

Middleware Best Practice
Oracle FLEXCUBE Universal Banking
Release 14.4.0.2.0
Part No. F36581-01
[November] [2020]



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1. Introduction

1.1 Purpose of this Document

The purpose of this document is to explain the steps required for Configuration and applying best practices in cluster mode for

- FCUBS 14.4
- Weblogic Version 12.2.1.4.0
- JDK 1.8.0_241

1.2 WebLogic Server Overview

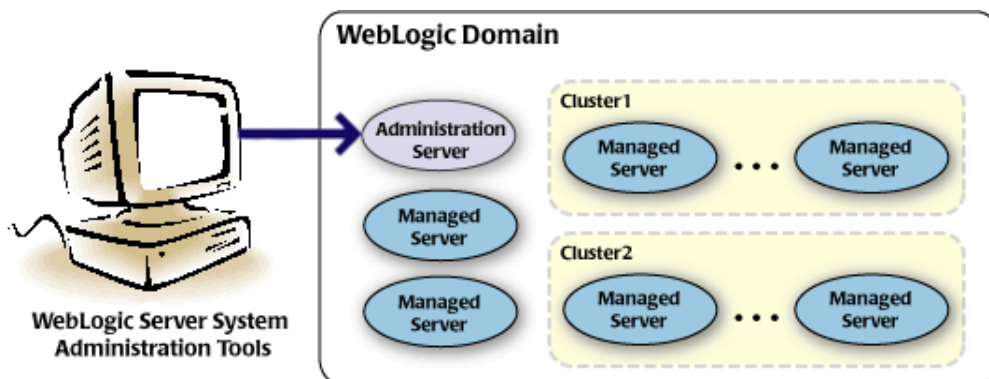
This section of the document provides brief explanation on the main components involved in WebLogic server.

Domain

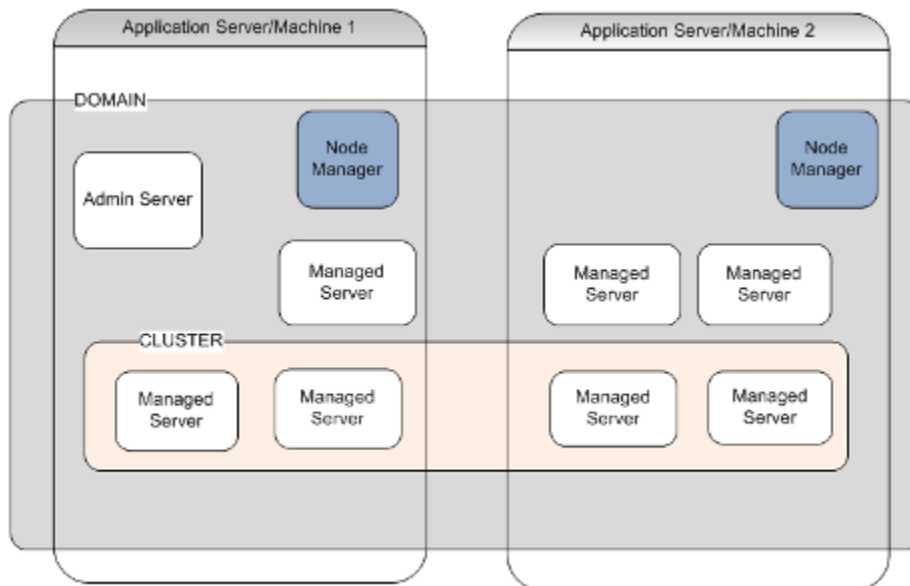
A domain is the basic administration unit for WebLogic Server instances. A domain consists of one or more WebLogic Server instances (and their associated resources) that is managed with a single Administration Server. Multiple domains can be defined based on different system administrators' responsibilities, application boundaries, or geographical locations of servers. Conversely, a single domain can be used to centralize all WebLogic Server administration activities.

Each WebLogic Server domain must have one server instance that acts as the Administration Server. Administration Server can be used via the Administration Console or using the command line for configuring all other server instances and resources in the domain.

WebLogic Domain Structure



WebLogic 12c Domain Overview



Administration Server

A domain includes one WebLogic Server instance that is configured as an Administration Server. All changes to configuration and deployment of applications are done through the Administration Server. The Administration Server provides a central point for managing the domain and providing access to the WebLogic Server administration tools.

These tools include the following:

- WebLogic Server Administration Console: Graphical user interface to the Administration Server.
- WebLogic Server Node Manager: A Java program that lets you start and stop server instances - both Administration Servers and Managed Servers - remotely, and to monitor and automatically restart them after an unexpected failure.

Admin server start mode needs to be configured as Production Mode.

Managed Server

In a domain, server instances other than the Administration Server are referred to as Managed Servers. Managed servers host the components and associated resources that constitute your applications—for example, JSPs and EJBs.

When a Managed Server starts up, it connects to the domain's Administration Server to obtain configuration and deployment settings. In a domain with only a single WebLogic Server instance, that single server works as both the administration server and managed server.

Node Manager

The Managed Servers in a production WebLogic Server environment are often distributed across multiple machines and geographic locations.

Node Manager is a Java utility that runs as separate process from WebLogic Server and allows you to perform common operations tasks for a Managed Server, regardless of its location with respect to its Administration Server. While use of Node Manager is optional, it provides valuable benefits if your WebLogic Server environment hosts applications with high availability requirements.

If you run Node Manager on a machine that hosts Managed Servers, you can start and stop the Managed Servers remotely using the Administration Console or from the command line. Node Manager can also automatically restart a Managed Server after an unexpected failure.

Machine

A machine in the Weblogic Serve context is the logical representation of the computer that hosts one or more Weblogic Server instances(servers). The Admin Server uses the machine definitions to start remote servers through the Node Managers that run on those servers. A machine could be a physical or virtual server that hosts an Admin or Managed Server that belongs to a domain.

Managed Server Cluster

Two or more Managed Servers can be configured as a WebLogic Server cluster to increase application scalability and availability. In a WebLogic Server cluster, most resources and services are deployed to each Managed Server (as opposed to a single Managed Server,) enabling failover and load balancing.

The servers within a cluster can either run on the same machine or reside in different machines. To the client, a cluster appears as a single WebLogic Server instance.

Dynamic Cluster

A dynamic cluster is any cluster that contains one or more dynamic servers. Each server in the cluster will be based upon a single shared server template. The server template allows you to configure each server the same and ensures that servers do not need to be manually configured before being added to the cluster. This allows you to easily scale up or down the number of servers in your cluster without the need for setting up each server manually. Changes made to the server template are rolled out to all servers that use that template.

You cannot configure dynamic servers individually; there are no server instance definitions in the config.xml file when using a dynamic cluster. Therefore, you cannot override the server template with server-specific attributes or target applications to an individual dynamic server instance.

When configuring your cluster you specify the maximum number of servers you expect to need at peak times. The specified number of server instances is then created, each based upon your server template. You can then start up however many you need and scale up or down over time according to your needs. If you need additional server instances on top of the number you originally specified, you can increase the maximum number of servers instances (dynamic) in the dynamic cluster configuration.

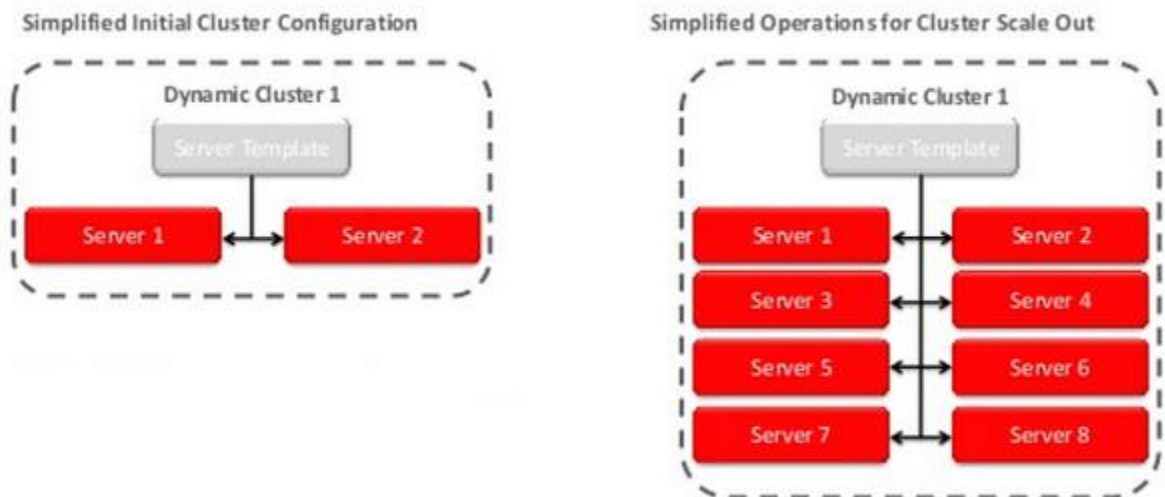
Server Templates

A single server template provides the basis for the creation of the dynamic servers. Using this single template provides the possibility of every member being created with exactly the same attributes. Where some of the server-specific attributes like Servername, listen-ports, machines, etc. can be calculated based upon tokens.

You can pre-create server templates and let Weblogic clone one when a Dynamic Cluster is created.

When none is available a server template is created with the Dynamic Cluster. The name and the listen ports are the only server template attributes that you provide during Dynamic Cluster creation.

Simplified Configuration with Scalability and Elasticity



1.3 Pre-requisites

In this document, we are going to create a domain with two managed servers. The managed servers are going to be created on two different physical servers (nodes). Note that, this document has been prepared based on a test conducted in Linux servers.

This requires Weblogic Server of same version to be installed on both the machines and services.

Environment

2 servers where linux is installed, 1 will be primary where admin console will be running along with managed servers and the other where only managed servers will be.

Softwares

- 1) Oracle Weblogic Server 12.2.1.4 installed on both the machines under same folder structure.
- 2) JDK 1.8 Latest available version installed on both the machines. In this document JDK1.8.0_241 version is used.

Clock Synchronization

The clocks of both the servers participating in the cluster must be synchronized to within one second difference to enable proper functioning of jobs otherwise it will lead to session timeouts.

Enable Graphical User Interface (GUI)

Establish a telnet or SSH connection to primary server. Start X-manager (or any similar tool) in windows desktop. Export DISPLAY environment variable to the machine IP where x-manager is running.

Syntax: export DISPLAY=<ip-address>:<port>

Test using xclock

2. Domain Configuration

2.1 Domain Creation

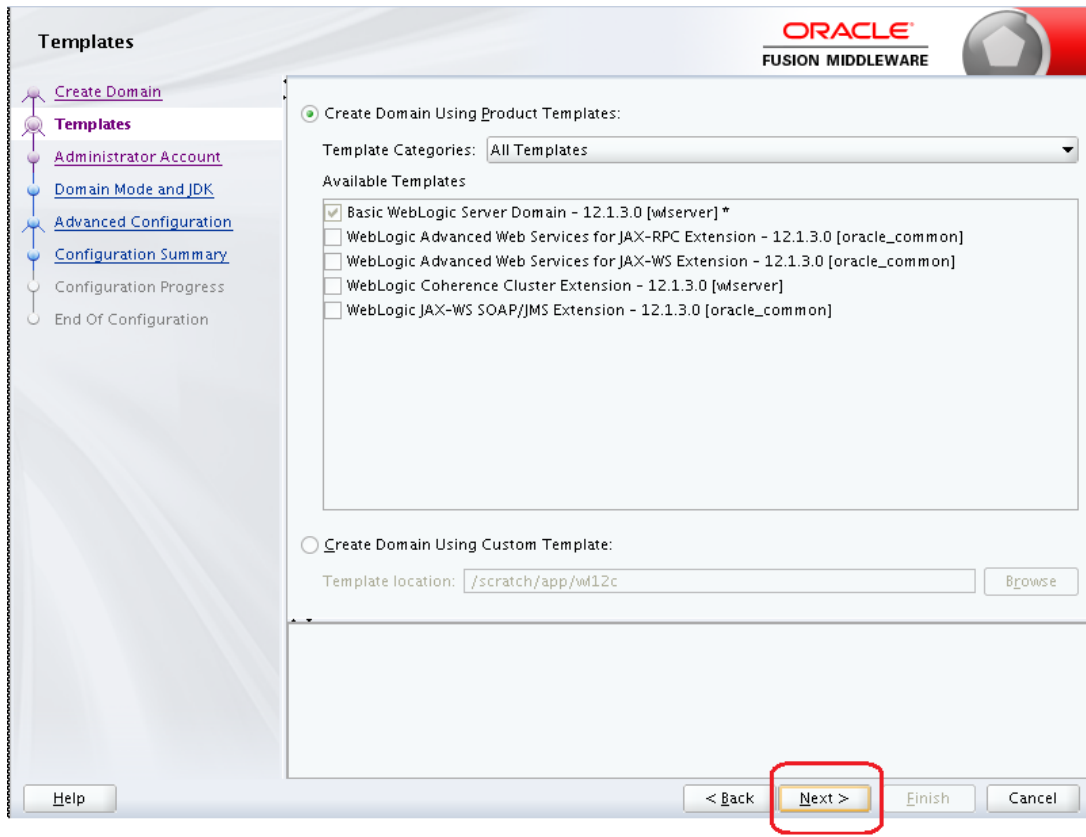
Weblogic domain creation and configuration will be done from primary server.

From primary server, launch the fusion Middleware configuration wizard using the command **config.sh** available under \$WLS_HOME/common/bin directory.

- 1) In the Welcome screen, select **Create a new domain** option. Enter the domain name and click on **Next**.

The screenshot shows the 'Create Domain' step of the Oracle Fusion Middleware Configuration Wizard. The interface includes a navigation pane on the left with options like 'Create Domain', 'Templates', 'Administrator Account', 'Domain Mode and JDK', 'Advanced Configuration', 'Configuration Summary', 'Configuration Progress', and 'End Of Configuration'. The main area asks 'What do you want to do?' with two radio buttons: 'Create a new domain' (selected) and 'Update an existing domain'. Below this is a 'Domain Location' field containing the path '/scratch/app/w12c/user_projects/domains/FCUBSDomain', with a 'Browse' button to its right. At the bottom, there are navigation buttons: 'Help', '< Back', 'Next >', 'Finish', and 'Cancel'. The 'Next >' button is highlighted with a red box.

- 2) Select the required templates from **Available Templates** and click **Next**.



3) Specify Administrator **User Name** and **Password**.

- The specified credentials are used to access Administration console.
- You can use this screen to define the default WebLogic Administrator account for the domain. This account is used to boot and connect to the domain's Administration Server. Click **Next**.

Administrator Account

ORACLE
FUSION MIDDLEWARE

Create Domain
Templates
Administrator Account
Domain Mode and JDK
Advanced Configuration
Configuration Summary
Configuration Progress
End Of Configuration

Name

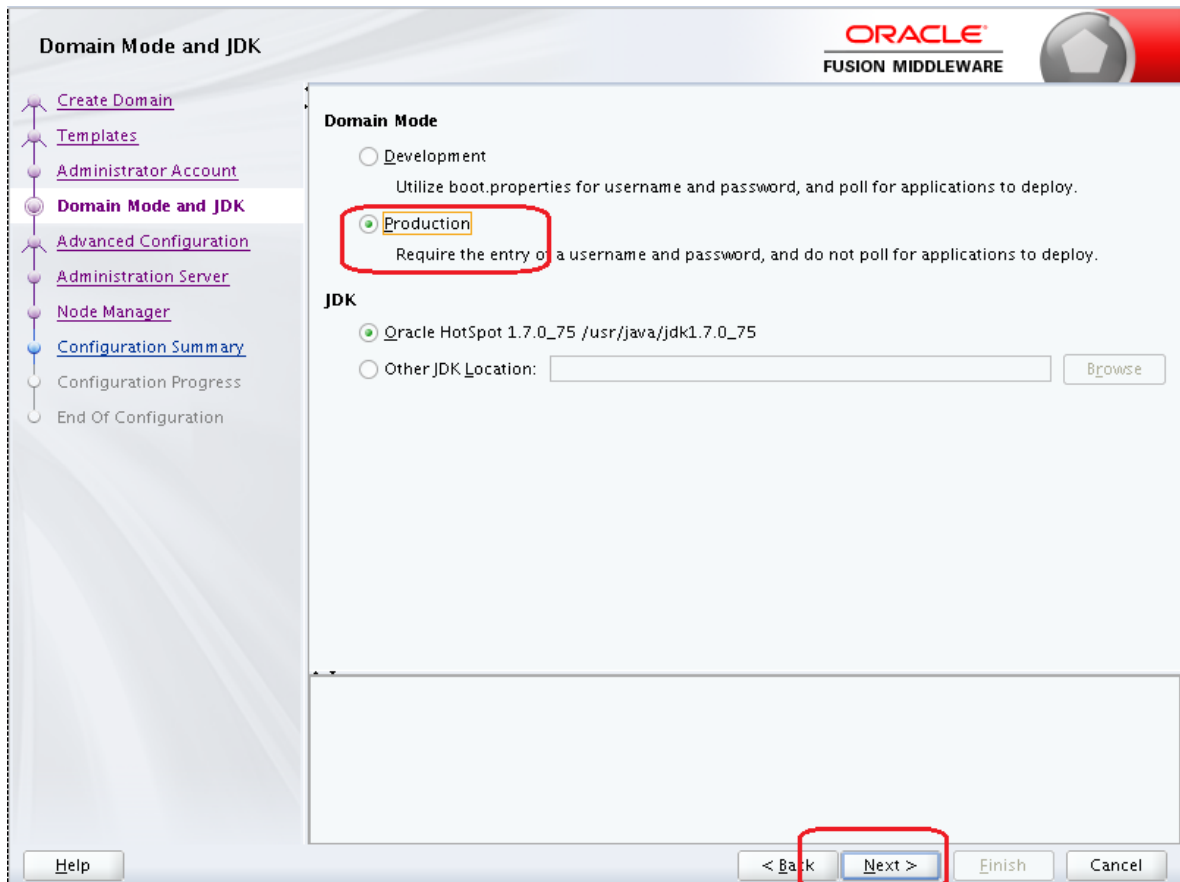
Password

Confirm Password

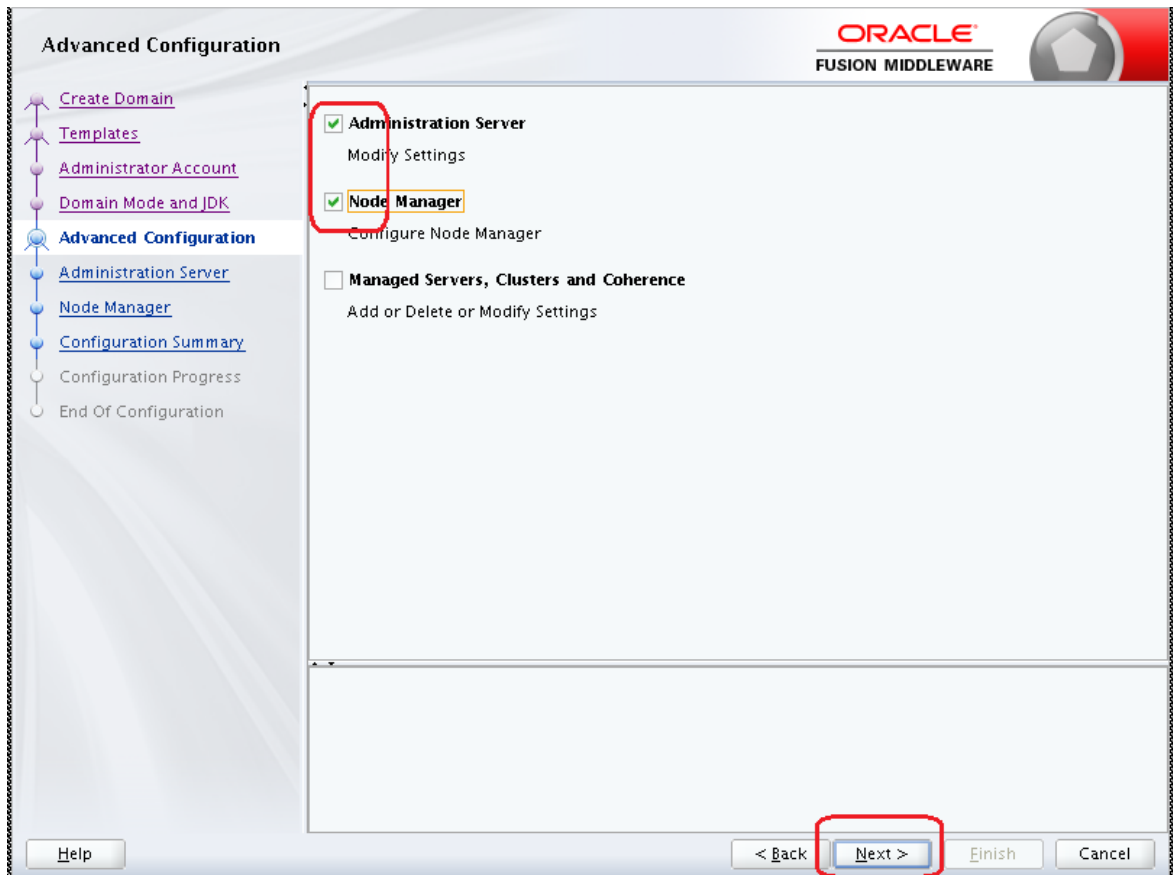
Must be the same as the password. Password must contain at least 8 alphanumeric characters with at least one number or special character.

Help < Back **Next >** Finish Cancel

4) Select Server Startup as **Production Mode** and the available **JDKs**. Click **Next**.



5) Select the check box adjacent to **Administration Server** and **Node Manager**. Click **Next**.



6) Specify the **Administration Server Listen address** and **Listen port**.

Administration Server

ORACLE
FUSION MIDDLEWARE

Create Domain
Templates
Administrator Account
Domain Mode and JDK
Advanced Configuration
Administration Server
Node Manager
Configuration Summary
Configuration Progress
End Of Configuration

Server Name: AdminServer
Listen Address: All Local Addresses
Listen Port: 7001
Enable SSL:
SSL Listen Port: 7101

Port number must be between 1 and 65535, and different from listen port and coherence port.

Help < Back **Next >** Finish Cancel

Note: The default Listen port is 7001 and SSL port is 7101. This could be changed to any other available port. Ensure to make a note, of this port since the same is required for launching the Admin console, post domain creation.

Note: Check for the port availability using the command - `netstat -anp |grep <Port no>`

The next screen displays **Node Manager Configuration**.

7) Configure **Node Manager**.

Select **Per Domain Default Location** option from **Node Manager Type**. And in the **Node Manager Credentials**, provide the username and password of the node manager. Click **Next**.

The screenshot shows the Oracle Fusion Middleware configuration wizard for Node Manager. On the left is a navigation pane with the following items: Create Domain, Templates, Administrator Account, Domain Mode and JDK, Advanced Configuration, Administration Server, **Node Manager**, Configuration Summary, Configuration Progress, and End Of Configuration. The main content area is titled 'Node Manager' and features the Oracle Fusion Middleware logo in the top right. Under the 'Node Manager Type' section, the 'Per Domain Default Location' radio button is selected and circled in red. Below it, the 'Node Manager Home' field contains the path 'pp/w12c/user_projects/domains/FCU85Domain/nodemanager' with a 'Browse' button. The 'Manual Node Manager Setup' radio button is unselected. The 'Node Manager Credentials' section contains three input fields: 'Username' with 'weblogic', 'Password' with masked characters, and 'Confirm Password' with masked characters. These three fields are enclosed in a red rectangular box. Below the input fields is a note: 'Must be the same as the password. Password must contain at least 8 alphanumeric characters with at least one number or special character.' At the bottom of the wizard, there are four buttons: 'Help', '< Back', 'Next >' (highlighted with a red box), and 'Finish Cancel'.

- 8) Verify the details and click **Create**. The domain creation process is initiated and the progress of completion is indicated.

Configuration Summary

ORACLE
FUSION MIDDLEWARE

View: Deployment

FCUBSDomain (/scratch/app/w12c/user_projects/)

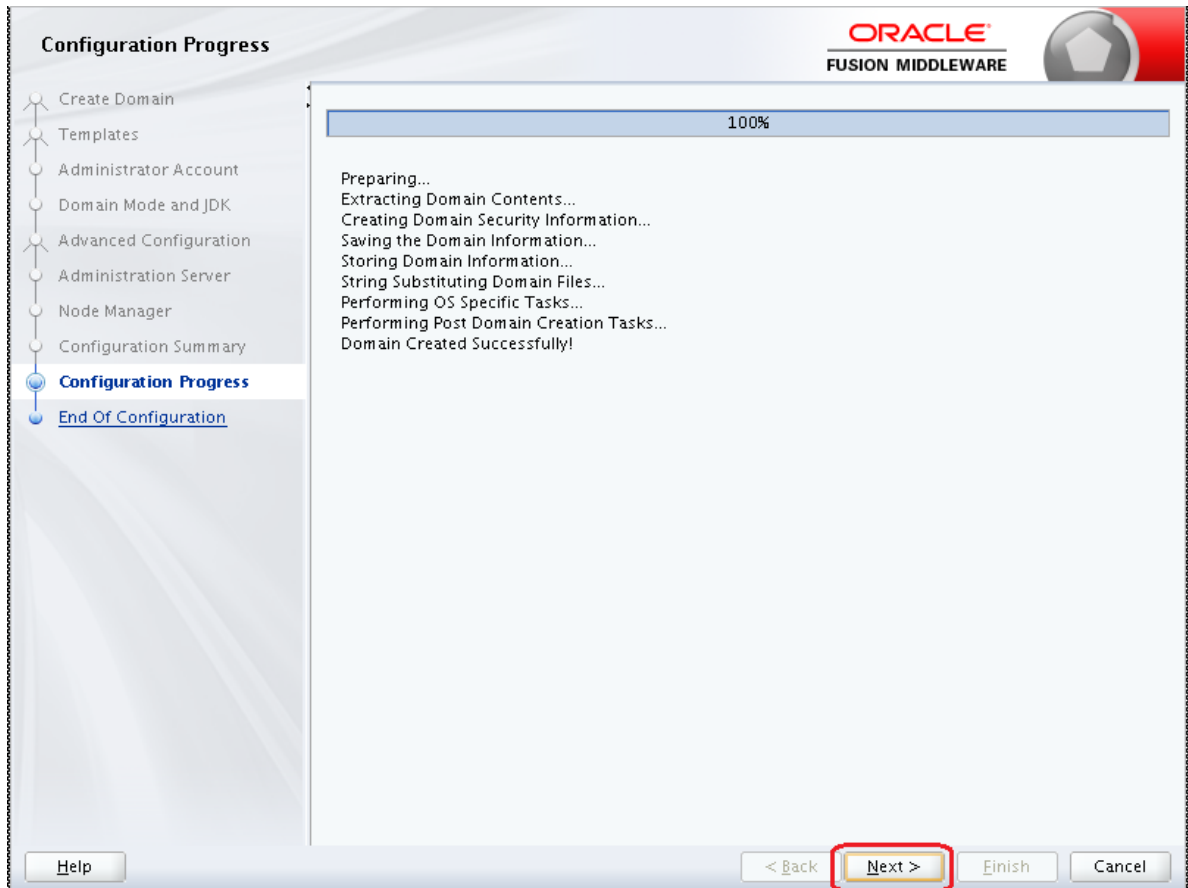
- Server
 - AdminServer

Name	Basic WebLogic Server Domain
Description	Create a basic WebLogic Server domain
Author	Oracle Corporation
Location	/scratch/app/w12c/w1server/commo

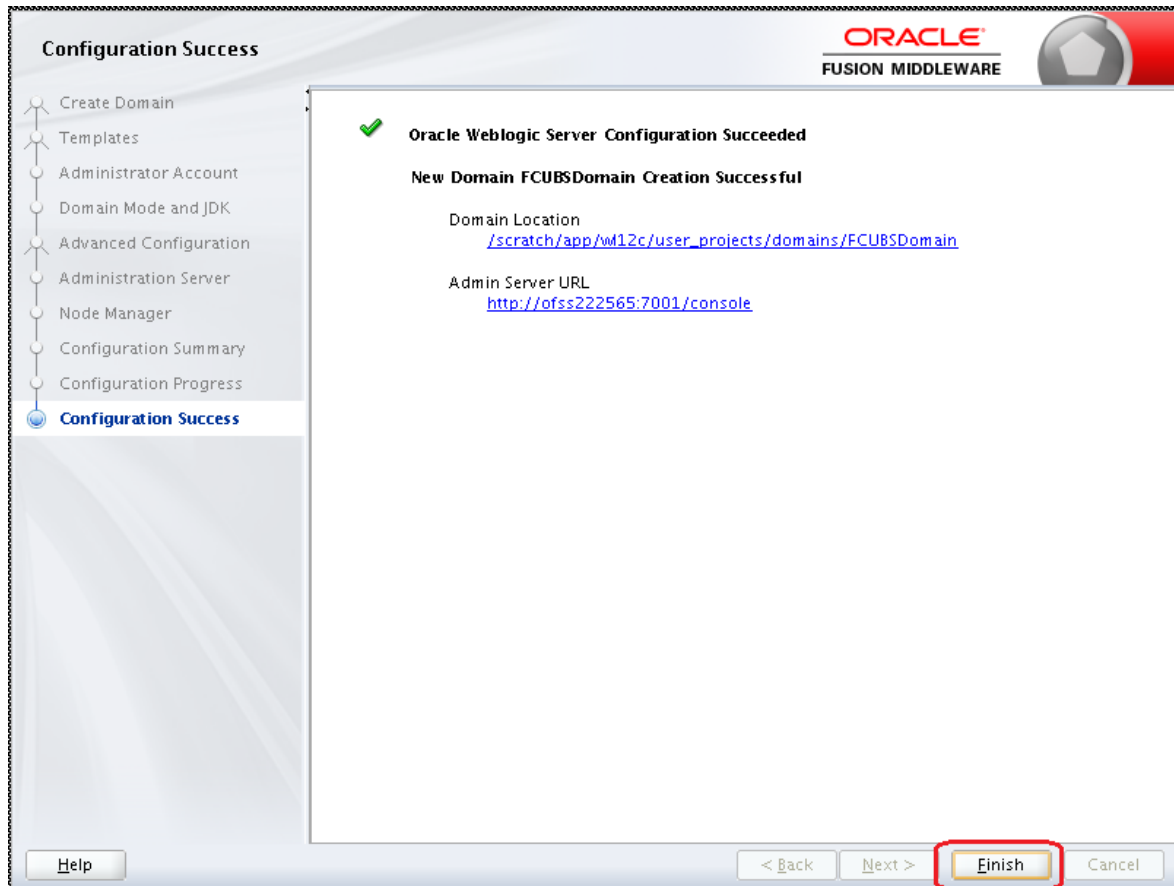
Select **Create** to accept the above options and start creating and configuring a new domain. To change the above configuration before starting Domain Creation, go back to the relevant page by selecting its name in the left pane, or by using the **Back** button.

Help < Back Next > **Create** Cancel

9) Click **Next**.



10) The **Configuration Success** message will be displayed as follows:



The Admin Server console URL is as indicated below:

`http://<IP address>:<admin console port>/console`

- 1) <IP address >: Host on which domain was created.
- 2) <admin console port > : Port specified in Administration Server configuration page.

In this case the Admin Console URL is: <https://<server1hostname>:7101/console>

2.2 Pack and Unpack Domain

The domain structure is expected to be copied to the second server during domain creation. To copy the same, you can use pack and unpack utility provided under \$WLSHOME/common/bin.

Pack

Pack domain in primary server:

```
./pack.sh -managed=true -domain=/scratch/app/wl12c/user_projects/domains/FCUBSDomain -  
template=/tmp/FCUBSDomain.jar -template_name="FCUBSDomain"
```

Unpack

Unpack FTP FCBUSDomain.jar in binary mode to secondary server under /tmp area and unpack the domain using unpack utility provided under \$WLSHOME/common/bin

```
./unpack.sh -domain=/scratch/app/wl12c/user_projects/domains/FCUBSDomain -  
template=/tmp/FCUBSDomain.jar
```

2.3 Start Admin server

Admin server is started on the primary server. Login to primary server and navigate to folder \$DOMAIN_HOME/bin and execute **startWeblogic.sh**.

2.4 Start Node Manager

Node Manager needs to be started on both the servers. Before starting the node manager update ListenAddress to the Hostname/IP Address of the machine in nodemanager.properties located in folder \$DOMAIN_HOME/nodemanager

To start the node manager login to the servers and navigate to folder \$DOMAIN_HOME/bin and execute **NodeManager.sh**

3. Cluster Configuration

Dynamic Cluster configuration involves below steps

- 1) Machine Configuration
- 2) Dynamic Cluster Creation: In a normal WebLogic Cluster you define Managed Server and add them to Cluster. In Dynamic Cluster, you select number of Servers you want in Cluster and Server Template you wish to assign to Servers in this WebLogic Dynamic Cluster.
- 3) Server template modification: Servers (or Managed Server) that are part of WebLogic Dynamic Cluster will have properties taken from Server Template.
Modify server template for best practices parameters for Dynamic Servers (part of Dynamic Cluster), you modify Server Template that is applicable to Dynamic Cluster. These settings are applicable to all the managed servers.
- 4) Activate Changes which would automatically create the managed servers (as mentioned in the number of servers required parameter).

Calculate Number of Servers Required:

For every 50 logged in FLEXCUBE users require one managed server of size 8GB. i.e. for 300 logged in FLEXCUBE users, it is recommended to have 6 managed servers. Based on the logged in users that needs to be supported decide on the number of the managed servers required. This parameter is required later in the dynamic cluster creation.

3.1 Machines Configuration

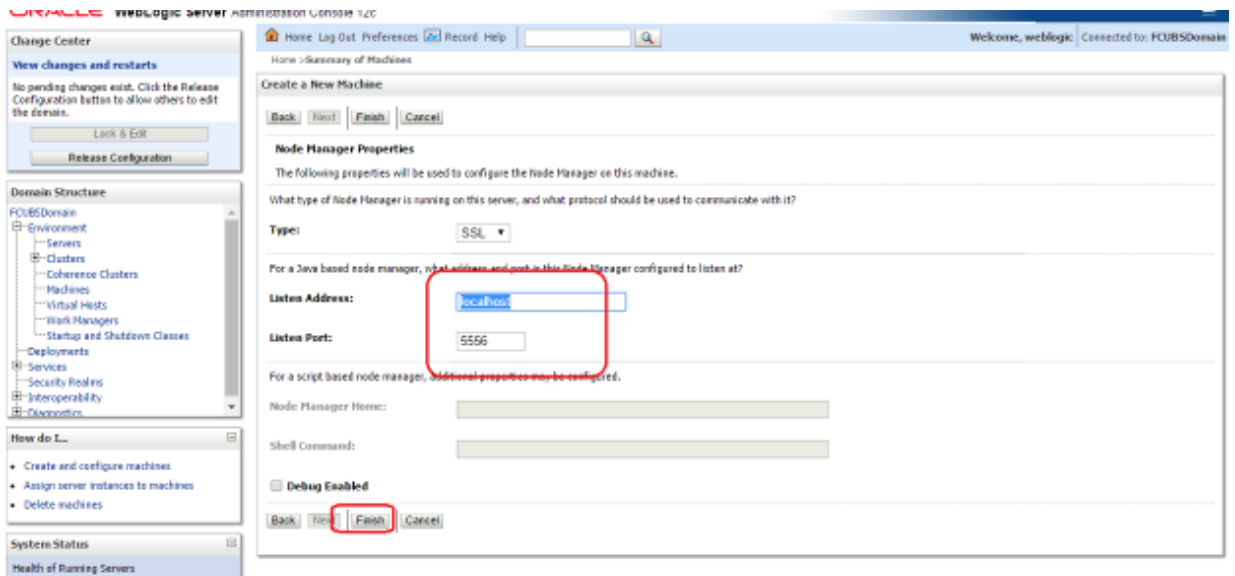
- 1) Login into Admin Console and navigate to **FCUBSDomain** → **Environment** → **Machine** and click **New**.

The screenshot shows the Oracle WebLogic Server Administration Console interface. The top navigation bar includes 'Home', 'Log Out', 'Preferences', 'Record', and 'Help'. The user is logged in as 'weblogic' and connected to 'FCUBSDomain'. The left sidebar contains a 'Domain Structure' tree with 'FCUBSDomain' expanded to 'Environment' > 'Machines'. The main content area is titled 'Summary of Machines' and contains a table with columns 'Name' and 'Type'. The table is currently empty, displaying 'Showing 0 to 0 of 0' items. A 'Change Center' panel on the left shows 'View changes and restarts' with 'Lock & Edit' and 'Release Configuration' buttons. A 'How do I...' panel below it lists tasks like 'Create and configure machines'.

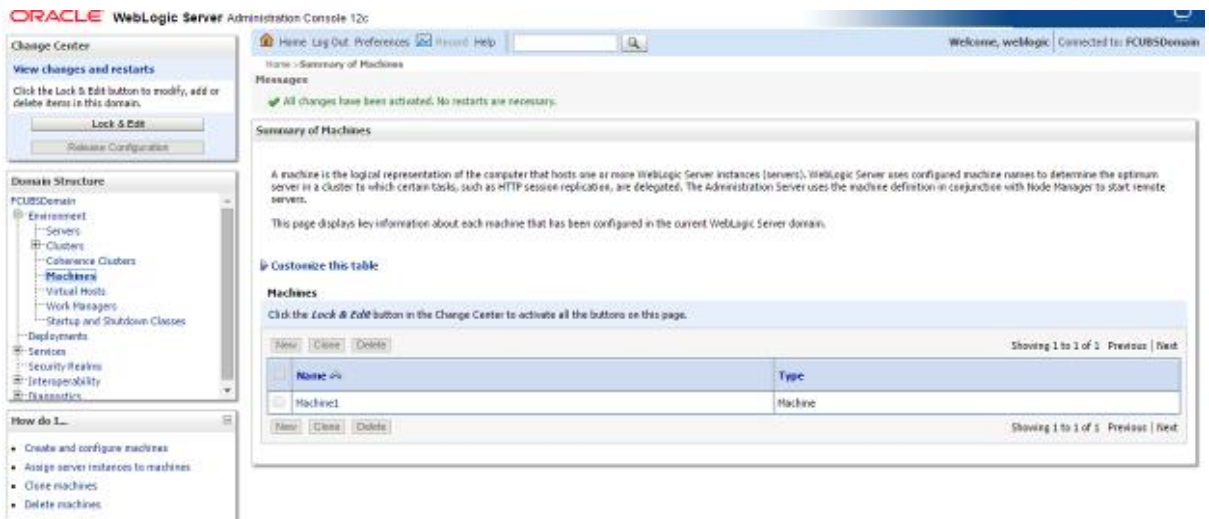
- 2) Enter the **Machine Name** and click **Next**.

The screenshot shows the 'Create a New Machine' form in the Oracle WebLogic Server Administration Console. The form is titled 'Create a New Machine' and has 'Back', 'Next', 'Finish', and 'Cancel' buttons at the top. The 'Machine Identity' section asks 'What would you like to name your new Machine?' and has a text input field containing 'Machine1', which is highlighted with a red box. Below this, the 'Machine OS' section has a dropdown menu set to 'Other', also highlighted with a red box. The 'Next' button at the bottom is also highlighted with a red box. The left sidebar and top navigation bar are consistent with the previous screenshot.

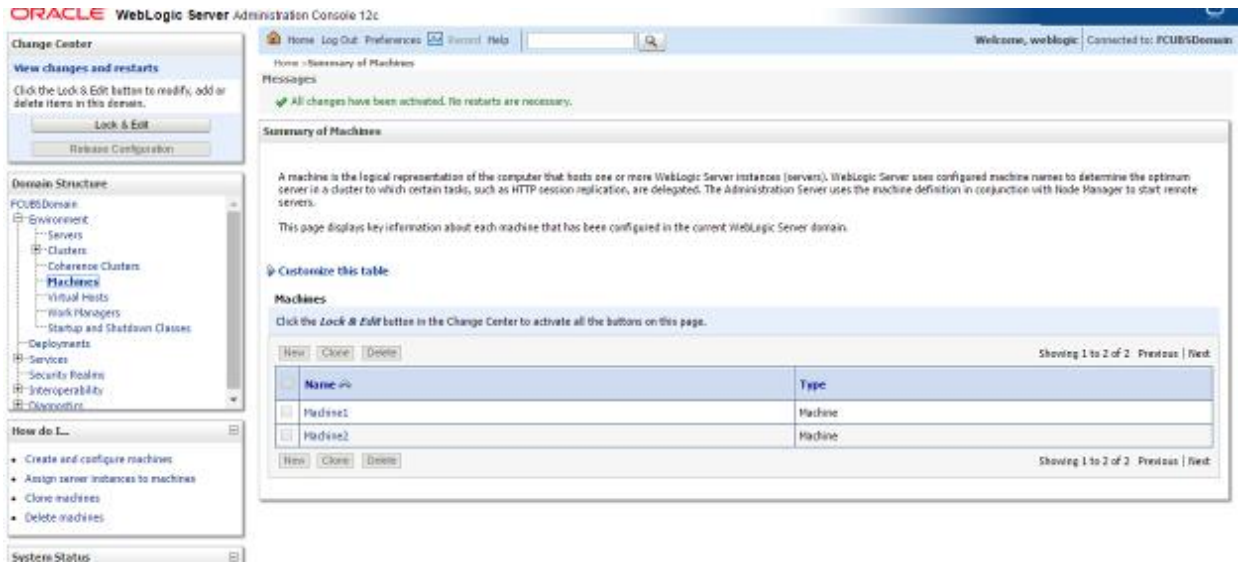
- 3) Enter the **Listen Address** and **Listen Port** (this is the port mentioned in nodemanager.properties file) and click **Finish**.



- 4) Machine is created.



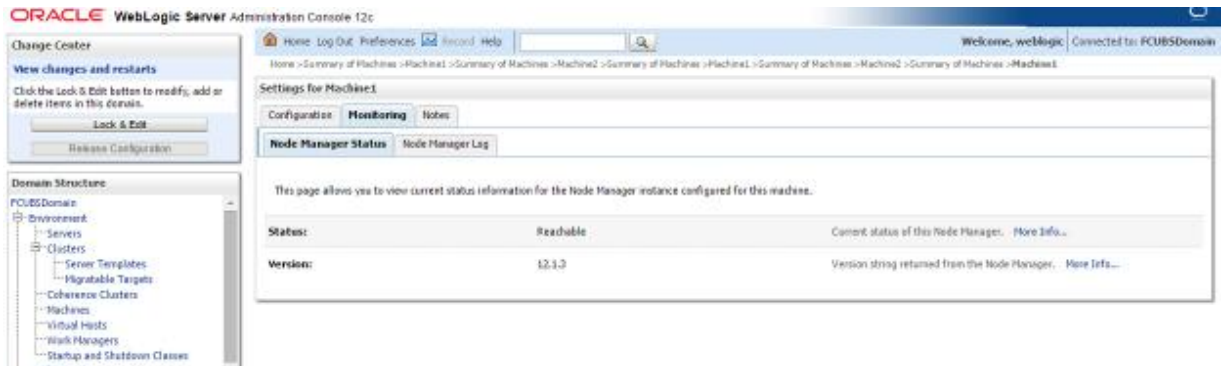
5) Similarly create a new machine entry for the other server.



Verifying machine status

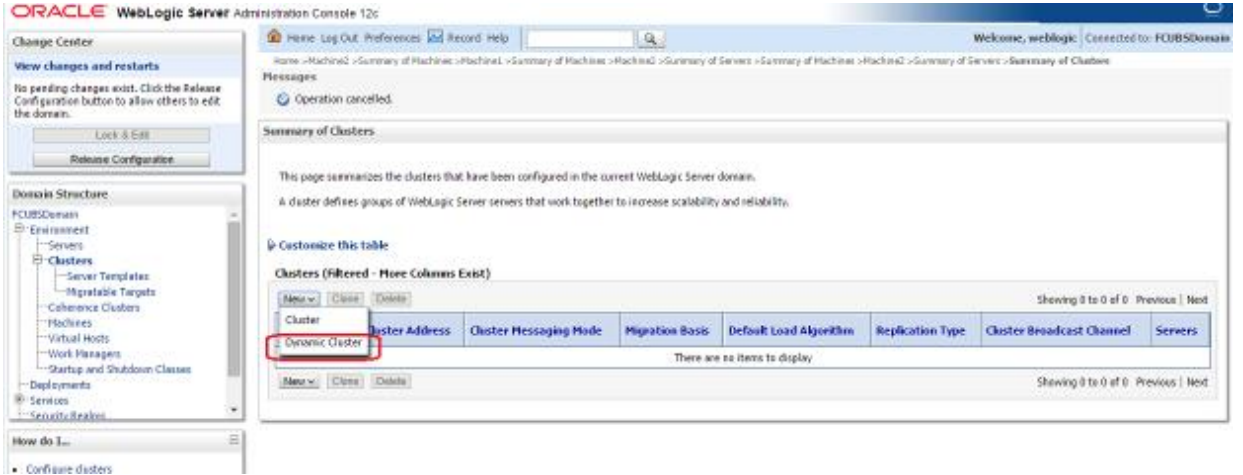
Before starting the managed servers, ensure that the Node manager Status of all the machines are "Reachable".

In the console, navigate through **Domain structure** → **Machines** → **machine1** → **Monitoring** → **Node Manager Status**. Status should be **Reachable**.

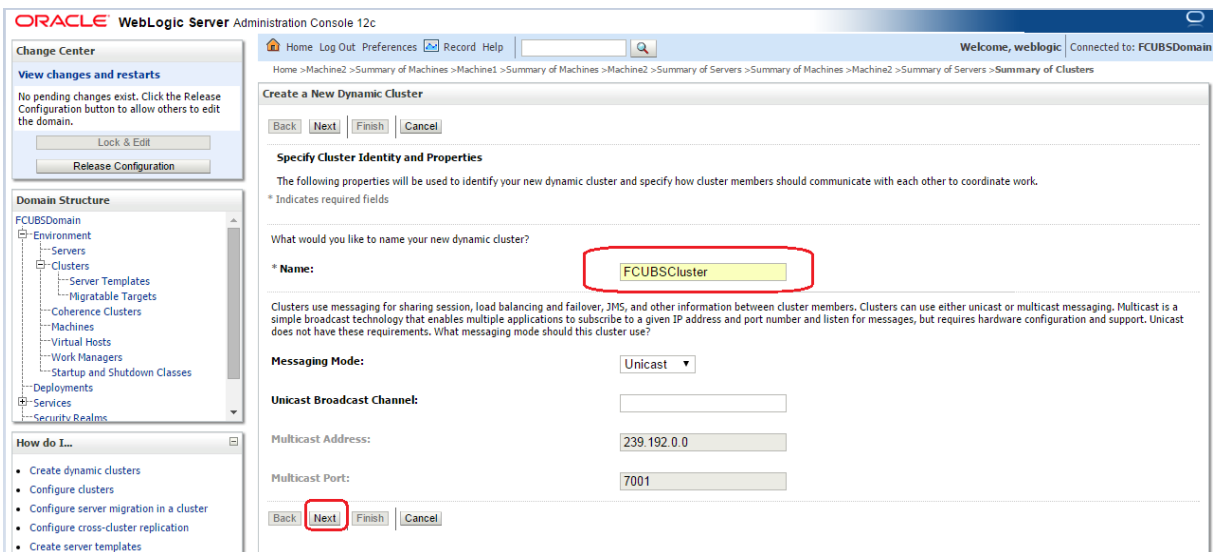


3.2 Dynamic Cluster Creation

- 1) Login into Admin Console and Navigate to **FCUBSDomain** → **Environment** → **Clusters** → **New** → select **Dynamic Cluster**.



- 2) Enter the **Cluster Name** and click on **Next**.



- 3) Enter the **number of dynamic servers** you want to configure, enter the **server name prefix** and click on **Next**.

ORACLE WebLogic Server Administration Console 12c

Home Log Out Preferences Record Help Welcome, weblogic Connected to: FCUBSDomain

Home > Machine2 > Summary of Machines > Machine1 > Summary of Machines > Machine2 > Summary of Servers > Summary of Machines > Machine2 > Summary of Servers > Summary of Clusters

Create a New Dynamic Cluster

Back Next Finish Cancel

Specify Dynamic Server Properties

The following properties will be used to specify the size and characteristics of your new dynamic cluster.

How many dynamic servers will you need at peak load?

Number of Dynamic Servers:

What naming convention would you like to use for new dynamic servers in this cluster?

Server Name Prefix:

Server templates are used to configure the characteristics that are common to all dynamic servers in this cluster. Server templates are unique to a cluster and cannot be shared across clusters, so a new server template will be created to support this new cluster.

Back **Next** Finish Cancel

- 4) Select machines that participate in domain, in this case all machines will be part of the domain, select **Use any machine configured in this domain** option and click on **Next**.

ORACLE WebLogic Server Administration Console 12c

Home Log Out Preferences Record Help Welcome, weblogic Connected to: FCUBSDomain

Home > Machine2 > Summary of Machines > Machine1 > Summary of Machines > Machine2 > Summary of Servers > Summary of Machines > Machine2 > Summary of Servers > Summary of Clusters

Create a New Dynamic Cluster

Back Next Finish Cancel

Specify Machine Bindings

Associating dynamic servers with machines is essential if you intend to use Node Manager and the Administration Console (or WLST) to start server instances.

How do you want to distribute dynamic servers across machines?

Use any machine configured in this domain

Use a single machine for all dynamic servers

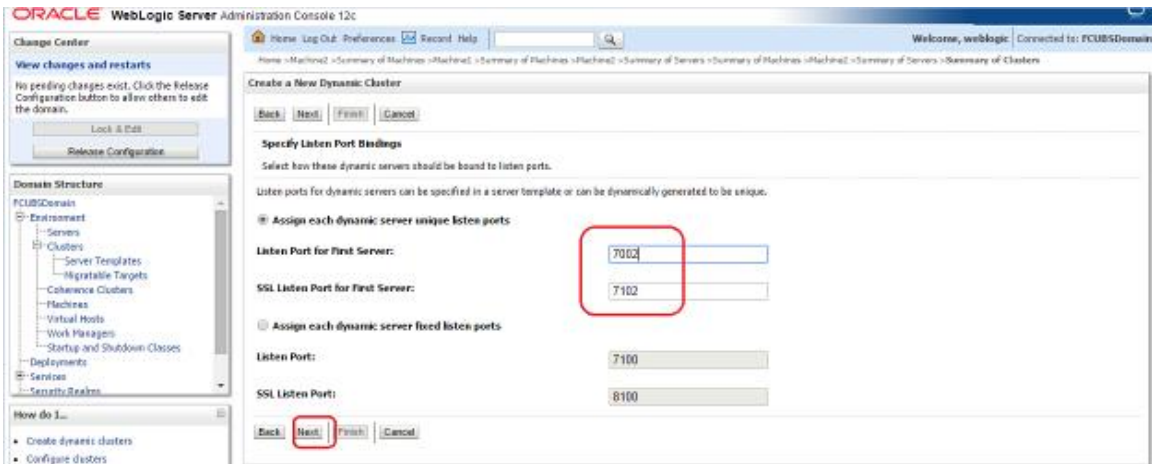
Selected Machines:

Use a subset of machines in this domain

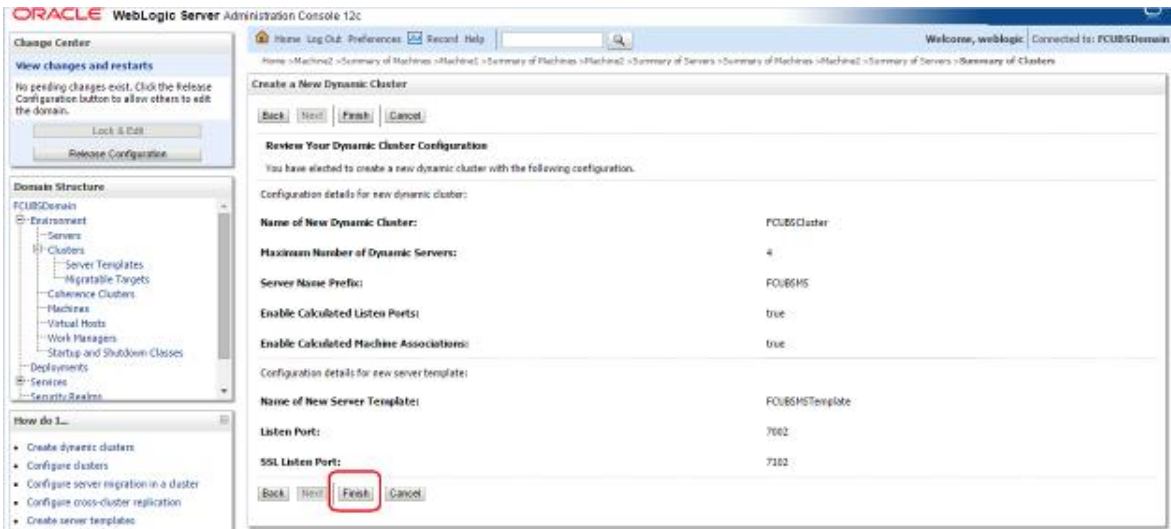
Machine Name Match Expression:

Back **Next** Finish Cancel

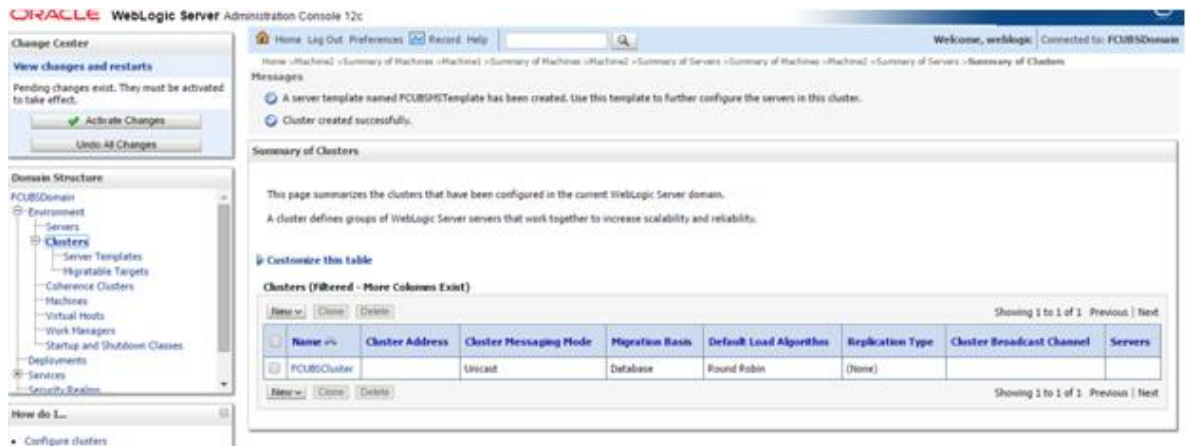
- 5) Select the **listen port for the first server** in the dynamic cluster and then the **SSL listener port** for the first server in the dynamic cluster. The subsequent servers will be assigned with an incremental port number. Click **Next**.



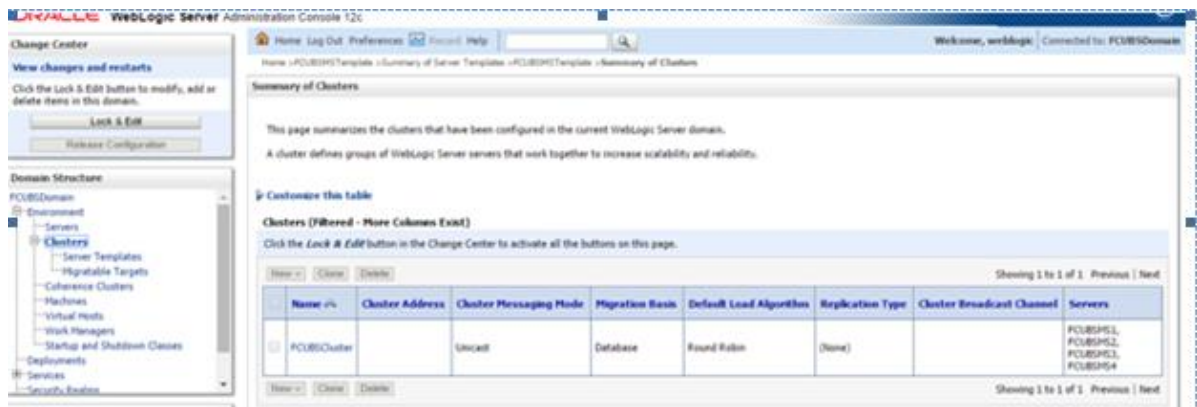
- 6) A summary of new Dynamic Cluster Configuration is presented. Click **Finish** to create Dynamic Cluster.



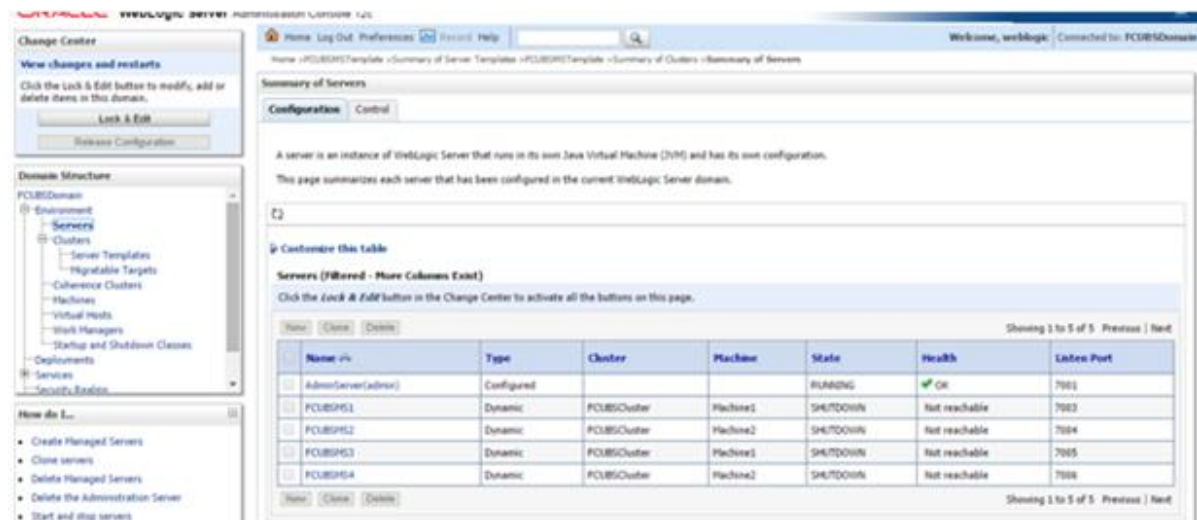
7) The **Summary of Clusters** screens should show the recently created Dynamic Cluster.



8) Upon **Activate Changes** would automatically create 4 managed servers.



9) Navigate to **FCUBSDomain** → **Environment** → **Servers** tab and 4 new servers are created.



3.3 Managed Server Template configuration

The server template created is modified to apply the below parameters:

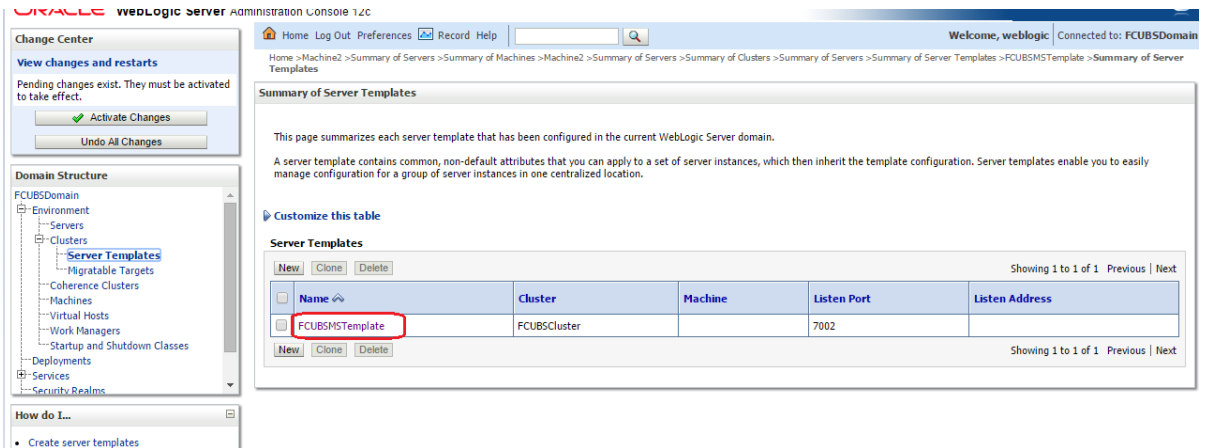
3.3.1 Logging

The process of log file writing in a Weblogic server can impact the performance. Hence, you need to keep the logging to minimum in a production environment.

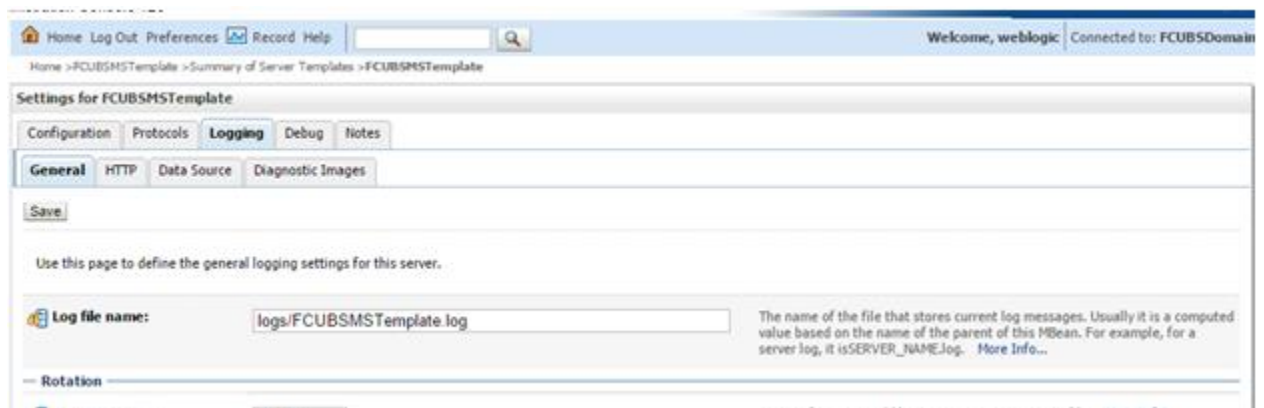
Update below parameters by in Logging Screen

Minimum Severity to log	Warning
Log file Severity level	Warning
Standard Out Severity level	Critical
Domain broadcaster Severity level	Critical

1) Navigate to **FCUBSDomain → Environment → Clusters.**



2) Select **FCUBSTemplate** and navigate to **Logging → General.**



3) Under **Advanced** tab, update the below parameters and click on **Save**.

Advanced	
Date Format Pattern: <input type="text" value="MMM d, yyyy h:mm:ss a z"/>	The date format pattern used for rendering dates in the log. The DateFormatPattern string conforms to the specification of the java.text.SimpleDateFormat class. More Info...
Minimum severity to log: <input type="text" value="Warning"/>	The minimum severity of log messages going to all log destinations. By default all messages are published. More Info...
Logger severity properties: <input type="text"/>	The configuration of the different logger severities keyed by name. The values are one of the predefined Severity strings namely Emergency, Alert, Critical, Error, Warning, Notice, Info, Debug, Trace. More Info...
Log file :	
Severity level: <input type="text" value="Warning"/>	The minimum severity of log messages going to the server log file. By default all messages go to the log file. More Info...
Filter: <input type="text" value="None"/>	The filter configuration for the server log file. More Info...
Log File Buffer: <input type="text" value="8"/>	Gets the underlying log buffer size in kilobytes. More Info...
Standard out :	
Severity level: <input type="text" value="Critical"/>	The minimum severity of log messages going to the standard out. Messages with a lower severity than the specified value will not be published to standard out. More Info...
Filter: <input type="text" value="None"/>	The filter configuration for log events being sent to the standard out. More Info...
Domain log broadcaster :	
Severity level: <input type="text" value="Critical"/>	The minimum severity of log messages going to the domain log from this server's log broadcaster. Messages with a lower severity than the specified value will not be published to the domain log. More Info...
Filter: <input type="text" value="None"/>	The filter configuration for log events being sent to the domain log. More Info...
Buffer Size: <input type="text" value="10"/>	Broadcasts log messages to the domain log in batch mode. More Info...
<input checked="" type="checkbox"/> Stack Traces to stdout	Specifies whether to dump stack traces to the console when included in logged message. More Info...
stdout Stack Trace Depth: <input type="text" value="5"/>	Determines the no of stacktrace frames to display on standard out. All frames are displayed in the log file. * -1 means all frames are displayed. More Info...
stdout Format: <input type="text" value="standard"/>	The output format to use when logging to the console. More Info...
<input type="button" value="Save"/>	

3.3.2 HTTP Logging

- 1) **FCUBSDomain** → **Environment** → **Clusters** → **FCUBSTemplate** → **Logging** → **HTTP** → Uncheck the **Access Logs** Flag.

The screenshot shows the Oracle WebLogic Administration Console interface. At the top, there is a navigation bar with links for Home, Log Out, Preferences, Record, and Help. The user is logged in as 'weblogic' and is connected to 'FCUBSDoma'. The breadcrumb trail is 'Home > FCUBSMSTemplate > Summary of Server Templates > FCUBSMSTemplate'. The main heading is 'Settings for FCUBSMSTemplate'. Below this, there are tabs for Configuration, Protocols, Logging, Debug, and Notes. Under the 'Logging' tab, there are sub-tabs for General, HTTP, Data Source, and Diagnostic Images. A 'Save' button is visible. A descriptive paragraph states: 'Use this page to configure HTTP logging for the server. By default, HTTP logging is enabled and the server saves HTTP requests in a separate log file; it does not store HTTP requests in the server log file or the domain log file.' The 'HTTP access log file enabled' checkbox is checked and highlighted with a red rectangle. Below it, the 'Log file name' is set to 'logs/access.log'. Under the 'Rotation' section, the 'Rotation type' is set to 'By Size' and the 'Rotation file size' is set to '5000'.

3.3.3 Stuck Thread Max Time

- 1) **FCUBSDomain** → **Environment** → **Clusters** → **FCUBSTemplate** → **Tuning**, update the stuck thread max time to **18000** and Click on **Save**.

4. Tuning

4.1 General Parameters

PARAMETER	VALUE	Navigate To
JTA Time out seconds	18000	Login to Weblogic Server console. Click on the domain name (ex: FCUBSDomain) which is under 'Domain Structure'. Go to Configuration > JTA, parameter and values is found on the right side panel of console.
Session Timeout	900	Login to Weblogic Server console Click on Deployments which is under 'Domain Structure'. Click on the deployed FCJ application from right side panel. Click on FCJNeoWeb from 'Modules and components' Go to Configuration General, the parameter values can be found here.

4.2 JVM Tuning

This section of the document provides JVM optimization for Oracle FLEXCUBE Universal Banking Solution.

Basically the JAVA minimum and maximum heap size needs to be reset for 32 and 64 bit environments. Both the minimum and maximum heap size is set to 1.5GB and 4GB in case of 32 bit and 64 bit environments respectively.

How to find whether the JVM is 32bit or 64bit?

Go to \$JAVA_HOME/bin directory. Check java version using command `./java -d64 -version`
64 bit JVM shows the version details where as 32bit throws an error.

How to modify the JVM heap parameters?

To change the JVM heap parameters create a file `setUserOverrides.sh` under domain FCUBSCL in both servers. This file should be created in `"$WL_HOME/user_projects/domains/$WLS_DOMAIN/bin"` in both the servers. Paste below contents of `USER_MEM_ARGS` variable accordingly to override the standard memory arguments passed to java for **SUN JDK**.

32 bit JDK

```
USER_MEM_ARGS="-
Dorg.apache.xml.dtm.DTMMManager=org.apache.xml.dtm.ref.DTMMManagerDefault
-
Dorg.apache.xerces.xni.parser.XMLParserConfiguration=org.apache.xerces.
parsers.XML11Configuration -Dweblogic.threadpool.MinPoolSize=100 -
Dweblogic.threadpool.MaxPoolSize=100 -Xms1536M -Xmx1536M -
XX:MaxPermSize=256m -server -XX:+UseParallelOldGC -
XX:ParallelGCThreads=4"
export USER_MEM_ARGS
```

64 bit JDK

```
USER_MEM_ARGS="-
Dorg.apache.xml.dtm.DTMMManager=org.apache.xml.dtm.ref.DTMMManagerDefault
-Dorg.a
pache.xerces.xni.parser.XMLParserConfiguration=org.apache.xerces.parser
s.XML11Configuration -Dweblogic.threadpool.MinPoolSize=100 -
Dweblogic.threadpool.MaxPoolSize=100 -Xms8g -Xmx8g -Xmn4g -server
-XX:+UseParallelOldGC -XX:ParallelGCThreads=4"
export USER_MEM_ARGS
```

Note: Take a backup of the files before modifying the same.

5. Start Managed Servers

Starting using scripts

Managed Servers can be started by executing startManagedWebLogic.sh script present in folder **`$DOMAIN_HOME/bin`**

Usage: `./startManagedWebLogic.sh SERVER_NAME {ADMIN_URL}`

Eg: `./startManagedWebLogic.sh FCUBSMS1 https://<hostname1>/console`

Starting using console

Alternatively, login to admin console, navigate to **FCUBSDomain → Environment → Servers → Control**, select the managed servers to be started and click on **Start**.

The screenshot shows the Oracle WebLogic Server Administration Console. The main content area is titled "Summary of Servers" and has a "Control" tab selected. Below the tab, there is a table of servers. The table has columns for "Server ID", "Machine", "State", and "Status of Last Action". The first row is "AdminServer(admin)" with state "RUNNING". The next four rows are "FCUBSMS1", "FCUBSMS2", "FCUBSMS3", and "FCUBSMS4", all with state "SHUTDOWN". A red box highlights the "Start" button for the selected servers. The table also includes action buttons like "Resume", "Suspend", "Shutdown", and "Restart SSL".

Server ID	Machine	State	Status of Last Action
AdminServer(admin)		RUNNING	None
FCUBSMS1	Machine1	SHUTDOWN	None
FCUBSMS2	Machine2	SHUTDOWN	None
FCUBSMS3	Machine1	SHUTDOWN	None
FCUBSMS4	Machine2	SHUTDOWN	None

Upon successful startup, the status of Managed servers is changed to **“RUNNING”**.

6. Data Source creation and JDBC Configuration

Following are the JNDI names of those data sources used by FLEXCUBE application.

jdbc/fcjdevDS - This datasource is used by FLEXCUBE online screen excluding branch screens.

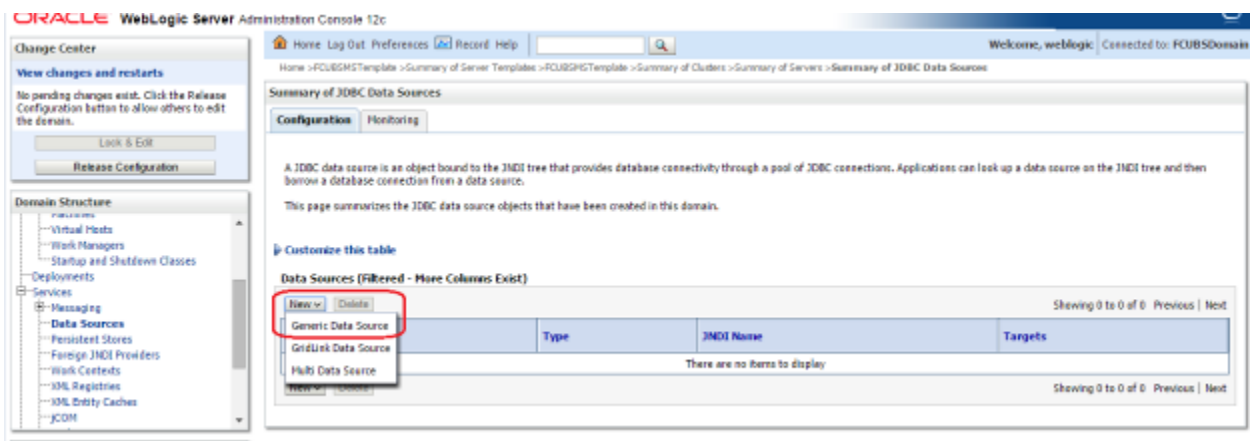
- jdbc/fcjdevDSBranch - This datasource is used by Branch screens.
- jdbc/fcjSchedulerDS - This datasource is used by Quartz scheduler.

Note:

- jdbc/fcjdevDS should be **NonXA**.
- jdbc/fcjdevDSBranch and jdbc/fcjSchedulerDS should be **XA**

6.1 Data source creation: non XA

- 1) Navigate to **FCUBSDomain** → **Services** → **Data Sources** → select **New > Generic Data Source**.



The screenshot shows the Oracle WebLogic Server Administration Console. The breadcrumb navigation is: Home > FCUBSGMSTemplate > Summary of Server Templates > FCUBSGMSTemplate > Summary of Clusters > Summary of Servers > Summary of JDBC Data Sources. The page title is 'Summary of JDBC Data Sources'. There are two tabs: 'Configuration' (selected) and 'Monitoring'. A text block explains: 'A JDBC data source is an object bound to the JNDI tree that provides database connectivity through a pool of JDBC connections. Applications can look up a data source on the JNDI tree and then borrow a database connection from a data source. This page summarizes the JDBC data source objects that have been created in this domain.' Below this is a 'Customize this table' section with a table titled 'Data Sources (Filtered - More Columns Exist)'. The table has columns for 'Name', 'Type', 'JNDI Name', and 'Targets'. The 'Name' column contains 'Generic Data Source', 'GridLink Data Source', and 'Multi Data Source'. The 'Type' column is empty. The 'JNDI Name' column contains 'There are no items to display'. The 'Targets' column is empty. The 'New' button in the table header is highlighted with a red box. The table footer shows 'Showing 0 to 0 of 0: Previous | Next'.

- 2) Enter the **Name** and **JNDI Name** and Click on **Next**

ORACLE WebLogic Server Administration Console 12c

Home Log Out Preferences Record Help

Welcome, weblogic Connected to: FCUBSDomain

Change Center

New changes and restarts

No pending changes exist. Click the Release Configuration button to allow others to edit the domain.

Lock & Edit

Release Configuration

Domain Structure

FCUBSDomain

- Environment
 - Services
 - Clusters
 - Server Templates
 - Migratable Targets
 - Coherence Clusters
 - Machines
 - Virtual Hosts
 - Work Managers
 - Startup and Shutdown Classes
 - Deployments
 - Services
 - MessageQueue

How do I...?

- Create JDBC generic data sources
- Create LIR-enabled JDBC data sources

System Status

Health of Running Servers

Failed (0)

Create a New JDBC Data Source

Back Next Finish Cancel

JDBC Data Source Properties

The following properties will be used to identify your new JDBC data source.

* Indicates required fields

What would you like to name your new JDBC data source?

Name: FCUBSDS

What JDBC name would you like to assign to your new JDBC Data Source?

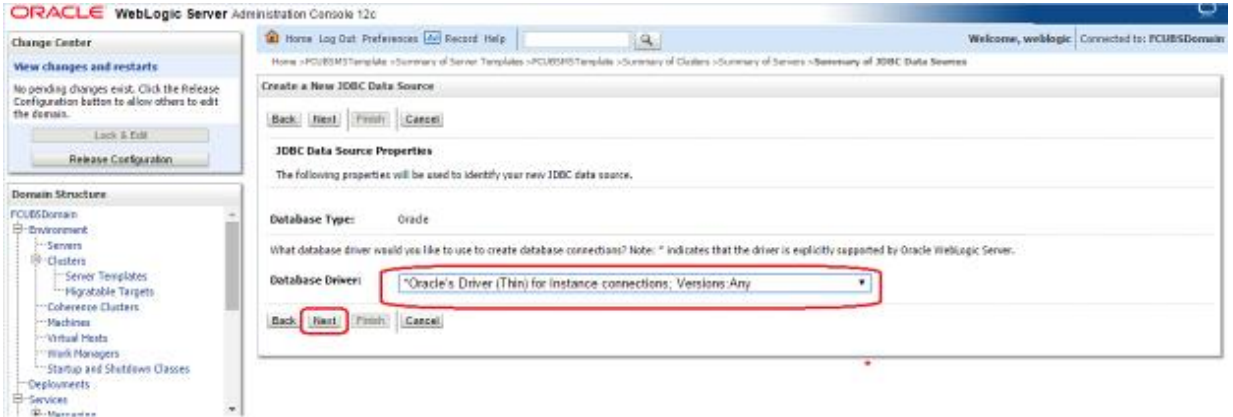
JNDI Name: jdbc/FCJdevDS

What database type would you like to select?

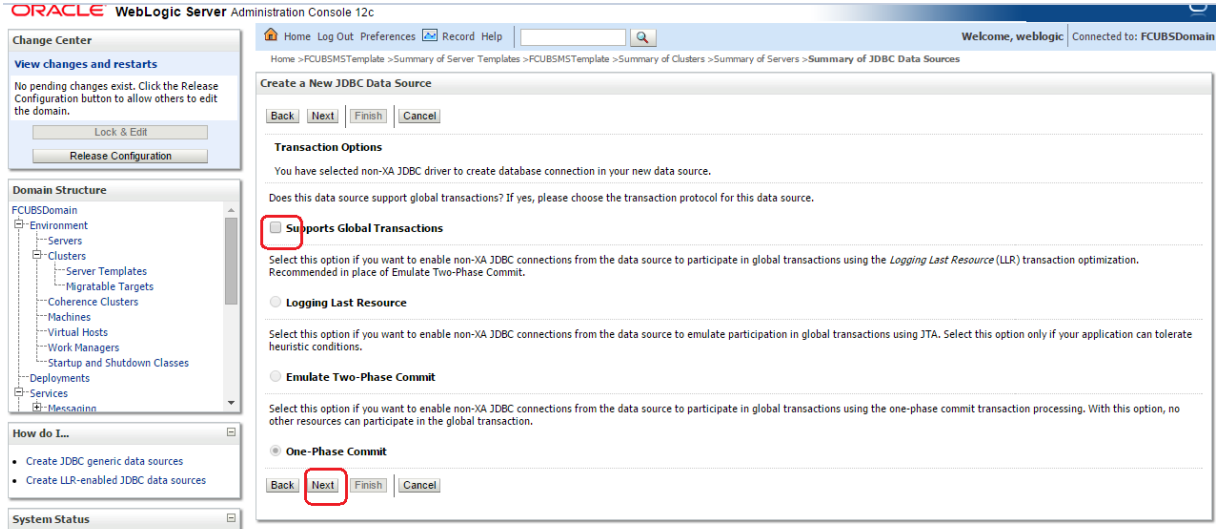
Database Type: Oracle

Back Next Finish Cancel

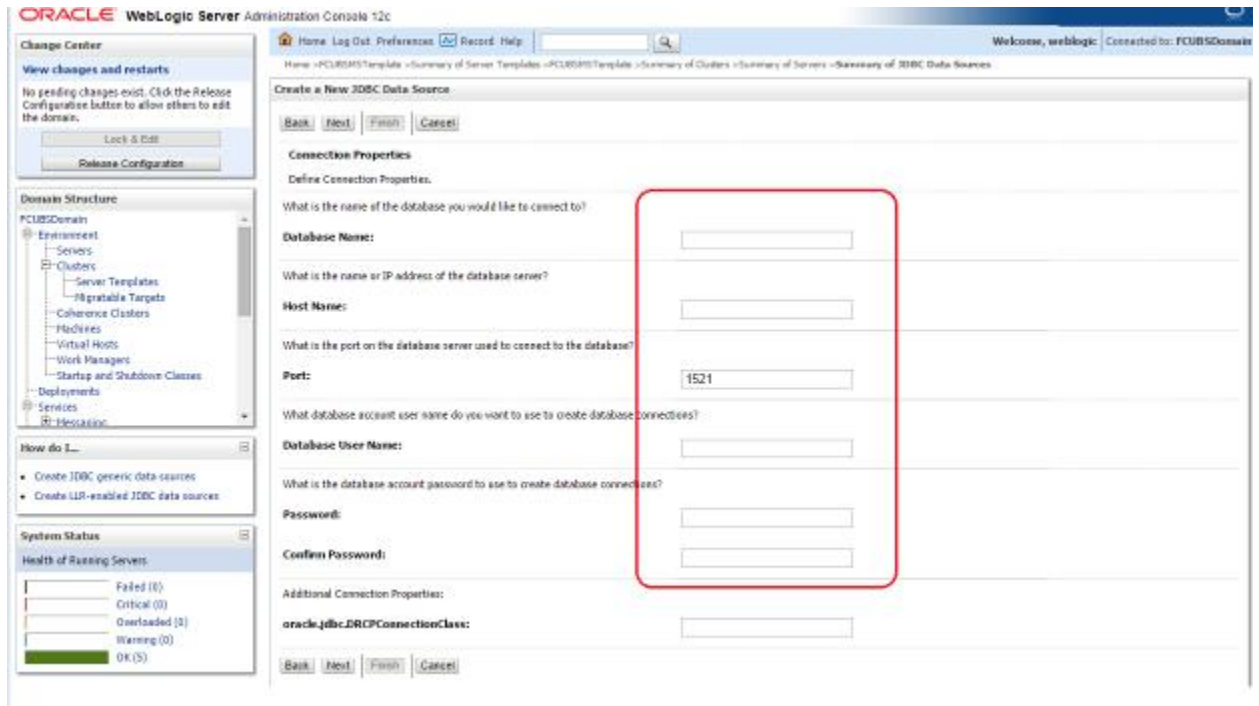
- 3) Select the Driver as **Oracle's Driver(thin) for Instance connection: Versions: Any** and Click on **Next**.



- 4) Uncheck the **Supports Global Transactions** and click on **Next**.



- 5) Enter the **Database Name, Host Name, Port, Database User Name, Password, Confirm Password** and click on **Next**.



- 6) Replace the **JDBC URL** in the below format and click on **Next**.

Default URL: jdbc:oracle:thin:@<IP_Address>:<Port>:<INSTANCE_NAME>.

Change the default URL to:

```
jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=xxxxxx.com)(PORT=1521)))(CONNECT_DATA=(SERVICE_NAME=fcubs)))
```

Where,

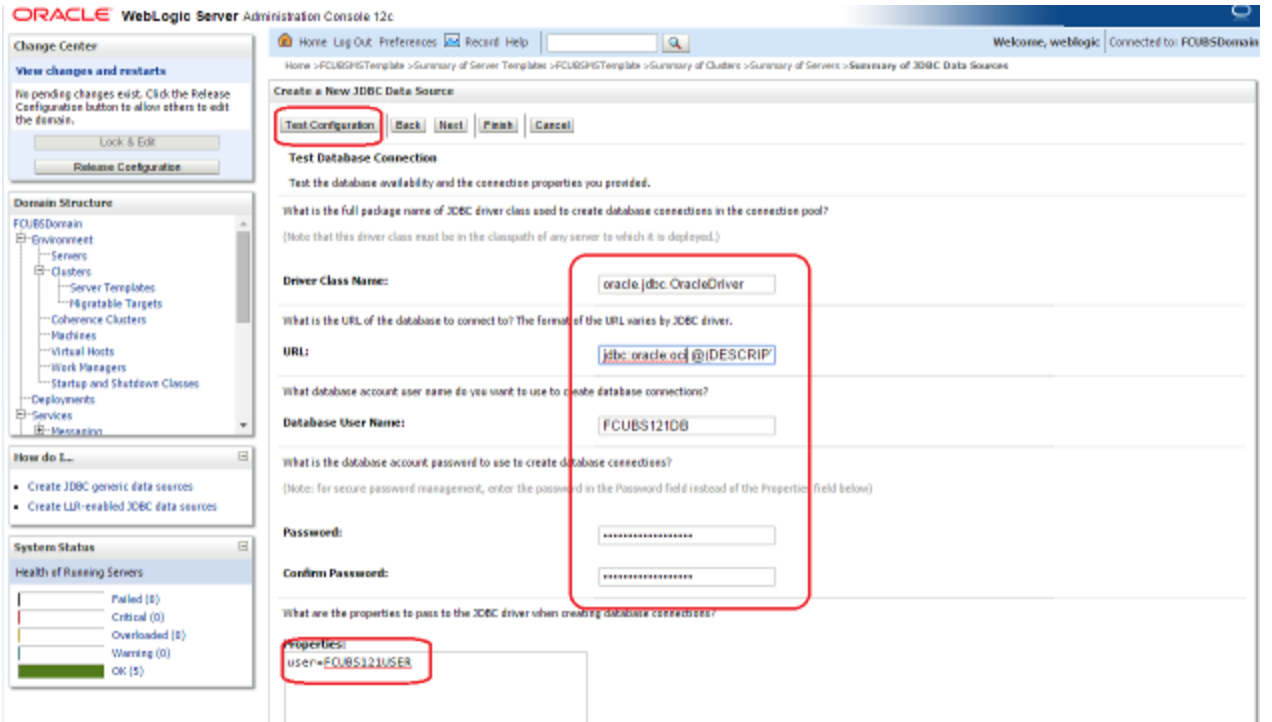
Scan IP = xxxxxx.com

Service Name = fcubs

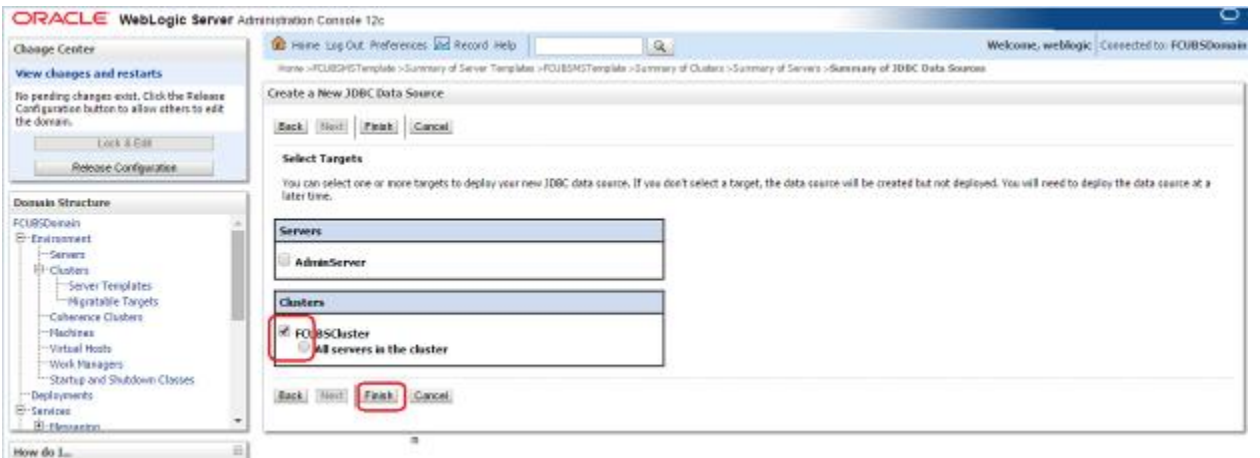
Port = 1521

Make sure that in URL, we make the necessary changes.

Then Click on Test Configuration. The connection test should be successful.

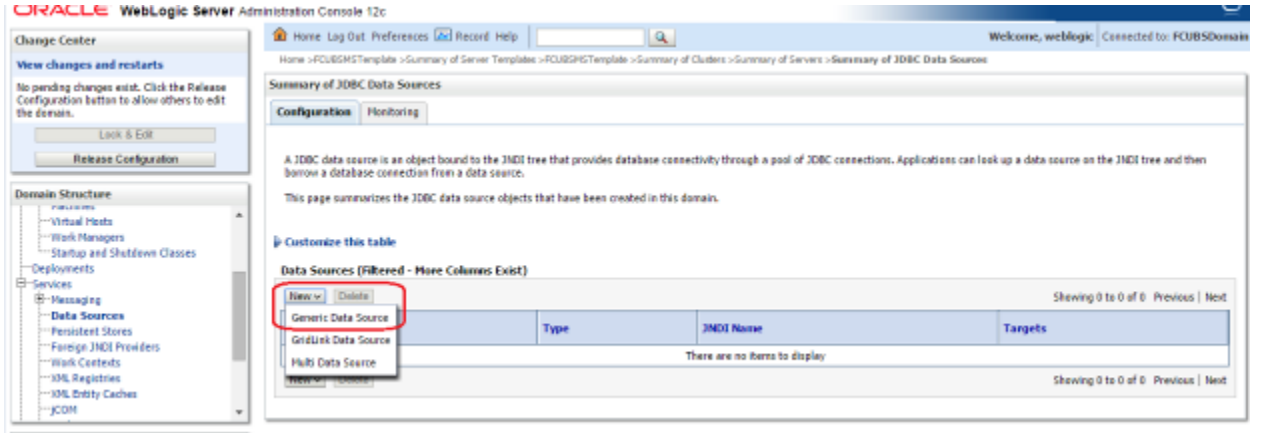


7) Select Target as **FCUBSCluster** and click on **Finish**.

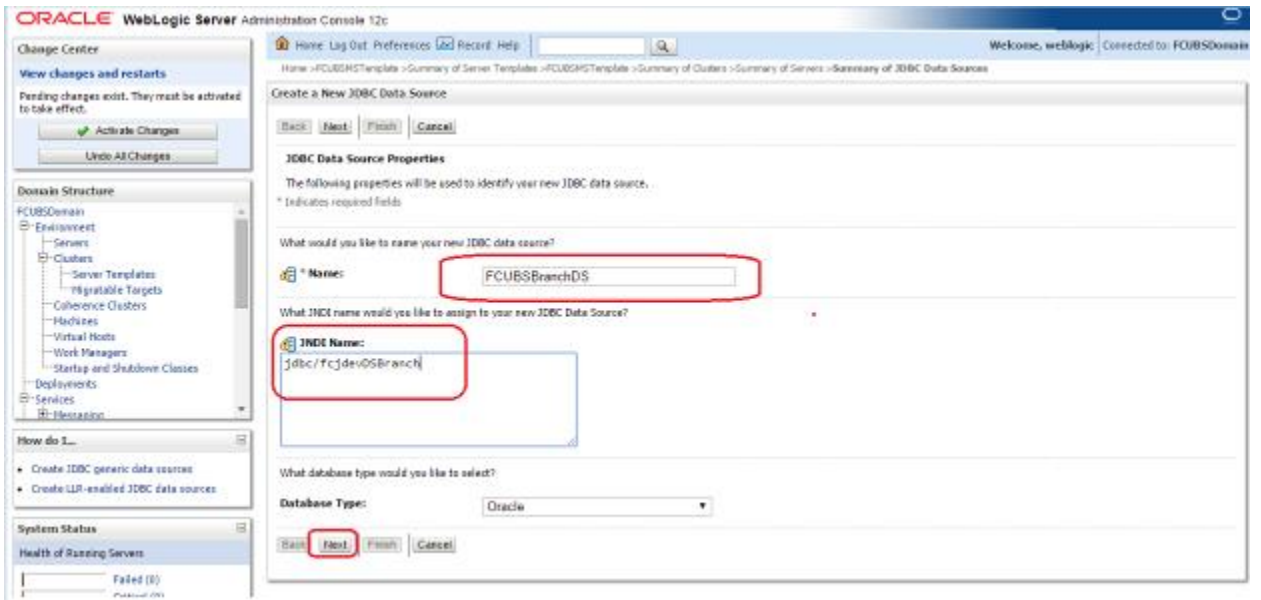


6.2 XA Datasource

- 1) Navigate to **FCUBSDomain** → **Services** → **Data Sources** → select **New > Generic Data Source**.



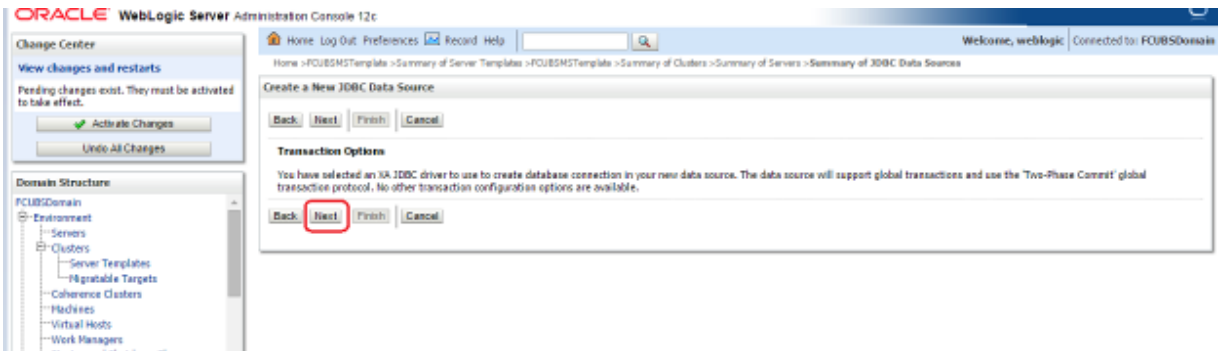
- 2) Enter the **Name** and **JNDI Name** and Click on **Next**.



- 3) Select the Driver as **Oracle's Driver(thin XA) for Instance connection: Versions: Any** and Click on **Next**.



- 4) Click on **Next**.



5) From this step to target setting step follow as mentioned in non-xa.

ORACLE WebLogic Server Administration Console 12c

Home Log Out Preferences Record Help

Welcome, weblogic Connected to: FCUBSDomain

Home > FCUBSGTemplate > Summary of Server Templates > FCUBSGTemplate > Summary of Clusters > Summary of Servers > Summary of JDBC Data Sources

Create a New JDBC Data Source

Back Next Finish Cancel

Connection Properties

Define Connection Properties.

What is the name of the database you would like to connect to?

Database Name:

What is the name or IP address of the database server?

Host Name:

What is the port on the database server used to connect to the database?

Port:

What database account user name do you want to use to create database connections?

Database User Name:

What is the database account password to use to create database connections?

Password:

Confirm Password:

Additional Connection Properties:

oracle.jdbc.DBCPConnectionClass:

Back Next Finish Cancel

ORACLE WebLogic Server Administration Console 12c

Home Log Out Preferences Record Help

Welcome, weblogic Connected to: FCUBSDomain

Home > FCUBSGTemplate > Summary of Server Templates > FCUBSGTemplate > Summary of Clusters > Summary of Servers > Summary of JDBC Data Sources

Create a New JDBC Data Source

Test Configuration Back Next Finish Cancel

Test Database Connection

Test the database availability and the connection properties you provided.

What is the full package name of JDBC driver class used to create database connections in the connection pool?
(Note that the driver class must be in the classpath of an server to which it is deployed.)

Driver Class Name:

What is the URL of the database to connect to? The format of the URL varies by JDBC driver.

URI:

What database account user name do you want to use to create database connections?

Database User Name:

What is the database account password to use to create database connections?
(Note: for secure password management, enter the password in the Password field instead of the Properties field below)

Password:

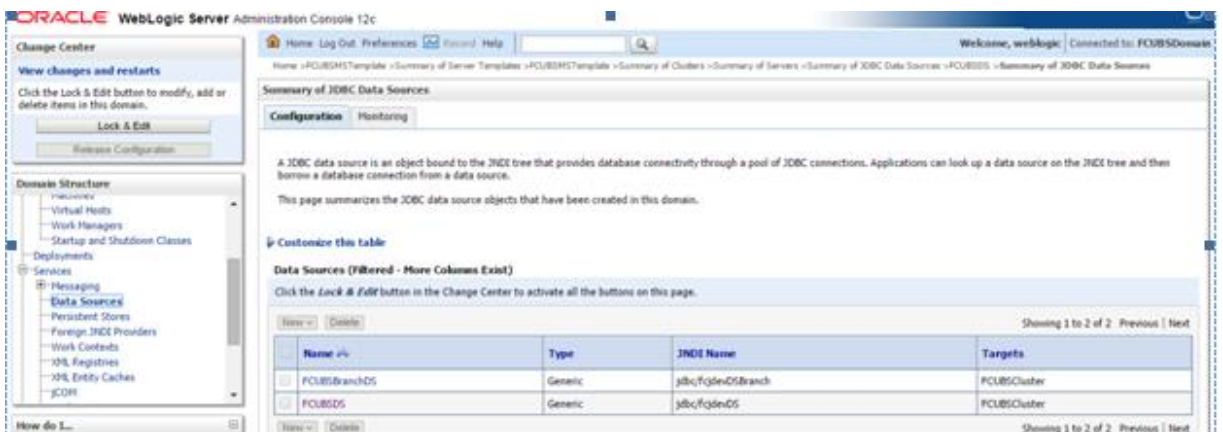
Confirm Password:

What are the properties to pass to the JDBC driver when creating database connections?

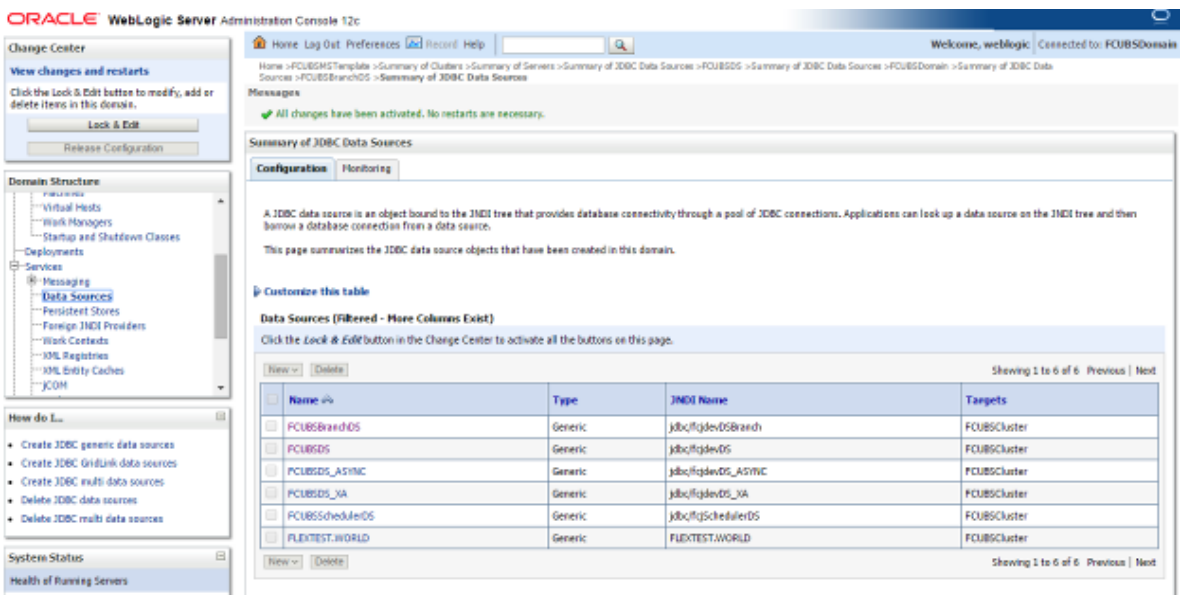
Properties:



6) Upon **Activate Changes** would create the XA Datasource.



7) Similarly create all the other Data Source required for the FCUBS Application and Gateway Deployments.



6.3 JDBC Parameters Tuning

Below JDBC parameters needs to updated for all the Datasources.

PARAMETER	VALUE	Navigate To
Connection Reserve time out	30	Connection Pool->Advance
Test Frequency	60	Connection Pool->Advance
Inactive connection time out	30	Connection Pool->Advance
Initial Capacity	1	Connection Pool
Max capacity	Based on Site Requirement	Connection Pool
Capacity Increment	5	Connection Pool
Shrink Frequency	900	Connection Pool->Advance
Test Connection on Reserve	Checked	Connection Pool->Advance
Statement Cache Size	50	Connection Pool

7. JMS Resource Creation

JMS Resource Creation involves various steps:

- Persistence Store Creation
- JMS Server Creation
- JMS Module Creation
- Resource Creation: Connection Factory and Queue's

Refer to the [Configuring JMS on Weblogic Server](#) for further details on JMS setup.

8. Oracle WebLogic Load Balancing

For Weblogic Load balancing, use

- 1) Oracle HTTP Server: Refer to Configuration for Oracle HTTP Server for setup.
- 2) Apache: Refer to Configuration for Apache for setup.

9. Frequently Asked Questions

9.1 Machine status is Unreachable

If the machine status is unreachable, means that machine is not reachable and from console you cannot start/stop the managed servers.

In the console, navigate through Domain structure → Machines → machine1 → Monitoring → Node Manager Status will be **Unreachable**.

To change the status, you need to start the node manager on that server. Refer to start node manager section on steps to start the node manager.

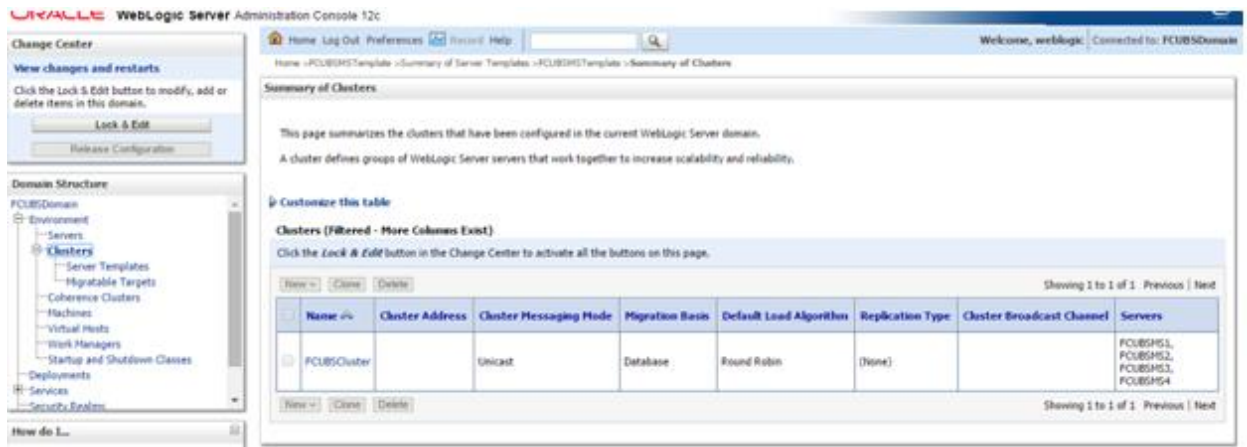
9.2 How to restart node manager?

- 1) Locate node manager pid using `ps -ef|grep weblogic.nodemanager.javaHome`
- 2) Change directory to `$DOMAIN_HOME/bin`
- 3) Kill the unix process using `kill -9 <pid>`
- 4) Verify that the node manager is killed by `tail -f nohup.out`
- 5) Start node manager using `nohup ./startNodeManager.sh &`
- 6) Verify nodemanager is started using `tail -f nohup.out`

9.3 Scaling Up Dynamic Cluster

When the capacity is insufficient and you need to scale-up, you can add dynamic servers on demand. It requires only a few clicks.

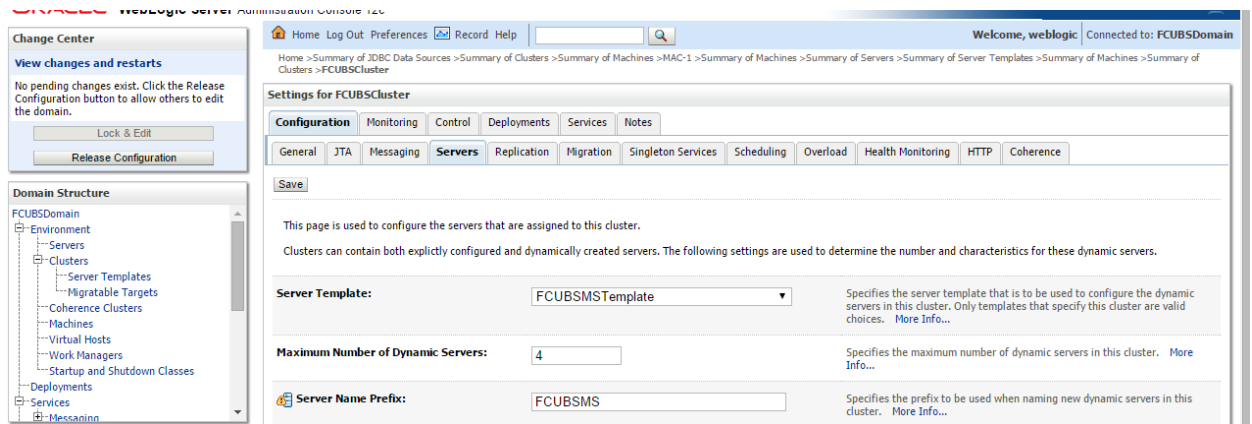
- 1) Navigate to **FCUBSDomain → Environment → Clusters**.



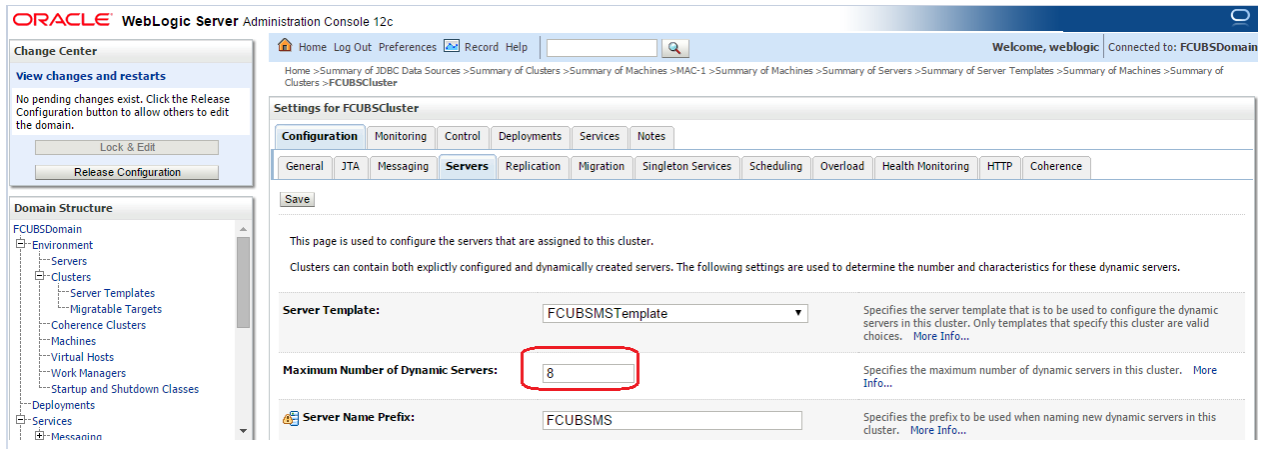
The screenshot shows the WebLogic Server Administration Console interface. On the left, the 'Domain Structure' tree is visible, with 'Clusters' selected under 'FCUBSDomain'. The main area displays the 'Summary of Clusters' page, which includes a table of clusters. The table has the following data:

Name	%s	Cluster Address	Cluster Messaging Mode	Migration Basis	Default Load Algorithm	Replication Type	Cluster Broadcast Channel	Servers
FCUBSCluster			Unicast	Database	Round Robin	(None)		FCUBSHS1, FCUBSHS2, FCUBSHS3, FCUBSHS4

2) Click **FCUBSCluster** → **Configuration** → **Servers** tab.



3) Change the **Maximum Number of Dynamic Servers** to 8. Click **Save**.



4) Activate changes in the **Change Center** of the Weblogic Console. After activation, 4 new Dynamic Servers are added to the Dynamic Cluster.

<input type="checkbox"/>	Name	Type	Machine	Listen Port
<input type="checkbox"/>	FCUBSMS1	Dynamic	MAC-1	7101
<input type="checkbox"/>	FCUBSMS2	Dynamic	MAC-2	7102
<input type="checkbox"/>	FCUBSMS3	Dynamic	MAC-1	7103
<input type="checkbox"/>	FCUBSMS4	Dynamic	MAC-2	7104
<input type="checkbox"/>	FCUBSMS5	Dynamic	MAC-1	7105
<input type="checkbox"/>	FCUBSMS6	Dynamic	MAC-2	7106
<input type="checkbox"/>	FCUBSMS7	Dynamic	MAC-1	7107
<input type="checkbox"/>	FCUBSMS8	Dynamic	MAC-2	7108

5) Start the 4 new Dynamic Servers and you have doubled you capacity.

9.4 **Session Timeout**

Session timeouts occur intermittently during load condition. Verify the following:

1. Clock Synchronization: Time across the nodes/machines is same.
2. Session Stickiness in load balancer: Persistence Type in load balancer should be set to SOURCE IP and should not be cookie.



Middleware Best Practice
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