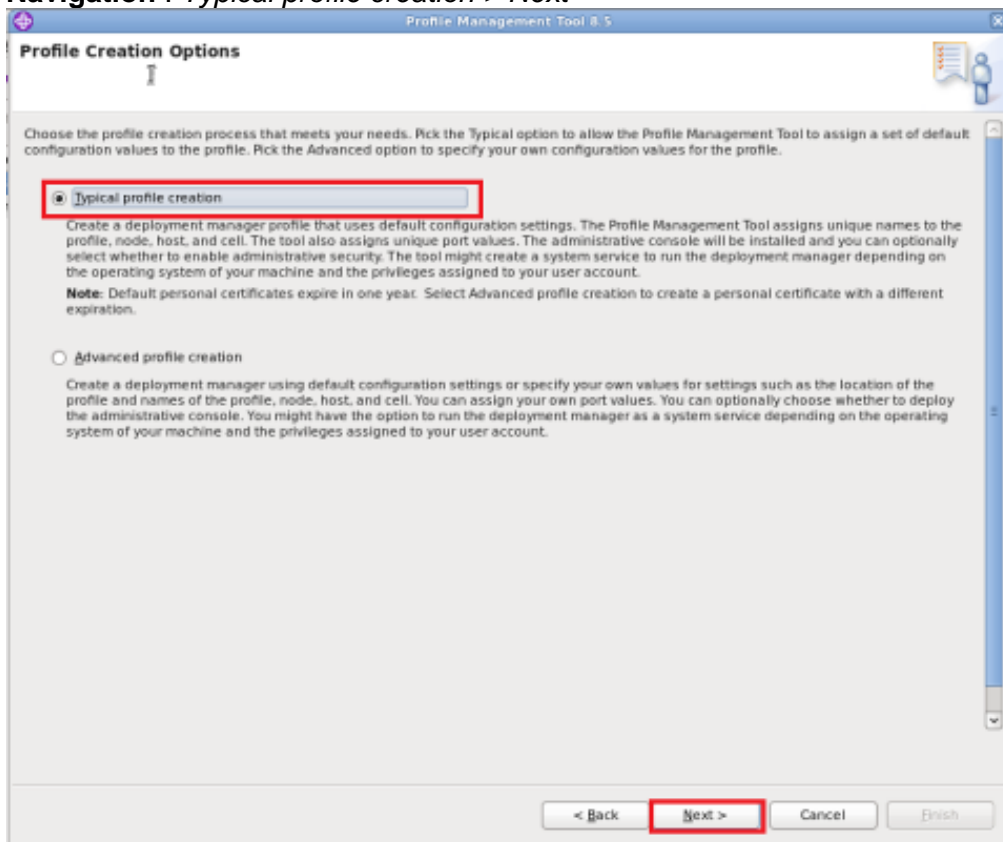
4.1.1 Create Deployment Manager Profile

Navigation : *Profile Management Tool > Create*



Navigation : *Management >Next*



Navigation : *Deployment Manager > Next***Navigation : *Typical profile creation > Next***

Navigation : Enable administrative security > Next

Profile Management Tool 8.5

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 Management Tool 8.5

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

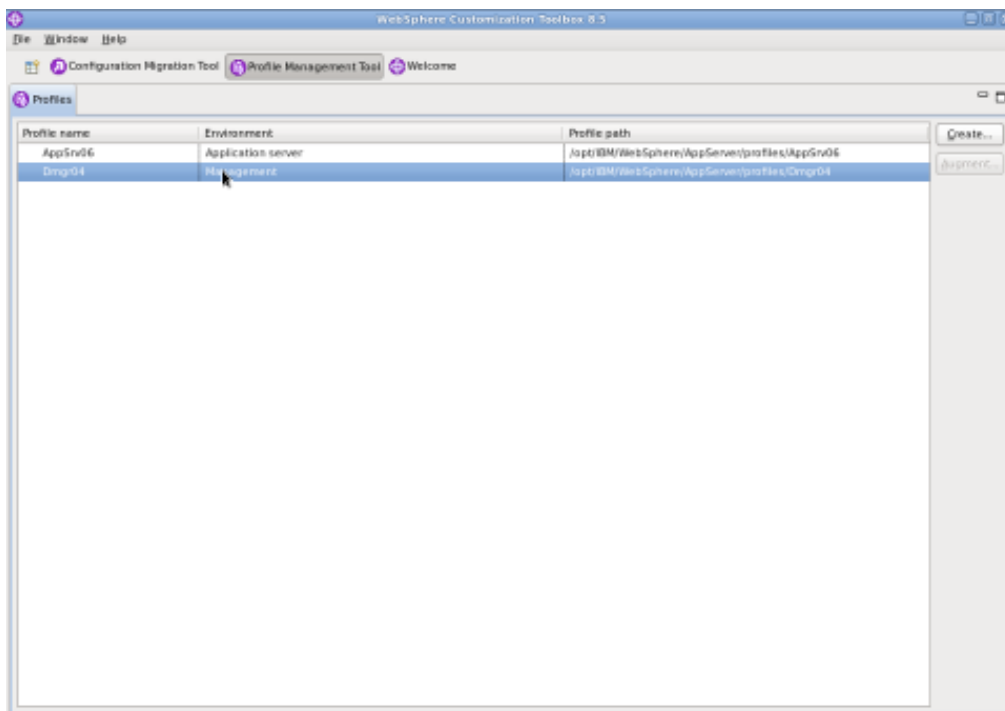
Deploy the administrative console (recommended): True

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

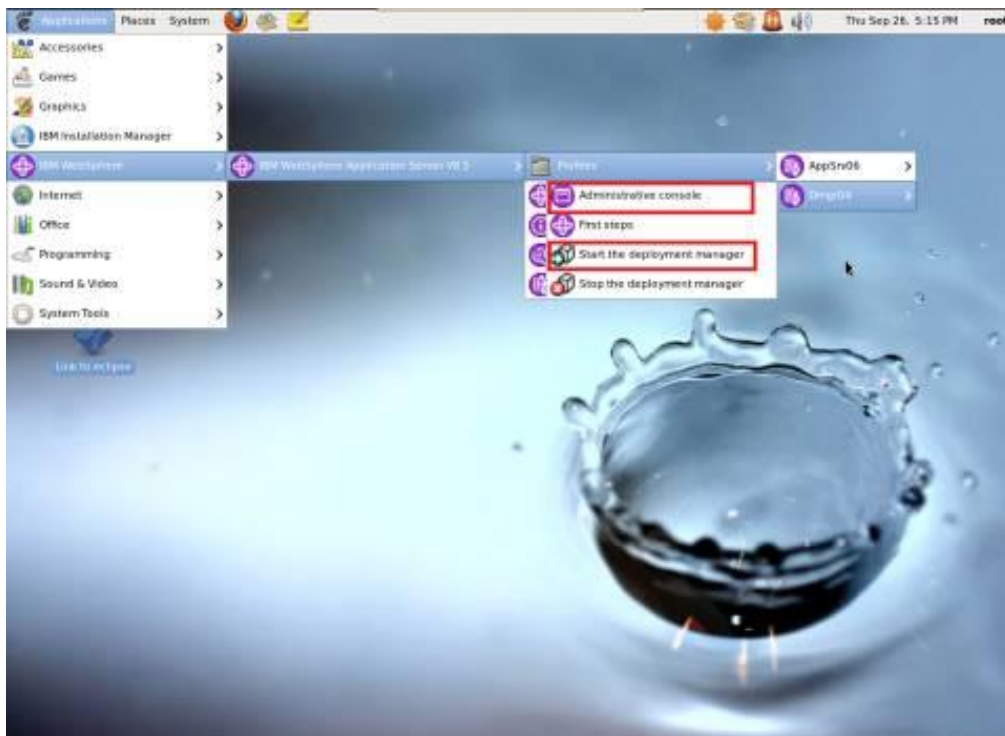
Run deployment manager as a service: False

< 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 shows the WebSphere software administration console. The left sidebar contains a navigation tree with categories like Welcome, Guided Activities, Servers, Applications, Jobs, Services, Resources, Runtime Operations, Security, Operational policies, Environment, System administration, Centralized Installation Manager, Task Management, Users and Groups, Monitoring and Tuning, Troubleshooting, Service integration, and UDDI. The main content area displays the 'Add Node' dialog box. The dialog has a title bar 'Add Node' and a 'Close page' link. The main text reads: 'Use this page to add either a managed or an unmanaged node.' Below this, there are three radio button options: 'Managed node' (selected and highlighted with a red box), 'Unmanaged node', and 'Recover an existing node'. Each option has a brief description. At the bottom of the dialog, there are 'Next' and 'Cancel' buttons, with 'Next' highlighted by a red box.

WebSphere software

Welcome admin Help Logout

Views: All tasks

Nodes

Close page

Add Node

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.

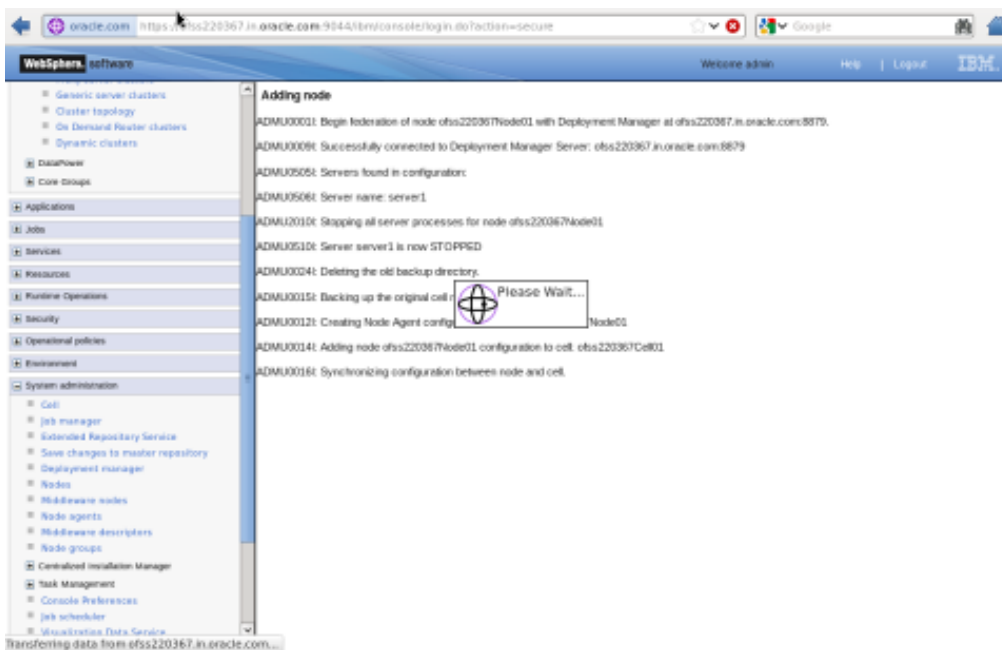
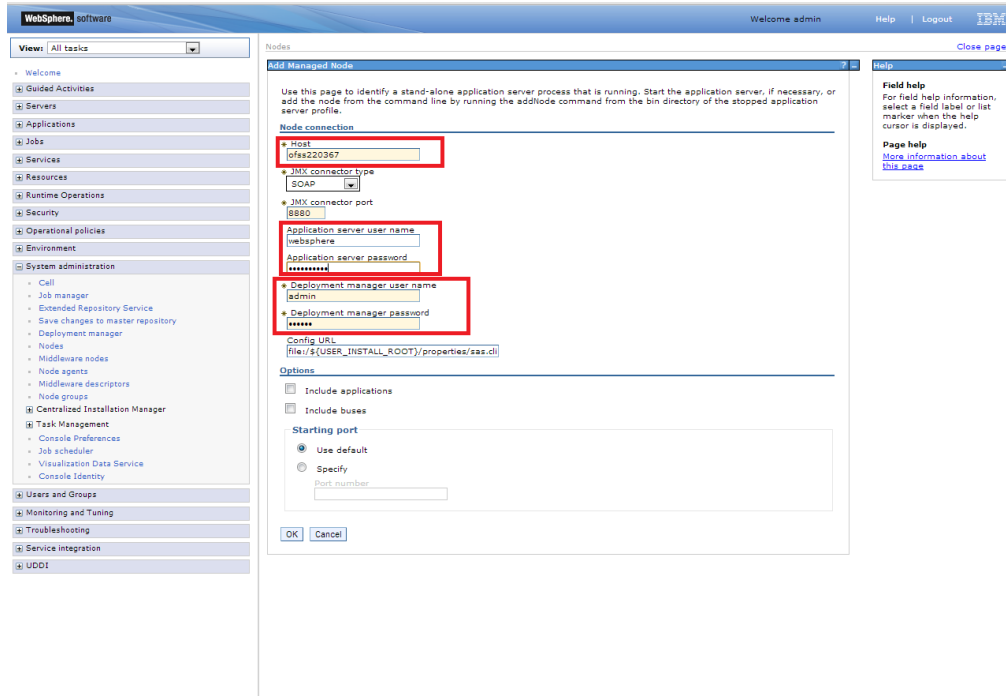
Unmanaged node
Specifies the creation of an unmanaged node. An unmanaged node represents a node in the topology that does not have an application server process or a node agent process. Unmanaged nodes are for other server processes, such as web servers that exist on their own node in the topology.

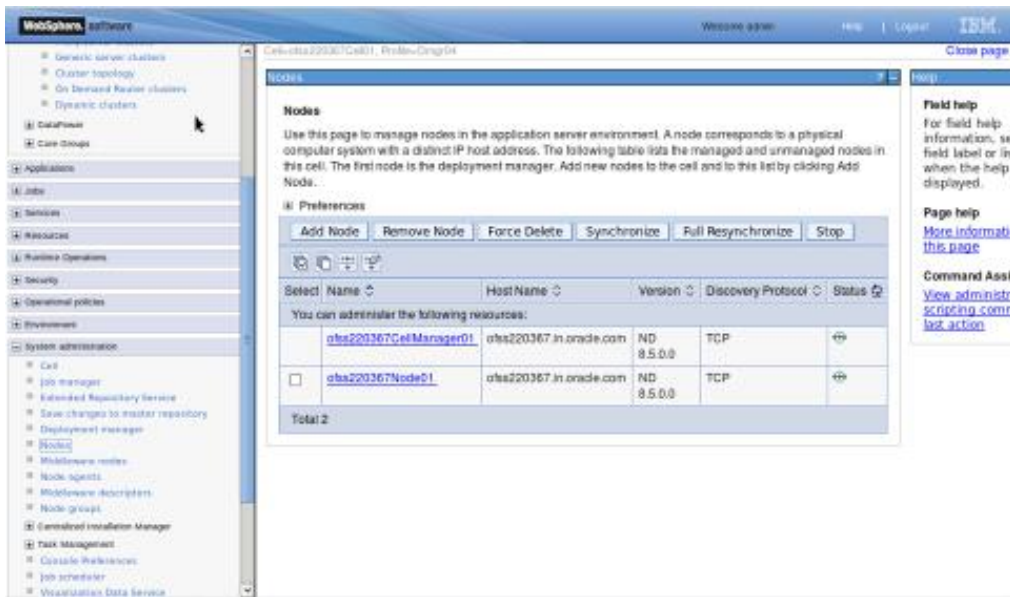
Recover an existing node
Specifies to replace a damaged node in the cell. First, create a new profile to replace the damaged node and give it the same profile and node names. Then use this option to replace the damaged node in the cell with the new node.

Next Cancel

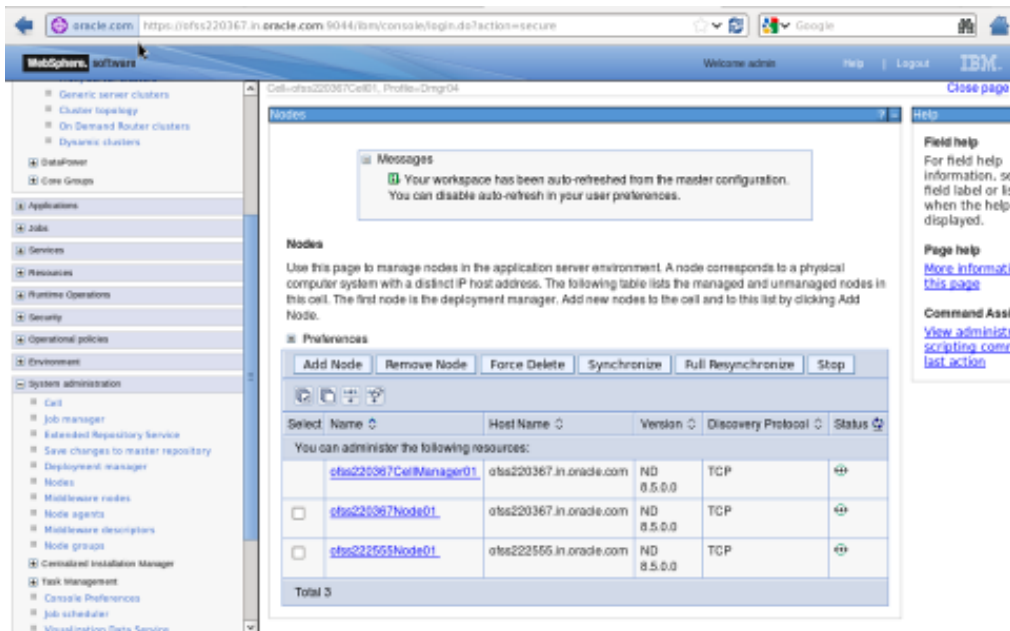
Provide the following field information and Click 'OK'

- 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

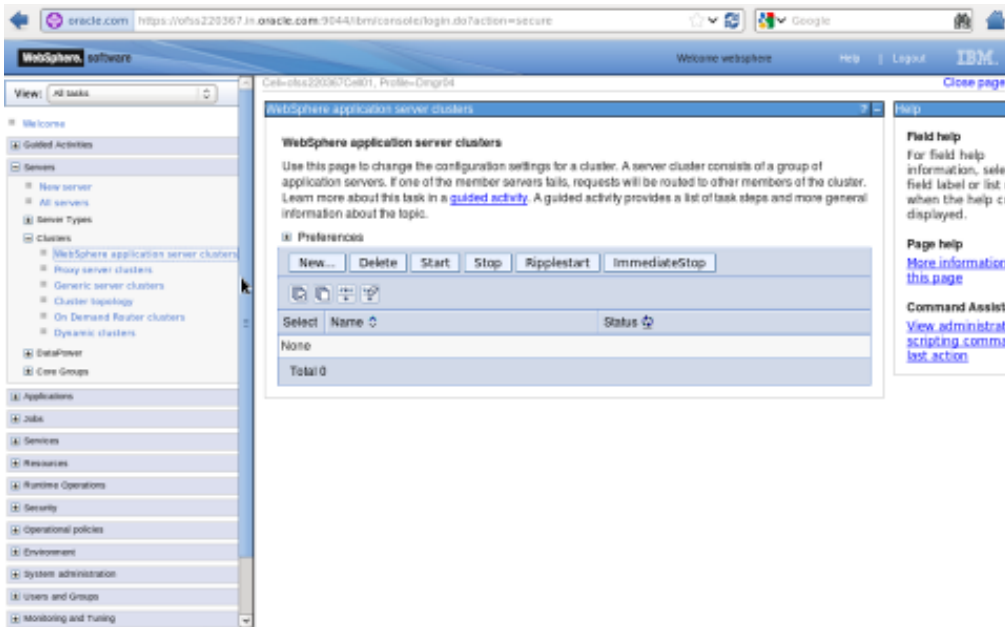
Select	Name	Node	Host Name	Version	Status
<input type="checkbox"/>	nodeagent	otss222555Node01	otss222555.in.oracle.com	ND 8.5.0.0	
<input type="checkbox"/>	nodeagent	otss220367Node01	otss220367.in.oracle.com	ND 8.5.0.0	
Total 2					

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

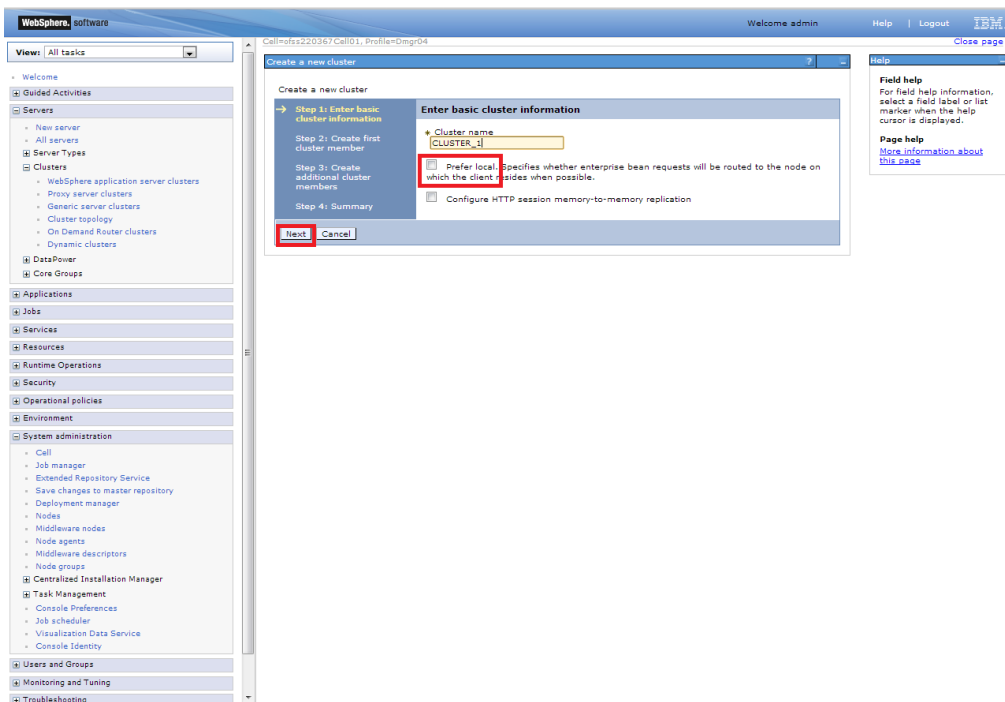
Page help
[More information this page](#)

4.3 Create Cluster

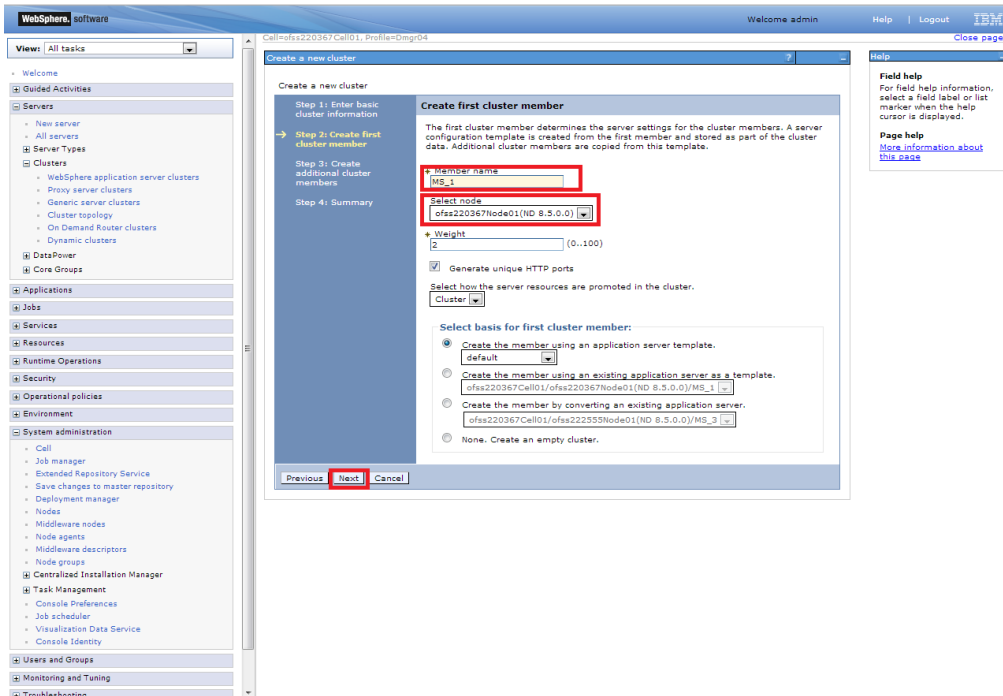
Navigation: Servers>Clusters> WebSphere application server clusters > New



Navigation : Uncheck [Prefer Local] > Next

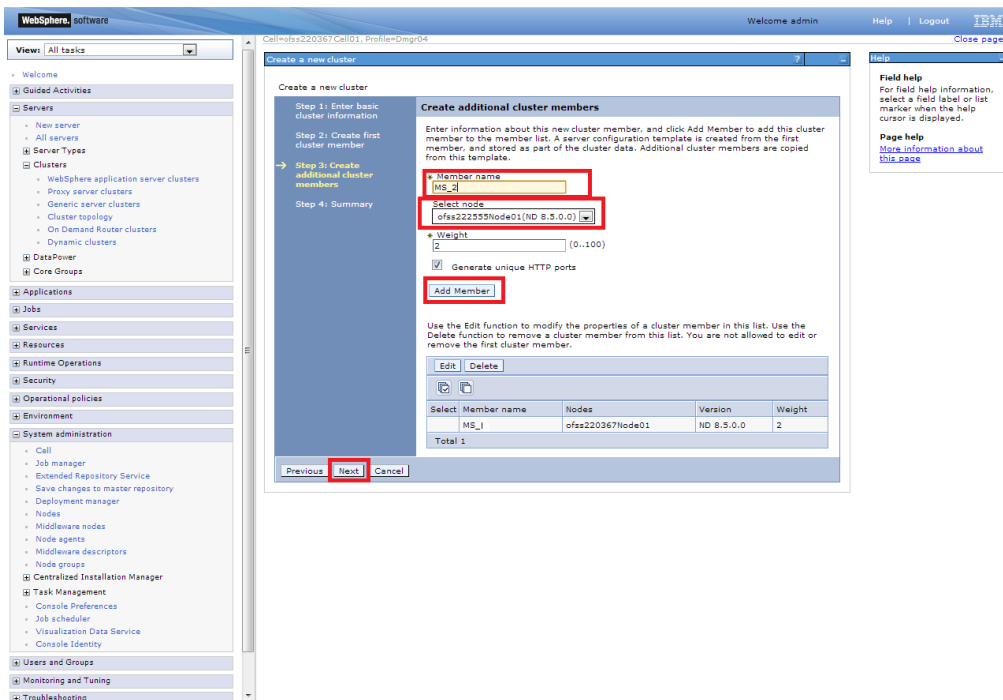


4.3.1 Add Cluster Members



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 'Step 3: Create additional cluster members'. It includes a 'Member name' field, a 'Select node' dropdown menu (currently showing 'ofs222555Node01(ND 8.5.0.0)'), a 'Weight' field (set to 2), and a checked 'Generate unique HTTP ports' option. Below these fields is an 'Add Member' button. A table lists the 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 for 'Edit' and 'Delete' are visible above the table. A 'Help' sidebar on the right contains 'Field help' and 'Page help' sections.

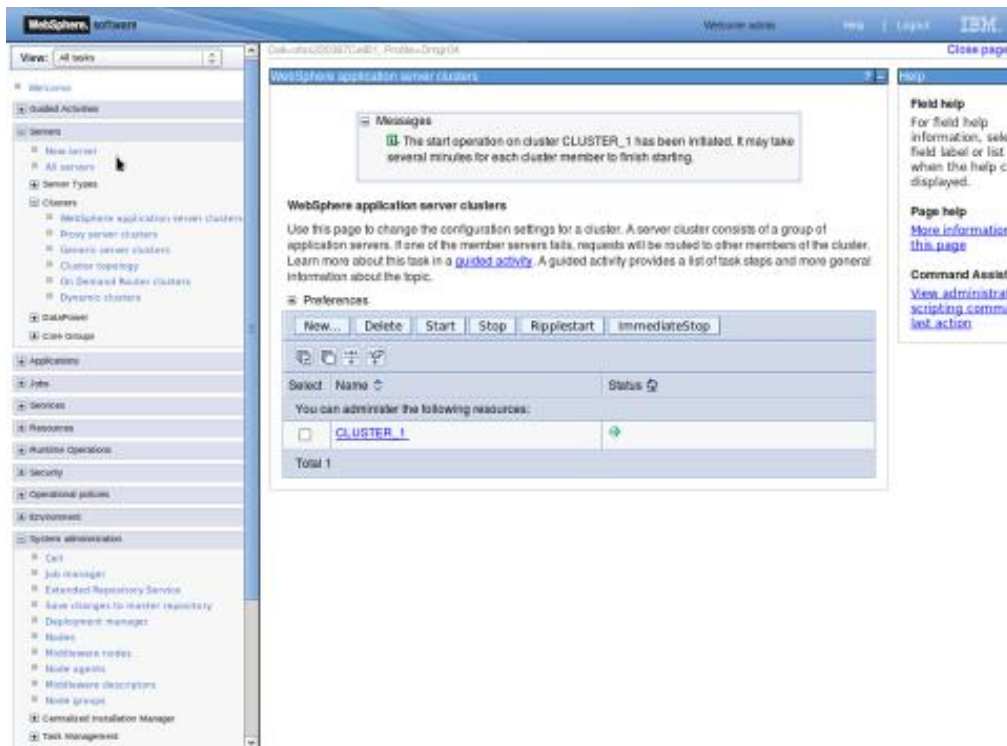
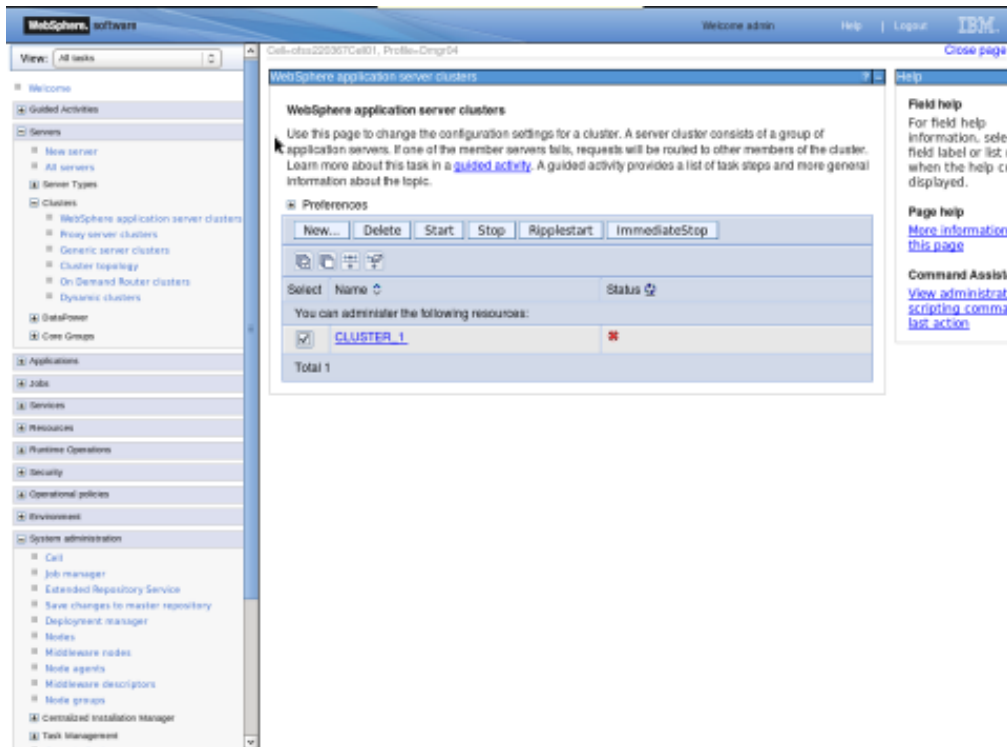
Navigation : Finish

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 'Step 4: Summary'. It includes a 'Summary' section with a table of options and values:

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

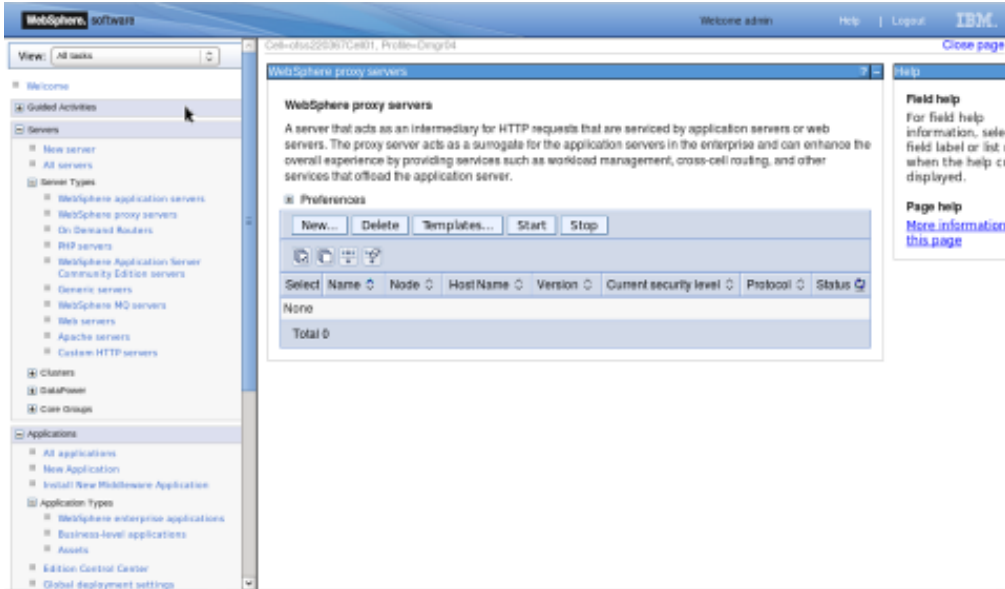
Buttons for 'Previous', 'Finish', and 'Cancel' are visible at the bottom. A 'Help' sidebar on the right contains 'Field help' and 'Page help' sections.

4.3.2 Start Cluster

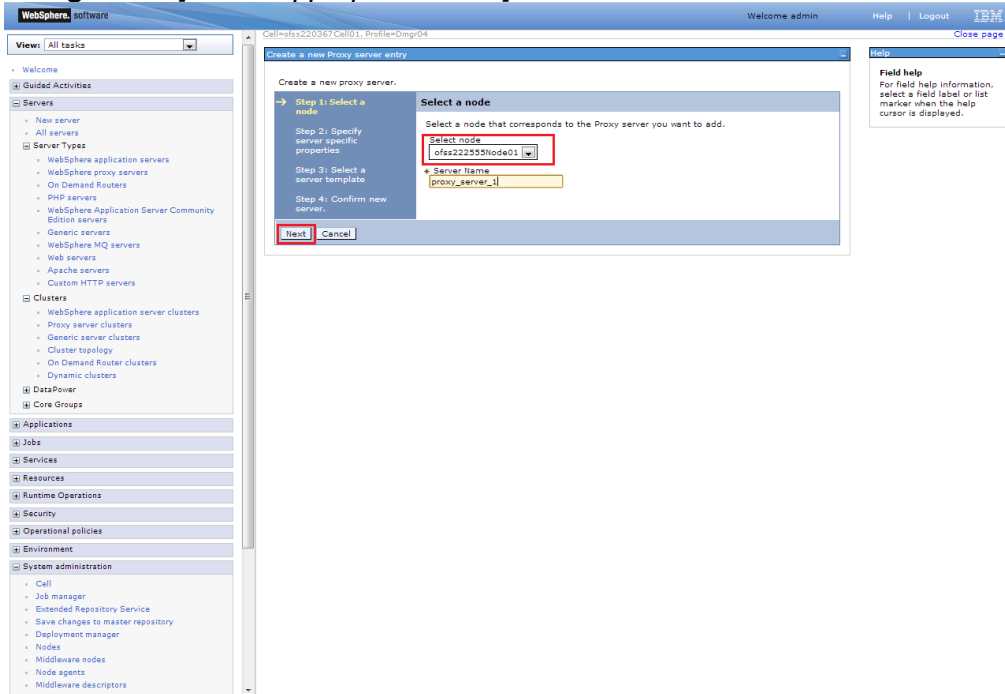


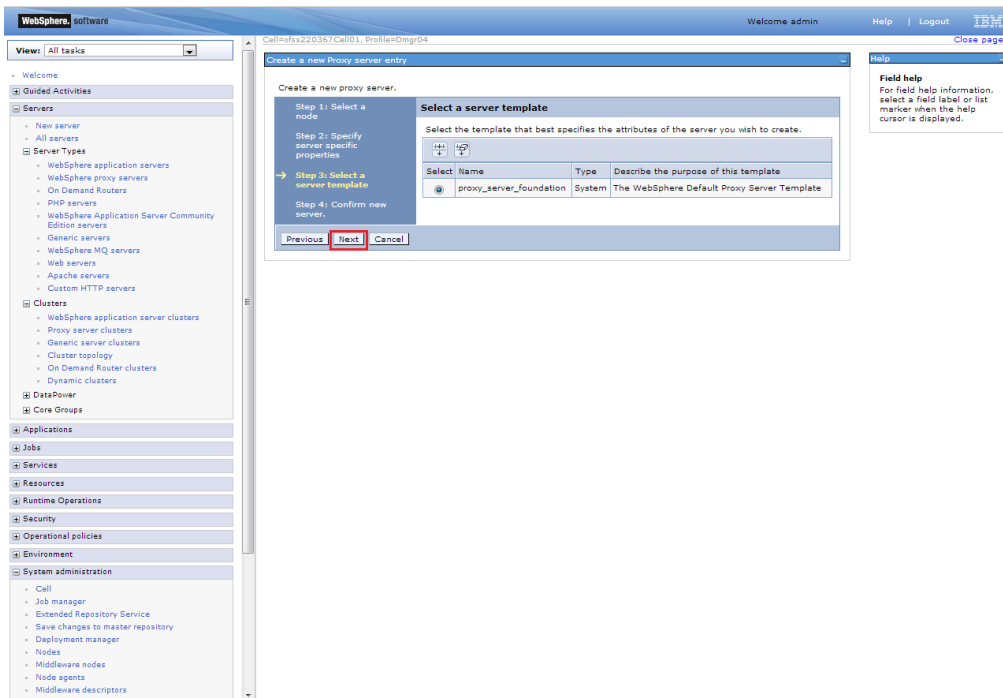
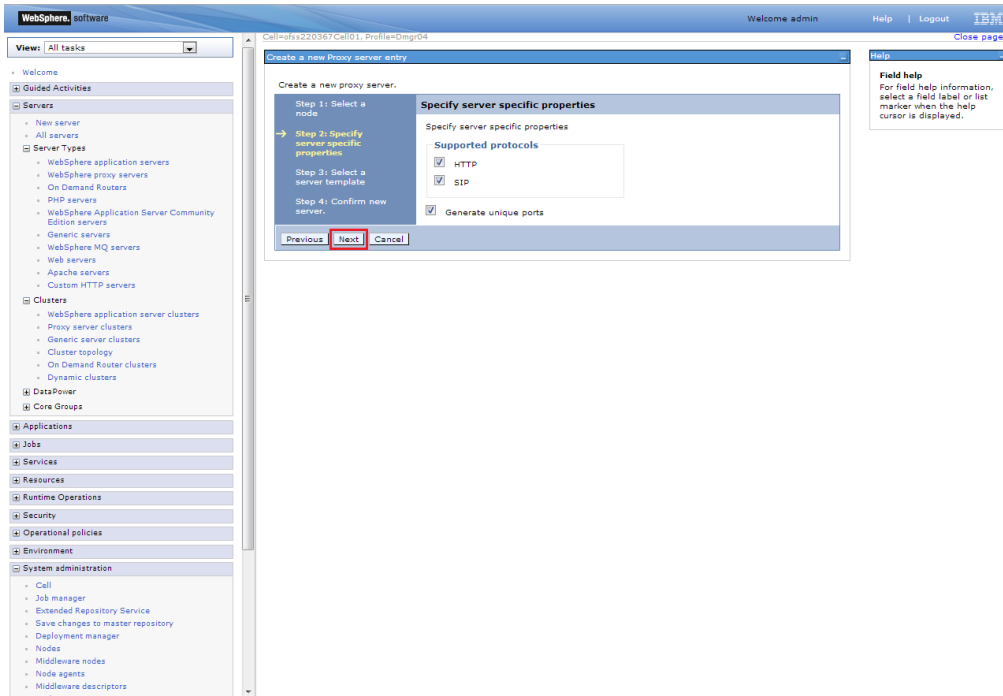
4.4 Create Proxy Server

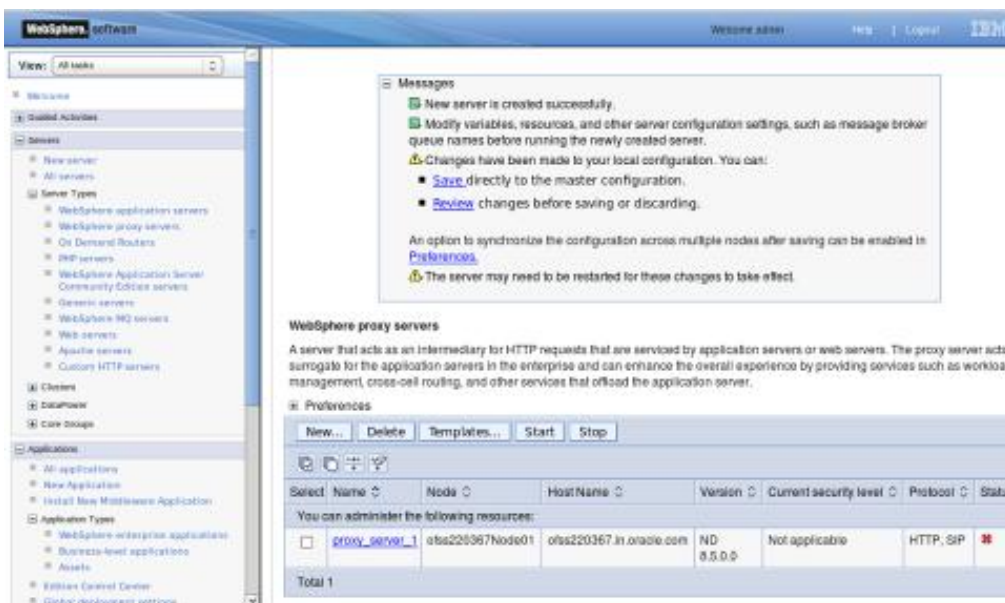
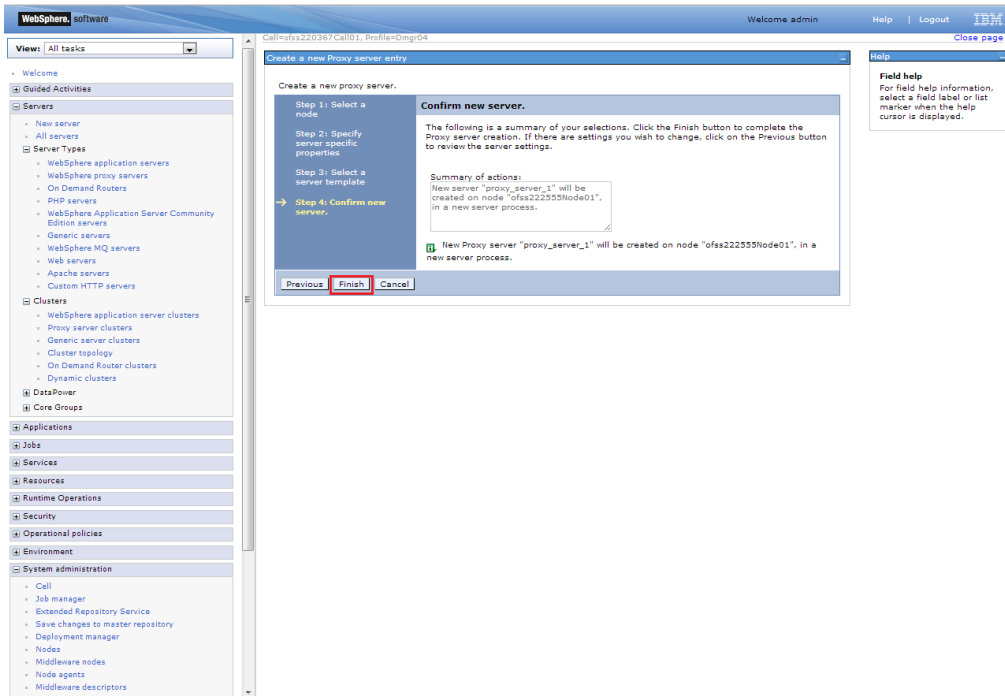
Navigation : Servers > Server Types > WebSphere proxy servers > New



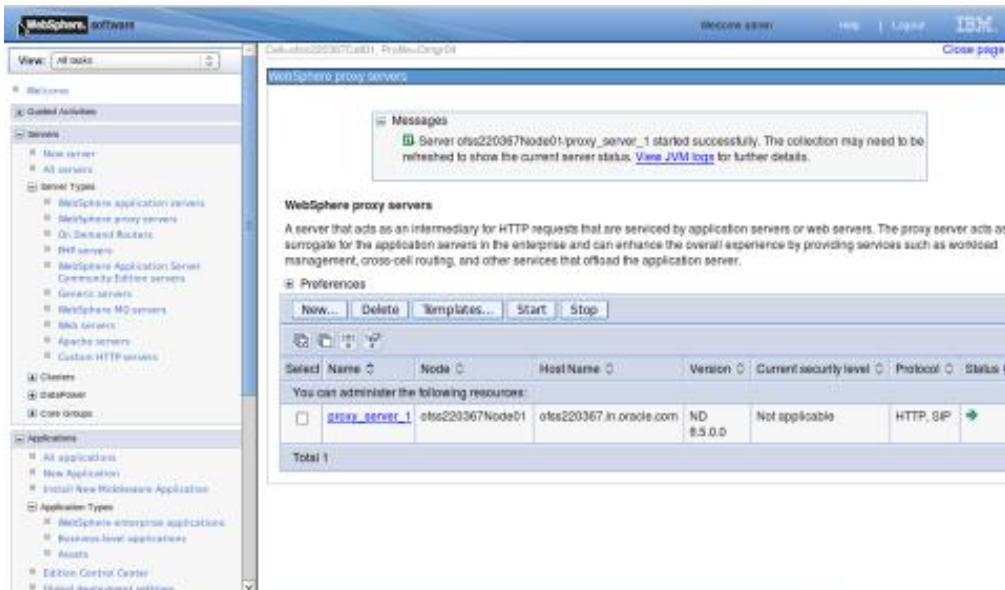
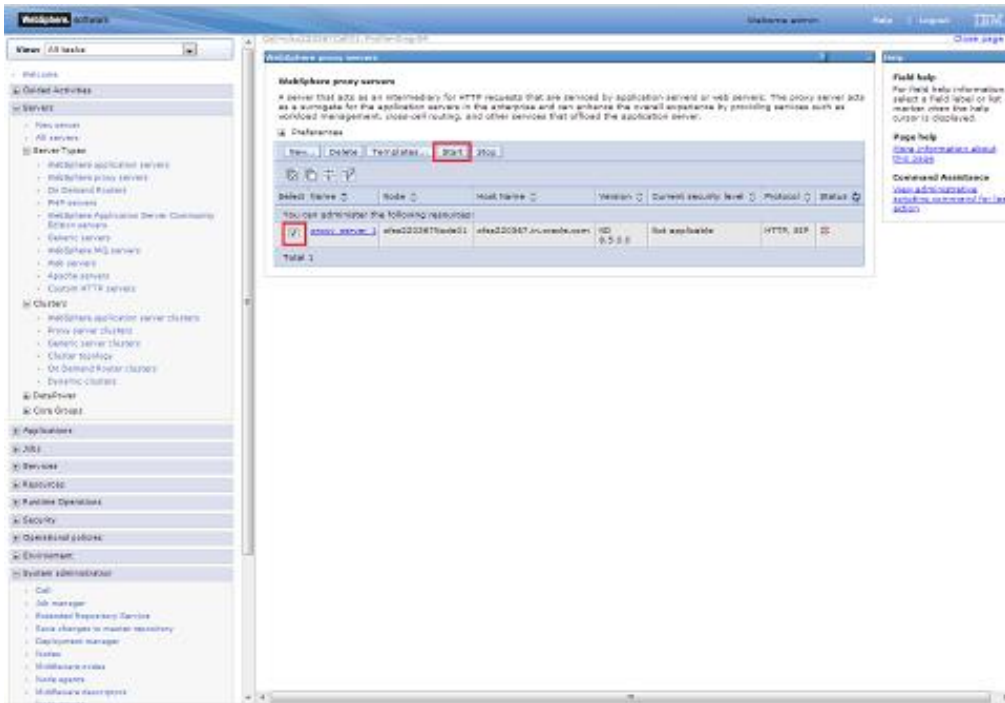
Navigation : [Select appropriate Node] > Next





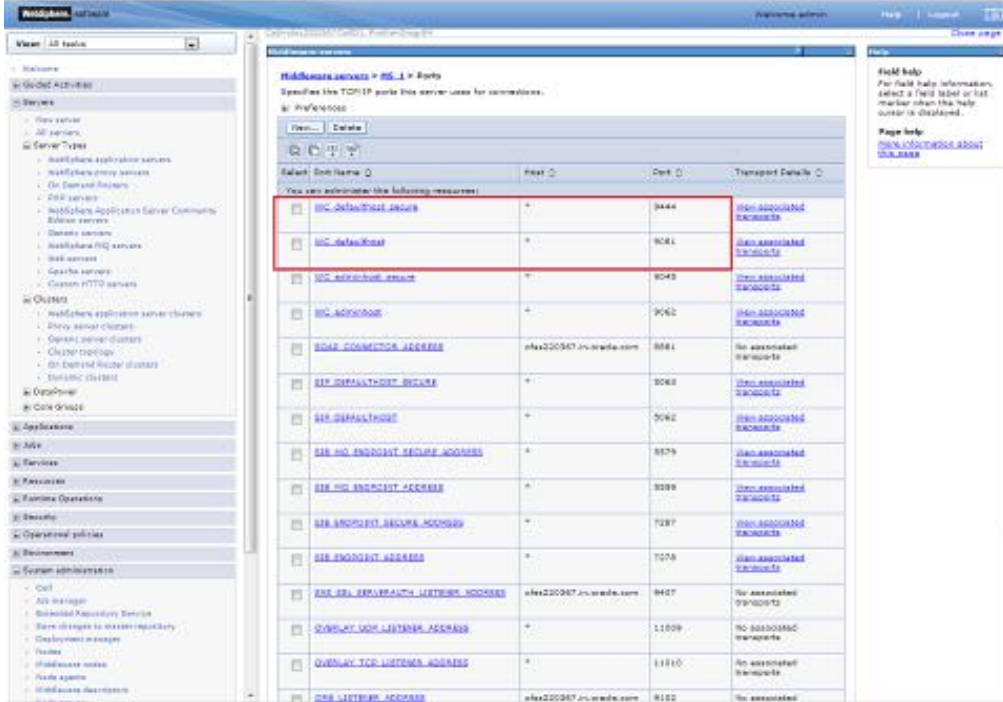


4.4.1 Start Proxy Server

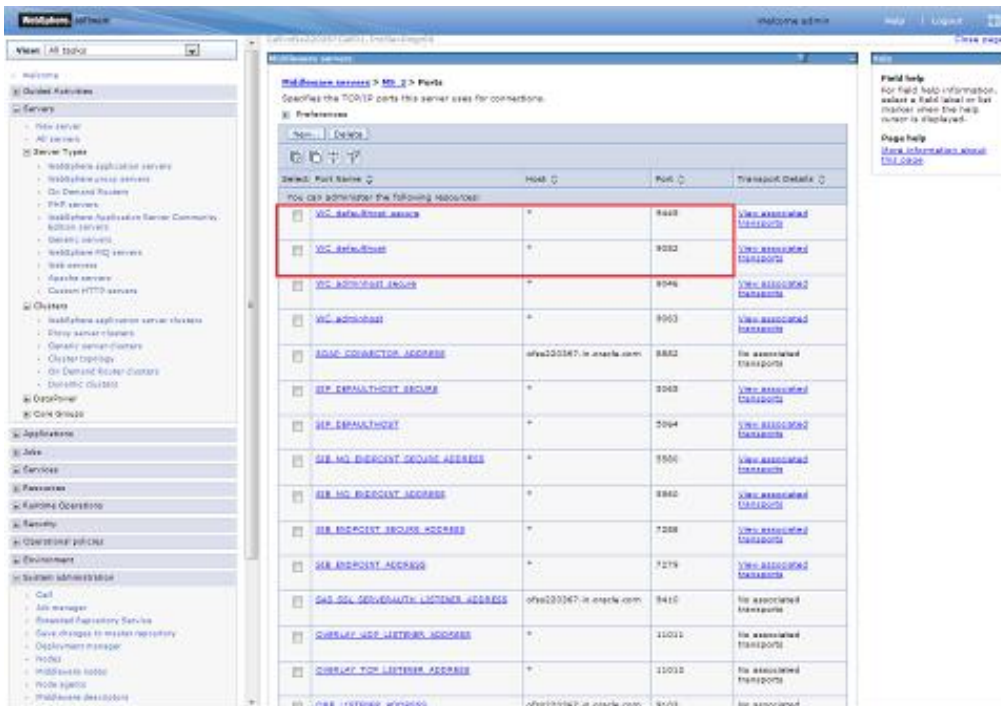


4.5 Configure Virtual Host

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' section. 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'.

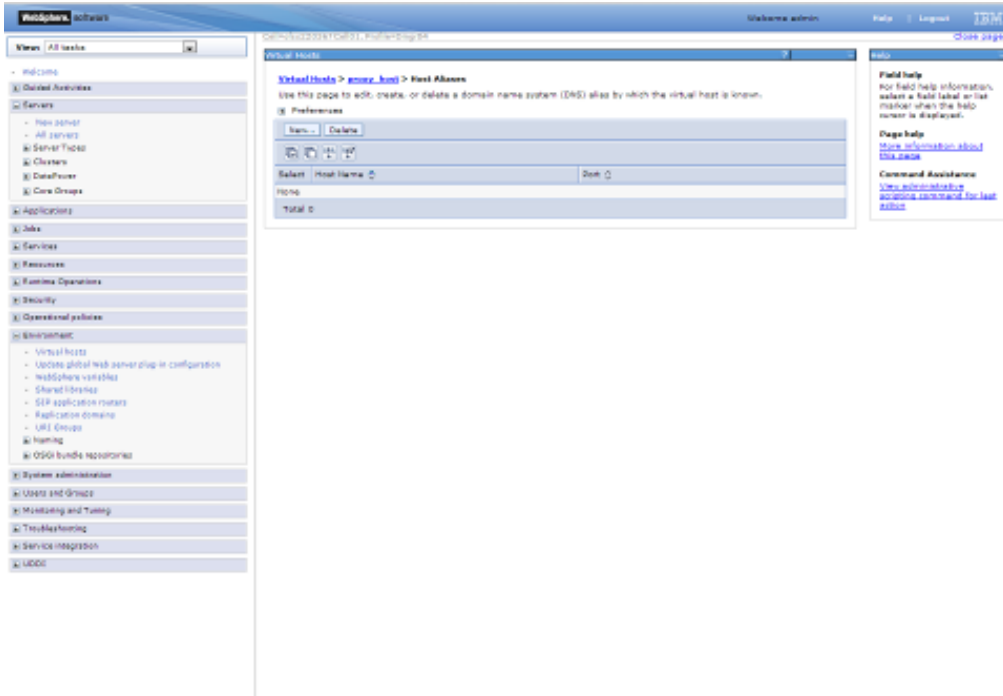
Navigation : *Host Aliases*

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' section. 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:

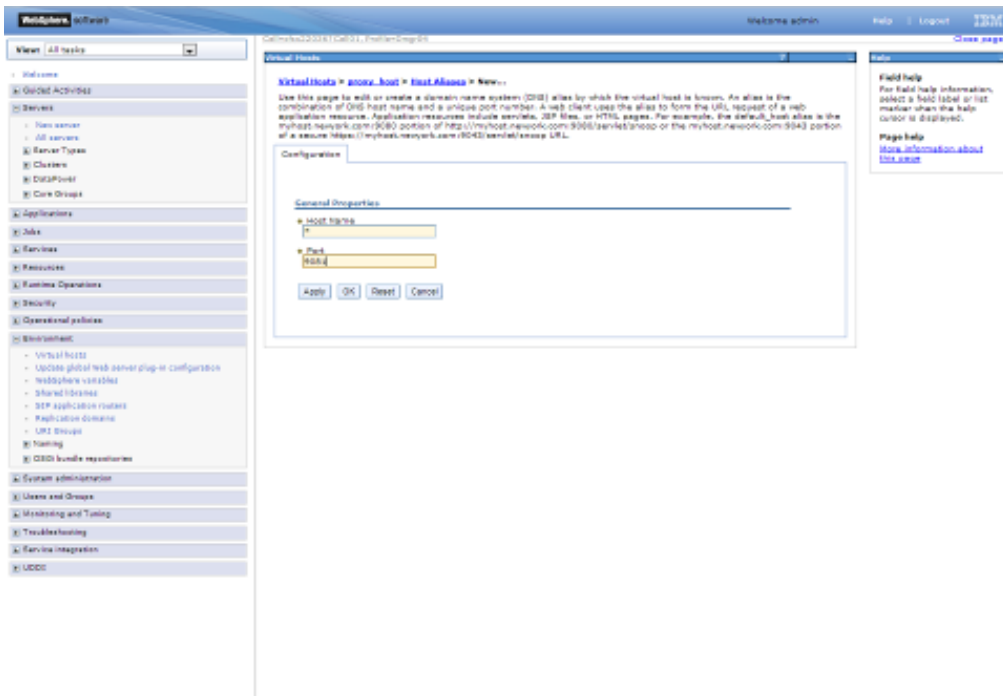
Name	Host Alias
<input type="checkbox"/>	proxy_host
<input type="checkbox"/>	proxy_host

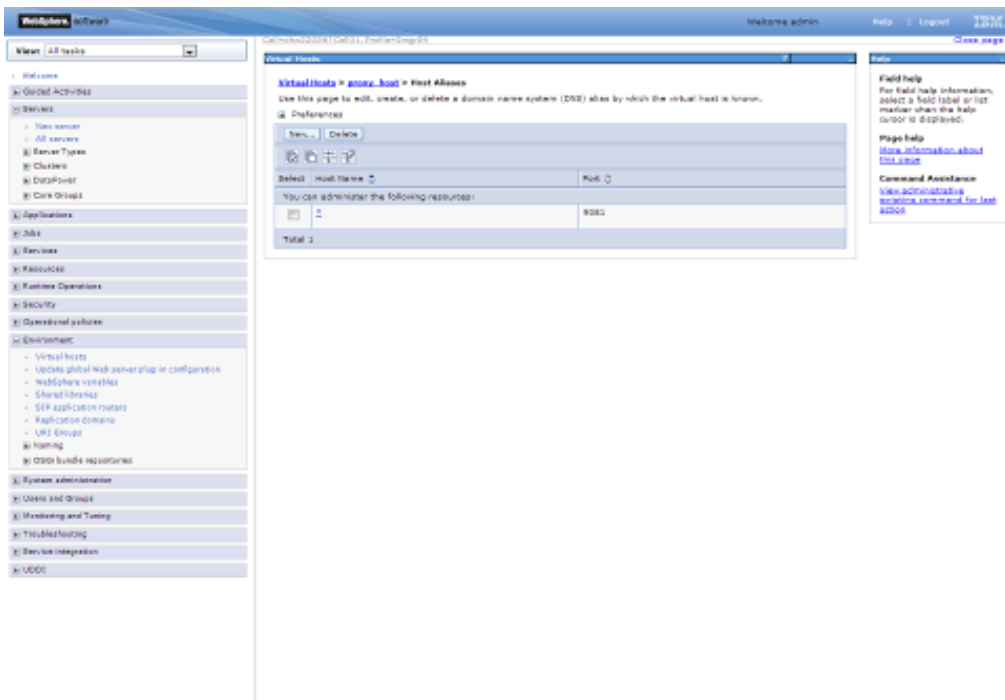
The table indicates a 'Total 2' aliases. On the right side, there are links for 'Field help', 'Page help', and 'Command Assistance'.

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

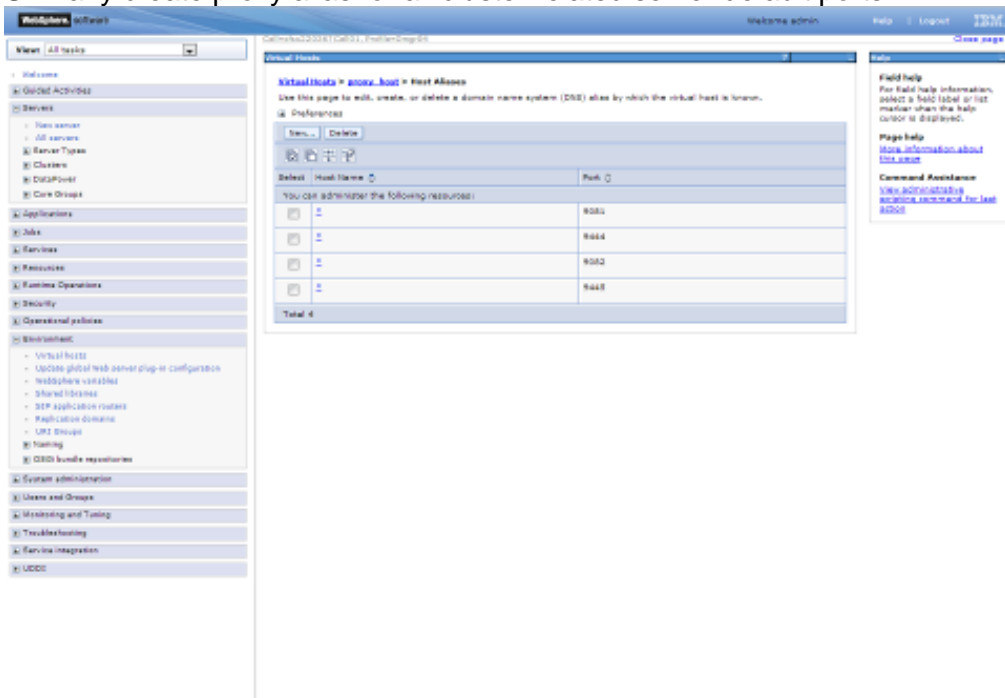


Create New Alias for default port in managed server <<9081>>:



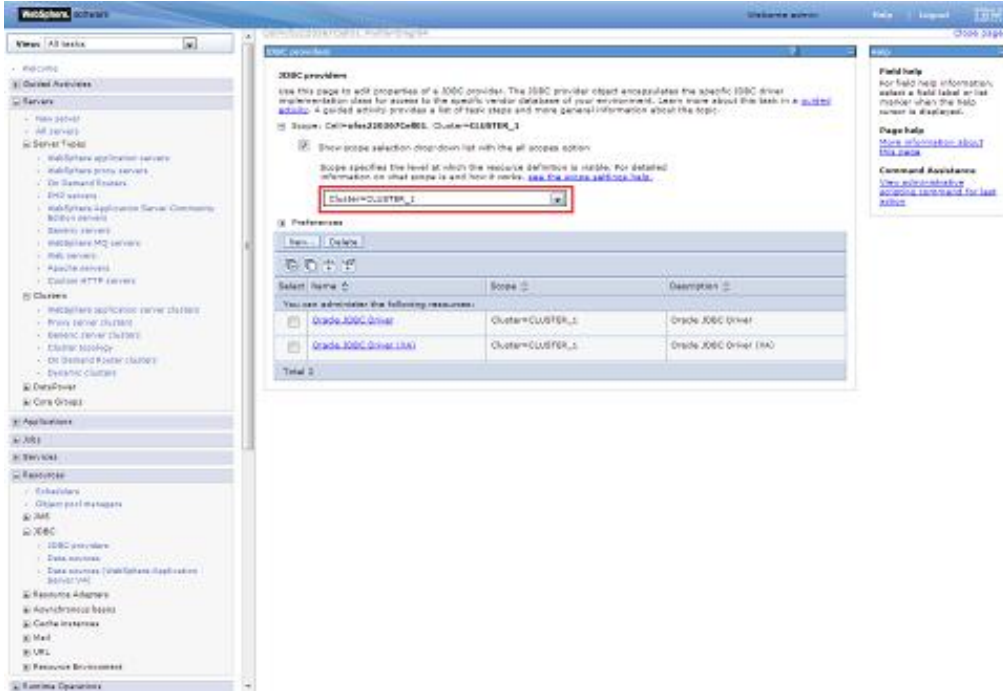


Similarly create proxy alias for all cluster related server default ports

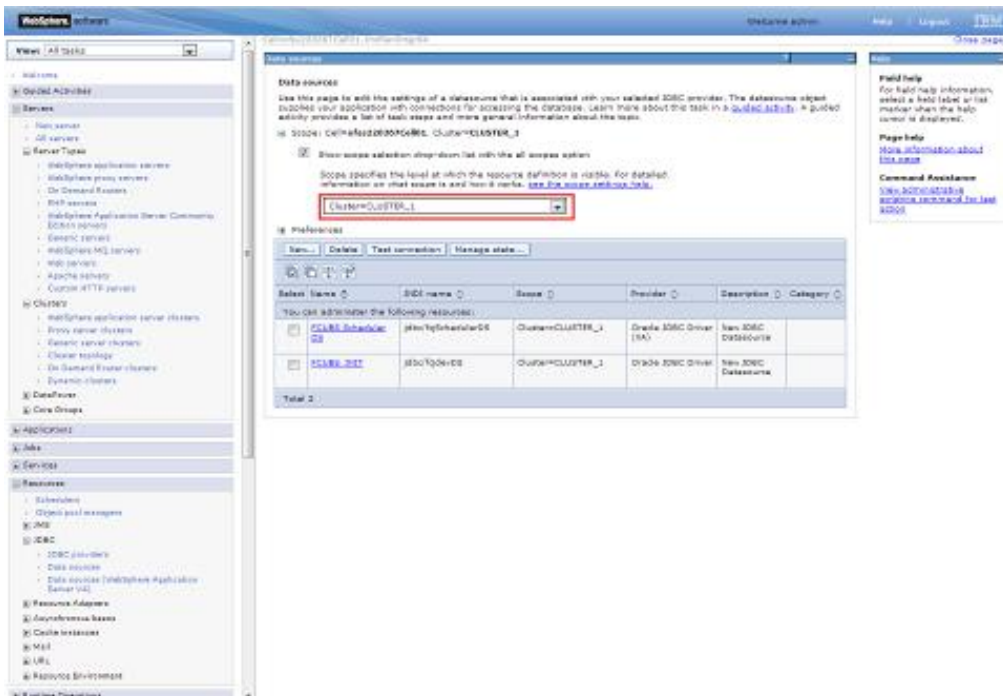


5. Create Resources in Cluster Scope

JDBC Provider :



Datasource :



Queue Connection Factory

Queue connection factories
A queue connection factory is used to create connections to the associated JMS provider of the JMS queue destination, for point-to-point messaging.

Scope: `Cell=flexcube001Cell01, Cluster=CLUSTER_1`

Show scope selection drop-down list with the all scope 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 selection help](#).

Cluster=CLUSTER_1

Preferences

SELECT	Name	JMS name	Provider	Description	Scope
<input type="checkbox"/>	EMRQCF	EMRQCF	WebSphere MQ messaging provider		Cluster=CLUSTER_1
<input type="checkbox"/>	FC_QCF	FC_QCF	WebSphere MQ messaging provider		Cluster=CLUSTER_1
<input type="checkbox"/>	HRBQCF	HRBQCF	WebSphere MQ messaging provider		Cluster=CLUSTER_1
<input type="checkbox"/>	SubscribedQCF	SubscribedQCF	WebSphere MQ messaging provider		Cluster=CLUSTER_1

Total: 4

JMS Queue:

JMS Queue
A JMS queue is used as a destination for point-to-point messaging.

Scope: `Cell=flexcube001Cell01, Cluster=CLUSTER_1`

Show scope selection drop-down list with the all scope 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 selection help](#).

Cluster=CLUSTER_1

Preferences

SELECT	Name	JMS name	Provider	Description	Scope
<input type="checkbox"/>	EMR_QUEUE	EMR_QUEUE	WebSphere MQ messaging provider		Cluster=CLUSTER_1
<input type="checkbox"/>	EMR_OUT_QUEUE	EMR_OUT_QUEUE	WebSphere MQ messaging provider		Cluster=CLUSTER_1
<input type="checkbox"/>	FC_QUEUE	FC_QUEUE	WebSphere MQ messaging provider		Cluster=CLUSTER_1
<input type="checkbox"/>	FC_QUEUE_INQ	FC_QUEUE_INQ	WebSphere MQ messaging provider		Cluster=CLUSTER_1
<input type="checkbox"/>	FC_QUEUE_RESPONDER	FC_QUEUE_RESPONDER	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

Total: 8

Create Message Listeners for individual Servers in Cluster

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

The screenshot shows the Oracle WebSphere Admin Center interface. The left sidebar contains a navigation tree with categories like Overview, Servers, Applications, JMS, Services, Resources, J2EE, Resource Adapters, Remote Operations, Security, Operational policies, and Environment. The main content area is titled "Middleware servers > MS_1 > Message listener service > Listener Ports". Below the title, there are tabs for "New", "Delete", "Start", "Stop", and "Convert to activation specification". A table lists the configured listener ports:

Select	Name	Description	Connection factory J2EE name	Destination J2EE name	Status
<input type="checkbox"/>	EMSD_OUT_LISTENER	EMSD_OUT_LISTENER	EMSDOUT	EMSD_OUTQUEUE	+
<input type="checkbox"/>	EMSD_IN_LISTENER	EMSD_IN_LISTENER	EMSDOUT	EMSD_OUTQUEUE	+
<input type="checkbox"/>	MSB_LISTENER	MSB_LISTENER	MSBQCF	MSB_QUEUE	+
<input type="checkbox"/>	NOTIFY_OUT_LISTENER	NOTIFY_OUT_LISTENER	NOTIFYOUTQCF	NOTIFY_QUEUE	+
<input type="checkbox"/>	NOTIFY_IN_LISTENER		NOTIFYOUTQCF	NOTIFY_QUEUE	+
<input type="checkbox"/>	EMMS_LISTENER		NOTIFYOUTQCF	EMMS_QUEUE	+

At the bottom of the table, it says "Total: 6". On the right side, there are sections for "Field help", "Page help", and "Command Assistance".

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

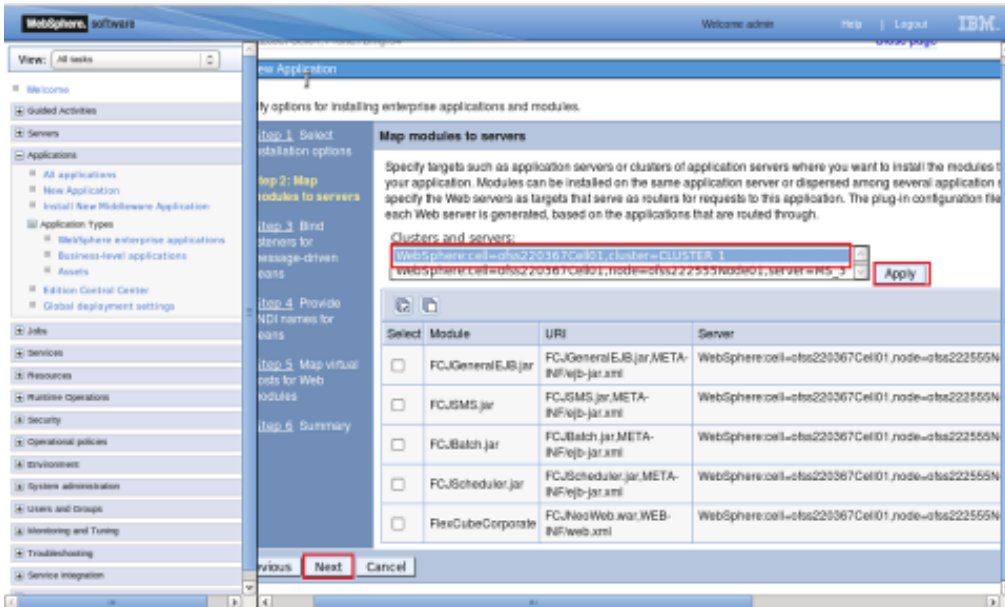
The screenshot shows the Oracle WebSphere Admin Center interface, similar to the previous one but for MS_2. The main content area is titled "Middleware servers > MS_2 > Message listener service > Listener Ports". The table lists the configured listener ports:

Select	Name	Description	Connection factory J2EE name	Destination J2EE name	Status
<input type="checkbox"/>	EMSD_OUT_LISTENER	EMSD_OUT_LISTENER	EMSDOUT	EMSD_OUTQUEUE	+
<input type="checkbox"/>	EMSD_IN_LISTENER	EMSD_IN_LISTENER	EMSDOUT	EMSD_OUTQUEUE	+
<input type="checkbox"/>	MSB_LISTENER	MSB_LISTENER	MSBQCF	MSB_QUEUE	+
<input type="checkbox"/>	NOTIFY_OUT_LISTENER	NOTIFY_OUT_LISTENER	NOTIFYOUTQCF	NOTIFY_QUEUE	+
<input type="checkbox"/>	NOTIFY_IN_LISTENER		NOTIFYOUTQCF	NOTIFY_QUEUE	+
<input type="checkbox"/>	EMMS_LISTENER		NOTIFYOUTQCF	EMMS_QUEUE	+

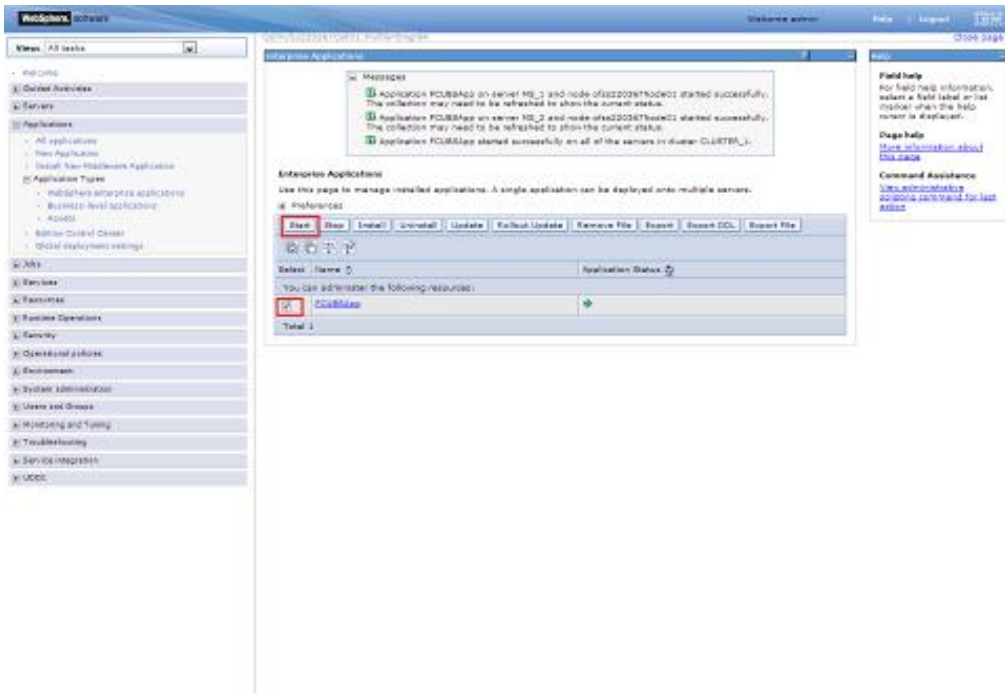
At the bottom of the table, it says "Total: 6".

6. Deploy Application to Cluster

While deploying ensure the application is installed to Cluster



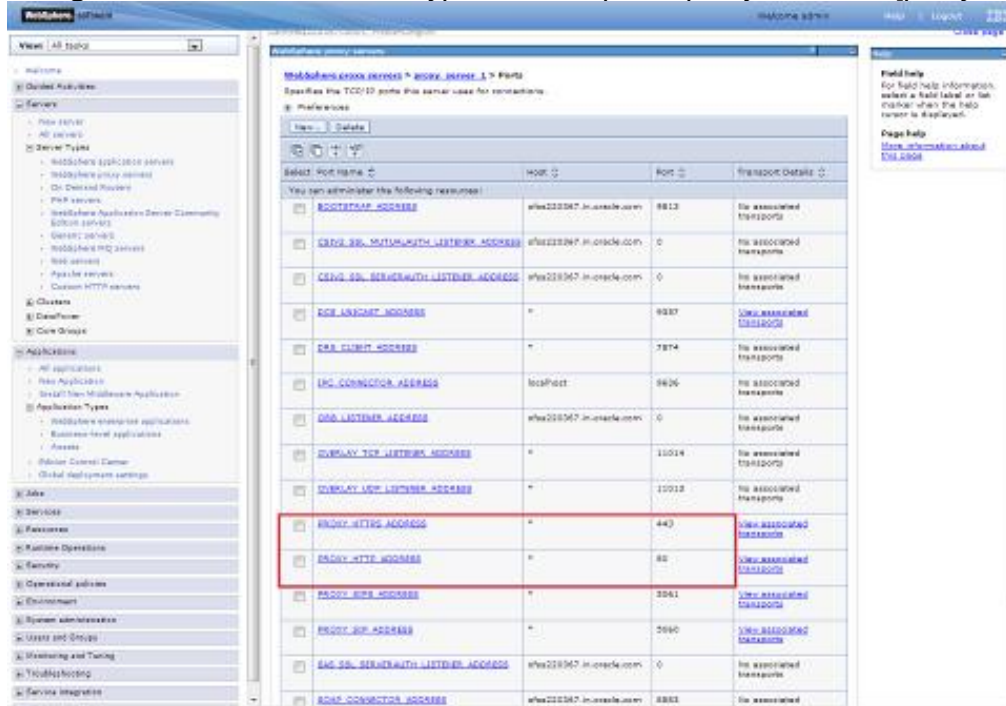
Start FCUBS application



6.1.1 Test the application

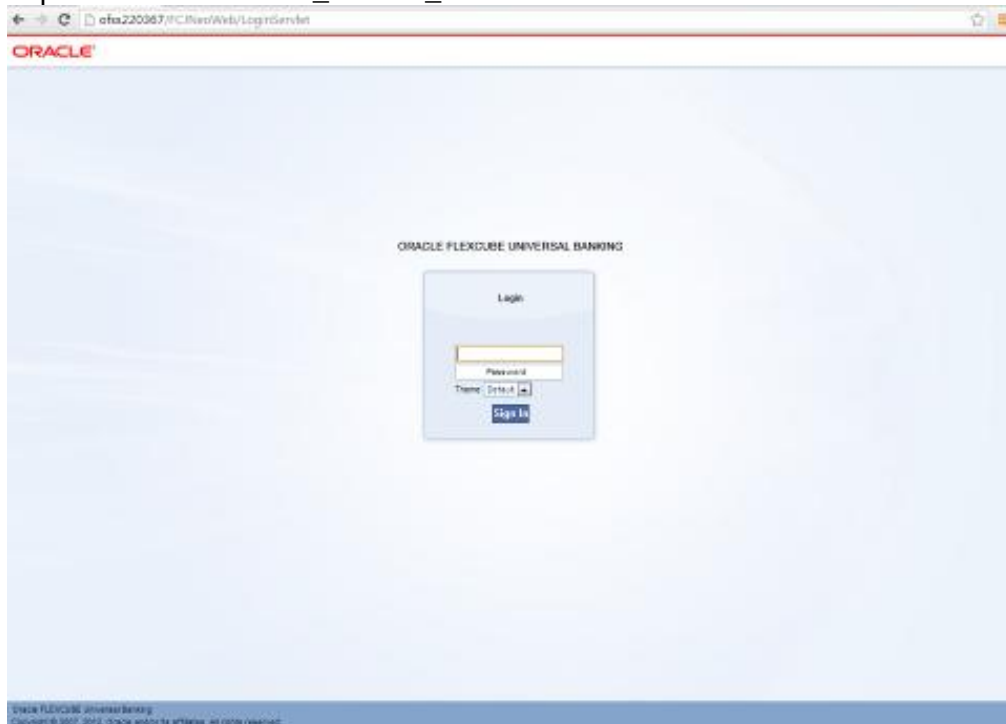
Make a note of the ports `PROXY_HTTPS_ADDRESS/PROXY_HTTP_ADDRESS` to access the application.

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`





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