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Oracle WebLogic Server 12*c*: Administration I

Activity Guide

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Practices for Lesson 3: Installing and Patching WebLogic Server

Chapter 3

Practices for Lesson 3: Overview

Practices Overview

In these practices, you install Oracle WebLogic Server 12*c* and apply a patch to it.

Practice 3-1: Installing WebLogic Server

Overview

In this practice, you install the Java Development Kit (JDK) and then WebLogic Server.

Both the JDK and WebLogic Server have already been installed on both hosts. You will rename the installation directory on host01 to gain installation practice. If something goes wrong during the installation on host01, you can revert to the preinstalled version of the products by changing the directories back to their original names.

Assumptions

None

Tasks

1. Connect to host01.
   a. Refer to the instructions in Appendix A: Connecting to the Environment to connect to your machine.
   b. Unless stated otherwise, you will be working within host01 for the remainder of this practice.
2. Rename the installation directories.
   a. Open a Terminal window, and navigate to `/u01/app`.

   Tip: There is a launcher for a Terminal window in the panel at the top of the desktop.

   ```
   $ cd /u01/app
   ```
   b. Rename the FMW installation directory.
   ```
   $ mv fmw fmw-orig
   ```
   c. Create a new, empty `fmw` directory.
   ```
   $ mkdir fmw
   ```
   d. Rename the JDK installation directory.
   ```
   $ mv jdk jdk-orig
   ```
3. Install the JDK.
   a. In the Terminal window, navigate to `/install/java`.
   ```
   $ cd /install/java
   ```
   b. Unzip the tar file by running the `tar` command.
   ```
   $ tar xvf jdk-linux-x64.tar.gz –C /u01/app
   ```
   Command options:
   - `x:` Extract
   - `v:` Verbose output
   - `f:` File to extract
   - `C:` The `tar` command changes the current directory to the one specified before performing any operations. (Note that this is a capital "C.")

   c. Rename the JDK installation directory to something more generic. In a Terminal window, navigate back to `/u01/app`.
   ```
   $ cd /u01/app
   $ mv jdk1.7.0_67 jdk
   ```

Note: The exact name of the directory created by unzipping the tar file may be different, depending upon the version of the JDK. Rename whatever the directory name is to `jdk`.

4. Install WebLogic Server.

   a. In the Terminal window, navigate to `/install/weblogic`.

   ```
   $ cd /install/weblogic
   ```

   b. Set the `JAVA_HOME` variable to where the JDK is installed.

   ```
   $ export JAVA_HOME=/u01/app/jdk
   ```

   c. Set the `PATH` to include the `bin` directory of the JDK.

   ```
   $ export PATH=$JAVA_HOME/bin:$PATH
   ```

   d. Run the Java virtual machine with the `jar` option to run the generic installer.

   Note: The exact name of the JAR file may be different. Use the name of the generic installer JAR file in your system. The `-D` option ensures that the WebLogic installer performs a 64-bit product installation.

   ```
   $ java -d64 -jar fmw_12.1.3.0.0_wls.jar
   Extracting files.....
   ...
   ```

   Note: If any of the installation requirements fail, continue with the installation anyway by answering **y** when you are asked if you want to continue. There really is not a problem; the installer might get confused because host01 is a virtual machine.

   e. After the files are extracted, the graphical installer appears. Use the guidelines in the following table to install the software:

Step	Window/Page Description	Choices or Values
a.	Specify Oracle Inventory Directory	This screen appears when you install the first Oracle product. If it appears, enter `/u01/app/oraInventory` and click **Next**. If it does not appear, move to the next step.
b.	Welcome	Click **Next**.
c.	Installation Location	Enter `/u01/app/fmw` and click **Next**.
d.	Installation Type	Select **Complete with Examples**. Click **Next**.
e.	Prerequisite Checks	When all prerequisite checks are 100% successful, click **Next**.
f.	Security Updates	Deselect **I wish to receive security updates via My Oracle Support**. (In your training environment, you do not want to associate the installations with a specific user.) Click **Next**. In the dialog box that opens, click **Yes**.
g.	Installation Summary	Click **Install**.
h.	Installation Progress	Note the progress and successful completion of the installation. (This step may take several minutes.) Click **Next**.

Step	Window/Page Description	Choices or Values
i.	Installation Complete	Deselect **Automatically Launch the Quickstart Configuration Wizard**. Click **Finish**.

f. Close the Terminal window.

Practice Solution: Installing WebLogic Server

There is no scripted solution for this practice. If you did not do the practice, there is nothing for you to do, the products are already installed.

If you started the practice, but did not complete it, you revert to the preinstalled version of the products by deleting any new directories you created and renaming the original installation directories back to their previous names.

Assumptions

You started the practice but did not complete it.

Solution Tasks

Important: Do these tasks only if you started the practice but did not complete it.

1. Connect to host01.
   a. Refer to the instructions in Appendix A: Connecting to the Environment to connect to your machine.
   b. Unless stated otherwise, you will be working within host01 for the remainder of this practice.
2. Check that the preinstalled FMW directory is there. Delete the new FMW installation directory that you created. Rename the preinstalled directory back to its original name.
   a. Open a Terminal window, and navigate to `/u01/app`. Then, list the directories to ensure that the `fmw-orig` directory is present. Check that this preinstalled directory has valid contents.
   ```
   $ cd /u01/app
   $ ls
   fmw ... fmw-orig ...
   $ ls fmw-orig
   cfgtoollogs  coherence ...
   ```
   b. Ensure that you are in the proper directory. Remove the new installation directory that you created.
   ```
   $ pwd
   /u01/app
   $ rm -rf fmw
   ```
   Warning: This command permanently deletes the directory, all its subdirectories, and files. Use with caution.
   c. Rename the preinstalled directory back to its original name.
   ```
   $ mv fmw-orig fmw
   ```
3. Check that the preinstalled JDK directory is there. Delete the new JDK directory that you created. Rename the preinstalled directory back to its original name.
   a. In a Terminal window, navigate to `/u01/app`. Then list the directories to ensure that the `jdk-orig` directory is present.
   ```
   $ cd /u01/app
   $ ls
   jdk ... jdk-orig ...
   ```
   b. Ensure that you are in the proper directory. Remove the new installation directory that you created.

```
$ pwd
/u01/app
$ rm -rf jdk
```

Warning: This command permanently deletes the directory, all its subdirectories, and files. Use with caution.

c. Rename the preinstalled directory back to its original name.

```
$ mv jdk-orig jdk
```

4. Close the Terminal window.

Practice 3-2: Patching WebLogic Server

Overview

In this practice, you apply a WebLogic patch to the WebLogic Server environment installed in the previous practice. Optionally, you can also roll back the patch at the end of this practice.

Assumptions

You completed "Practice 3-1: Installing WebLogic Server" and WebLogic Server has been successfully installed.

No instances of WebLogic Server are running.

Tasks

1. Connect to host01.

   Note: If a connection for host01 is already available, you can continue to use it.
2. Access the patch zip file (`p19234430_121300_Generic.zip`).
   a. Open a Terminal window, and navigate to `/install/weblogicpatch`.
   ```
   $ cd /install/weblogicpatch
   ```
3. Define the `PATCH_TOP` environment variable.
   a. Define the PATCH_TOP variable and assign it the value `/install/weblogicpatch`.
   ```
   $ export PATCH_TOP=/install/weblogicpatch
   ```
   b. Print the variable to the screen to make sure you set up `PATCH_TOP` correctly.
   ```
   $ echo $PATCH_TOP
   /install/weblogicpatch
   ```
4. Define (or redefine) the `ORACLE_HOME` environment variable.
   a. In a Fusion Middleware environment, the `ORACLE_HOME` variable should point to the top directory where WebLogic Server has been installed (`/u01/app/fmw`).
   ```
   $ export ORACLE_HOME=/u01/app/fmw
   ```
   b. Print the variable to the screen to make sure you set up `ORACLE_HOME` correctly.
   ```
   $ echo $ORACLE_HOME
   /u01/app/fmw
   ```
5. Define (or redefine) the `JAVA_HOME` environment variable.
   a. The `JDK` used to run OPatch must be the `JDK` installed in `$ORACLE_HOME`.
   ```
   $ export JAVA_HOME=/u01/app/jdk
   ```
   b. Print the variable to the screen to make sure you set up `JAVA_HOME` correctly.
   ```
   $ echo $JAVA_HOME
   /u01/app/jdk
   ```
6. Add the directory where the OPatch utility resides to the Linux `PATH`.
   a. The executable shell file `opatch` resides in the `OPatch` directory. The `OPatch` directory must be added to the `PATH` so that the shell will be able to invoke it.
   ```
   $ export PATH=$ORACLE_HOME/OPatch:$PATH
   ```
   Note: Notice that the "`O`" and "`P`" in the "`OPatch`" directory name are capitalized.

   b. Confirm the `opatch` executable appears in your system `PATH`.
   ```
   $ which opatch
   ```

```
/u01/app/fmw/OPatch/opatch
```

7. Unzip the patch zip file into the `PATCH_TOP` directory.

   a. Use the `unzip` utility to expand the zip file `p19234430_121300_Generic.zip`.

   Note: If asked to replace an existing file, enter **A** for "`All`."

```
$ unzip -d $PATCH_TOP p19234430_121300_Generic.zip
Archive:  p19234430_121300_Generic.zip
   creating: 19234430/
   creating: 19234430/files/
   creating: . . .
  inflating:
19234430/files/oracle.fmwconfig.common.wls.shared/12.1.3.0.0/fmw
config.common.symbol/modules/com.oracle.cie.config-
wls_8.1.0.0.jar/com/oracle/cie/domain/DomainNodeManagerHelper.cl
ass
  inflating: 19234430/README.txt
   creating: 19234430/etc/
   creating: 19234430/etc/config/
  inflating: 19234430/etc/config/actions.xml
  inflating: 19234430/etc/config/inventory.xml
```

   b. Set your current directory to the directory where the patch is located.

```
$ cd $PATCH_TOP/19234430
```

   c. Make sure that your default directory is correct.

```
$ pwd
/install/weblogicpatch/19234430
```

8. Before applying the patch, view the patch README file.

   a. In the patch directory, find the README file.

```
$ ls README*
README.txt
```

   b. Open the file in the editor. Briefly look at the instructions. The directions in this practice are based on the directions in this file.

```
$ gedit README.txt
```

   c. Close the editor without making any changes to the file.

9. Run the OPatch utility with the `lsinventory` parameter, which finds the Oracle WebLogic inventory and prints out all the components found.

   a. Run `opatch` with the `lsinventory` parameter.

```
$ opatch lsinventory -jdk $JAVA_HOME
Oracle Interim Patch Installer version...
. . .
Oracle Home       : /u01/app/fmw
Central Inventory : /u01/app/oraInventory
   from           : /u01/app/fmw/oraInst.loc
. . .
--------------------------------------------
```

```
There are no Interim patches installed in this Oracle Home.

--------------------------------------------
OPatch succeeded.
$
```

Note: As expected, the `lsinventory` output states that no interim patches are currently installed.

10. Apply the patch.
    a. Run the OPatch utility to apply the patch. When you are asked if the local system is ready for patching, enter **`y`**.

Note: This can take a while to complete.

```
$ opatch apply -jdk $JAVA_HOME
Oracle Interim Patch Installer version ...
...

Oracle Home       : /u01/app/fmw
Central Inventory : /u01/app/oraInventory
   from           : /u01/app/fmw/oraInst.loc

...

Applying interim patch '19234430' to OH '/u01/app/fmw'
Verifying environment and performing prerequisite checks...
All checks passed.

Please shutdown Oracle instances running out of this ORACLE_HOME
on the local system.
(Oracle Home = '/u01/app/fmw')

Is the local system ready for patching? [y|n]
y
User Responded with: Y
Backing up files...
...
Verifying the update...
Patch 19234430 successfully applied
...
OPatch succeeded.
$
```

11. Rerun the OPatch utility with the `lsinventory` parameter. This time `opatch` should find the interim patch you just applied, and print its information to the screen.
    a. Run `opatch` with `lsinventory`.

```
$ opatch lsinventory -jdk $JAVA_HOME
```

```
Oracle Interim Patch Installer version ...
...
Oracle Home       : /u01/app/fmw
Central Inventory : /u01/app/oraInventory
   from           : /u01/app/fmw/oraInst.loc
...
--------------------------------------------
Interim patches (1) :

Patch  19234430     : applied on ...
Unique Patch ID:  17945590
Patch description:  "One-off"
   Created on 14 Aug 2014, 13:47:02 hrs Asia/Calcutta
   Bugs fixed:
     19234430
--------------------------------------------------------
OPatch succeeded.
$
```

Note: This time the `lsinventory` output states that there is one interim patch, the one you just applied, 19234430.

12. (Optional) Roll back the applied patch. If an issue occurred while applying a patch, your system could be left in an unstable state, with a few files already uploaded and other files missing. In this case, the best course of action is to roll back the patch.

    Note: This can take a while to complete.

    a. Use OPatch to roll back the patch. When you are asked whether the local system is ready for patching, enter **`y`**.

```
$ opatch rollback -id 19234430 -jdk $JAVA_HOME
Oracle Interim Patch Installer version ...
...
RollbackSession rolling back interim patch '19234430' from OH
'/u01/app/fmw'

Please shutdown Oracle instances running out of this ORACLE_HOME
on the local system.
(Oracle Home = '/u01/app/fmw')

Is the local system ready for patching? [y|n]
y
User Responded with: Y
...
RollbackSession removing interim patch '19234430' from inventory
...
OPatch succeeded.
```

```
$
```

13. (Optional) Make sure that the patch has been removed.
    a. Run the OPatch utility with the `lsinventory` parameter one more time to show that no interim patches are found.

```
$ opatch lsinventory -jdk $JAVA_HOME
...
--------------------------------------------

There are no Interim patches installed in this Oracle Home.

--------------------------------------------

OPatch succeeded.
$
```

Note: As expected, the `lsinventory` output states that no interim patches are installed. The interim patch installed and subsequently rolled back is no longer there.

14. Close the Terminal window.

Practice Solution: Patching WebLogic Server

There is no solution for this practice. This practice is not required and can be skipped.

Practices for Lesson 4: Creating Domains

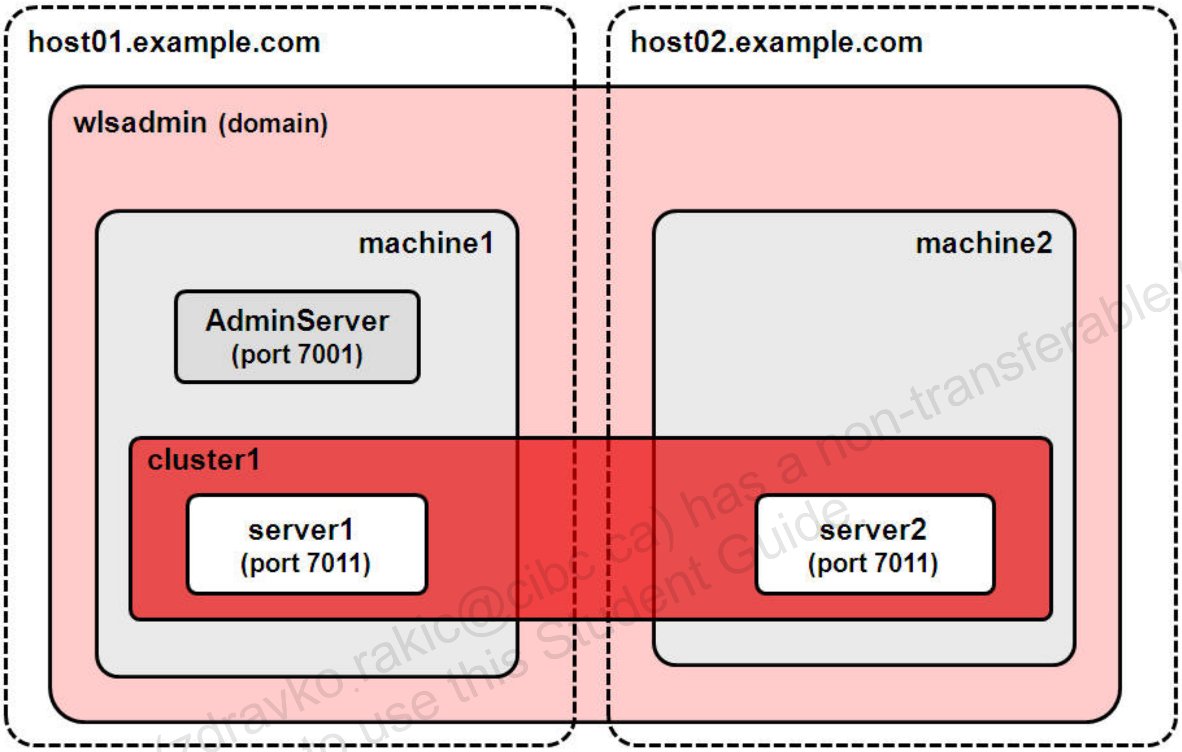
Chapter 4

Practices for Lesson 4: Overview

Practices Overview

In these practices, you create a new WebLogic Server domain. You then move the domain to a second machine by using the pack and unpack utilities.

The following is a diagram of the domain:



Practice 4-1: Creating a New Domain

Overview

In this practice, you create a new WebLogic Server domain by using the Configuration Wizard. As you create the domain, you create and configure some domain resources.

Assumptions

You completed "Practice 3-1: Installing WebLogic Server" and the installation was successful.

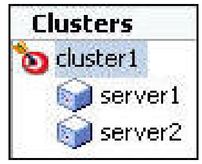
Completing "Practice 3-2: Patching WebLogic Server" is not required for this practice, but it is OK if you did it.

Tasks

1. Connect to host01.
   a. Unless stated otherwise, you will be working within host01 for the remainder of this practice.
2. Run the Configuration Wizard in graphical mode.
   a. Open a new Terminal window. Navigate to the location of the Configuration Wizard script, the `common/bin` directory under the Oracle Common directory: `/u01/app/fmw/oracle_common/common/bin`.
   ```
   $ cd /u01/app/fmw/oracle_common/common/bin
   ```
   Note: Remember that you can use the Tab key to auto-complete directory and file names as you type them.
   b. Run the Configuration Wizard.
   ```
   $ ./config.sh
   ```
   c. After the graphical wizard opens, use the guidelines in the following table to create the domain:

Step	Window/Page Description	Choices or Values
a.	Create Domain	Select **Create a new domain**. Enter the Domain Location: **`/u01/domains/part1/wlsadmin`** Click **Next**.
b.	Templates	Ensure that **Create Domain Using Product Templates** is selected. Click **Next**. **Note: Basic WebLogic Server Domain** is selected automatically and cannot be deselected.
c.	Administrator Account	Enter these values for the following fields: • Name: **`weblogic`** • Password: **`Welcome1`** • Confirm Password: **`Welcome1`** **Note:** The password displays as ●●●●●●●●. Click **Next**.
d.	Domain Mode and JDK	Under Domain Mode, select **Production**.

Step	Window/Page Description	Choices or Values
		Under JDK, ensure that **Oracle HotSpot** is selected (whatever version you have). Click **Next**.
e.	Advanced Configuration	Select **Administration Server** and **Managed Servers, Clusters, and Coherence**. Click **Next**. **Note:** Although Node Manager can be set up at this time, you will wait to configure it after it has been discussed.
f.	Administration Server	Enter or select these values for the following fields: • Server Name: `AdminServer` • Listen Address: `host01.example.com` • Listen Port: `7001` • Enable SSL: Deselected • SSL Listen Port: (Disabled) Click **Next**.
g.	Managed Servers	Click the **Add** button. Then, in the row, enter or select these values for the following fields: • Server Name: `server1` • Listen Address: `host01.example.com` • Listen Port: `7011` • Enable SSL: Deselected • SSL Listen Port: (Disabled) Click the **Add** button again. Then, in the row, enter or select these values for the following fields: • Server Name: `server2` • Listen Address: `host02.example.com` • Listen Port: `7011` • Enable SSL: Deselected • SSL Listen Port: (Disabled) Click **Next**.
h.	Clusters	Click the **Add** button. Then, in the row, enter or select these values for the following fields: • Cluster Name: `cluster1` • Cluster Address: (leave blank) Click **Next**.
i.	Assign Servers to Clusters	Under Servers, select `server1`. Then, under Clusters, ensure `cluster1` is selected and click the right arrow button. Do the same thing to move `server2` under

Step	Window/Page Description	Choices or Values
		`cluster1`. The Clusters column should look like this:  Click **Next**.
j.	Machines	Click the **Machine** tab. Click the **Add** button. Then, in the row, enter or select these values for the following fields: • Name: **`machine1`** • Node Manager Listen Address: **`host01.example.com`** • Node manager listen port: **`5556`** Click the **Add** button again. Then, in the row, enter or select these values for the following fields: • Name: **`machine2`** • Node Manager Listen Address: **`host02.example.com`** • Node manager listen port: **`5556`** Click **Next**.
k.	Assign Servers to Machines	Under Machines, select **`machine1`**. Then under Servers, select **`AdminServer`** and click the right arrow button. Under Machines, ensure **`machine1`** is still selected. Then under Servers, select **`server1`** and click the right arrow button. Under Machines, select **`machine2`**. Then under Servers, select **`server2`** and click the right arrow button. The Machines column should look like this:  Click **Next**.
l.	Configuration Summary	Review the domain. Click **Create**.

Step	Window/Page Description	Choices or Values
m.	Configuration Progress	When the progress bar reaches 100%, click **Next**.
n.	Configuration Success	Click **Finish**.

d. The Configuration Wizard closes. Close the terminal window.

Practice Solution: Creating a new Domain

Perform the following tasks if you did not complete this practice and want to use the finished solution.

Assumptions

You completed "Practice 3-1: Installing WebLogic Server" and the installation was successful or you did not do Practice 3-1at all (the products are pre-installed).

Solution Tasks

1. Connect to host01. If you partially completed the practice, delete the domain directory you created.
   a. Open a Terminal window and navigate to the parent directory of the domain directory. Then remove the domain directory.
      ```
      $ cd /u01/domains/part1
      $ rm –rf wlsadmin
      ```
   Warning: This command permanently deletes the directory, all its subdirectories, and files. Use with caution.

   Note: If you did not start the practice, there is no domain directory to delete.
2. Run the solution script.
   a. In a Terminal window, navigate to the practice directory.
      ```
      $ cd /practices/part1/practice04-01
      ```
   b. Run the solution script.
      ```
      $ ./solution.sh
      ```
   Note: This script starts the WebLogic Scripting Tool (WLST) passing it the WLST script `create_domain.py`, which creates the new domain for you. The WLST script prints out messages. When it writes the domain, it can take some time, so be patient and do not close the Terminal window until you see the message:
      ```
      >>>Domain created successfully at /u01/domains/part1/wlsadmin
      ```
3. Close the Terminal window.

Practice 4-2: Copying a Domain to a New Machine

Overview

In this practice, you use the pack and unpack utilities to copy the domain to another machine, so a managed server of the domain can run there.

Assumptions

You completed "Practice 4-1: Creating a New Domain" successfully.

Tasks

1. Connect to host01.
   a. Unless stated otherwise, you will be working within host01 for the remainder of this practice.
2. Create a managed server template by using the pack utility and the domain you just created.
   a. Open a Terminal window and navigate to the location of the `pack.sh` script.
   ```
   $ cd /u01/app/fmw/oracle_common/common/bin
   ```
   b. Run the `pack.sh` script with the options to use your domain and create a managed server template in your home directory:

   Note: Enter the command on one line. It is on multiple lines here due to space limitations.
   ```
   $ ./pack.sh -domain=/u01/domains/part1/wlsadmin
                -template=/home/oracle/managedserver.jar
                -template_name=wlsadmin_managed
                -managed=true
   << read domain from "/u01/domains/part1/wlsadmin"
   >>  succeed: read domain from "/u01/domains/part1/wlsadmin"
   .............................................
   >>  succeed: write template to "/home/oracle/managedserver.jar"
   << close template
   >>  succeed: close template
   $
   ```
3. Send the template JAR file over to host02.
   a. In the Terminal window, navigate to the location of the new JAR file.
   ```
   $ cd /home/oracle
   ```
   b. Use SFTP to put the JAR file on host02. You use the username `oracle`. If you are warned about the authenticity of host02 and asked if you want to continue, enter **`yes`**. If asked for the password of the user, it is also **`oracle`**.
   ```
   $ sftp oracle@host02.example.com
   Connecting to host02.example.com...
   The authenticity of host...
   ...
   Are you sure you want to continue connecting (yes/no) ? yes
   ...
   sftp> cd /home/oracle
   ```

```
sftp> pwd
Remote working directory: /home/oracle
sftp> put managedserver.jar
Uploading managedserver.jar to /home/oracle/managedserver.jar
managedserver.jar           100% ...
sftp>
```

c. Exit SFTP.

```
sftp> bye
$
```

d. Close the Terminal window.

4. Connect to host02.
   a. Unless stated otherwise, you will be working within host02 for the remainder of this practice.
5. Create a copy of the domain on host02 by using the unpack utility.
   a. Open a Terminal window. Verify that the domain does not already exist on this host.

```
$ ls /u01/domains/part1
$
```

Note: Nothing displays because there are currently no files or directories there.

b. Navigate to the location of the `unpack.sh` script.

```
$ cd /u01/app/fmw/oracle_common/common/bin
```

c. Run the `unpack.sh` script with the options to use the managed server template to create your domain on this host.

Note: Enter the command on one line. It is on multiple lines here due to space limitations.

```
$ ./unpack.sh -domain=/u01/domains/part1/wlsadmin
            -template=/home/oracle/managedserver.jar
<< read template from "/home/oracle/managedserver.jar"
>>  succeed: read template from "/home/oracle/managedserver.jar"
<< set config option DomainName to "wlsadmin"
>>  succeed: set config option DomainName to "wlsadmin"
<< write Domain to "/u01/domains/part1/wlsadmin"
...................................................
>>  succeed: write Domain to "/u01/domains/part1/wlsadmin"
<< close template
>>  succeed: close template
$
```

Note: Notice that the domain on host02 is placed in the same location as it is on host01. This is the recommended practice.

6. Check out the domain directories on host02.
   a. In the same Terminal window, navigate to the domain directory and look around by using the `cd` and `ls` commands.

```
$ cd /u01/domains/part1/wlsadmin
$ ls
```

```
bin  fileRealm.properties  lib  security  startWebLogic.sh
...
$ cd bin
$ ls
nodemanager  setDomainEnv.sh ...
...
```

7. Close the Terminal window.

Practice Solution: Copying a Domain to a New Machine

Perform the following tasks if you did not complete this practice and want to use the finished solution.

Assumptions

You completed "Practice 4-1: Creating a New Domain" successfully.

Solution Tasks

1. Connect to host02.

   Note: Notice you are going to host02 (not host01).

2. If you partially completed the practice, delete the domain directory on host02. (If you did not start the practice, skip this task.)

   Note: Do *not* delete the domain directory on host01.

   a. Open a Terminal window and navigate to the parent directory of the domain directory. Then remove the domain directory.

      ```
      $ cd /u01/domains/part1
      $ rm -rf wlsadmin
      ```

   Warning: This command permanently deletes the directory, all its subdirectories, and files. Use with caution.

   Note: If you did not start the practice, there is no domain directory to delete.

3. Run the solution script.

   a. In a Terminal window, navigate to the practice directory.

      ```
      $ cd /practices/part1/practice04-02
      ```

   b. Run the solution script.

      ```
      $ ./solution.sh
      ```

   Note: This script runs the unpack utility, which uses a previously created managed server template, to create the domain on host02. The command can take a little while, so wait for the messages that unpack succeeded in writing the domain and that the template file was closed, before you close the Terminal window.

4. Close the Terminal window.

Practices for Lesson 5: Starting Servers

Chapter 5

Practices for Lesson 5: Overview

Practices Overview

In this practice, you start and stop instances of WebLogic Server by using the scripts supplied with the domain. You also update a start script to modify the `CLASSPATH` of the servers.

Practice 5-1: Starting and Stopping Servers

Overview

In this practice, you start the administration server by using the domain start script. You create a boot identity file for the administration server so you do not have to enter a username and password each time you start and stop the server. You start a managed server by using the domain start script. You also stop servers by using domain stop scripts. Finally, you update a script to add to the servers' `CLASSPATH`.

Assumptions

You completed "Practice 4-1: Creating a New Domain" and "Practice 4-2: Copying a Domain to a New Machine" so that the domain is created and installed on both hosts.

Tasks

1. Connect to host01.
   a. Unless stated otherwise, you will be working within host01 for the remainder of this practice.
2. Start the administration server by using the script supplied with the domain.
   a. Open a Terminal window and navigate to the domain directory. Then run the `startWebLogic.sh` script.

   ```
   $ cd /u01/domains/part1/wlsadmin
   $ ./startWebLogic.sh
   ```

   Note: Remember that you can use the Tab key to auto-complete directory and file names as you type them.

   b. When prompted for the username, enter **`weblogic`**. When prompted for the password, enter **`Welcome1`**:

   ```
   ...
   Enter username to boot WebLogic server: weblogic
   Enter password to boot WebLogic server: Welcome1
   ...
   ```

   Note: The password does not display.

   c. Messages will appear in the window. When the server successfully completes its startup process, it writes the following message to the window:

   ```
   <The server started in RUNNING mode>
   ```

   Note

   – To remember that this is the window in which the administration server is running, you might want to change the title of the Terminal window. In the window's menu, select **Terminal**, and then **Set Title**. Enter the title of **`AdminServer`** and click **OK**.

   – If you close the window in which a server is running, you kill the server. Minimize the window, if you want.
3. Create a boot identity file for the administration server.
   a. Open a new Terminal window and navigate to the AdminServer directory in the domain:

   ```
   $ cd /u01/domains/part1/wlsadmin
   $ cd servers/AdminServer
   ```

b. Create the `security` subdirectory under the `AdminServer` directory:

```
$ mkdir security
```

c. Create a text file in this security directory called `boot.properties` and edit it. In this example, the gedit text editor is used.

```
$ cd security
$ gedit boot.properties
```

d. Add the following two lines to the file:

```
username=weblogic
password=Welcome1
```

e. Save the file (select **File** > **Save**, or click **Ctrl** + **S**). Close the text editor.

f. Leave the terminal window open for the next task.

4. Stop the administration server and restart it. Observe the server's use of the boot identity file.

a. In the Terminal window, navigate to the `bin` directory under the domain directory, and run the script to stop the administration server:

```
$ cd /u01/domains/part1/wlsadmin/bin
$ ./stopWebLogic.sh
```

Note

- Notice that the script uses the WebLogic Scripting Tool (WLST).
- You can also stop a server by pressing **Ctrl + C** in the window in which it is running.

b. When the stop script finishes, find the Terminal window in which the administration server was running. You can see that it has been shut down. Close this window.

c. Return to the other Terminal window, navigate to the domain directory, and once again run the script to start the administration server:

```
$ cd /u01/domains/part1/wlsadmin
$ ./startWebLogic.sh
...
```

Note: This time you are *not* prompted for the username and password.

d. Messages will appear in the window. When the server successfully completes its startup process, it writes the following message to the window:

```
<The server started in RUNNING mode>
```

Note

- If you look through the messages in the window, you can see the message about storing the boot identity: `<Storing boot identity in the file: ...>`. It was at this point that the server found the `boot.properties` file, used the credentials in it, and because those credentials were valid, encrypted the credentials and copied over the plain text in the file.
- You may have noticed that the stop script you used earlier did not prompt you for the username and password. That script normally does, but it too can use the

`boot.properties` file. It, however, does not encrypt the username and password, as the start script does.

e. Leave the administration server running. Give the Terminal window the title of `AdminServer` and minimize it, if you want.

5. Start a managed server by using the script supplied with the domain.

   a. In a new Terminal window, navigate to the `bin` directory under the domain directory, and run the script to start the managed server called `server1`:

   ```
   $ cd /u01/domains/part1/wlsadmin/bin
   $ ./startManagedWebLogic.sh server1 host01.example.com:7001
   ```

   Note: Notice that this script takes two parameters: the name of the managed server and the URL of the domain's administration server.

   b. When prompted for the username, enter **`weblogic`**. When prompted for the password, enter **`Welcome1`**:

   ```
   ...
   Enter username to boot WebLogic server: weblogic
   Enter password to boot WebLogic server: Welcome1
   ```

   Note: The password does not display.

   c. Messages will appear in the window. When the server successfully completes its startup process, it writes the following message to the window:

   ```
   <The server started in RUNNING mode>
   ```

   Note

   – To remember that this is the window in which server1 is running, you might want to change the title of the Terminal window. In the window's menu, select **Terminal**, and then **Set Title**. Enter the title of **`server1`** and click **OK**.

   – If you close the window in which a server is running, you kill the server. Minimize the window, if you want.

   – If you want to skip being prompted for the username and password when starting this server too, create a `boot.properties` file for it as you did for the administration server. (Create the `security` directory under the `server1` directory and create a new `boot.properties` file there.)

   d. Leave the managed server running.

   e. Minimize the host01 desktop window to use it later.

6. Start a managed server on the other host, host02.

   a. Connect to host02.

   b. Open a Terminal window, navigate to the `bin` directory under the domain directory, and run the script to start the managed server called `server2`:

   ```
   $ cd /u01/domains/part1/wlsadmin/bin
   $ ./startManagedWebLogic.sh server2 host01.example.com:7001
   ```

   Note: Notice that this script takes two parameters: the name of the managed server and the URL of the domain's administration server.

   c. When prompted for the username, enter **`weblogic`**. When prompted for the password, enter **`Welcome1`**:

   ```
   ...
   Enter username to boot WebLogic server: weblogic
   ```

```
Enter password to boot WebLogic server: Welcome1
```

Note: The password does not display.

d. Messages will appear in the window. When the server successfully completes its startup process, it writes the following message to the window:

```
<The server started in RUNNING mode>
```

Note

- You might want to set the title of the Terminal window to **`server2.`**
- If you close the window in which the server is running, you kill the server. Minimize the window, if you want.
- If you want to, you could create a `boot.properties` file for this server, too.

e. Leave the managed server running.

7. Add a new JAR file to the `CLASSPATH` of all servers.

a. Return to the host01 desktop.

Note: If you closed the window, then you must open it again.

b. Open a new Terminal window and copy the JAR file from the current practice directory to the `/home/oracle` directory.

```
$ cd
$ cp /practices/part1/practice05-01/sample.jar .
```

c. Navigate to the `bin` directory of the domain and create the `setUserOverrides.sh` file.

Note: The `setUserOverrides.sh` file is invoked by the `setDomainEnv.sh` script if the file exists. It is a best practice to set environmental changes in the override file instead of making changes directly to WebLogic Server startup scripts. This avoids your changes getting overwritten when new domain templates or Oracle product installations are introduced that affect your domains.

```
$ cd /u01/domains/part1/wlsadmin/bin
$ gedit setUserOverrides.sh
```

d. Add the following line to the file:

```
$ export PRE_CLASSPATH=/home/oracle/sample.jar
```

e. Save the file and exit the editor.

8. Use SFTP to copy the updated script and the JAR file to the other host.

a. In the same Terminal window, start SFTP and copy the updated script to other host (replacing the script that is there). Also, put the JAR file onto the other host (in the same relative location).

```
$ sftp oracle@host02.example.com
Connecting to host02.example.com...
sftp> cd /u01/domains/part1/wlsadmin/bin
sftp> pwd
Remote working directory: /u01/domains/part1/wlsadmin/bin
sftp> put setDomainEnv.sh
Uploading setDomainEnv.sh to ...
setDomainEnv.sh             100% ...
sftp> cd /home/oracle
```

```
sftp> pwd
Remote working directory: /home/oracle
sftp> put /home/oracle/sample.jar
Uploading /home/oracle/sample.jar to /home/oracle/sample.jar
/home/oracle/sample.jar     100% ...
sftp> bye
$
```

9. Stop and restart a server. These instructions will use `server1`.
   a. In a Terminal window, navigate to the `bin` directory under the domain directory, and run the script to stop the managed server, `server1`. If you created a boot identity file for this server, you will not be prompted for the username and password. If you did not, when prompted for them, enter **`weblogic`** and **`Welcome1`**, respectively.

      ```
      $ cd /u01/domains/part1/wlsadmin/bin
      $ ./stopManagedWebLogic.sh server1 host01.example.com:7001
      ...
      ```

   Note: Notice that this script takes two parameters: the name of the managed server and the URL for the domain's administration server.

   b. From a Terminal window, restart `server1`. You can use the window you were in, the window in which the server was previously running, or a new window. Again, if prompted for the username and password, enter **`weblogic`** and **`Welcome1`**, respectively.

      ```
      $ cd /u01/domains/part1/wlsadmin/bin
      $ ./startManagedWeblogic.sh server1 host01.example.com:7001
      ...
      <The server started in RUNNING mode>
      ```

   c. Leave the window open in which the server is running.

10. Notice the `CLASSPATH` update.
    a. Scroll up in the window in which the server is running until you find the print out of the `CLASSPATH`.

       ```
       ...
       CLASSPATH=/home/oracle/sample.jar:...
       ...
       ```

    Note: Notice the new JAR file at the front of the `CLASSPATH`.

    b. Minimize the server window, if you want.
    c. Leave all servers running for now.

    Note: Only one server was stopped and restarted, so only that server picked up the addition to the `CLASSPATH`. The others will pick it up the next time they are stopped and started again. Because the JAR file code is not used by anything, it does not matter that the other servers do not yet have access to it.

Practice Solution: Starting and Stopping Servers

There is no solution for this practice. It primarily involves starting and stopping servers. The modification of the domain script is not required, so not completing this practice has no effect on completing subsequent practices.

Practices for Lesson 6: Using the Administration Console

Chapter 6

Practices for Lesson 6: Overview

Practices Overview

In this practice, you access the WebLogic Server administration console. You then use the console to create and configure some domain resources.

Practice 6-1: Using the Administration Console for Configuration

Overview

In this practice, you access the WebLogic Server administration console. You use the console to create and configure some resources in the domain.

Assumptions

You completed “Practice 5-1: Starting and Stopping Servers.”

All servers in the domain are currently running.

Note: If you did not complete “Practice 5-1: Starting and Stopping Servers,” but completed “Practice 4-1: Creating a New Domain,” and “Practice 4-2: Copying a Domain to a New Machine,” and then start the servers in the domain, you can still do this practice.

Tasks

1. Connect to host01.
2. Access the WebLogic Server administration console from the host01 machine.
   a. On the host01 machine, click the Mozilla Firefox web browser icon in the launch bar near the top of the screen.

   Note: You can make Firefox the default browser if you want to.

   b. In the web browser, enter the URL to the administration console:
   `http://host01.example.com:7001/console`

   c. On the console welcome page, enter the Username as `weblogic` and Password as `Welcome1`. Then click the **Login** button.

   Note: You can have Firefox remember the password if you want to.

   d. Look at the layout of the administration console.
      – At the top left is the Change Center.
      – Below that is the Domain Structure (the hierarchy of domain resources).
      – The large area to the right displays information about the element selected in the Domain Structure.
      – Above that display area are links for the **Home** page, to **Log Out**, to access the **Preferences**, and to access the administration console **Help**.
3. Update an administration console preference.
   a. At the top of the administration console, click the **Preferences** link.

   b. Under Preferences ensure that the **User Preferences** tab is selected.

   c. Scroll down to the **Paths To Remember** field. Change the number to `8`.

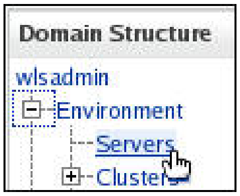
   Note: If the check box above this, **Remember Last Used Path**, is selected, the deployment file browser remembers the last path you used to find a deployment. The number of **Recently Used Paths** displayed in the file browser depends upon the **Paths To Remember** field.

   d. Scroll up (or down) to find the **Save** button. Click the **Save** button.

   e. Notice the message at the top: “Settings updated successfully.”
4. Update the configuration of an existing domain resource.

a. Lock the configuration. In the Change Center, click the **Lock & Edit** button.

b. In the Domain Structure, expand **Environment** (click the "**+**" sign) and then select **Servers**.



c. On the right, in the Servers table, select **AdminServer(admin)** in the Name column.

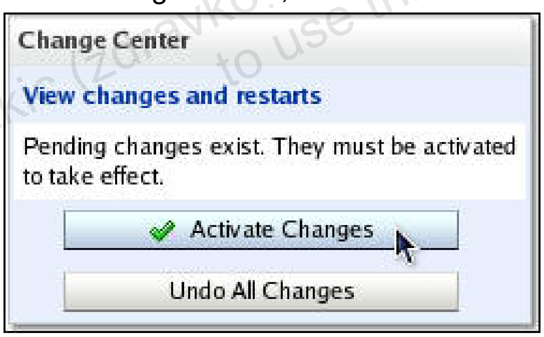
d. When "Settings for AdminServer" is displayed, click the **Logging** tab. Ensure that the **General** subtab is selected.

e. Scroll down to find the "Rotation file size" field. Enter `7500`.

f. Click the **Save** button.

Note: Notice the message at the top: "Settings updated successfully." Also notice in the Change Center that the buttons have been modified.

g. In the Change Center, click **Activate Changes**.



Note

- Notice the message at the top: "All changes have been activated. No restarts are necessary." This change occurred without having to restart the affected server. Many configuration changes can be completed on a running server without a server restart.
- Also notice that the configuration is no longer locked.

5. Create a new domain resource. To illustrate the capabilities of the Change Center, the creation of this new resource will not be activated, so no change will actually take place in the domain configuration.

a. Lock the configuration. In the Change Center, click the **Lock & Edit** button.

b. In the Domain Structure, expand **Environment** (click the "**+**" sign) and then select **Servers**.

c. On the right, above the Servers table, click the **New** button.

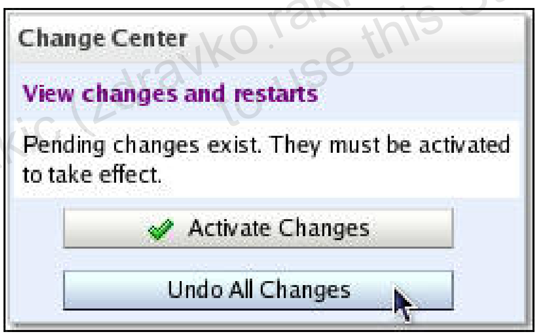
Note: This allows you to create a new instance of WebLogic Server.

d. The wizard for creating a new server starts. Use the guidelines in the following table to create a new server:

Step	Window/Page Description	Choices or Values
a.	Create a New Server: Server Properties	Enter or select these values for the following fields: • Server Name: `server3` • Server Listen Address: `host02.example.com` • Server Listen Port: `7013` • Should this server belong to a cluster? Select `Yes, make this server a member of an existing cluster.` • Select a cluster: `cluster1` Click **Next**.
b.	Create a New Server: Review Choices	Review the choices made. Click **Finish**.

Note: Although the new server has been saved, the changes have not yet been activated. That means they are pending, and the configuration has not actually been updated. You have decided *not* to update the configuration with this new server at this time.

e. In the Change Center, click **Undo All Changes**.



Note: Notice that the new server is no longer in the Servers table and the configuration is no longer locked.

6. (Optional – if you are interested and have time) Access the administration console Help.
   a. Return to the **Logging** > **General** page of the admin server. Scroll down to find the “Rotation type” field. It is currently set to: `By Size`. Notice to the right of this (and every) field there is a short description of the field. At the end of the description of the "Rotation type" field is a link: **More info…** To learn more about how log files can be rotated, click that link.
   b. The **More info…** link takes you to the administration console help on the appropriate field. The help opens in a new browser window (or tab).
   c. Read a little about log file rotation. Then close the window (or tab).

d. Back on the administration console, ensure that you are still on the **Logging** > **General** tabs of the admin server. Click the **Help** link (at the top). Notice the help is context sensitive, and you are taken to help about server logging.

e. On the left of the help text, find the **Contents** tab. Ensure that it is selected and look around the help contents. Select some other help topic of interest.

f. Notice the other tab: **Search**. Click the **Search** tab. Enter `gridlink` in the Search field and click the **Go** button. Notice all the topics that display below the field. Select one and you are taken to that help content.

g. Close the help window (or tab).

Practice Solution: Using the Administration Console for Configuration

There is no solution for this practice. Any domain configuration changes made in the practice are not required, so not completing the practice has no effect on subsequent practices.

Practices for Lesson 7: Configuring JDBC

Chapter 7

Practices for Lesson 7: Overview

Practices Overview

In this practice, you create and configure a JDBC data source.

Practice 7-1: Configuring a JDBC Data Source

Overview

In this practice, you create and configure a generic JDBC data source by using the administration console.

Assumptions

You completed "Practice 5-1: Starting and Stopping Servers."

All servers in the domain are currently running.

> **Note:** If you did not complete "Practice 5-1: Starting and Stopping Servers," but completed "Practice 4-1: Creating a New Domain," and "Practice 4-2: Copying a Domain to a New Machine," and then start the servers in the domain, you can still do this practice.

Tasks

1. Connect to host01.
2. Open the WebLogic Server administration console.
3. Create a generic JDBC data source.
   a. Lock the configuration. In the Change Center, click the **Lock & Edit** button.
   b. In the Domain Structure, expand **Services** (click the "**+**" sign) and then select **Data Sources**.
   c. On the right, above the Data Sources table, click the **New** button and select **Generic Data Source**.
   d. The "create a data source" wizard starts. Use the guidelines in the following table to create a new generic data source:

Step	Window/Page Description	Choices or Values
a.	Create a New JDBC Data Source: JDBC Data Source Properties (page 1)	Enter or select these values for the following fields: • Name: `datasource1` • JNDI Name: `datasource1` • Database Type: `Oracle` **Note:** The name and the JNDI name do not have to match, that is just the choice made in this example. Click **Next**.
b.	Create a New JDBC Data Source: JDBC Data Source Properties (page 2)	Select this value for the following field: • Database Driver: `*Oracle's Driver (Thin XA) for Instance connections; Versions:Any` Click **Next**.
c.	Create a New JDBC Data Source: Transaction Options	Click **Next**. **Note:** Because an XA driver was selected, there are no transaction options to choose.
d.	Create a New JDBC Data Source: Connection	Enter or select these values for the following fields: • Database Name: `orcl`

Step	Window/Page Description	Choices or Values
	Properties	**Note:** That is a lowercase "L" on the end. • Host Name: `host02.example.com` • Port: `1521` • Database User Name: `oracle` • Password: `Welcome1` • Confirm Password: `Welcome1` • oracle.jdbc.DRCPConnectionClass: (leave blank) Click **Next**.
e.	Create a New JDBC Data Source: Test Database Connection	Click the **Test Configuration** button. When the message "Connection test succeeded." displays, click **Next**. **Note:** If the test fails, click the **Back** button and check your entries. Correct any mistakes and come back to this page and try the test again.
f.	Create a New JDBC Data Source: Select Targets	Under Clusters, select **cluster1**. Ensure that **All servers in the cluster** is selected. Click **Finish**.

e. In the Change Center, click **Activate Changes**.

Note: Notice the message at the top: "All changes have been activated. No restarts are necessary." This data source was created and targeted without having to restart the affected servers.

f. Verify the JNDI name is set on the servers in the cluster. Expand **Environments**, click **Servers**, click **server1**, and click **View JNDI Tree**. You should see **datasource1** as an entry in the list. Repeat for **server2**.

4. Tune the new generic data source.

Note: The scenario for the database is this:

– The database has intermittent peak usage and the database should be allowed to shrink every five minutes.
– The DBA has determined that each connection pool should start with one connection and grow to a maximum of five connections.
– Prepared and callable statements are used. The DBA has calculated that each connection pool should cache 15 statements.
– The DBA wants connections to be tested before they are given to applications.
– The DBA wants to test unused connections every four minutes.
– Even though connections are tested, performance impact is to be minimized by trusting idle connections for one minute.

a. Lock the configuration again by clicking **Lock & Edit** in the Change Center.
b. In the Domain Structure, expand **Services** and then select **Data Sources**. In the Data Sources table, select the new data source, **datasource1**.
c. Click the **Configuration** tab and then the **Connection Pool** subtab.
d. Use the guidelines in the following table to set some of the connection pool attributes:

Step	Field and Value	Reason
a.	Initial Capacity: `1`	The initial value from the DBA **Note:** With intermittent peak usage, the initial capacity should be smaller than the maximum.
b.	Maximum Capacity: `5`	The maximum value from the DBA **Note:** Remember when setting this value that the actual maximum number of connections that can be retrieved from the database is this maximum times the number of target servers.
c.	Minimum Capacity: `1`	The same as the initial capacity **Note:** This number is used in pool shrinking calculations.
d.	Statement Cache Type: `LRU`	This algorithm keeps statements used frequently in the cache.
e.	Statement Cache Size: `15`	The cache size value from the DBA

e. Click **Save**.

f. Click **Advanced**. Use the guidelines in the following table to set the rest of the connection pool attributes:

Step	Field and Value	Reason
a.	Test Connections On Reserve: Selected	Test connections before they are distributed
b.	Test Frequency: `240`	Test unused connections every four minutes
c.	Seconds to Trust an Idle Pool Connection: `60`	Trust idle connections for one minute
d.	Shrink Frequency: `300`	Allow the database to shrink every five minutes

g. Click **Save**.

h. In the Change Center, click **Activate Changes**.

Note: Notice the message at the top: “All changes have been activated. No restarts are necessary.”

5. Log out of the administration console.
   a. Click the **Log Out** link.
   b. Close the web browser.

Practice Solution: Configuring a JDBC Data Source

Perform the following tasks if you did not complete this practice and want to use the finished solution.

Note: If you started creating the data source, saved and activated the changes, this script will not work. To run the script in that case: access the administration console, lock the configuration, select the check box next to `datasource1`, click the **Delete** button, click **Yes**, and activate the changes.

Assumptions

You completed "Practice 5-1: Starting and Stopping Servers."

All servers in the domain are currently running.

Note: If you did not complete "Practice 5-1: Starting and Stopping Servers," but completed "Practice 4-1: Creating a New Domain," and "Practice 4-2: Copying a Domain to a New Machine," and then start the servers in the domain, you can still run this solution.

Solution Tasks

1. Connect to host01.
2. Run the solution script.
   a. Open a Terminal window and navigate to the practice directory.
   ```
   $ cd /practices/part1/practice07-01
   ```
   b. Run the solution script.
   ```
   $ ./solution.sh
   ```
   Note: This script starts the WebLogic Scripting Tool (WLST) passing it the WLST script `create_data_source.py`, which creates the new generic data source for you. The WLST script prints out messages. Be patient and do not close the Terminal window until you see these messages:
   ```
   ...
   >>>Data source created successfully!


   Exiting WebLogic Scripting Tool.
   ```
3. Close the Terminal window.

Practices for Lesson 10: Deploying Applications

Chapter 10

Practices for Lesson 10: Overview

Practices Overview

In these practices, you deploy, redeploy, and undeploy an application. You also load test an application by using The Grinder.

Practice 10-1: Deploying an Application

Overview

In this practice, you deploy, redeploy, and undeploy an application by using the administration console.

Assumptions

You completed “Practice 9-1: Configuring and Using Node Manager.”

All servers are currently running.

Tasks

1. Create a new directory from which to deploy applications. Copy the application from the practice directory to this new directory.
   a. Connect to host01.
   b. Open a new Terminal window and navigate to the domain directory. Create a new subdirectory called `apps` from which you will deploy applications.
   ```
   $ cd /u01/domains/part1/wlsadmin
   $ mkdir apps
   ```
   c. Copy the application from the current practice directory to this directory.
   ```
   $ cd apps
   $ cp /practices/part1/practice10-01/benefits.war .
   ```
   d. Leave the Terminal window open.
2. Open the WebLogic Server administration console.
3. Deploy the application.
   a. In the Change Center, click **Lock & Edit**.
   b. In the Domain Structure, select **Deployments**.
   c. Above the Deployments table, click the **Install** button.
   d. Use the links next to and below Current Location to navigate to:
   `host01.example.com/u01/domains/part1/wlsadmin/apps`

   Note: This fills in the **Path** field as you click links.

   e. When the path is correct, select the option button next to **benefits.war**.

   f. Click the **Next** button.
   g. Select **Install this deployment as an application** and click **Next**.
   h. Select the check box next to **cluster1**. Ensure that the **All servers in the cluster** option button is selected. Click **Next**.
   i. Leave all the Optional Settings at their default values. Click **Next**.
   j. Select **No, I will review the configuration later**. Click **Finish**.

k. In the Change Center, click **Activate Changes**.

Note: Notice the message that the changes have been activated and no restarts are necessary.

4. Start the application.
   a. In the Deployments table, select the check box next to the benefits application.
   b. Click the **Start** button and select **Servicing all requests**.
   c. When asked to confirm, click **Yes**.

   Note: Notice that the State of the benefits application is now "Active."

5. Test the application.
   a. In the Deployments table, click the link that is the name of the newly deployed application, **benefits**.
   b. Click the **Testing** tab.
   c. Click any of the test links.
   d. The benefits application opens in a new window or tab.
   e. Try the application by selecting things and clicking buttons or links.

   f. When you are finished trying the application, close the Benefits window or tab.

6. Obtain an updated version of the application.
   a. Open a Terminal window on host01 and navigate to the current practice directory. List the contents of the directory. Then list the contents of the update subdirectory.

```
$ cd /practices/part1/practice10-01
$ ls
...  benefits.war  ...  update
$ ls update
benefits.war
```

   Note: The `update` directory has an updated version of the benefits application.

   b. Navigate to the `apps` directory. Rename the current benefits archive. Copy the updated version to its location.

```
$ cd /u01/domains/part1/wlsadmin/apps
$ mv benefits.war benefits.old
$ cp /practices/part1/practice10-01/update/benefits.war .
```

   c. Close the Terminal window.

7. Redeploy the application.
   a. Return to the administration console.
   b. In the Change Center, click **Lock & Edit**.

c. In the Domain Structure, select **Deployments**.

d. Select the check box next to the **benefits** application.

e. Click the **Update** button.

f. Leave the "Source path" as it is. There is no deployment plan, so the empty "Deployment plan path" is correct. Click **Next**.

g. On the next page, click **Finish**.

h. In the Change Center, click **Activate Changes**.

Note: Notice the message that the changes have been activated and no restarts are necessary. Also notice that the State of the benefits application is "Active," even though you did not explicitly start it.

i. Follow the earlier steps to test the application again. When you are finished, close the Benefits window or tab.

8. Stop the application, so you can undeploy it.
   a. Return to the administration console.
   b. In the Domain Structure, select **Deployments**.
   c. Select the check box next to the **benefits** application.
   d. Click the **Stop** button and select **Force Stop Now**.
   e. When asked to confirm, click **Yes**.

   Note: Notice the State of the benefits application is no longer "Active."

9. Undeploy the application.
   a. In the Change Center, click **Lock & Edit**.

   Note: If it is already locked, skip this step.

   b. In the Domain Structure, select **Deployments**.
   c. Select the check box next to the **benefits** application.
   d. Click the **Delete** button.
   e. When asked to confirm, click **Yes**.
   f. In the Change Center, click **Activate Changes**.

   Note: Notice the message that the changes have been activated and no restarts are necessary. Also notice that the benefits application is no longer in the Deployments table.

Practice Solution: Deploying an Application

Perform the following tasks if you did not complete this practice and want to use the finished solution. Note that this solution leaves the application deployed, so you can use the application if you want to. To have your domain in the same state as if you did this practice, do nothing. (The final task of the practice is to undeploy the new application.)

Assumptions

You completed "Practice 9-1: Configuring and Using Node Manager."

All servers are currently running.

Solution Tasks

1. Connect to host01.
2. Run the solution script.
   a. Open a Terminal window and navigate to the practice directory.
      `$ cd /practices/part1/practice10-01`
   b. Run the solution script.
      `$ ./solution.sh`

   Note

   - This script creates the `apps` directory under the domain directory. It copies the original `benefits.war` file there, calling it `benefits.old`. It then copies the updated `benefits.war` into the `apps` directory from the practice's `update` subdirectory. The script then starts the WebLogic Scripting Tool (WLST) passing it the WLST script `deploy_app.py`, which deploys the benefits application, targets it to `cluster1`, and starts it.
   - If you get a warning about closing in a different thread, ignore it (`WLContext.close() was called in a different thread...`). It is a known issue with WLST deployment and does no harm.

   c. Do not close the Terminal window.
   d. If you want to access the newly deployed application, enter the following URL in the web browser:
      `http://host01.example.com:7011/benefits`
   e. Close the web browser when you are finished.

3. If you want to undeploy the application after you have looked at it, as the practice does, run the `undeploy.sh` script.
   a. In the same terminal window, run the undeploy script.
      `$ ./undeploy.sh`

   Note

   - The script starts the WebLogic Scripting Tool (WLST) passing it the WLST script `undeploy_app.py`, which undeploys the benefits application.

   b. Close the Terminal window.

Practice 10-2: Load Testing an Application

Overview

In this practice, you use The Grinder to load test an application running on WebLogic Server. You then view the results in The Grinder console.

Assumptions

You completed "Practice 9-1: Configuring and Using Node Manager."

"Practice 10-1: Deploying an Application" is not necessary for this practice.

All servers are currently running.

Tasks

1. Connect to host01. Run a script to deploy the application from which The Grinder script was created.
   a. Open a Terminal window and navigate to the practice directory. Then, run the `deploy.sh` script.

```
$ cd /practices/part1/practice10-02
$ ./deploy.sh
...
>>>Deploying application contacts. Please wait.
...
>>>Application contacts deployed.
...
$
```

2. Connect to host02. Run the database setup script. It initializes (or reinitializes) the database to create a table and put some data in it that the application requires.

   Note: Notice that this is host02, not host01.

   a. Open a Terminal window and navigate to the practice directory. Set some environment variables. Then run the `setup.sh` script.

   Note: The `ORACLE_HOME` variable points to where the database is installed. `ORACLE_SID` (Oracle System ID) is the unique name of this particular database.

```
$ cd /practices/part1/practice10-02
$ export ORACLE_HOME=/u01/app/db11g/product/11.2.0/dbhome_1
$ export ORACLE_SID=orcl
$ ./setup.sh

SQL*Plus: Release 11.2...
...
1 row created.

Commit complete.
...
```

Note: The SQL script drops the table (and sequence) it creates, so you can run it multiple times. Therefore, the first time the script is run, it produces messages that no such table or sequence exist. Ignore those messages if you see them.

3. Access the newly deployed application from the web browser. You will use the application in the same way that it was used to create the `grinder.py` script. This script was recorded for you by using The Grinder TCPProxy utility and using the contacts application in a web browser.

   Note: To record the script, the web browser first had to be configured. It was set to communicate with the TCPProxy utility by setting a manual proxy configuration. The HTTP Proxy field was set to `localhost`, and the Port field set to `8001`. (That is the port on which the TCPProxy utility runs.)

   a. In the web browser, enter the URL for the application:

      ```
      http://host01.example.com:7011/contacts
      ```

   Note: This is the first request in The Grinder script (which will display in The Grinder console as "Page 1").

   b. On the home page, click the **browse all contacts** link.

   Note: This is the second request in the script (which will display in The Grinder console as "Page 2").

   c. Click the **[edit]** link in the first row.

   Note: This is the third request in the script (which will display in The Grinder console as "Page 3").

   d. View the data on the edit screen.

   Note: This is the fourth request in the script (which will display in The Grinder console as "Page 4").

4. Install The Grinder on host02.

   a. Open a Terminal window on host02 and navigate to `/install/grinder`. Then, list the contents of the directory.

      ```
      $ cd /install/grinder
      $ ls
      grinder-3.11-binary.zip
      ```

   b. Unzip the zip file to `/home/oracle`.

      ```
      $ unzip grinder-3.11-binary.zip –d /home/oracle
      Archive:  grinder-3.11-binary.zip
        creating: /home/oracle/grinder-3.11/
       inflating: /home/oracle/grinder-3.11/CHANGES
      ...
      ```

   c. Leave the Terminal window open for later.

5. Install The Grinder on host01.

   a. Open a Terminal window on host01 and navigate to `/install/grinder`.

      ```
      $ cd /install/grinder
      ```

   b. Unzip the zip file to `/home/oracle`.

      ```
      $ unzip grinder-3.11-binary.zip –d /home/oracle
      Archive:  grinder-3.11-binary.zip
        creating: /home/oracle/grinder-3.11/
      ```

```
 inflating: /home/oracle/grinder-3.11/CHANGES
...
```

6. Examine the `grinder.properties` file and start The Grinder console.
   a. In the Terminal window on host02, navigate to the practice directory.
      $ **cd /practices/part1/practice10-02**
   b. View the `grinder.properties` file in the editor.
      $ **gedit grinder.properties**
   c. Scroll down past the comments and notice the following attributes and their values:
      – `grinder.script = grinder.py`
      – `grinder.processes = 2`
      – `grinder.threads = 200`
      – `grinder.runs = 0`

   Note: What this means is that the agent starts two worker processes with 200 threads each. It runs the script called `grinder.py`. It continues running until the console tells it to stop.
   d. Exit the editor without making any changes.
   e. View the `setgrinderenv.sh` script.
      $ **cat setgrinderenv.sh**
```
GRINDERPATH=/home/oracle/grinder-3.11
GRINDERPROPS=/practices/part1/practice10-02/grinder.properties
CLASSPATH=$GRINDERPATH/lib/grinder.jar:$CLASSPATH
JAVA_HOME=/u01/app/jdk
PATH=$JAVA_HOME/bin:$PATH
export CLASSPATH PATH GRINDERPROPS
```
   Note: Notice this script sets various environment variables that The Grinder needs: where The Grinder is, the location of its properties file, the `CLASSPATH`, and the `PATH`.
   f. View the `startconsole.sh` script.
      $ **cat startconsole.sh**
```
source setgrinderenv.sh
java –classpath $CLASSPATH net.grinder.Console
```
   Note: Notice this script calls the one that sets environment variables, and then it starts the JVM with the `net.grinder.Console` class.
   g. Start The Grinder console.
      $ **./startconsole.sh**
   h. Leave the console open.

   Note: Now that the console is running, when an agent is started, it waits for signals from the console.
7. Start a Grinder agent on host01.
   a. In the Terminal window on host01, navigate to the practice directory.
      $ **cd /practices/part1/practice10-02**
   b. Run the `startagent.sh` script to start a Grinder agent.
      $ **./startagent.sh**

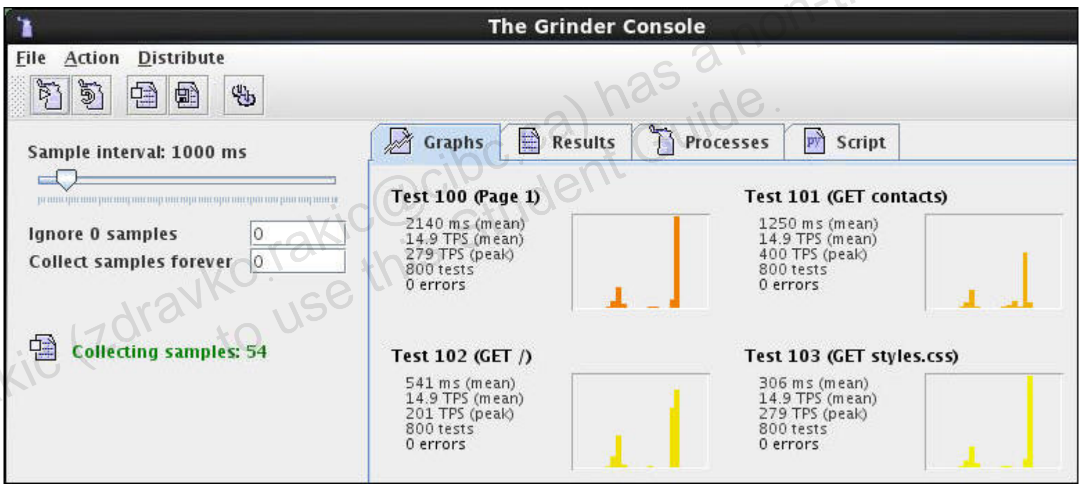
```
... INFO  agent: The Grinder 3.11
... INFO  agent: connected to console at host02.example.com/...
... INFO  agent: waiting for console signal
```

Note: The agent is running in this window and waiting for communication from the console.

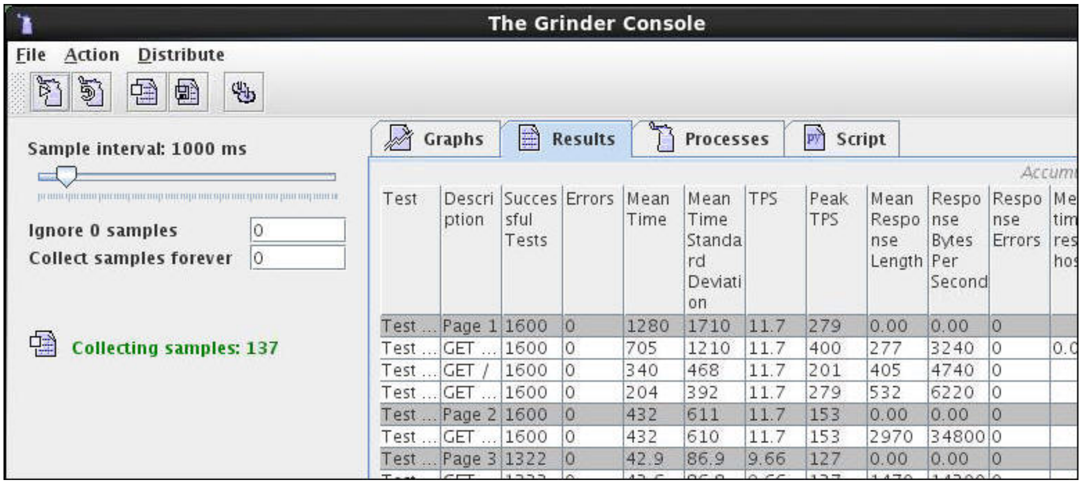
c. Leave the Terminal window open.

8. From The Grinder console on host02, signal the agent (worker processes) to start working. Then view the data that comes back. After a while, stop collecting data and reset the agent (worker processes).
   a. Access The Grinder console on host02.
   b. Click the button to "Start the worker processes" (the first button on the left).

   c. When the dialog box warns that you have not selected a properties file, click **OK**.
   d. Click the **Graphs** tab. Watch the graphs go by for a while.



e. Click the **Results** tab. Watch the numbers update for a while.



f. Click the “Stop collecting statistics” button.

g. Look at the numbers in the console on the **Results** tab. The “Mean Time” is the number of milliseconds a request takes. Although the script has “think time” in it for each web page accessed (like a real user would have), that is not included in the Mean Time, which is just the time the HTTP request takes.

Note: Remember, this time is in milliseconds. You probably will see much lower than sub-second response time for all the “pages.”

h. Next, click the “Reset the worker processes” button. When asked whether you also want to reset the console, click **No**. (You did not reset the console in case you want to continue to look at the numbers.)

i. When you have finished investigating the numbers, close The Grinder console.

Note: If you are interested, the raw data has been saved in files in a newly created `log` directory in the practices directory.

j. Close the host02 Terminal window.

9. Return to host01 and view the agent window.
   a. The Terminal window in which the agent was running has various messages in it. You should notice that the agent is no longer running. It stopped when it could no longer communicate with the console, which you closed.

```
...
... INFO  agent: finished
$
```

   b. Close the Terminal window.

Practice Solution: Load Testing an Application

Perform the following tasks if you did not complete this practice and want to use the finished solution. Note that this solution does not install The Grinder or run its load test. The solution just deploys the application that was used in the load test.

Assumptions

You completed "Practice 9-1: Configuring and Using Node Manager."

"Practice 10-1: Deploying an Application" is not necessary for this solution.

All servers are currently running.

Solution Tasks

1. Connect to host02 and run the practice setup script which initializes (or reinitializes) the database to create a table and put some data in it that the application requires.

   Note: Notice that this is host02, not host01.

   a. Open a Terminal window and navigate to the practice directory. Set up some environment variables, and then run the script.

      ```
      $ export ORACLE_HOME=/u01/app/db11g/product/11.2.0/dbhome_1
      $ export ORACLE_SID=orcl
      $ cd /practices/part1/practice10-02
      $ ./setup.sh
      ```

   Note: The SQL script drops the table (and sequence) it creates, so you can run it multiple times. Therefore, the first time the script is run, it produces messages that no such table or sequence exist. Ignore those messages if you see them.

   b. Close the Terminal window.

2. Connect to host01 and run the script to deploy the application from which The Grinder script was created.

   a. Open a new Terminal window, navigate to the practice directory, and run the deploy script.

      ```
      $ cd /practices/part1/practice10-02
      $ ./deploy.sh
      ```

   Note: If you get a warning from WLST about closing in a different thread, ignore it (`WLContext.close() was called in a different thread…`). It is a known issue with WLST deployment and does no harm.

   b. Close the terminal window.

Practices for Lesson 12: Clusters

Chapter 12

Practices for Lesson 12: Overview

Practices Overview

In these practices, you create a “regular” cluster and a dynamic cluster. You also deploy an application to the dynamic cluster.

Practice 12-1: Configuring a Cluster

Overview

In this practice, you create and configure a cluster. You start the servers in the cluster.

Assumptions

You completed "Practice 9-1: Configuring and Using Node Manager."

The administration server is currently running.

Tasks

1. Open the WebLogic Server administration console.
2. Create and configure a cluster.
   a. In the Change Center, click **Lock & Edit**.
   b. In the Domain Structure, expand **Environment** and select **Clusters**.
   c. Above the Clusters table, click the **New** button and select **Cluster**.
   d. Enter or select the following values for these fields and then click **OK**.
      – **Name:** `cluster3` (You are saving the name `cluster2` for the dynamic cluster.)
      – **Messaging Mode:** `Unicast`.
   e. Click **OK**.
   f. Select the new cluster in the Clusters table.
   g. Select the **Configuration** > **Servers** tabs.
   h. Scroll down to the Servers table and click the **Add** button.
   i. Select **Create a new server and add it to this cluster**. Click **Next**.
   j. Enter or select the following values for these fields, then click **Finish**.
      – **Server Name:** `server3`
      – **Server Listen Address:** `host01.example.com`
      – **Server Listen Port:** `7013`
   k. Click the **Add** button again.
   l. Select **Create a new server and add it to this cluster**. Click **Next**.
   m. Enter or select the following values for these fields and then click **Finish**.
      – **Server Name:** `server4`
      – **Server Listen Address:** `host02.example.com`
      – **Server Listen Port:** `7013`
   n. Click the **Add** button again.
   o. Select **Create a new server and add it to this cluster**. Click **Next**.
   p. Enter or select the following values for these fields and then click **Finish**.
      – **Server Name:** `server5`
      – **Server Listen Address:** `host01.example.com`
      – **Server Listen Port:** `7015`
   q. Click the **Add** button again.
   r. Select **Create a new server and add it to this cluster**. Click **Next**.

s. Enter or select the following values for these fields and then click **Finish**.
   - **Server Name:** `server6`
   - **Server Listen Address:** `host02.example.com`
   - **Server Listen Port:** `7015`

t. In the Change Center, click **Activate Changes**.

3. Assign the new servers to the proper machines.
   a. In the Change Center, click **Lock & Edit**.
   b. In the Domain Structure, expand **Environment** and select **Servers**.
   c. Ensure the **Configuration** tab is selected.
   d. Click **server3**.
   e. Ensure that the **Configuration** > **General** tabs are selected.
   f. Use the Machine drop-down list to select **`machine1`**.
   g. Click the **Save** button.
   h. Use the breadcrumbs and select **Summary of Servers**. Click **server4**. Ensure that the **Configuration** > **General** tabs are selected. Use the Machine drop-down list to select **`machine2`**. Click the **Save** button.
   i. Use the breadcrumbs and select **Summary of Servers**. Click **server5**. Ensure that the **Configuration** > **General** tabs are selected. Use the Machine drop-down list to select **`machine1`**. Click the **Save** button.
   j. Use the breadcrumbs and select **Summary of Servers**. Click **server6**. Ensure that the **Configuration** > **General** tabs are selected. Use the Machine drop-down list to select **`machine2`**. Click the **Save** button.
   k. In the Change Center, click **Activate Changes**.

4. Start the new servers in the new cluster.
   a. In the Domain Structure, expand **Environment** and select **Servers**.
   b. Select the **Control** tab.
   c. Select the check boxes next to `server3`, `server4`, `server5`, and `server6`. Then click **Start**. When asked to confirm, click **Yes**.
   d. Wait for a little while and refresh the web browser. Ensure that the state of the new managed servers is “RUNNING.”

Practice Solution: Configuring a Cluster

Perform the following tasks if you did not do this practice and want to use the finished solution.

Assumptions

You completed "Practice 9-1: Configuring and Using Node Manager."

The administration server is currently running.

Tasks

1. Connect to host01.
2. Run the solution script.
   a. Open a Terminal window and navigate to the practice directory. Run the solution script.
      ```
      $ cd /practices/part1/practice12-01
      $ ./solution.sh
      ```
   Note
   - This script calls a WLST script that creates the new servers, the new cluster, and adds the servers to the cluster. It then calls another WLST script to start all the servers in the new cluster.
   - The WLST script that starts the servers can take a while to run, so be patient.

   b. Close the Terminal window.

Practice 12-2: Configuring a Dynamic Cluster

Overview

In this practice, you create and configure a dynamic cluster. You start the servers in the cluster. You also deploy an application to all the servers in the dynamic cluster.

Assumptions

You completed "Practice 9-1: Configuring and Using Node Manager." ("Practice 12-1: Configuring a Cluster" is not a prerequisite for this practice.)

The administration server is currently running.

Tasks

1. Connect to host02. From there, run a script that sets up the database with a table and loads it with some data. This is required by the application you will deploy later in this practice.

   Note: Notice that this is host02, not host01.

   a. Open a Terminal window and navigate to the practice directory. Set a couple of environment variables and run the script that sets up the database.

   Note: The `ORACLE_HOME` variable points to where the database is installed. `ORACLE_SID` (Oracle System ID) is the unique name of this particular database.

   ```
   $ cd /practices/part1/practice12-02
   $ export ORACLE_HOME=/u01/app/db11g/product/11.2.0/dbhome_1
   $ export ORACLE_SID=orcl
   $ ./setup.sh
   ...
   1 row created.

   1 row created.

   Commit complete.
   ...
   $
   ```

   Note: The SQL script drops the table (and sequence) it creates, so you can run it multiple times. Therefore, the first time the script is run, it produces messages that no such table or sequence exist. Ignore those messages if you see them.

   b. Close the Terminal window.

2. Connect to host01 and copy the application to the domain's application directory.

   a. Open a Terminal window and navigate to the practice directory. Copy the application to the domain's application directory.

   ```
   $ cd /practices/part1/practice12-02
   $ cp supplies.war /u01/domains/part1/wlsadmin/apps
   ```

   b. Close the Terminal window.

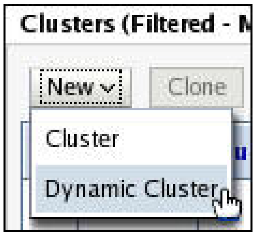
3. Open the WebLogic Server administration console.

4. Create and configure a dynamic cluster.

   a. In the Change Center, click **Lock & Edit**.

b. In the Domain Structure, expand **Environment** and select **Clusters**.

c. Above the Clusters table, click the **New** button and select **Dynamic Cluster**.



d. Enter or select the following values for these fields and then click **Next**.
   - **Name:** **`cluster2`**
   - **Messaging Mode:** **`Unicast`**.

e. Enter or select the following values for these fields and then click **Next**.
   - **Number of Dynamic Servers:** **`4`**
   - **Server Name Prefix:** **`cluster2server-`**

Note: That is a "dash" on the end of the prefix name.

f. Select **Use any machine configured in this domain**. Click **Next**.

g. Enter or select the following values for these fields, then click **Next**:
   - **Assign each dynamic server unique listen ports:** Selected
   - **Listen Port for First Server:** `7099`
   - **SSL Listen Port for First Server:** `8099`

h. Notice the details of this new dynamic cluster, including the name of the new server template that will be created. Click **Finish**.

i. In the Change Center, click **Activate Changes**.

5. View the new servers generated for the dynamic cluster. Start those servers.

   a. In the Domain Structure, expand **Environment** and select **Servers**. Ensure that the **Configuration** tab is selected.

   b. Notice the four new servers. Their names all start with "`cluster2server-`" and end in an index.

   c. Notice their type is "Dynamic," as opposed to the other servers, which are "Configured."

   d. Also notice that the servers alternate between `machine1` and `machine2`.

   e. Click the **Control** tab.

   f. First, so not many servers are running at one time, stop all other managed servers. Select the check boxes next to all managed servers not in the new dynamic cluster. Click **Shutdown** and select **Force Shutdown Now**. When asked to confirm, click **Yes**.

   Note: You may have to click the **Next** link and do this more than once if not all servers are displayed on the first page.

   g. Next, start the new dynamic servers. Select the check boxes next to all the dynamic servers: `cluster2server-1`, `cluster2server-2`, `cluster2server-3`, and `cluster2server-4`. Then click **Start**. When asked to confirm, click **Yes**.

   h. Wait for a little while and refresh the web browser. Ensure that the state of all the new managed servers is "RUNNING," and the state of the other managed servers is "SHUTDOWN."

6. Change the data source target to include the new cluster.
   a. In the Change Center, click **Lock & Edit**.
   b. In the Domain Structure, expand **Services** and select **Data Sources**.
   c. In the Data Sources table, click the name of `datasource1`.
   d. Click the **Targets** tab.
   e. Select the check box for `cluster2`. Ensure that **All servers in the cluster** is selected.
   f. Click **Save**.
   g. In the Change Center, click **Activate Changes**.
7. Deploy an application to the new cluster.
   a. In the Change Center, click **Lock & Edit**.
   b. In the Domain Structure, select **Deployments**.
   c. Above the Deployments table, click the **Install** button.
   d. Use the links next to and below **Current Location** to navigate to:
      `host01.example.com/u01/domains/part1/wlsadmin/apps`

   Note: This fills in the **Path** field as you click links.
   e. When the path is correct, select the option button next to **supplies.war**. Click **Next**.
   f. Select **Install this deployment as an application** and click **Next**.
   g. Select the check box next to `cluster2`. Ensure that the **All servers in the cluster** option button is selected. Click **Next**.
   h. Leave all the Optional Setting at their default values. Click **Next**.
   i. Select **No, I will review the configuration later**. Click **Finish**.
   j. In the Change Center, click **Activate Changes**.

   Note: Notice the message that the changes have been activated and no restarts are necessary.
8. Start the application.
   a. In the Deployments table, select the check box next to the **supplies** application.
   b. Click the **Start** button and select **Servicing all requests**.
   c. When asked to confirm, click **Yes**.

   Note: Notice that the State of the supplies application is now "Active."

Practice Solution: Configuring a Dynamic Cluster

Perform the following tasks if you did not do this practice and want to use the finished solution.

Note: If you started the practice and created the dynamic cluster or the server template, you must delete them before running this solution. Use the administration console. If any of the dynamic servers were created and started, first stop them (**Environment** > **Servers** > **Control**; select the servers and click **Shutdown** > **Force Shutdown Now**). Then delete the dynamic cluster (**Lock & Edit**; **Environment** > **Clusters**; select **cluster2** and click **Delete**, then **Yes**; **Activate Changes**). Then delete the server template (**Lock & Edit**; **Environment** > **Clusters** > **Server Templates**; select **cluster2server-Template** and click **Delete**, then **Yes**; **Activate Changes**).

Assumptions

You completed “Practice 9-1: Configuring and Using Node Manager.” (“Practice 12-1: Configuring a Cluster” is not a prerequisite for running this solution.)

The administration server is currently running.

Solution Tasks

1. Connect to host02 and run the database setup script.

   Note: Notice that this is host02, not host01.

   a. Open a Terminal window and navigate to the practice directory. Set a couple of environment variables and run the script that sets up the database.

   ```
   $ cd /practices/part1/practice12-02
   $ export ORACLE_HOME=/u01/app/db11g/product/11.2.0/dbhome_1
   $ export ORACLE_SID=orcl
   $ ./setup.sh
   ```

   b. Close the Terminal window.

2. Connect to host01 and run the solution script.

   a. Open a Terminal window, navigate to the practice directory, and run the solution script.

   ```
   $ cd /practices/part1/practice12-02
   $ ./solution.sh
   ```

   Note

   – This script calls a WLST script that creates the server template and the dynamic cluster based on it. It then calls another WLST script to deploy the application to the new cluster. It then calls a WLST script to stop all servers in the other two clusters. Next, it calls a WLST script to start all the servers in the new cluster. Finally, it calls a WLST script to target the data source to the new cluster.

   – The WLST script that starts servers can take a while to run, so be patient.

   b. Close the Terminal window.

Practices for Lesson 13: Clusters

Chapter 13

Practices for Lesson 13: Overview

Practices Overview

In these practices, you install and create an instance of Oracle HTTP Server. You then configure Oracle HTTP Server as the proxy to the dynamic cluster. You test the application deployed to that cluster. You also configure replication groups in another cluster.

Practice 13-1: Installing OHS (Optional)

Overview

In this practice, you install the Oracle HTTP Server (OHS) portion of Oracle Web Tier on host01. You also create an instance of OHS on that host.

OHS is already installed and a Web Tier instance with an OHS process has been created on host01. You will rename the installation directory (that also contains the instance) to gain OHS installation practice. If something goes wrong during the installation, you can revert to the preinstalled version of the product by changing the directory back to its original name.

Assumptions

You completed "Practice 12-2: Configuring a Dynamic Cluster."

Tasks

1. Connect to host01.
2. Rename the OHS installation directory and create a new, empty directory.
   a. Open a Terminal window, and navigate to `/u01/app`. Then rename the OHS installation directory (that also contains the OHS instance).
      ```
      $ cd /u01/app
      $ mv ohs ohs-orig
      $ mkdir ohs
      ```
3. Install the OHS part of Web Tier.
   a. Navigate to the directory that holds the Web Tier installer and execute it.
      ```
      $ cd /install/webtier
      $ ./fmw_12.1.3.0.0_ohs_linux64.bin
      0%..............................
      ```
   Note
   - If the installer file name is different (a different version of OHS), use that file name instead.
   - Wait for all the files to extract before the installer starts. It can take a while.

   b. Use the guidelines in the following table to install the software by using the graphical installer:

Step	Window/Page Description	Directions
a.	Welcome	Click **Next**.
b.	Installation Location	Oracle Middleware Home: **`/u01/app/ohs`** Click **Next**.
c.	Installation Type	Select **Standalone HTTP Server** and click **Next**. **Note:** The environment intentionally uses separate OHS and WebLogic installation locations so they can be maintained separately.
d.	Prerequisite Checks	Wait for the progress bar to reach 100% and all checks to pass.

Step	Window/Page Description	Directions
		Click **Next**.
e.	Security Updates	Deselect **I wish to receive security updates via My Oracle Support**. Click **Next**.
f.	Pop-up window	Click **Yes**.
g.	Installation Summary	Click **Install**.
h.	Installation Progress	Wait for the progress bar to reach 100%. Click **Next**. **Note:** This can take a few minutes.
i.	Installation Complete	Click **Finish**.

4. Configure an OHS instance.
   a. Rename the current OHS domain directory.
      $ **cd /u01/domains**
      $ **mv ohs ohs-orig**
   b. Navigate to the common Configuration Wizard for OHS.
      $ **cd /u01/app/ohs/oracle_common/common/bin**
   c. Run the Domain Configuration Wizard to create an OHS domain.
      $ **./config.sh**

   Note: The OHS 12*c* release provides a WebLogic domain template for FMW system components.

   d. Use the guidelines in the following table to configure the OHS domain by using the Configuration Wizard:

Step	Window/Page Description	Directions
a.	Create Domain	Select **Create a new domain**. Enter `/u01/domains/ohs` as the domain location. Click **Next**.
b.	Templates	Select **Oracle HTTP Server (Standalone) – 12.1.3.0 [ohs]**. Click **Next**. **Note:** The Basic Standalone System... template is selected by default.
c.	JDK Selection	Select **Oracle HotSpot 1.7.0_xx /u01/app/ohs/oracle_common/jdk**. Click **Next**.
d.	System Components	Leave all default values and click **Next**. Note the system component name, ohs1.
e.	OHS Server	System Component: `ohs1` Admin Host: `host01.example.com`

Step	Window/Page Description	Directions
		Admin Port: 9999 Listen Address: `host01.example.com` Listen Port: 7777 SSL Listen Port: 7778 Server Name: http://host01.example.com:7777 Click **Next**.
f.	Node Manager	Node Manager Type: Per Domain Default Location Node Manager Credentials: Username: **weblogic**, Password: **Welcome1** Click **Next**.
g.	Configuration Summary	Review and click **Create**.
h.	Configuration Progress	Wait for the progress bar to reach 100%. Click **Next**. **Note:** This can take a few minutes.
i.	Success	Click **Finish**.

e. Verify that the domain files are in place.

```
$ ls -l /u01/domains/ohs
drwxr-x--- 2 oracle oinstall 4096 Sep 23 09:52 bin
drwxr-x--- 4 oracle oinstall 4096 Sep 23 09:52 config
drwxr-x--- 2 oracle oinstall 4096 Sep 23 09:52 init-info
drwxr-x--- 2 oracle oinstall 4096 Sep 23 09:52 nodemanager
drwxr-x--- 2 oracle oinstall 4096 Sep 23 09:52 security
...
```

5. Install patch file for OHS.

```
$ /install/webtier/patch/patch.sh
If no errors are shown, then the patch file successfully
installed.
```

Practice Solution: Installing OHS (Optional)

There is no scripted solution for this practice. If you did not do the practice, there is nothing for you to do, the product is already installed and the OHS instance is created.

If you started the practice, but did not complete it, you revert to the preinstalled version of the products by deleting any new directories you created and renaming the original installation directory back to its previous name.

Solution Tasks

Important: Only do these tasks if you started the practice but did not complete it.

1. Connect to host01.
2. Check that the preinstalled directory is there. Delete the new installation directory that you created. Rename the preinstalled directory back to its original name.
   a. Open a Terminal window, and navigate to `/u01/app`. Then list the directories to ensure the `ohs-orig` directory is present. Check that this preinstalled directory has valid contents.
   ```
   $ cd /u01/app
   $ ls
   ohs ... ohs-orig ...
   $ ls ohs-orig
   bin  domain-registry.xml  inventory  lib  nls
   oracle_common  oui  precomp  sqlplus  wlserver
   ...  oraInst.loc  plsql  slax  webgate
   ```
   b. Ensure you are in the proper directory. Remove the new installation directory that you created.
   ```
   $ pwd
   /u01/app
   $ rm -rf ohs
   ```
   Warning: This command permanently deletes the directory, all its subdirectories, and files. Use with caution.
   c. Rename the preinstalled directory back to its original name.
   ```
   $ mv ohs-orig ohs
   ```
3. Restore the original OHS domain folder.
   a. In a Terminal window on host01, navigate to the `/u01/domains` folder. Then list the directories to ensure the `ohs-orig` directory is present. Check that this preinstalled directory has valid contents.
   ```
   $ cd /u01/domains
   $ ls
   ohs ... ohs-orig ...
   $ ls ohs-orig
   auditlogs  bin  config  init-info  nodemanager  security
   servers  system_components
   ```
   b. Ensure you are in the proper directory. Remove the new installation directory that you created.
   ```
   $ pwd
   ```

```
/u01/domains
$ rm -rf ohs
```

Warning: This command permanently deletes the directory, all its subdirectories, and files. Use with caution.

c. Rename the preinstalled directory back to its original name.

```
$ mv ohs-orig ohs
```

Practice 13-2: Configuring a Cluster Proxy

Overview

In this practice, you configure Oracle HTTP Server (OHS) to act as the proxy to the cluster created in the previous practice. You access the application deployed to the cluster via the proxy, and verify that in-memory session replication works.

Assumptions

You completed "Practice 12-2: Configuring a Dynamic Cluster."

"Practice 13-1: Installing OHS" was completed successfully, or not done at all (OHS is already installed and ready on host01).

The administration server and all managed servers in the new dynamic cluster are currently running.

Tasks

1. Connect to host01.
2. Edit the WebLogic plug-in configuration file for OHS.
   a. Open a Terminal window and navigate to the configuration directory of the OHS instance. Edit both `httpd.conf` and `mod_wl_ohs.conf`.
   ```
   $ cd /u01/domains/ohs/config/fmwconfig/components/OHS/instances/ohs1
   $ gedit httpd.conf mod_wl_ohs.conf
   ```
   b. Check that `httpd.conf` includes the plug-in configuration file. Make sure the **httpd.conf** tab in the editor is selected. Press **Ctrl + F** and in the pop-up window enter **`mod_wl_ohs.conf`** and click the **Find** button. Notice the `include` directive that includes this configuration file.
   c. Close the Find pop-up window. Close the `httpd.conf` file (click the "X" in the tab) without making any changes to it.
   d. Edit the plug-in configuration file, `mod_wl_ohs.conf`. Notice that most lines are commented out (they start with a "`#`"). Also notice the `LoadModule` line, which loads the WebLogic plug-in.
   e. In between `<IfModule weblogic_module>` and `</IfModule>` enter following lines:
   ```
   <Location />
     WLSRequest On
     WebLogicCluster
                 host01.example.com:7100,host02.example.com:7101
   </Location>
   ```
   Note
   - Enter the `WebLogicCluster` line on a single line in the file.
   - This initial list does not include all servers in the cluster, nor does it have to. The plug-in will be updated with the other servers in the cluster when the cluster servers it uses return the "dynamic cluster list" to it.

– The / parameter set in `Location` tells the proxy that requests for all locations ("slash") should go to the cluster, no matter what the context root of the web applications

Tip: Make sure there is no space between the "/" and the ">" or the line will not work.

f. When finished editing this file, it should look like this:

```
LoadModule weblogic_module
                      "${PRODUCT_HOME}/modules/mod_wl_ohs.so"
<IfModule weblogic_module>
#   WebLogicHost <WEBLOGIC_HOST>
#   WebLogicPort <WEBLOGIC_PORT>
<Location />
   WLSRequest On
   WebLogicCluster
              host01.example.com:7100,host02.example.com:7101
</Location>
</IfModule>

#<Location /weblogic>
#   SetHandler weblogic-handler
#   PathTrim /weblogic
#   ErrorPage  http:/WEBLOGIC_HOME:WEBLOGIC_PORT/
#</Location>
```

Note: The file is shown with some of the comment lines removed. You can keep them, if you prefer. Also, due to space limitations, the `LoadModule` line is shown here on two lines, but in the file it is on one line.

g. When you are satisfied that the file is correct, save it and exit the editor.

3. Configure OHS Node Manager to use a non-SSL connection.

You have to modify two configuration settings to make Node Manager use a non-SSL connection. Add one setting in the domain's `config.xml` file and the other setting in the `nodemanager.properties` file.

a. Open the domain's `config.xml` file for editing.

`$ gedit /u01/domains/ohs/config/config.xml`

b. Add the `<nm-type>` line to the machine's `node-manager` element, and then save and close the file.

```
<machine>
    <name>localmachine</name>
    <node-manager>
      <name>localmachine</name>
      <nm-type>Plain</nm-type>
      <listen-address>localhost</listen-address>
      ...
```

c. Open the `nodemanager.properties` file for editing.

`$ gedit /u01/domains/ohs/nodemanager.properties`

d. Set the `SecureListener` property to `false`, and then save and close the file.

```
SecureListener=false
```

4. Start OHS.

a. Open a new Terminal window, name the window **OHS NM**, and navigate to the OHS domain's `bin` folder.

```
$ cd /u01/domains/ohs/bin
```

b. Execute the following commands to explore the `bin` folder and start the OHS Node Manager.

```
$ ls
startComponent.sh    startRSDaemon.sh  stopNodeManager.sh
startNodeManager.sh  stopComponent.sh  stopRSDaemon.sh
$ ./startNodeManager.sh
...
ohs -> /u01/domains/ohs


<Sep 24, 2014 4:40:35 AM PDT> <INFO> <Node manager v12.1.3
#1604337>
<Sep 24, 2014 4:40:36 AM PDT> <INFO> <Secure socket listener
started on port 5556, host localhost/127.0.0.1>
```

Note: Wait for the command to finish.

c. Open a new Terminal window, name the window **OHS**, and navigate to the OHS domain's `bin` folder.

```
$ cd /u01/domains/ohs/bin
```

d. Execute the following command to start OHS.

```
$ ./startComponent.sh ohs1
Starting system Component ohs1 ...
...
Reading domain from /u01/domains/ohs
Please enter Node Manager password:
```

e. Enter **`Welcome1`** as the Node Manager password.

```
Connecting to Node Manager ...
Successfully Connected to Node Manager.
Starting server ohs1 ...
Successfully started server ohs1 ...
Successfully disconnected from Node Manager.
...
```

f. Execute the following command to check the status of OHS.

```
$ /u01/app/fmw/wlserver/common/bin/wlst.sh
/install/webtier/config/status.py
Connecting to Node Manager ...
Successfully Connected to Node Manager.


RUNNING
```

Note

– Make sure that the "status" is "RUNNING."

5. Access the application deployed to the cluster through the OHS cluster proxy. Use the application to ensure it creates a session for you.
   a. Open your web browser and enter the OHS URL, followed by **`/supplies`**:
      `http://host01.example.com:7777/supplies`
   b. When the application home page displays, click the **browse the catalog** link.
   c. Click the **[add]** link next to a few items.
   d. Scroll down and view the items in your shopping cart.

   Note: Remember what items are in your shopping cart.

   e. Do not close the web browser window. For the admin console, use a different browser window. You will come back to this web browser window later.
6. Open the WebLogic Server administration console in a new tab or window.
7. Use the administration console to see which cluster server is servicing your requests. Stop that server.
   a. Under Domain Structure, expand **Environment** and select **Clusters**.
   b. In the Clusters table, click **cluster2**.
   c. Click the **Monitoring** tab.
   d. Use the **Primary** column to determine which of the clustered servers is hosting your current shopping cart session (the value should be greater than `0`). Remember which server it is.

   Note: You can also see which server holds the backup copy of the session. Look at the **Secondary Distribution Names** column. For example, if `cluster2server-1` is the primary, another server will have a value in this column of: `cluster2server-1:1`. What this means is that this server has `1` secondary session for `cluster2server-1`.

   Tip: If you cannot tell which server is the primary, write down the Primary session count number for all the servers. Close all browsers. Open a new browser and access and use the application again. In the admin console, come back to this table and see which Primary number has increased. That is the server that currently holds your session and is servicing your requests.

   e. Stop the server that has your session. In the Domain Structure, expand **Environment** and select **Servers**. Click the **Control** tab. Select the check box next to the server that is hosting your session. Click the **Shutdown** button and select **Force Shutdown Now**. When asked whether you are sure, click **Yes**.
   f. Wait a little while and refresh the web browser. Ensure that the state of the server is SHUTDOWN.
8. Ensure your shopping cart still has your items to show that in-memory session replication is working.
   a. Go back to the web browser in which you were using the application. Remember the items that were in your shopping cart. Click the **[add]** link next to some new and different item. Scroll down and view your shopping cart. The new item and all the old items should display in the shopping cart.
9. Shut down all of the servers in cluster2.

Practice Solution: Configuring a Cluster Proxy

Perform the following tasks if you did not complete this practice and want to use the finished solution.

Assumptions

You completed "Practice 12-2: Configuring a Dynamic Cluster."

The administration server and all managed servers in the new dynamic cluster are currently running.

Solution Tasks

1. Connect to host01.
2. Run the script.
   a. Open a Terminal window and navigate to the practice directory. Then run the script.
      $ **cd /practices/part1/practice13-02**
      $ **./solution.sh**

   Note:

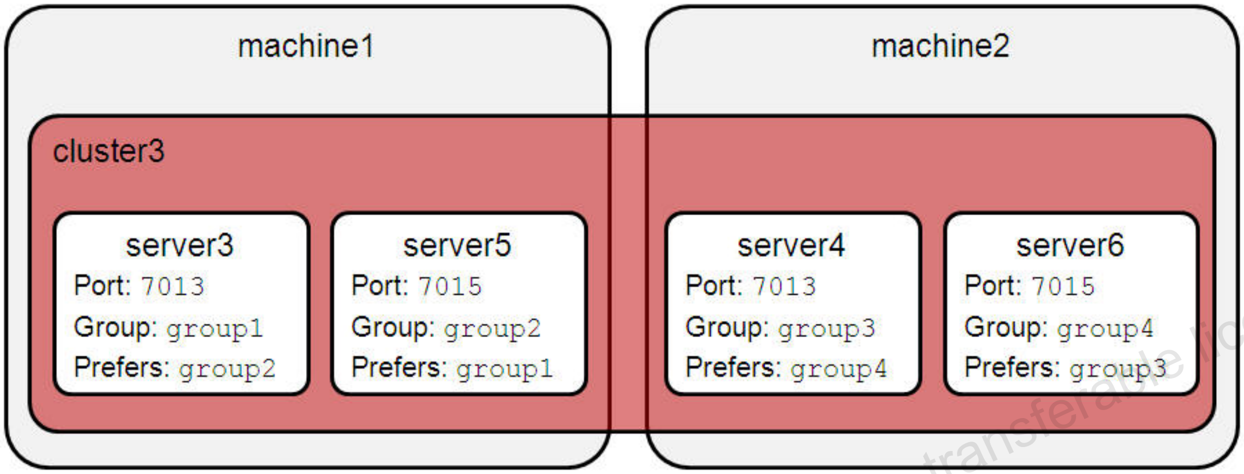
   This script performs the following tasks:
   - Copies a completed WebLogic plug-in configuration file for OHS to the right location
   - Configures the OHS Node Manager to use a non-SSL connection
   - Starts the OHS Node Manager
   - Starts OHS
   - Checks the status of the OHS server
   - You should see the print out in the Terminal window that `ohs1` is `RUNNING`.

   b. Close the Terminal window.
3. If you want to access the application deployed to the cluster (in a previous practice) through the OHS proxy, use the web browser.
   a. Enter this URL:
      http://host01.example.com:7777/supplies

Practice 13-3: Configuring Replication Groups

Overview

In this practice, you configure replication groups in a cluster.



Assumptions

You completed "Practice 12-1: Configuring a Cluster."

The administration server is running.

Tasks

1. Connect to host01.
2. Open the WebLogic Server administration console.
3. Set replication groups and preferred secondary groups.

   Note: This is not a realistic example because you would not want to set up replication groups so that a server's secondary server was on its same machine. It does give you practice in configuring replication groups, however. And, if you do the optional task at the end of this practice, it will prove that replication group settings take precedence over the "choose a different machine" preference when a secondary server is selected.

   a. First, stop all the servers in cluster3, if they are running. In the Domain Structure, expand **Environment** and select **Clusters**. In the Clusters table, select **cluster3**. Click the **Control** tab. Select the check box in front of all the servers in the cluster that are RUNNING. Click **Shutdown** and select **Force Shutdown Now**. When asked to confirm, click **Yes**.

   Why? Changing a server's replication group or preferred secondary group does not take effect until the server restarts. You are shutting down these servers ahead of time and will start them later.

   b. In the Change Center, click **Lock & Edit**.

   c. In the Domain Structure, expand **Environment** and select **Servers**.

   d. In the Servers table, select **server3**.

   e. Click the **Configuration** > **Cluster** tabs.

   f. Enter the following values for these fields, then click **Save**.

      – Replication Group: **`group1`**

– Preferred Secondary Group: `group2`

g. Use the breadcrumbs to select **Summary of Servers**. In the Servers table, select **server5**. Click the **Configuration** > **Cluster** tabs. Enter the following values for these fields, then click **Save**.

– Replication Group: `group2`

– Preferred Secondary Group: `group1`

Note: Notice that you are putting two servers on the same machine in different groups, each preferring the other's group.

h. Use the breadcrumbs to select **Summary of Servers**. In the Servers table, select **server4**. Click the **Configuration** > **Cluster** tabs. Enter the following values for these fields, then click **Save**.

– Replication Group: `group3`

– Preferred Secondary Group: `group4`

i. Use the breadcrumbs to select **Summary of Servers**. In the Servers table, select **server6** (you may have to click the **Next** link to be able to select this server). Click the **Configuration** > **Cluster** tabs. Enter the following values for these fields and then click **Save**.

– Replication Group: `group4`

– Preferred Secondary Group: `group3`

j. In the Change Center, click **Activate Changes**.

4. Start the servers in this cluster.

a. To cut down on the number of concurrently running servers, stop all other managed servers that are running. In the Domain Structure, expand **Environment** and select **Servers**. Click the **Control** tab. Select the check boxes next to all *managed* servers *not* in cluster3 that are RUNNING. Click **Shutdown** and select **Force Shutdown Now**. When asked to confirm, click **Yes**.

b. In the Domain Structure, expand **Environment** and select **Clusters**.

c. In the Clusters table, select **cluster3**.

d. Click the **Control** tab.

e. Select the check box in front of all four servers. Click **Start**. When asked to confirm, click **Yes**. Wait a while and refresh the page. Ensure that the State of all four servers is RUNNING.

5. (Optional if you have time and are interested) Check to see whether the replication group configuration overrides the "chose a different machine" preference. To do this, you need to target a data source to this cluster, deploy an application that uses in-memory session replication to this cluster, run the application, and then see which server is chosen as the secondary server to the primary server servicing your requests.

a. In the Change Center, click **Lock & Edit**.

b. In the Domain Structure, expand **Services** and select **Data Sources**.

c. In the Data Sources table, click on the name of **datasource1**.

d. Click the **Targets** tab.

e. Select the check box for **cluster3**. Ensure that **All servers in the cluster** is selected.

f. Click **Save**.

g. In the Domain Structure, select **Deployments**.

h. In the Deployments table, click the **contacts** application.

i. Click the **Targets** tab.

j. Select the check box next to **cluster3**. Ensure that the **All servers in the cluster** option button is selected.

k. Click **Save**.

l. In the Change Center, click **Activate Changes**.

m. In the Domain Structure, select **Deployments**. Ensure the **contacts** application is Active. If not, start servicing all requests.

n. Do not close the admin console.

o. In the web browser, open a new window or tab.

p. Enter the URL for the application running on server3:

   `http://host01.example.com:7013/contacts`

Note: A proxy for this cluster is not set up, so you are accessing the application directly on server3.

q. Click the link **browse all contacts**.

r. Return to the admin console. In the domain structure, expand **Environment** and select **Clusters**. In the Clusters table, select **cluster3**.

s. Click the **Monitoring** tab.

t. In the **server3** row, you should see a `1` in the **Primary** column. Look in the **Secondary Distribution Names** column in all of the rows. If the replication group configuration works as suspected, you should see in the **server5** row this value:

   `server3:1`

Note: Remember, server3 has “group1” as its replication group and “group2” as its preferred secondary group. And server5 has “group2” as its replication group. So, even though server5 is on the same machine as server3, it is still chosen as the secondary server because of the replication group configuration.

Practice Solution: Configuring Replication Groups

There is no solution for this practice. Setting the replication groups is not needed in the cluster.

Practices for Lesson 14: Clusters

Chapter 14

Practices for Lesson 14: Overview

Practices Overview

In this practice, you configure a replication channel for a cluster.

Practice 14-1: Configuring a Replication Channel

Overview

In this practice, you configure a replication channel for peer-to-peer communication in a cluster.

Assumptions

You completed "Practice 9-1: Configuring and Using Node Manager."

The administration server is running.

To do the optional task of monitoring the replication channel, you must have also completed "Practice 10-2: Load Testing an Application," or deploy the contacts application manually.

Tasks

1. Connect to host01.
2. Open the WebLogic Server administration console.
3. So unnecessary servers are not running, shut down all managed servers.

   Note: You are also shutting down servers you want to be running, because the changes being made only take effect after a server restart, so you are shutting down these servers ahead of time.

   a. In the Domain Structure, expand **Environment** and select **Servers**.
   b. Click the **Control** tab.
   c. Select the check box in front of all RUNNING managed servers.
   d. Click **Shutdown** > **Force Shutdown Now**. Click **Yes** when asked to confirm. Wait for the State of the servers to be SHUTDOWN.

   Note: You may need to click the **Next** link to access all the servers. Select any running managed servers on the next page and shut them down, too.
4. Configure a replication channel for each server in cluster1.

   a. In the Change Center, click **Lock & Edit**.
   b. In the Domain Structure, expand **Environment** and select **Servers**.
   c. Select **server1** in the Servers table.
   d. Click the **Protocols** > **Channels** tab.
   e. Click the **New** button.
   f. Enter or select the following values for these fields and then click **Next**.
      – **Name:** `ReplicationChannel`
      – **Protocol:** `t3`

   Note: Case matters in this name, as you want it to match everywhere you enter it.

   g. Enter or select the following values for these fields, then click **Next**.
      – **Listen Address:** `host01.example.com`
      – **Listen Port:** `6000`
      – **External Listen Address:** (blank)
      – **External Listen Port:** (blank)
   h. Enter or select the following values for these fields and then click **Next**.
      – **Enabled:** Selected
      – **Tunneling Enabled:** Not selected

- **HTTP Enabled for This Protocol:** Selected
- **Outbound Enabled:** Selected

i. Enter or select the following values for these fields and then click **Finish**.
   - **Two Way SSL Enabled:** Not selected
   - **Client Certificate Enforced:** Not selected

j. Use the breadcrumbs to select **Summary of Servers**. Select **server2**. Click the **Protocols** > **Channels** tab. Click the **New** button. Go through the Create a New Network Channel wizard again, using the following values:

Field	Value
Name	`ReplicationChannel`
Protocol	`t3`
Listen Address	`host02.example.com`
Listen Port	`6000`
External Listen Address	(blank)
External Listen Port	(blank)
Enabled	Selected
Tunneling Enabled	Not selected
HTTP Enabled for This Protocol	Selected
Outbound Enabled	Selected
Two Way SSL Enabled	Not selected
Client Certificate Enforced	Not selected

k. In the Change Center, click **Activate Changes**.

5. Configure the cluster to use the new replication channel.
   a. In the Change Center, click **Lock & Edit**.
   b. In the Domain Structure, expand **Environment** and select **Clusters**.
   c. Select **cluster1** in the Clusters table.
   d. Click the **Configuration** > **Replication** tab.
   e. Ensure that `ReplicationChannel` is in the **Replication Channel** field.
   f. Click the **Save** button.
   g. In the Change Center, click **Activate Changes**.

   Note: If you did not type into the field, then no changes were made and the **Activate Changes** button will still say **Release Configuration**. If that is the case, click **Release Configuration**.

6. Start all cluster1 servers.
   a. In the Domain Structure, expand **Environment** and select **Clusters**.
   b. Select **cluster1** in the Clusters table.
   c. Click the **Control** tab.
   d. Select the check box in front of all cluster1 servers. Click **Start**. Click **Yes** when asked to confirm. Wait for the State of the servers to be RUNNING.
   e. Do not close the web browser.

7. Verify that the replication channel started by looking at server1's output.
   a. Open a new Terminal window on host01 and navigate to the `logs` directory of server1. Then edit the `server1.out` file.

      `$ cd /u01/domains/part1/wlsadmin/servers/server1/logs`

      `$ gedit server1.out`
   b. Press **Ctrl + F**. In the Find pop-up window, enter **`ReplicationChannel`** in the **Search for** field and press **Enter**.
   c. You should see the message that this channel is listening on port `6000` for `t3`, `CLUSTER-BROADCAST`, and `http`.
   d. Close the Find window, and exit the editor.
   e. Close the Terminal window.
8. (Optional if you have time and are interested) Monitor the replication channel after session replication has taken place. To do this you need to target a data source to this cluster, deploy an application that uses in-memory session replication to this cluster, and run the application.

   Note: If the data source and application are already targeted to cluster1 you can skip those steps when you get to them.
   a. Return to the admin console.
   b. In the Change Center, click **Lock & Edit**.
   c. In the Domain Structure, expand **Services** and select **Data Sources**.
   d. In the Data Sources table, click the name of **datasource1**.
   e. Click the **Targets** tab.
   f. If the data source is already targeted to cluster1, move on to the next step. If not, select the check box for **cluster1**. Ensure **All servers in the cluster** is selected. Click **Save**.
   g. In the Domain Structure, select **Deployments**.
   h. In the Deployments table, click the **contacts** application.
   i. Click the **Targets** tab.
   j. If the application is already targeted to cluster1, move on to the next step. If not, select the check box next to **cluster1**. Ensure that the **All servers in the cluster** option button is selected. Click **Save**.
   k. In the Change Center, click **Activate Changes**.

   Note: If the data source and the contacts application were both already targeted to cluster1, instead click **Release Configuration**.
   l. Do not close the admin console.
   m. In the web browser, open a new window or tab.
   n. Enter the URL for the application running on server1:

      `http://host01.example.com:7011/contacts`

   Note: A proxy for this cluster is not set up, so you are accessing the application directly on server1.
   o. Click the **browse all contacts** link.
   p. Return to the admin console. In the Domain Structure, expand **Environment** and select **Servers**. In the Servers table, select **server1**.
   q. Click the **Protocols** > **Channels** tab.
   r. In the Network Channels table, select the **ReplicationChannel** channel.

s. Click the **Monitoring** > **Overview** tab.

t. Review the statistics for the channel. You should see that messages have been sent and received on the replication channel.

u. You can go view the statistics for the replication channel on **server2**, as well.

Practice Solution: Configuring a Replication Channel

There is no solution for this practice. Setting a replication channel is not needed in this cluster.

Practices for Lesson 16: WebLogic Server Security

Chapter 16

Practices for Lesson 16: Overview

Practices Overview

In this practice, you configure an external LDAP and set it as one of the authentication providers of the WebLogic Server security realm.

Practice 16-1: Configuring an Authentication Provider

Overview

In this practice, you configure an external LDAP, OpenDS. You then set this LDAP, which is installed on host02, as one of the authentication providers in your WebLogic domain. Finally, you configure the authentication provider control flags.

> **Note:** The default embedded LDAP continues as one of the authentication providers and retains all the administrative users, groups, and roles. The external LDAP is used for all other users, groups, and roles.

Assumptions

You completed “Practice 13-2: Configuring a Cluster Proxy.”

The administration server and the four servers in the dynamic cluster are currently running.

OHS is running.

Tasks

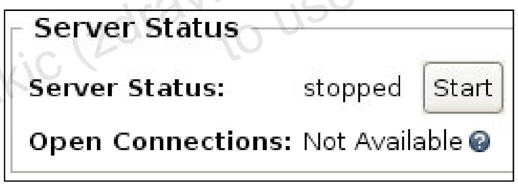
1. Create some LDAP users in the external LDAP system.
   a. Connect to host02.

   Note: Notice that this is host02, not host01.

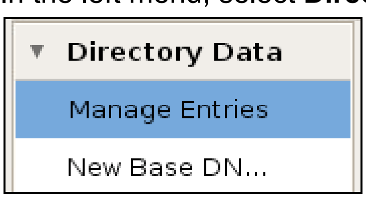
   b. Open a Terminal window. Navigate to the `bin` directory under the installed OpenDS LDAP system, and launch the OpenDS control panel:

   ```
   $ cd /u01/app/ldap/bin
   $ ./control-panel
   ```

   c. A dialog box appears warning that the Local Server is not running. Click **OK** to close it.
   d. Click the **Start** button.



   e. When prompted, enter the password, `Welcome1`, and click **OK**.
   f. After the dialog box indicates that the LDAP server has successfully started, click the **Close** button on the dialog box.
   g. In the left menu, select **Directory Data > Manage Entries**.



   h. Click the base node in the list on the left, **dc=example,dc=com**. Then right-click and select **New User**.

i. Enter or select the following values and then click **OK**.

Field	Value
First Name	`Larry`
Last Name	`Fine`
Common Name	`Larry Fine`
User ID	`larryf`
Password	`Welcome1`
Password (Confirm)	`Welcome1`
E-mail	`larry.fine@example.com`
Naming Attribute	`uid`

Note: Leave blank any fields not listed.

j. After the user has been successfully created, close the “Entry created” dialog box.

Note: It may be behind other windows.

k. Click the base node again, **dc=example,dc=com**. Right-click and select **New User**. Then enter or select the following values and click **OK**.

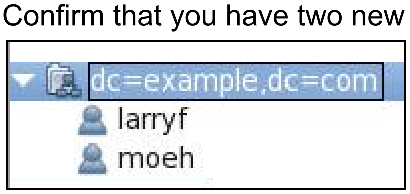
Field	Value
First Name	`Moe`
Last Name	`Howard`
Common Name	`Moe Howard`
User ID	`moeh`
Password	`Welcome1`
Password (Confirm)	`Welcome1`
E-mail	`moe.howard@example.com`
Naming Attribute	`uid`

Note: Leave blank any fields not listed.

l. After the user has been successfully created, close the “Entry created” dialog box.

Note: It may be behind other windows.

m. Confirm that you have two new users within the base DN.



2. Create a group in the external LDAP system and add a user to it.
   a. Click the base node, **dc=example,dc=com** again. Right-click and this time select **New Group**.
   b. For **Name**, enter `boss`.
   c. Ensure that **Static Group** is selected.
   d. Click the **Add Members** button.
   e. Select the **moeh** user and click **OK**.
   f. Click **OK** again.
   g. Close the "Entry created" dialog box.

   Note: It may be behind other windows.

   h. Close the Manage Entries dialog box.
   i. Exit the control panel.

   Tip: Click the "**X**" at the top right, or select **File** > **Exit**.

   j. Close the Terminal window.
3. Open the WebLogic Server administration console.
4. Add the external LDAP system as an authentication provider to the domain's security realm.
   a. In the Change Center, click the **Lock & Edit** button.
   b. In the Domain Structure, select **Security Realms**.
   c. In the Realms table, click **myrealm**.
   d. Click the **Providers** > **Authentication** tabs.
   e. Click the **New** button.
   f. Enter or select the following, then click **OK**.

Field	Value
Name	`CompanyLDAP`
Type	`LDAPAuthenticator`

   g. In the Authentication Providers table, click the name of the new provider.
   h. Click the **Configuration > Provider Specific** tabs.
   i. Enter the following values, then click **Save**.

Field	Value
Host	`host02.example.com`
Port	`7878`
Principal	`cn=Directory Manager`
Credential	`Welcome1`
Confirm Credential	`Welcome1`
User Base DN	`dc=example,dc=com`
User Name Attribute	`uid`
Group Base DN	`dc=example,dc=com`
Static Group Name Attribute	`cn`

   Note: Any fields not mentioned should be left at their default values.

5. Adjust the authentication provider processing order and control flags.
   a. Use the breadcrumbs (at the top of the administration console) to return to the Authentication Providers table.

   b. Click the **Reorder** button.
   c. Select providers and use the arrow buttons ( ) to put the authentication providers in the following order:
      – CompanyLDAP
      – DefaultAuthenticator
      – DefaultIdentityAsserter
   d. Once the order is correct, click **OK**.
   e. In the Authentication Providers table, click the **CompanyLDAP** provider.
   f. Ensure that the **Configuration > Common** tabs are selected.
   g. Set the **Control Flag** to **Sufficient**.
   h. Click **Save**.
   i. Similarly, edit **DefaultAuthenticator** and set its **Control Flag** to **Sufficient** as well. Save that change.
   j. In the Change Center, click **Activate Changes**.

   Note: Notice the message that some items must be restarted. You need to stop and start all servers that are running. (The admin server and the managed servers need to access the new external LDAP.)
6. Navigate to the practice folder and execute the following script to disable the user cache.

```
$ cd /practices/part1/practice16-01
$ ./disable_cache.sh
```

7. Stop all the managed servers.
   a. In the Domain Structure, expand **Environment** and then select **Servers**.
   b. On the right, click the **Control** tab.
   c. Select the check box next to any managed server that is running. Click the **Shutdown** button and select **Force Shutdown Now**. When asked to confirm, click **Yes**.
   d. Wait a moment and refresh the screen. Ensure that the “State” column in the table confirms that all managed servers are shut down.

8. Stop and restart the administration server.
   a. Connect to host01.
   b. Find the Terminal window in which the admin server is running.
   c. Press **Ctrl + C** in the admin server window.

   Note: This has the same effect as Force Shutdown Now.
   d. Use the up arrow to bring back the command issued to start the admin server, and start it again.
      ```
      $ ./startWebLogic.sh
      ```
9. Access the WebLogic Server administration console again.
10. Restart all the managed servers in cluster2.
    a. In the Domain Structure, expand **Environment** and then select **Clusters**.
    b. Click on the name of **cluster2**.
    c. Click the **Control** tab.
    d. Select the check box next to all the managed servers in cluster2. Click the **Start** button. When asked to confirm, click **Yes**.
    e. Wait a moment and refresh the screen. Ensure that the “State” column in the table confirms that all these managed servers are RUNNING.
11. Deploy and start an application that uses role-based security. This application uses its deployment descriptors to:
    - Define a role called `manager`.
    - Protect certain resources, which only users in the `manager` role are allowed to access.
    - Map the `manager` role to a principal called `boss`.

    Therefore, any user in the `boss` group should be allowed to access the protected resources.
    a. Open a new Terminal window on host01 and navigate to the current practice directory. Copy the new application to the domain's application directory.
       ```
       $ cd /practices/part1/practice16-01
       $ cp timeoff.war /u01/domains/part1/wlsadmin/apps
       ```
    b. Return to the web browser running the admin console.
    c. In the Change Center, click **Lock & Edit**.
    d. In the Domain Structure, select **Deployments**.
    e. Above the Deployments table, click **Install**.
    f. Using the links, navigate to:
       `host01.example.com/u01/domains/part1/wlsadmin/apps`
    g. Select the option button in front of **timeoff.war** and click **Next**.
    h. Ensure that **Install this deployment as an application** is selected. Click **Next**.
    i. Select **cluster2**. Ensure that **All servers in the cluster** is selected. Click **Next**.
    j. Do not change any optional settings. Click **Next**.
    k. Select **No, I will review the configuration later**. Click **Finish**.
    l. In the Change Center, click **Activate Changes**.
    m. Return to the Deployments table. Select the check box in front of the **timeoff** application.

n. Click **Start** and select **Servicing all requests**. Click **Yes**.

o. Ensure the state of the timeoff application is now "Active."

p. Close the web browser. If any other web browsers are open, close them, too.

Why? You do not want to be logged in to anything.

12. Use the new application. Log in as a user that does not have the correct role to access the protected resources.

a. Open the web browser.

b. In the web browser, enter the URL to access the new timeoff application:

`http://host01.example.com:7777/timeoff`

c. The timeoff application opens.

d. Click the **Request Time Off** link.

e. Fill out the form and click the **Submit Report** button.

f. Click the **Back to Home Page** link.

Note: This part of the application is not protected, so it is open to anyone.

g. Now try the **Close an Office** link.

h. When the "Log In" page displays, enter the username and password of the non-manager and then click **Log In**.

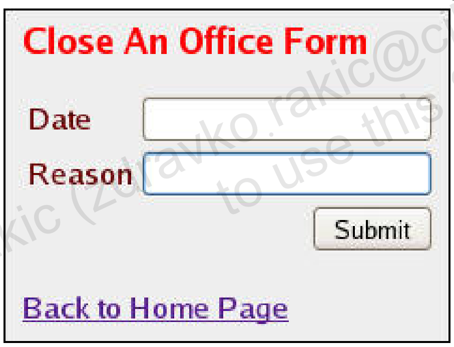
– **User Name:** `larryf`

– **Password:** `Welcome1`

i. Since Larry does not have the correct role, you get an error.

j. Close the web browser.

13. Use the new application again. This time, log in as a user that does have the correct role to access the protected resources.
    a. Open the web browser.
    b. In the web browser, enter the URL to access the new timeoff application:
    `http://host01.example.com:7777/timeoff`
    c. The timeoff application opens.
    d. Click the **<u>Close an Office</u>** link.
    e. When the "Log In" page displays, enter the username and password of the manager and then click **Log In**.
       – **User Name:** **`moeh`**
       – **Password:** **`Welcome1`**
    f. This time, because Moe is a manager, you are taken to the "Close an Office Form."



Note: The user Moe (`uid: moeh`) was placed in the `boss` group. The `boss` principal was mapped to the role `manager` by the application's deployment descriptor. The protected resources (particular pages in the web application) allow the role `manager` to have access.

    g. Enter a **Date** and a **Reason** and click the **Submit Form** button.
    h. On the next page, click the **<u>Back to Home Page</u>** link.
    i. Close the web browser.

Practice Solution: Configuring an Authentication Provider

Perform the following tasks if you did not do this practice and want to use the finished solution.

Assumptions

You completed “Practice 13-2: Configuring a Cluster Proxy.”

The administration server and the four servers in the dynamic cluster are currently running.

OHS is running.

Solution Tasks

1. Connect to host02.

   Note: Notice that this is host02, not host01.
2. Run the solution script.
   a. In a Terminal window, run the solution script.

      ```
      $ cd /practices/part1/practice16-01
      $ ./solution.sh
      ```

   Note: This script runs an executable under the `bin` directory of the LDAP server that imports users and a group. It then calls another executable that starts the LDAP server. Next, it calls a WLST script that creates the external LDAP authentication provider within the domain. Finally, it calls two more scripts: one stops all the servers in cluster2, the next starts them up again. (Servers must be rebooted for the authentication provider changes to take effect.) Stopping and starting the servers can take a while, so be patient.

   b. Close the Terminal window.
3. Connect to host01. Run a script to deploy an application to the dynamic cluster. Then stop and restart the administration server.
   a. In a Terminal window, run the deployment script.

      ```
      $ cd /practices/part1/practice16-01
      $ ./deploy.sh
      ```

   Note: If you get the WLContext.close() warning, ignore it.

   b. Close the Terminal window.

   c. Find the window in which the admin server is running. Press **Ctrl + C**.

   d. Once the server has stopped, use the up arrow to bring back the last command entered (`startWebLogic.sh`). Press enter to run it.

      ```
      $ ./startWebLogic.sh
      ```

   Note: If you do not have a boot identity file, when prompted, enter the username and password (**`weblogic`** and **`Welcome1`**).

   e. Wait for the server to indicate it is in RUNNING mode.