

Setting up Clustering with Weblogic Application Server 8.1 sp1

By
Thea Solutions

Contact contact@theasolutions.com if you face difficulties in setting up the cluster

Visit www.theasolutions.com for more exciting tutorials

Table Of Contents

1	Basics of Weblogic Cluster:.....	3
2	Setting up the Cluster Domain through the Configuration Wizard	3
3	Configuring the Node Manager	7
4	Configuring the Proxy Server	8
5	Setting up Session Replication.....	10
6	Verifying the Cluster Configuration	11
7	Adding a new Managed Server to the Cluster	11
	Adding a machine	11
	Configuring the Node Manager	12
	Creating the Managed Server	12
8	Starting and Stopping Managed Servers.....	12

Weblogic 8.1 sp1 Clustering

Before entering into the weblogic clustering implementation, let us know some terms in cluster concepts.

1 Basics of Weblogic Cluster:

A WebLogic Server cluster consists of multiple WebLogic Server instances running simultaneously and working together to provide increased scalability and reliability. A cluster appears to clients to be a single WebLogic Server instance. The server instances that constitute a cluster can run on the same machine, or be located on different machines. You can increase a cluster's capacity by adding additional server instances to the cluster on an existing machine, or you can add machines to the cluster to host the incremental server instances. Each server instance in a cluster must run the same version of WebLogic Server.

2 Setting up the Cluster Domain through the Configuration Wizard

This type of domain configuration is recommended for production environments that require the improved availability and performance provided by failover and load balancing in a WebLogic Server cluster.

To create a new domain with a cluster of Managed Servers and an Administration Server (which is not part of the cluster):

- Start the Domain Configuration Wizard by navigating to the <Weblogic_Home>\weblogic81\common\bin and executing the **config.cmd** file.
- The Domain Configuration Wizard displays the Create or Extend a Configuration page.

Note: The remaining instructions in this section assume that you are running the Domain Configuration Wizard in GUI mode.

- On the Create or Extend a Configuration page, click **Create a new WebLogic configuration** button. Then click **Next**.
- On the Select a Configuration Template page, choose the Basic WebLogic Server Domain template. Then click **Next**.
- On the Choose Express or Custom Configuration page, choose Custom. Then click **Next**.

On the Administration Server Configuration page, configure the Administration Server as follows:

- **Name:** Enter an alphanumeric name that is unique for all configuration objects in the domain. Within a domain, each server, machine, cluster, JDBC connection pool, virtual host, and any other resource type must be named uniquely and must not use the same name as the domain.
- This field will not accept spaces.
- The server name is not used as part of the URL for applications that are deployed on the server. It is for your identification purposes only. The server name displays in the Administration Console, and if you use WebLogic Server command-line utilities or APIs, you use this name to identify the server.
- **Listen Address**—To accept the default behavior, leave the All Local Addresses value. By default, remote processes can access server instances through the IP address or DNS name of the host machine. Local processes can access the server with the IP address, DNS name, or the localhost string.
- To change the default behavior, click in the field and choose a value from the drop-down list.
- **Listen Port:** Enter a numeric value for the listen port. The range is 1 to 65535.
- **SSL Enabled.** Click in this box to enable SSL.
- By default, the server instance uses demonstration certificates for SSL communication. In a production environment, you must configure the server to use certificates from a certificate authority.
- **SSL Listen Port:** Enter a numeric value for SSL listen port. The range is 1 to 65535.
- Click **Next**.
- On the Managed Servers, Clusters and Machine Options page, click **Yes**. Then click **Next**.
- On the Configure Managed Servers page, click **Add** and fill in the fields of the Add Server row as follows:
- **Name**—Enter an alphanumeric name that is unique for all configuration objects in the domain. Within a domain, each server, machine, cluster, JDBC connection pool, virtual host, and any other resource type must be named uniquely and must not use the same name as the domain.
- This field will not accept spaces.
- Each server within a domain must have a unique name.
- **Listen Address**—To accept the default behavior, leave the All Local Addresses value. By default, remote processes can access server instances through the IP

address or DNS name of the host machine. Local processes can access the server with the IP address, DNS name, or the localhost string.

To change the default behavior, choose a value from the drop-down list.

- **Listen Port:** Enter a numeric value for the listen port. The range is 1 to 65535.
- **SSL Enabled.** Click in this box to enable SSL.
- By default, the server instance uses demonstration certificates for SSL communication. In a production environment, you must configure the server to use certificates from a certificate authority.
- **SSL Listen Port:** Enter a numeric value for SSL listen port. The range is 1 to 65535.
- Repeat step 8. to add additional Managed Servers, then click **Next** to move to the Cluster Configuration page.
- On the Configure Clusters page, click **Add** and fill in the fields of the Add Cluster row as follows:
- **Cluster Name:** Enter an alphanumeric name that is unique for all configuration objects in the domain. Within a domain, each server, machine, cluster, JDBC connection pool, virtual host, and any other resource type must be named uniquely and must not use the same name as the domain. This field will not accept spaces.
- **Multicast Address:** Enter a multicast address for the cluster. A multicast address is an IP address in the range from 224.0.0.0 to 239.255.255.255.
- **Multicast Port:** Enter a numeric value for the multicast port. The range of values is 1 to 65535.
- **Cluster Address:** (Optional) Enter the cluster address. The cluster address forms the host name portion of URLs for requests directed to the cluster. If the cluster address is not set, EJB handles may not work properly.

For production use, enter a DNS name that maps to the individual IP addresses of the Managed Servers in the cluster.

- For testing or development purposes, use a comma-separated list of the IP addresses and ports assigned to the Managed Servers (this is the default entry). For example IPAddress1:port1,IPAddress2:port2,IPAddress3:port3
- Click **Next** to display the Assign Servers to Clusters page.
- On the Assign Servers to Clusters page:
- In the Target list, select the cluster you created.
- In the Source list, select Managed Servers.
- Administration Servers cannot be part of a cluster.

- Click the right arrow button to assign the server to the cluster.
- Click **Next** to display the Configure Machines page.
- On the Configure Machines page, complete the following steps for each WebLogic Server host that will run servers in the domain:
 - Click the **Add** button.

In the Name column provide a name that identifies the computer that will run a server instance.

If you plan to use the Node Manager on the computer, in the Node Manager Listen Address column, enter the DNS name of the computer. In Node Manager Listen Port, enter the port on which the Node Manager listens for requests.

The Administration Server uses the listen address and listen port to connect to the Node Manager running on the remote computer. The Administration Server can then ask the Node Manager to start a server instance on the computer.

For servers that are in a cluster, WebLogic Server uses the Machines that you configure to determine the optimum server to which certain tasks, such as HTTP session replication, are delegated.

- Click **Next** to display the Assign Servers to Machines page.
- On the Assign Servers to Machines page:
 - In the Target list, select a Machine that you created.
 - In the Source list, select a server.
 - Click the right arrow to assign the server to the machine.
 - When you complete all server associations, click **Next**.
 - Skip subsequent pages until the wizard displays the Configure Administrative Username and Password page.
 - On the Configure Administrative Username and Password page, enter a user name and password. This user becomes the initial administrative user for the domain. Then click **Next**.

For Windows systems, the Configuration Wizard prompts you to create an item on the Windows Start menu. Click **Yes** if you want the wizard to lead you through the process of configuring a shortcut for the servers in your domain.

For Windows systems, the wizard also prompts you to install the Administration Server as a Windows service. Select **Yes** if you want the Administration Server to start automatically when you boot the Windows computer. Click **Next** to continue.

- On the Configure Server Start Mode and Java SDK page, select Production Mode. Then click **Next**.
- On the Create WebLogic Configuration page, click **Create**.

By default, the wizard creates a domain with the following characteristics:

The domain is named mydomain.

The domain's Administration Server is named myserver.

The root directory for the Administration Server is located in WL_HOME\user_projects\domains\mydomain.

To start the Administration Server in this domain, open a command prompt, change to WL_HOME\user_projects\domains\mydomain, and run the startWebLogic.cmd (Windows) or startWebLogic.sh (UNIX) script.

To access the Administration Console for the domain, use any of the following URLs:

From the same computer on which the server is running: <http://localhost:7001/console>

From any computer:

<http://DNS-name:7001/console>

where DNS-name is the DNS name of the computer on which the server is running.

From any computer:

<http://IP=Address:7001/console>

where IP-Address is an IP address of the computer on which the server is running.

Note: After creating the cluster, open the admin console and navigate to

- Clusters → *<Cluster_Name>* → Configuration → General
- In the cluster address column, provide the list of managed servers with the ports separated by a comma.
 - **E.g.** myserver:9000,serverqa1:9000,serverqa2:9000
- Click on Apply
- Restart the admin server after making the change.

The above process mentioned in the note is carried out for load balancing to happen properly.

3 Configuring the Node Manager

The node manager is a gateway through which the admin server contacts the managed server and issues commands. The node manager has to be manually started in all the managed server machines. Before starting the node manager in the managed server machines, the following steps have to be followed.

1. Open the admin server console and navigate to Servers → *<Admin Server>* → Configuration → Keystores & SSL → Advanced Options [SHOW]
2. Scroll down to the **Hostname Verification** attribute and from the pull down menu choose the *None* option.
3. Click on **Apply**
4. Navigate to *<Weblogic_Home>\weblogic81\server\bin* in both the admin server and the managed server and open the nodeManager.hosts file using a text editor and add the ip address of the machine where the managed server is to run to the file and save the file.
5. Repeat the above steps for all the managed servers in the cluster.

6. Go to the managed server machine and navigate to `<Weblogic-Home>\weblogic81\server\bin` and run the **startNodeManager.cmd**.
7. In order to verify the connection between the admin server and the node manager, open the admin console and navigate to Machine → `<ManagedServerMachine>` → Monitoring.
8. If monitoring tab displays the details of the node manager running on the machine, then the connection has been set up successfully or if there is an exception the exception is displayed on the screen. If the configuration were successful, the screen would contain similar kind of data.

E.g.

This page allows you to view current status information for the Node Manager.

```
State : RUNNING
bea.home : null
weblogic.nodemanager.javaHome : D:\WEBLOG~1.1SP\JDK141~1
weblogic.nodemanager.listenAddress : *.*
weblogic.nodemanager.listenPort : 5555
CLASSPATH : D:\ cluster\ myapp\ 6.1;D:\ cluster\ myapp\ 6.1\ lib\ cuiLogin.jar;D:\
cluster\ myapp\ 6.1\ lib\ ldapjdk.jar;D:\ WEBLOG~1.1SP\ JDK141~1\ lib\ tools.jar;D:\
WEBLOG~1.1SP\ WEBLOG~1\ server\ lib\ weblogic_sp.jar;D:\ WEBLOG~1.1SP\
WEBLOG~1\ server\ lib\ weblogic.jar;
```

4 Configuring the Proxy Server

The proxy server would not be a part of the cluster and can be created in a separate domain also.

This step is for proxying requests through weblogic proxy server. For this we have to have some tags in the web.xml, which is in the directory. `/wlserver6.1/config/mydomain/applications/my_app/Web-Inf`

```
<servlet-mapping>
  <servlet-name>HttpClusterServlet</servlet-name>
  <url-pattern>/</url-pattern>
</servlet-mapping>
<servlet-mapping>
  <servlet-name>HttpClusterServlet</servlet-name>
  <url-pattern>*.jsp</url-pattern>
</servlet-mapping>
<servlet-mapping>
  <servlet-name>HttpClusterServlet</servlet-name>
  <url-pattern>*.htm</url-pattern>
```

```

</servlet-mapping>
<servlet-mapping>
  <servlet-name>HttpClusterServlet</servlet-name>
  <url-pattern>*.html</url-pattern>
</servlet-mapping>

```

Then, we have to specify the managed servers list in this same deployment descriptor for proxying the requests. It should look like this.

```

<servlet>
  <servlet-name>HttpClusterServlet</servlet-name>
  <servlet-class>
    weblogic.servlet.proxy.HttpClusterServlet
  </servlet-class>
  <init-param>
    <param-name>WebLogicCluster</param-name>
    <param-value>
      server1:7001:7002|server2:7001:7002
    </param-value>
  </init-param>
</servlet>

```

So replace the contents of **web.xml** on the proxy server with the following lines.

```

<?xml version="1.0" encoding="UTF-8"?>

<!DOCTYPE web-app PUBLIC "-//Sun Microsystems, Inc.//DTD Web Application
2.2//EN"
'http://java.sun.com/j2ee/dtds/web-app_2_2.dtd'>

<web-app>
<servlet>
  <servlet-name>HttpClusterServlet</servlet-name>
  <servlet-class>
    weblogic.servlet.proxy.HttpClusterServlet
  </servlet-class>

  <init-param>
    <param-name>WebLogicCluster</param-name>
    <param-value>
      server1:7001:7002|server2:7001:7002
    </param-value>
  </init-param>

</servlet>

```

```

<servlet-mapping>
  <servlet-name>HttpClusterServlet</servlet-name>
  <url-pattern>/</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>HttpClusterServlet</servlet-name>
  <url-pattern>*.jsp</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>HttpClusterServlet</servlet-name>
  <url-pattern>*.htm</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>HttpClusterServlet</servlet-name>
  <url-pattern>*.html</url-pattern>
</servlet-mapping>

</web-app>

```

Note: You will have to replace *server1:7001:7002/server2:7001:7002* in the specified lines above with whatever managed servers you are using.

Open the **config.xml** inside the proxy domain using a text editor and append the following set of tags and save the file.

```

  <Application Name="<application name>"
    Path="<Weblogic_Home>\user_projects\domains\<Proxy Domain>\applications"
    StagingMode="nostage" TwoPhase="true">
    <WebAppComponent Name="<application name>" Targets="<Proxy Server
Name>" URI="<application name>"/>
  </Application>

```

Note: Replace the values mentioned in bold letters with the corresponding path values based on the configuration.

5 Setting up Session Replication

After deploying the application on all the managed servers, session replication among the managed servers can be configured through the following steps.

This step has to be repeated for all the managed servers in the cluster.

In the managed server, navigate to

<Weblogic-Home>\weblogic81\server\bin*<ManagedServerName>*\stage\<application name> \WEB-INF and open the weblogic.xml file with a text editor. Add the following tags before the <jsp-descriptor> tag.

Note: If the following piece of code were appended at the end of the weblogic.xml file an exception would be thrown when the server starts up.

```
<session-descriptor>
  <session-param>
    <param-name>PersistentStoreType</param-name>
    <param-value>replicated</param-value>
  </session-param>
</session-descriptor>
```

Restart all the managed servers in the cluster after updating the weblogic.xml file. For details on starting and stopping of Managed Servers please refer **Section 8 Starting and Stopping on Managed Servers**.

6 Verifying the Cluster Configuration

In order to verify if the cluster has been set up properly Navigate to the **Clusters** tab and click on the cluster name.

Click the **Monitoring** tab from the right pane. We can see the following lines.

```
Number of servers configured for this cluster      2
Number of servers currently participating in this cluster  2
```

If the number of clusters configured is equal to the number of clusters participating in the cluster, then the cluster configuration is correct.

7 Adding a new Managed Server to the Cluster

In order to add a managed server running on a new machine, the following steps have to be followed.

Add the machine in which the managed server is to be created has to be added through the admin console.

Configuring the Node Manager

Create the managed server on the servers tab.

Add the new managed server to the cluster.

Deploy the application on the newly added managed server.

Adding a machine

The machine in which the managed server has to be created can be added through the following steps.

Open the admin console and navigate to Machines → Configure a new Machine.

Enter the name of the machine for the **Name** attribute.

Click on **Apply**

In the Node Manager tab, mention the hostname or the ip address of the machine for the **Listen Address** attribute.

Enter the port in which the node manager is listening in the machine for the **Listen Port** attribute.

Click on **Apply**

Configuring the Node Manager

After creating the machine, the node manager on the newly created machine is to be configured so that the admin server can communicate with the managed server running on the machine. In order to configure the node manager on the machine, please refer **Section 3 Configuring the NodeManager**.

Creating the Managed Server

In order to create the managed server, navigate to Servers → Configure a new Server

Enter the name of the server for the **Name** attribute.

Select the machine in which the server is to be created from the **Machine** pull down menu.

Select the cluster to which the managed server has to belong from the **Cluster** pull down menu.

Enter the port in which the server would listen for the **Listen Port** attribute.

Enter the secure port in which the application would listen for the **SSL Listen Port** attribute. Click on **Create**.

Navigate back to Machines → <Newly added machine name> → Servers

Select the newly created managed server to the machine from the list of servers.

Click on **Apply**.

8 Starting and Stopping Managed Servers

All the managed servers in the cluster can be configured from the administration console. In order to start a particular managed server, navigate to

Servers → <Managed_Server> → Control

and click on **Start this Server** link, a confirmation screen would be displayed to the user and click **Yes** on the screen.

In order to stop a managed server, navigate to

Servers → <Managed_Server> → Control

And click on **Gracefully shutdown this Server**, a confirmation screen would be displayed to the user and click **Yes** on the screen.

If the server is to be force shutdown, instead of clicking on the **Gracefully shutdown this Server** link, click on the **Forcefully shutdown this Server**.

In order to start all the servers in a cluster at the same time, navigate to

Clusters → <Cluster_Name> → Control

And click on **Start all Managed Servers** link, a confirmation screen would be displayed to the user and click **Yes** on the screen.

In order to stop all the servers in a cluster, navigate to
Clusters → *<Cluster_Name>* → Control

And click on **Gracefully shutdown of all Managed Servers** link, a confirmation screen would be displayed to the user and click **Yes** on the screen.

If the server is to be force shutdown, instead of clicking on the **Gracefully shutdown of all Managed Servers** link, click on the **Forcefully shutdown of all Managed Servers**.