Estimated time 1:45

# WebSphere Virtual Enterprise: Dynamic operations for WebSphere endpoints

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# What this exercise is about

The objective of this lab is to provide you with an understanding of how to configure Extended Deployment for dynamic application placement.

# Lab requirements

This lab assumes that this setup is complete before starting the lab. If you do not have this environment set up, first complete the Installation lab exercise, and then run the scripts specified in Part 1 of this exercise:



- The lab requires three machines: hostA, hostB, and hostC
- Deployment manager, on-demand router (ODR) node, ODR and the stress tool are installed on hostA
- HostB and HostC each contain a managed node that has been federated into HostA's cell.
- In a production environment the deployment manager should not be on the same node as the on-demand router. It will normally be on a machine by itself, though it could be co-located with an application server node.

# What you should be able to do

At the end of this lab you should be able to:

- Configure WebSphere Extended Deployment to perform application placement
  - o Configure node groups, dynamic clusters, service policies, transaction classes
- Test application server placement using a stress tool and verify it by studying the visualization charts in the administrative console

# Introduction

Application Server placement is a powerful feature of WebSphere Extended Deployment. Extended Deployment allows applications to be virtually present in a 'cluster', much like the virtual memory in an operating system

Once the application server is defined so that applications are completely mobile, the placement of applications is influenced by operational policies and node processor utilization, and the work will be routed to the application by an intelligent workload manager. A policy is a collection of expressions that inform a decision maker of the criteria to be used in order to make decisions. In Extended Deployment, operational policy consists of two main classes: service policies and transaction classes, which are used to categorize work. The work, before being performed, has its operation policy read by the on demand router in order to determine the proper flow of work for completion, given the available server resource. Service policies are the main building blocks of the operational policy.

Visualization in Extended Deployment allows you to see a visual representation of the operations occurring in the system environment. You can drill down to more specific views from the operation center on your desktop. By configuring filters you can create customized charting, and navigate your chart views depending on your preference settings.

In this lab, you will install a sample application with four Web modules. The mapping that you will create between the Web modules, dynamic clusters, service policies and transaction classes is shown in table below:

Dynamic cluster	Web module	Transaction class	Service policy
StockTrade_DC	StockTrade	StockTrade_TC	Platinum_SP
StockTrade_DC	StockQuery	StockQuery_TC	Bronze_SP
AccountManagement_DC	AccountManagement	AccountManagement_TC	Silver_SP
FinancialAdvice_DC	FinancialAdvice	FinancialAdvice_TC	Gold_SP

The goals that you will create for the service policies are shown below. Note that the Bronze service policy has the worst response time goal and is mapped to the StockQuery Web module. The Platinum service policy which is mapped to StockTrade Web module has the best response time goal.

Service Policy	Goal	Importance
Platinum_SP	1250ms	highest
Gold_SP	1500ms	high
Silver_SP	2 sec	medium
Bronze_SP	3 sec	low

# **Exercise instructions**

This exercise assumes you have created a deployment manager, the application server nodes, the HostANode01, and the ODR server within the HostANode01, using this course's installation lab. If your environment is different, you may adjust the instructions to match your installation (for example, host and node names).

Some instructions in this lab may be Windows<sup>®</sup> operating-system specific. If you plan on running the lab on an operating-system other than Windows, you will need to run the appropriate commands, and use appropriate files ( .sh versus .bat) for your operating system. The directory locations are specified in the lab instructions using symbolic references, as follows:

Reference variable	Windows location	AIX <sup>®</sup> or UNIX <sup>®</sup> location
<was_home></was_home>	C:\WebSphere\AppServer	/usr/WebSphere/AppServer
		/opt/WebSphere/AppServer
<lab_files></lab_files>	C:\LabFilesXD	/tmp/LabFilesXD
<lab_name></lab_name>	PlacementLab	PlacementLab

**Note for Windows users**: When directory locations are passed as parameters to a Java program such as EJBdeploy or wsadmin, it is necessary to replace the backslashes with forward slashes to follow the Java convention. For example, C:\LabFilesXD\ would be replaced by C:/LabFilesXD/

# Part 1: Create an on-demand router

The "Lab requirements" section of this lab shows a multi-machine environment that is required to complete the exercise. This section will walk you through creating such an environment, provided that you have already completed the installation lab exercise.

- \_\_\_\_\_1. Start the Deployment Manager.
  - \_\_\_\_a. On **hostA**, open a command prompt.
  - \_\_\_\_b. Change directories to C:\WebSphere\AppServer\profiles\dmgr\bin.
  - \_\_\_\_ c. Enter this command to start the Deployment Manager: startManager.
  - \_\_\_\_d. Wait for the deployment manager to start. Verify that this line appears in the Command Prompt window.
    - ADMU3000I: Server dmgr open for e-business; process id is XXXX
  - \_\_\_\_2. Start the HostANode01's node agent.
    - \_\_\_\_a. Change directories to C:\WebSphere\AppServer\profiles\HostANode01\bin.
    - \_\_\_\_b. Enter this command to start the node agent on the ODR node: startNode
  - 3. WebSphere Extended Deployment provides a script (createodr.jacl) that automatically creates an on-demand router named 'odr'. Run it to create an on-demand router for this lab exercise.
    - \_\_\_\_a. On hostA, Open a command prompt.
    - \_\_\_\_b. Change directories to C:\WebSphere\AppServer\bin.
    - \_\_\_\_ c. Enter this command to create an on-demand router server on node HostANode01:

#### wsadmin -f createodr.jacl hostANode01

```
C:\WebSphere\AppServer\bin>wsadmin -f createodr.jacl HostANode01
WASX7209I: Connected to process "dmgr" on node wsbeta156CellManager01 using SOAP
connector; The type of process is: DeploymentManager
WASX7303I: The following options are passed to the scripting environment and are
available as argument that is stored in the argv variable: "[HostANode01]"
createodr: checking for existence of node HostANode01
createodr: checking to see if server odr is already configured on node HostANode01
createodr: checking to see if the nodeagent server mbean is available
createodr: Node type verified as an XD node
createodr: checking for the existence of a NodeSync MBean on node HostANode01
createodr: creating a server odr .....
createodr: saving the configuration
createodr: Invoking synchronization for node WebSphere:platform=common,cell=wsbe
ta156Cell01,version=6.0.2.5,name=nodeSync,mbeanIdentifier=nodeSync,type=NodeSync
,node=HostANode01,process=nodeagent because serverStartupSyncEnabled is set to
false
createodr: Done with synchronization.
Createodr: done.
```

Note: This script will create an on-demand router that listens for incoming HTTP requests on port 80. Ensure that your system is not running a Web server or other process that is also listening on port 80.

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If a server named odr already exists on this node, you will see the message:

createodr: checking for existence of node HostANode01 createodr: checking to see if server odr is already configured on node HostANode01 createodr: Error -- Server odr already configured on node HostANode01

# Part 2: Start the server processes

You can start the remote node agents using the procedures below, or by using the procedures described in Appendix A – Starting a middleware node from the administrative console on page 47.

- 4. Start the hostANode01's node agent, if it is not already running. (it should already be running.)
  - \_\_\_\_a. On hostA, change directories to C:\WebSphere\AppServer\profiles\hostANode01\bin.
  - \_\_\_\_b. Enter this command to start the node agent on the ODR node: startNode
- \_\_\_\_5. Start the on-demand router (ODR) server.
  - \_\_\_\_a. On hostA, change directories to C:\WebSphere\AppServer\profiles\HostANode01\bin.
  - \_\_\_\_b. Enter this command to start the on-demand router on the ODR node: startServer odr
- 6. Start the node agent on hostBNode01, if it is not already running. (it should already be running.)
  - \_\_\_\_a. On **hostB**, open a command prompt.
  - \_\_\_\_b. Change directories to C:\WebSphere\AppServer\profiles\hostBNode01\bin
  - \_\_\_\_ c. Enter this command to start the node agent : startnode
  - \_\_\_\_d. Wait for the node agent to start. Verify that this line appears in the Command Prompt window. ADMU3000I: Server nodeagent open for e-business; process id is XXXX
- 7. Start the node agent on hostCNode01, if it is not already running (it should already be running.)
  - \_\_\_\_a. On hostC, open a command prompt
  - \_\_\_\_b. Change directories to C:\WebSphere\AppServer\profiles\hostCNode01\bin
  - \_\_\_\_ c. Enter this command to start the node agent : startnode
  - \_\_\_\_d. Wait for the node agent to start. Verify that this line appears in the Command Prompt window. ADMU30001: Server nodeagent open for e-business; process id is XXXX

# Part 3: Create node group and configure dynamic clusters

- 8. Open the administrative console.
  - \_\_\_\_a. On hostA, open a Web browser.
  - \_\_\_\_b. Enter the URL: http://localhost:9060/ibm/console.
  - \_\_\_\_ c. Enter a user ID of your choice and click Log In.
  - \_\_\_ 9. Create a node group.
    - \_\_\_\_a. In the administrative console, expand System Administration
    - \_\_\_\_ b. Click Node Groups.
    - \_\_\_ c. Click New.
    - \_\_\_\_ d. Enter a name of StockNodeGroup.

General Properties * Name StockNodeGroup	The additional properties will not be available until the general properties for this item are applied or saved. Additional Properties
Description	<ul><li>Custom properties</li><li>Node group members</li></ul>
Apply OK Reset Cancel	

\_\_\_e. Click OK.

\_\_\_\_\_f. The new node group should now appear in your list of node groups.

New	New Delete				
D					
Select	Name 🛟	Members 🗘	Description 🗘		
	DefaultNodeGroup	4	WebSphere Default Node Group.		
	StockNodeGroup	0			
Total	2		Total 2		

- \_\_\_\_g. Click **StockNodeGroup** to edit the properties of your new Node Group.
- \_\_\_h. Under Additional properties, click Node group members.
- \_\_\_\_ i. Click the **Add** button.

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- \_\_\_\_j. Check the boxes next to **hostBNode01** and **hostCNode01** from the Available Node list and click **Add** to make them members of StockNodeGroup.
- 10. Save the changes
  - \_\_\_\_a. Click **Review** in the messages area (or under the System Administration menu).
  - \_\_\_\_b. On the Save panel, select the check box **Synchronize changes with Nodes.**
  - \_\_\_ c. Click Save.

<u>Node groups</u> > <u>StockNodeGroup</u> > <u>Node group members</u> > Save
Save your workspace changes to the master configuration
Click Save to update the master repository with your changes. Click Discard to discard your changes and begin work again using the master repository configuration. Click Cancel to continue working with your changes.
Total changed documents: 1
Synchronize changes with Nodes
Save Discard Cancel

- \_\_\_\_ d. Click **OK** when the synchronization operation completes.
- \_11. Create three dynamic clusters: StockTrade\_DC, AccountManagement\_DC and FinancialAdvice\_DC, mapped to the node group that was created in the previous step. First, create the dynamic cluster StockTrade:
  - \_\_\_\_a. Expand Servers. Click Dynamic clusters.
  - \_\_\_ b. Click New.

- \_\_\_\_ c. In Step 1, accept default server type WebSphere Application
  - Server

Create a new dynamic cluste	r ?
Create a new dynamic clus	;ter
<ul> <li>Step 1: Select a dynamic cluster server type</li> <li>Step 2: Select the membership method</li> <li>Step 3: Define dynamic cluster members</li> <li>Step 4: Select a dynamic cluster template</li> <li>Step 5: Specify dynamic cluster</li> </ul>	Select a dynamic cluster server type Server type WebSphere application server 🍽
specific properties Step 6: Summary	
Next Cancel	

- \_\_\_ d. Click NEXT
- \_\_\_\_e. In Step 2 Enter the name StockTrade\_DC.



\_\_\_f. Click Next.

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\_\_\_\_ g. Overtype the "DefaultNodeGroup" setting with "StockNodeGroup". Click Preview membership to verify you have typed the information correctly and then click Close on the preview window.

	Step 1: Select a	Define dynamic cluster members
<b>→</b>	dynamic cluster server type Step 2: Select the membership method Step 3: Define dynamic cluster members Step 4: Select a dynamic cluster template Step 5: Specify dynamic cluster specific properties	Edit rule [ Subexpression builder ] [ Syntax help ] Membership policy node_nodegroup = 'StockNodeGroup' AND node_property\$com.ibm.websphere.wxdopProductSho rtName = 'WXDOP' [ Preview membership ]
	Step 6: Summary	
F	Previous Next (	Cancel
	:er	Membership policy preview
	Define dynami	Dynamic cluster members are created on the following nodes.

er	Membership policy preview	
Define dynami Edit rule [ <u>Subexpress</u> Membership node_node node_prop rtName = ''	Dynamic cluster members are created on the following nodes. Total 2	
[ Preview me		

- \_\_\_\_h. Click **Next** on the next three windows.
- \_\_\_\_i. Click **Finish** on the Summary panel.
- \_\_\_\_ 12. Now, create the dynamic clusters: AccountManagement and FinancialAdvice.
  - \_\_\_\_a. Click **New** to create the AccountManagement dynamic cluster.
  - \_\_\_\_b. In Step 1, accept default server type WebSphere Application Server
  - \_\_\_\_ c. In Step 2, Enter the name as AccountManagement\_DC.
  - \_\_\_\_ d. In Step 3, ensure the Membership policy is
    - "node\_nodegroup='StockNodeGroup'"

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- \_\_\_\_e. Click **Next** on this panel and subsequent two panels (take defaults).
- \_\_\_\_f. Click **Finish** on the Summary panel.
- \_\_\_\_g. Click New to create the FinancialAdvice dynamic cluster.
- \_\_\_h. In Step 1, accept default server type WebSphere Application Server
- \_\_\_\_\_i. In Step 2, Enter the name as FinancialAdvice\_DC.
- \_\_\_\_j. In Step 3, ensure the Membership policy is
  - "node\_nodegroup='StockNodeGroup'"
- \_\_\_\_k. Click **Next** on this panel and subsequent two panels (take defaults).
- I. Click Finish on the Summary panel. Notice that the node groups all default to manual operational mode. That means Extended Deployment will take no action on its own or make any recommendations. Later you will change this to Automatic.

New	New Delete Manual V Set Mode			
Q				
Select	Name 🛟	Туре 🗘	Operational mode 🗘 👲	
	AccountManagement DC	WebSphere application server	🔯 Manual	
	FinancialAdvice DC	WebSphere application server	🔯 Manual	
	StockTrade_DC_	WebSphere application server	🔯 Manual	
Total	Total 3			

- \_\_\_\_ 13. Save the changes.
  - \_\_\_\_a. Click **Review** in the Messages area.
  - \_\_\_\_ b. On the Save panel, make sure that the check box Synchronize changes with Nodes is selected.
  - \_\_ c. Click Save.
  - \_\_\_\_ d. Click **OK** when the sync operation completes.
- 14. WebSphere Extended Deployment uses a conservative algorithm to determine how many servers will fit on a particular machine. To minimize the possibility of swapping, the placement controller assumes twice the maximum memory defined for a given server. The lab machines may have less RAM than is ideal for this exercise. To ensure that the servers can all be started on each machine, you need to change the maximum heap size for the dynamic cluster server templates to 128M. Changes made to a dynamic cluster template are automatically propagated to all servers in the dynamic cluster. First change the maximum heap size for the StockTrade dynamic cluster's server template. Also set Initial Heap size to 128.
  - \_\_\_\_a. Expand Servers. Click Dynamic Clusters.
  - \_\_\_\_b. Click StockTrade\_DC.
  - \_\_\_\_ c. Under Additional Properties, click **Server Template.**

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- \_\_\_\_d. Under Server Infrastructure, expand Java and Process Management, click Process Definition.
- \_\_\_\_e. Under Additional Properties, click Java Virtual Machine.
- \_\_\_\_\_f. In the Configuration Page, set the Initial Heap Size and Maximum Heap Size to 128.

Initial Heap Size	
128	
Maximum Heap Size	
128	

- \_\_\_ g. Click **OK.**
- 15. Now, you need to change the heap sizes for the AccountManagement\_DC and FinancialAdvice\_DC dynamic clusters' server templates.
  - \_\_\_\_ a. From the administrative console, select Dynamic Clusters > AccountManagement\_DC >Server Template > Java and Process Management > Process Definition >Java Virtual Machine.
  - \_\_\_\_b. In the configuration page, change the initial heap size and maximum heap size to **128.** Click **OK**.
  - \_\_\_\_ c. From the administrative console, select **Dynamic Clusters > FinancialAdvice\_DC >Server Template > Java and Process Management > Process Definition >Java Virtual Machine.**
  - \_\_\_\_\_d. In the configuration page, change the initial heap size and maximum heap size to **128.** Click **OK**.
  - \_\_\_\_16. Save the changes.
    - \_\_\_\_a. Click **Review** in the messages area.
    - \_\_\_\_ b. On the Save panel, make sure that the check box Synchronize changes with Nodes is selected.
    - \_\_\_ c. Click Save.
    - \_\_\_\_ d. Click **OK** when the sync operation completes.

# Part 4: Install the XDStock application

- \_\_\_\_\_17. Install the XDStock application.
  - \_\_\_\_a. In the Navigation panel, expand **Applications** and click **Install new application**.
  - \_\_\_\_b. Next to Local file system, click **Browse** to open c:\LabFilesXD\PlacementLab\XDStock.ear.
  - \_\_\_ c. Click Next.
  - \_\_\_\_\_d. On the Select Installation Options panel, click Next.
  - \_\_\_\_e. Click Step 2 Map modules to servers.
  - \_\_\_\_\_f. From the Clusters and Servers list, select the cluster **StockTrade\_DC.** From the Module list, select the modules **StockTrade** and **StockQuery**.

Map modules to servers				
Specify targets such as application servers or clusters of application servers where you want to install the modules contained in your application. Modules can be installed on the same application server or dispersed among several application servers. Also, specify the Web servers as targets that will serve as routers for requests to this application. The plug-in configuration file (plugin-cfg.xml) for each Web server is generated based on the applications which are routed through it.				
Clus Web Web Web	Clusters and Servers: WebSphere: cell=StockTradeCell, cluster=StockTrade_DC WebSphere: cell=StockTradeCell, cluster=FinancialAdvice_DC WebSphere: cell=StockTradeCell, cluster=AccountManagement_DC WebSphere: cell=StockTradeCell, node=ODRNode, server=odr Apply			
Ø				
Selec	t Module	URI	Server	
	StockTrade	StockTrade.war,WEB- INF/web.xml	WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	
	StockQuery StockQuery.war,WEB- INF/web.xml		WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	
	AccountManagement	AccountManagement.war,WEB- INF/web.xml	WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	
	FinancialAdvice	FinancialAdvice.war,WEB- INF/web.xml	WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	

\_\_\_ g. Click Apply.

\_\_\_h. From the Cluster list, select the cluster **FinancialAdvice\_DC**. From the Module list, select the module **FinancialAdvice**.

#### Map modules to servers

Specify targets such as application servers or clusters of application servers where you want to install the modules contained in your application. Modules can be installed on the same application server or dispersed among several application servers. Also, specify the Web servers as targets that will serve as routers for requests to this application. The plug-in configuration file (plugin-cfg.xml) for each Web server is generated based on the applications which are routed through it.

Clusters and Servers: WebSphere:cell=StockTradeCell,cluster=StockTrade_DC WebSphere:cell=StockTradeCell,cluster=FinancisIAdvice_DC WebSphere:cell=StockTradeCell,cluster=AccountManagement_DC WebSphere:cell=StockTradeCell,node=ODRNode,server=odr Apply				
Select	Module	URI	Server	
	StockTrade	StockTrade.war,WEB- INF/web.xml	WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	
	StockQuery	StockQuery.war,WEB- INF/web.xml	WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	
AccountManagement AccountManagement.war,WE			WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	
•	FinancialAdvice	FinancialAdvice.war,WEB- INF/web.xml	WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	

\_\_\_ i. Click Apply.

\_\_\_\_j. From the Cluster list, select the cluster AccountManagement\_DC. From the Module list, select the module AccountManagement.

Map modules to servers				
Specify targets such as application servers or clusters of application servers where you want to install the modules contained in your application. Modules can be installed on the same application server or dispersed among several application servers. Also, specify the Web servers as targets that will serve as routers for requests to this application. The plug-in configuration file (plugin-cfg.xml) for each Web server is generated based on the applications which are routed through it.				
Cluste WebS WebS WebS	Clusters and Servers: WebSphere:cell=StockTradeCell,cluster=StockTrade_DC WebSphere:cell=StockTradeCell,cluster=FinancialAdvice_DC WebSphere:cell=StockTradeCell,cluster=AccountManagement_DC WebSphere:cell=StockTradeCell,node=ODRNode,server=odr			
D	6		K	
Select	Module	URI	Server	
	StockTrade	StockTrade.war,WEB- INF/web.xml	WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	
	StockQuery	StockQuery.war,WEB- INF/web.xml	WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	
	AccountManagement AccountManagement.war,WEB-		WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	
	FinancialAdvice	FinancialAdvice.war,WEB- INF/web.xml	${\tt WebSphere:cell=StockTradeCell,cluster=FinancialAdvice\_DC}$	

\_\_\_\_k. Click Apply.

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## \_\_\_\_I. Verify that your modules mapping table looks like the screen capture below.

Select	Module	URI	Server	
	StockTrade	StockTrade.war,WEB- INF/web.xml	WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	
	StockQuery	StockQuery.war,WEB- INF/web.xml	WebSphere:cell=StockTradeCell,cluster=StockTrade_DC	
	AccountManagement	AccountManagement.war,WEB- INF/web.xml	${\tt WebSphere:cell=StockTradeCell, cluster=AccountManagement\_DC}$	
	FinancialAdvice	FinancialAdvice.war,WEB- INF/web.xml	WebSphere:cell=StockTradeCell,cluster=FinancialAdvice_DC	

- \_\_ m. Click Step 7 Summary.
- \_\_\_ n. On the Summary panel, click **Finish**.
- \_\_\_\_ o. Once the installation completes, click **Review.**.
- \_\_\_\_p. Make sure that **Synchronize changes with nodes** is selected and click **Save**.
- \_\_\_\_ q. Click **OK** when the sync operation completes.

# Part 5: Create operational policies

Next, you will create operational policies, which drives the decisions of the on-demand router (proxy server). Operational policies are made up of service policies and transaction classes. These policies determine how requests are managed by WebSphere. For this lab exercise, you will create service policies and transaction classes. The mapping between the transaction classes and Web modules is depicted in table below. The mapping between service policies and transaction classes is also depicted in the table.

Dynamic cluster	Web module	Transaction class	Service policy
StockTrade_DC	StockTrade	StockTrade_TC	Platinum_SP
StockTrade_DC	StockQuery	StockQuery_TC	Bronze_SP
AccountManagement_DC	AccountManagement	AccountManagement_TC	Silver_SP
FinancialAdvice_DC	FinancialAdvice	FinancialAdvice_TC	Gold_SP

You will now create the service policies Platinum\_SP, Gold\_SP, Silver\_SP and Bronze\_SP. The service policy goals are depicted in table below:

Service policy	Goal	Importance
Platinum_SP	1250ms	highest
Gold_SP	1500ms	high
Silver_SP	2 sec	medium
Bronze_SP	3 sec	low

- \_\_\_\_\_18. Create the Service policy Platinum\_SP.
  - \_\_\_\_a. In the Navigation panel, expand **Operational policies** and click **Service policies**.
  - \_\_\_\_\_b. Click **New** to create a new service policy.

\_\_\_\_ c. Enter the name as **Platinum\_SP**. Select **Average Response Time** from the Goal Type box.

→ Step 1: Define	Define service policy general properties
general properties	* Name
Step 2: Define service policy goal	Platinum_SP Description
Step 3: Define service policy memberships	
Step 4: Confirm service policy creation	Goal Type Average Response Time Average Response Time Percentile Response Time
Next Cancel	Discretionary Completion Time

- \_\_\_ d. Click Next
- \_\_\_\_\_e. Enter the Goal Value as **1250 milliseconds.** Select the Importance as **Highest**. Check "Monitor for persistent service policy violations". Set Time Period Value to **30 Seconds**, which indicates to Dynamic Operations that service policy violations must occur for 30 seconds consecutively before a policy violation task is generated.

Step 1: Define	Define service policy goal properties
<ul> <li>Step 2: Define service policy goal properties</li> <li>Step 3: Define service policy memberships</li> </ul>	Goal Value     1250     Milliseconds     Milliseconds     Monitor for persistent service policy violations     Create a sustime tack when the following
Step 4: Confirm service policy creation	Create a runtime task when the runtowing condition is observed. Goal Delta Value O Time Period Value 20 Seconds
Previous Next	Cancel

#### \_\_\_f. Click Next.

\_\_\_\_ g. In the Memberships panel, note there is a default transaction class that appears, and it cannot be removed; you will add a specific transaction class later. For now, click **Next** to accept the default.

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	Step 1: Define	Define service policy memberships		
→	service pointy general properties Step 2: Define service policy goal properties Step 3: Define service policy memberships Step 4: Confirm service policy creation	A default transaction class is defined for the service policy. Additional transaction classes are necessary only if you need to chart metrics at a fine-grained request level. Members of <b>Platinum_SP</b> : Default_TC_Platinum_SP         New         Remove		
	Previous Nert Canc	el		

\_\_\_h. In the Confirmation panel, click Finish.

	Step 1: Define	Confirm service policy creation		
	service policy general properties Step 2: Define	The following is a summary of your selections. Click <b>Finish</b> to complete the service policy creation. If there are settings you want to change, click <b>Previous</b> to review the service policy settings.		
	properties	The following actions will be performed:		
	Step 3: Define service policy memberships	A new service policy "Platinum_SP" will be created with an average response time service goal of "1250 Milliseconds" with an importance of "Highest". The new service policy will contain the following transaction classes: "Default_TC_Platinum_SP". A runtime task will be created when the Goal Value is exceeded by "O Seconds" for "30 Seconds".		
<b>→</b>	Step 4: Confirm service policy creation			
	Previous Fin the Cancel			

- \_ 19. Create the Gold\_SP, Silver\_SP, and Bronze\_SP service policies.
  - \_\_\_\_a. Click **New** to create a new service policy.
  - \_\_\_\_b. Enter the name as **Gold\_SP**. Select **Average Response Time** from the Goal Type box.
  - \_\_\_ c. Click Next.
  - \_\_\_\_\_d. Enter the Goal Value as **1500 milliseconds.** Enter the Importance as **High.** Check "Monitor for persistent service policy violations". Set Time Period Value to **30 Seconds**
  - \_\_\_e. Click Next.
  - \_\_\_\_f. In the Memberships panel, select Next.
  - \_\_\_\_g. In the Confirmation panel, click **Finish**.
  - \_\_\_\_h. Click **New** to create a new service policy.
  - \_\_\_\_\_i. Enter the name as **Silver\_SP**. Select **Average Response Time** from the Goal Type box.
  - \_\_\_ j. Click Next.

Lab exercise: Dynamic operations for WebSphere endpoints

- \_\_\_\_ k. Enter the Goal Value as 2 seconds. Enter the Importance as Medium. Check "Monitor for persistent service policy violations". Set Time Period Value to 30 Seconds
- \_\_ I. Click Next.
- \_\_\_\_m. In the Memberships panel, select Next.
- \_\_\_\_n. In the Confirmation panel, click **Finish**.
- \_\_\_\_ o. Click **New** to create a new service policy.
- \_\_\_\_p. Enter the name as **Bronze\_SP**. Select **Average Response Time** from the Goal Type box.
- \_\_\_ q. Click Next.
- \_\_\_\_ r. Enter the Goal Value as 3 seconds. Enter the Importance as Low. Check "Monitor for persistent service policy violations". Set Time Period Value to 30 Seconds
- \_\_\_ s. Click Next.
- \_\_\_\_\_t. In the Memberships panel, select Next.
- \_\_\_\_ u. In the Confirmation panel, click **Finish**.

## Service Policies

#### Service Policies

I∓I Preferences

A Service Policy defines a business goal and an importance, and contains one or more Transaction Classes. The Service Policies define an Operational Policy which is used by a component in the Proxy Server to categorize and filter work in the queue.

_					
New	New Delete				
D					
Select	Name 🛟	Importance 🗘	Goal 🗘	Description 🗘	
	Bronze SP	Low	Avg response 3 Seconds		
	Default SP		Discretionary		
	Gold SP	High	Avg response 1500 Milliseconds		
	<u>Platinum SP</u>	Highest	Avg response 1250 Milliseconds		
	Silver SP	Medium	Avg response 2 Seconds		
Total 5					

- \_\_\_\_ 20. Save the changes.
  - \_\_\_\_a. Click **Review** in the messages area.
  - \_\_\_\_ b. On the Save panel, make sure that the check box Synchronize changes with Nodes is selected.
  - \_\_\_ c. Click Save.
  - \_\_\_\_\_d. After the save completes, click **OK**.

- \_ 21. Next you will create the Transaction classes. First, create the Transaction class StockTrade\_TC and map it to the Web module StockTrade:
  - \_\_\_\_a. In the Navigation panel, expand **Operational Policies** and click **Service Policies**.
  - \_\_\_\_b. Click **Platinum\_SP**.
  - \_\_\_\_ c. In the transaction classes area, click **New** to create a new transaction class. (Note that a default transaction class already appears in the window and can be ignored.)

Transaction Classes					
Specify the transaction classes to associate with this service policy. To associate transaction classes with work classifications, navigate to Enterprise Applications, and click on the specific application to display the application properties, then select the Service Policies tab.					
Classify application requests with work classes					
Members of Platinum_SP:					
Default_TC_Platinum_SP	New Remove Modify Move				

\_\_\_\_d. Enter StockTrade\_TC as the Name.

$\rightarrow$	Step 1: Define	Define transaction class general properties			
	general properties	Create a new transaction class for service policy "Platinum_SP".			
	Step 2: Confirm transaction class creation	* Name StockTrade_TC			
		Description			
N	ext Cancel				

- \_\_\_e. Click Next.
- \_\_\_ f. On the confirmation panel, click Finish

Create a new transaction class							
Create a new transaction class. Define the general properties and associate enterprise application URIs to the transaction class.							
Step 1: Define transaction class	Confirm transaction class creation						
general properties → Step 2: Confirm transaction class	The following is a summary of your selections. Click <b>Finish</b> to complete the transaction class creation for service policy "Platinum_SP". If there are settings you wish to change, click <b>Previous</b> to review transaction class settings.						
creation	The following actions will be performed:						
	A new transaction class "StockTrade_TC" will be created.						
Previous Finish Cancel							

\_\_\_\_g. Click **OK** on the Platinum\_SP Service Policy Configuration page.

Transation Classes						
Transaction classes						
Specify the transaction classes to associate with this service policy. To associate transaction classes with work classifications, navigate to Enterprise Applications, and click on the specific application to display the application properties, then select the Service Policies tab.						
Classify application requests with work c	Idsses					
Members of Platinum_SP:	_					
StockTrade_TC						
Default_TC_Platinum_SP						
	New Remove Modify Move					
l						

- Apply OK Reset Cancel
- 22. Create transaction classes for StockQuery\_TC, AccountManagement\_TC and FinancialAdvice\_TC Web modules.
  - \_\_\_\_a. Click on the **Bronze\_SP** service policy.
  - \_\_\_\_b. In the Memberships area, click **New** to create a new transaction class.
  - \_\_\_\_ c. Enter **StockQuery\_TC** as the Name and click **Next**.
  - \_\_\_\_ d. On the Confirmation panel, click **Finish**.
  - \_\_\_\_e. Click **OK** on the Bronze\_SP Service Policy Configuration.
  - \_\_\_\_\_f. Click on the **Silver\_SP** service policy.
  - \_\_\_\_g. In the Memberships area, click **New** to create a new transaction class.
  - \_\_\_\_h. Enter AccountManagement\_TC as the Name and click Next.
  - \_\_\_\_ i. On the Confirmation panel, click **Finish**.

Lab exercise: Dynamic operations for WebSphere endpoints

- \_\_\_\_j. Click **OK** on the Silver\_SP Service Policy Configuration.
- \_\_\_\_k. Click on the Gold\_SP service policy.
- \_\_\_\_I. In the Memberships area, click **New** to create a new transaction class.
- \_\_\_\_m. Enter FinancialAdvice\_TC as the Name and click Next.
- \_\_\_\_n. On the Confirmation panel, click **Finish**.
- \_\_\_\_ o. Click **OK** on the Gold\_SP Service Policy Configuration.
- \_ 23. Save the changes.
  - \_\_\_\_a. Click **Review** in the messages area.
  - \_\_\_\_ b. On the Save panel, make sure that the check box Synchronize changes with Nodes is selected.
  - \_\_\_ c. Click Save.
- \_\_\_\_24. Define the **StockTrade\_WC** work class.
  - \_\_\_\_a. In the Navigation panel, expand Applications and click Enterprise Applications
  - \_\_\_\_ b. Click on **XDStock.**
  - \_\_\_\_ c. Note the Service Policies tab at the top of the General Properties panel. Click on the Service Policies tab.

Enterprise Applications	2 -							
Enterprise Applications > XDStock								
Use this page to configure an enterprise application. Click the links to access pages for further configuring of the application or its modules.								
Reports Operations Configuration Service Policies	Routing Policies							
General Properties	- Modules							
* Name XDStock	Manage Modules							
Application reference validation	Web Module Properties							
Issue warnings 🗸	Session management							
Detail Properties	Context Root For Web Modules							
Target specific application status	JSP reload options for web modules							

\_\_\_\_ d. Expand Work Classes For HTTP Requests.

## Lab exercise: Dynamic operations for WebSphere endpoints

	. e. na module	5.							
eports	Operations	Configuration	Service Policies	Routing Policies					
View	the mapping o	of all application v	ork to all service p	policies					
ssociat	e service polici	es with applicatio	n work						
Apply	OK Reset	Cancel							
- Work	classes for H1	TTP requests							
	Delete								
_									
Default_HTTP_WC     Default_HTTP_WC									
		Work classes for SOAP requests							
U Work	classes for SC	DAP requests							
Work	c classes for SC	DAP requests							

\_\_\_\_e. Click **New** to create a new HTTP work class.

## \_\_\_\_f. Type in the name **StockTrade\_WC** and click **Next**.

Creat	reate a new work class ?								
Cre	Create a new work class. Define the general properties and associate enterprise application URIs, EJBs, JMS, or Web services to the work class.								
$\rightarrow$	Step 1: Define work	Define work class general properties							
	class general properties	* Name							
	Step 2: Define work class membership	StockTrade_WC							
	Step 3: Confirm work class creation								
N	ext Cancel								

\_\_\_\_g. Using the "Module" drop-down menu, select **StockTrade.war**.

Step 1: Define work	Define work class membership				
properties	Associate HTTP type work from the XDStock application to this work class.				
→ Step 2: Define worl class membership	ModuleSelect a Module M				
Step 3: Confirm work class creation	Availa StockTrade.war AccountManagement.war FinancialAdvice.war Add >>  Add >>  Add >>				
	Custom HTTP pattern Add Pattern >>				
Previous Next	Cancel				

h. An HTTP selection list will appear. Make a multiple selection within the HTTP selection list: select the first available item in the box, press the Shift key, and then select the last item. Click Add to add the members.

	Step 1: Define work	Define work class membership					
	properties	Associate HTTP type work from the XDStock application to this work class.					
→	Step 2: Define work class membership	Module StockTrade.war					
	Step 3: Confirm work class creation	Available HTTP patterns	Members of StockTrade_WC:				
		/IOBound /memBound /CPUBound /sleepBound /CpuAndSleepBound 	Add >> << Remove				
	Previous Next Cance	1					

#### Lab exercise: Dynamic operations for WebSphere endpoints

\_\_\_\_\_i. The HTTP members should appear in the list on the right. Click **Next**.

	Step 1: Define work	Define work class membership					
	properties	Associate HTTP type work from the XDStock application to this work class.					
<b>→</b>	Step 2: Define work class membership	Module StockTrade.war					
	Step 3: Confirm work class creation	Available HTTP patterns		Members of StockTrade_WC:			
			Add >> << Remove	/StockTrade/IOBound (StockTrade.war) /StockTrade/memBound (StockTrade.war) /StockTrade/CPUBound (StockTrade.war) /StockTrade/SleepBound (StockTrade.war) /StockTrade/CpuAndSleepBound (StockTrade.war)			
		Custom HTTP pattern		Add Pattern >>			
Pr	revious Next Cance	4					

- \_\_\_\_j. Review the information in the Confirm Work Class Creation panel. Click Finish .
- 25. Define the remaining work classes. Warning: If you navigate away from the Service Policies tab without clicking "OK", your definitions that are in progress will be discarded.

Reports	Operations	Configuration	Service Policies	Routing Policies						
If you mus definitions Otherwise	If you must navigate away from the Service Policies tab before your definitions are complete, remember to click " <b>OK</b> " before you do so. Otherwise your definitions in progress will be discarded.									
	¥									
Apply	OK Reset	Cancel								
E Work	classes for HT	TP requests								
New	Delete									
	⊕ Default_HTTP_WC									
		_wc								
⊕ Work	classes for SC	AP requests								

- \_\_\_\_a. Click **New** to create a new HTTP work class.
- \_\_\_\_b. Type in the name StockQuery\_WC and click Next.
- \_\_\_\_ c. Using the "Module" drop-down, select StockQuery.war.
- \_\_\_\_\_ d. An HTTP selection list will appear. Make a multiple selection within the HTTP selection list: select the first available item in the box, press the Shift key, and then select the last item. Click Add to add the members.
- \_\_\_\_e. The HTTP members should appear in the list on the right. Click Next.
- \_\_\_\_f. Review the information in the Confirm Work Class Creation panel. Click **Finish**.
- \_\_\_\_ g. Click **New** to create a new HTTP work class.

- \_\_\_\_h. Type in the name FinancialAdvice\_WC and click Next.
- \_\_\_\_i. Using the "Module" drop-down menu, select FinancialAdvice.war.
- \_\_\_\_\_j. An HTTP selection list will appear. Make a multiple selection within the HTTP selection list: select the first available item in the box, press the Shift key, and then select the last item. Click **Add** to add the members.
- \_\_\_\_k. The HTTP members should appear in the list on the right. Click Next.
- \_\_\_I. Review the information in the Confirm Work Class Creation panel. Click Finish.
- \_\_\_\_m. Click **New** to create a new HTTP work class.
- \_\_\_\_n. Type in the name AccountManagement\_WC and click Next.
- \_\_\_\_o. Using the "Module" drop-down menu, select AccountManagement.war.
- \_\_\_\_ p. An HTTP selection list will appear. Make a multiple selection within the HTTP selection list: select the first available item in the box, press the Shift key, and then select the last item. Click Add to add the members.
- \_\_\_\_q. The HTTP members should appear in the list on the right. Click Next.
- \_\_\_\_r. Review the information in the Confirm Work Class Creation panel. Click **Finish**.
- \_\_\_\_\_s. You will see the panel associated with the Service Policies tab. Press OK to accept the changes you have made. Warning: If you navigate away from the Service Policies tab without clicking "OK", your definitions will be discarded.
- \_\_\_\_26. Save the changes.
  - \_\_\_\_a. Click **Review** in the messages area.
  - \_\_\_\_ b. On the Save panel, make sure that the check box Synchronize changes with Nodes is selected.
  - \_\_\_ c. Click Save.
- \_\_\_\_ 27. Associate the work classes with the appropriate transaction classes.
  - \_\_\_\_a. In the Navigation panel, expand **Applications** and click **Enterprise Applications**.
  - \_\_\_\_b. Click on **XDStock.**
  - \_\_\_\_ c. Click on the Service Policies tab.
  - \_\_\_\_\_d. Expand Work Classes For HTTP Requests.
  - \_\_\_\_e. Expand **StockTrade\_WC.** You can now see the details of the workclass.

Ne	w	Del	ete						
		Stock1	Trade_WC	2					
	If HTTP request matches HTTP patterns:								
	/StockTrade/IOBound (StockTrade.war)       /StockTrade/memBound (StockTrade.war)         /StockTrade/CPUBound (StockTrade.war)       /StockTrade/CPUBound (StockTrade.war)         /StockTrade/sleepBound (StockTrade.war)       /StockTrade/CpuAndSleepBound (StockTrade.war)							Edit HTTP Patterns	
	Th	ien app	ly the foll	owing classific	ation	rules			
		Add	l Rule	Delete Ru	e	Move	Up	Mo	ove Down
	s	Select	Order		Clas	ssificatio	n rule		
	N	lone							
	If Se	no clas lect tra	ssification	rules apply, th class	en cla	ssify to t	his tran	sacti	on class
	D	efault	t_TC (Def	ault_SP)		<b>~</b>			
	D S D D F D F D D S D S D S D S D S D S D S D S D S D S D S D S D S D S D S D S D S S D S S D S	efault tockQi efault inancia efault tockTr efault	_TC_Bron uery_TC ( _TC (Defi _TC_Gold alAdvice_ TC_Plati ade_TC ( TC_Silve	ze_SP (Bronz (Bronze_SP) ault_SP) _SP (Gold_SP TC (Gold_SP) num_SP (Plat Platinum_SP) er SP (Silver (	e_SP)	sp)			

\_\_ f. Click the drop-down menu below the text "If no classification rules apply, then classify to this transaction class", and select StockTrade\_TC(Platinum\_SP). This means that all requests matching the selected URI patterns will be mapped to this transaction class, since you have not created any other classification rules.

s	If no classification rules apply, then classify t elect transaction class	o this transaction cl	ass
	StockTrade_TC (Platinum_SP)	<b>~</b>	

\_\_\_\_ g. Click **Apply** at the top of the panel.

Lab exercise: Dynamic operations for WebSphere endpoints

Apply OK Reset Cancel
New Delete
StockTrade_WC
If HTTP request matches HTTP patterns:
/StockTrade/IOBound (StockTrade.war)

\_\_\_\_h. The table below contains a mapping of the work class names and transaction class names. Associate the remaining work classes with the corresponding transaction classes as listed in the table.

Work class name	Default transaction class name
AccountManagement_WC	AccountManagement_TC (Sliver_SP)
StockTrade_WC	StockTrade_TC (Platinum_SP)
StockQuery_WC	StockQuery_TC (Bronze_SP)
FinancialAdvice_WC	FinancialAdvice_TC (Gold_SP)

\_\_\_\_i. After you have mapped all of the work classes to transaction classes, click **OK**.

Lab exercise: Dynamic operations for WebSphere endpoints

- 28. So that the placement behavior can be observed more quickly than in the default case for the purpose of speeding this exercise, reduce the minimum time between placement changes.
  - \_\_\_\_\_a. In the Navigation panel, expand **Operational policies**, expand **Autonomic Managers**, and click **Application Placement Controller**.
  - \_\_\_\_b. Set "Minimum time between placement change" to 2 Minutes.

Configuration	Runtime		
General Pro	perties		Additional Properties     Custom Properties
Approval ti 10	meout	Minutes	
Server ope	eration times	Minutes	
2	ime between	placement change Minutes	
Apply C	Reset	Cancel	

- \_\_\_ c. Click **OK**.
- \_\_\_\_ 29. Save the changes.
  - \_\_\_\_a. Click **Review** in the messages area.
  - b. On the Save panel, make sure that the check box Synchronize changes with Nodes is selected.
  - \_\_\_ c. Click Save.

# Part 6: Start the servers

- \_ 30. Check the status of dynamic cluster instances on both the appserver nodes.
  - \_\_\_\_a. In the navigation panel, expand **Servers** and click **Application Servers**.
  - \_\_\_\_\_b. Note the status of the dynamic cluster instances StockTrade\_DC\_hostBNode01, StockTrade\_DC\_hostCNode01, AccountManagement\_DC\_hostBNode01, AccountManagement\_DC\_hostCNode01, FinancialAdvice\_DC\_hostBNode01 and FinancialAdvice\_DC\_hostCNode01. At this point they should all be **stopped**.
- \_\_\_\_\_ 31. Manually set the initial state of the servers, before you test the dynamic placement.
  - \_\_\_\_a. In the Navigation panel, expand Servers and click Application Servers.
  - \_\_\_\_b. Select the 1<sup>st</sup>, 3<sup>rd</sup>, and 6<sup>th</sup> Application Server and click **Start.**
  - \_\_\_\_ c. Wait for confirmation that the servers are started. This could take several minutes. The stopped and started servers list should look like this:

Select	Name 🛟	Node 🗘	Version 🗘	Cluster Name 🗘	Status ሷ
	AccountManagementj DC hostBNode01	hostBNode01	ND 6.1.0.7 WXDCG 6.1.0.0 WXDDG 6.1.0.0 WXDOP 6.1.0.0 XD 6.1.0.0	AccountManagementj_DC	€
	AccountManagementj DC hostCNode01	hostCNode01	ND 6.1.0.7 WXDCG 6.1.0.0 WXDDG 6.1.0.0 WXDOP 6.1.0.0 XD 6.1.0.0	AccountManagementj_DC	*
	FinancialAdvice DC hostBNode01	hostBNode01	ND 6.1.0.7 WXDCG 6.1.0.0 WXDDG 6.1.0.0 WXDOP 6.1.0.0 XD 6.1.0.0	FinancialAdvice_DC	€
	FinancialAdvice DC hostCNode01	hostCNode01	ND 6.1.0.7 WXDCG 6.1.0.0 WXDDG 6.1.0.0 WXDOP 6.1.0.0 XD 6.1.0.0	FinancialAdvice_DC	*
	StockTrade DC hostBNode01	hostBNode01	ND 6.1.0.7 WXDCG 6.1.0.0 WXDDG 6.1.0.0 WXDOP 6.1.0.0 XD 6.1.0.0	StockTrade_DC	8
	StockTrade DC hostCNode01	hostCNode01	ND 6.1.0.7 WXDCG 6.1.0.0 WXDDG 6.1.0.0 WXDOP 6.1.0.0 XD 6.1.0.0	StockTrade_DC	•
Total 6					

- \_\_\_\_ 32. Start the ODR server if it is not already started.
  - \_\_\_\_a. In the Navigation panel, expand Servers and click on-demand routers.
  - \_\_\_\_b. Select **ODR** if it is not started, select it and click **Start**.
  - \_\_\_\_ c. Wait for confirmation that the server has started.

Lab exercise: Dynamic operations for WebSphere endpoints

- \_ 33. Set the dynamic clusters' operational mode to **Automatic**.
  - \_\_\_\_a. In the Navigation panel, expand **Servers** and click **Dynamic clusters**.
  - \_\_\_\_b. Select all of the dynamic clusters in the table.
  - \_\_\_\_ c. Select **Automatic** in the drop-down list.

New	Delete Manual 🗙 Set	Mode		
D	Automatic	v		
Select	Name 🛟	Туре 🗘	Operational mode 💲 ሷ	
	AccountManagement DC	WebSphere application server	🔽 Manual	
	FinancialAdvice_DC_	WebSphere application server	🔽 Manual	
	StockTrade_DC	WebSphere application server	🔁 Manual	
Total 3				

\_\_\_\_ d. Click Set Mode.

New	New Delete Manual 💙 Set Mode				
D					
Select	Name 🛟	Type 🗘	Operational mode 🗘 👲		
	AccountManagement DC	WebSphere application server	S Automatic		
	FinancialAdvice_DC_	WebSphere application server	S Automatic		
	StockTrade_DC_	WebSphere application server	😼 Automatic		
Total 3					

# Part 7: A quick tour of runtime operations

\_ 34. In the navigation panel, expand **Runtime Operations**, then click on **Reports.** Accept the Adobe Software License agreement if it appears.

± Reso	urces			
Runt	ime Operat	tions		
= E	xtended De	eployment		
= R	eports			

\_\_\_\_a. A chart group with the cell name will be automatically opened. The Reports pane will draw but no data will be graphed.

At the top of the pane, if any operation alerts messages are available, they are displayed here. Here is an example of two messages you might see in Operation Alerts.

Ε	extion Alarts	0
	On Demand Router ode: This On Demand router is running, however is not posting any statistics. This could ecause it has not routed any work; or because it can not communicate with the deployment manager.	be
	Core components hostACell01: WebSphere Extended Deployment core runtime component, ARFMController, sporting a stability of level unknown. Please see the Extended Deployment summary operations view, core omponent sub-tab, for additional information.	is.

Operation alerts will notify you of various operational status conditions or error conditions, including servers or node agents that are stopped or that have failed, the absence of http traffic, or the "unknown" status of a system component. "Unknown" conditions are often harmless situations. In this case shown, no http traffic is flowing and so ARFM is not reporting its state to administrative processes, resulting in the "Unknown" operation alert. The lack of http traffic is also why you see the operation alert that indicates that the on-demand router is not posting any statistics.

Note: Loading operation alerts requires communications to various distributed components, which can result in a delay – sometimes as long as 15 to 25 seconds - in the posting of the operation alerts when navigating to the Reports or Extended Deployment panes. Once the messages are loaded, the delay will not be seen again as long as you continue your work within the pane, unless you click the "Refresh"

b. Expand **Reports Preferences** at the top left of the Reports panel. Using these settings, you can change the default charting characteristics of new reports. After reviewing these settings, collapse the **Reports Preferences** section.

Extended Deployment Reports
Reports Preferences
Default Chart Group (none) 💌
Default Chart Type
Default Chart Size Small 🔽
Display policy goals
Display data set shapes
Enable automatic refresh
Chart refresh interval 15
OK Reset

\_\_\_\_ c. Just above and to the right of the charting area, note the **Preferences** clickable control, which allows you to make immediate changes to a chart is actively being charted.

hostACell01		
	🖵 Preferences	

Click on **Preferences** to see the settings that can be applied to active charts. Click **OK** or **Cancel** after you have reviewed the settings.

Preferences
Chart Type
Line 💙
Chart Size Small
Display data set shapes
Display policy goals
OK Cancel

\_\_\_\_\_ d. At the bottom portion of the pane, you manage the data which you want to chart. Typically, you start by clicking "Add data" and selecting the data metrics. After the selection is made, charting automatically begins a few seconds later.

#### Lab exercise: Dynamic operations for WebSphere endpoints

elect Pattern Data Set Data Metric
Cours

Click on **Add data** just below the chart for the cell name. A gray pop-up should appear with pulldown and selection capabilities for **Data Set Type**, **Data Set** and **Available metrics**.

Organize the metrics by data set	
You can further organize the metrics in Alternatively, to view metrics from the se as data set".	the chart by selecting a specific data set. cope of the chart, select "Use current scope
Data Set Type	Data Set
On Demand Router	hostACell01_hostANode01_odr
Choose metrics from the selected data	a set to add to the chart
Available metrics          Concurrent Requests         Avg. Throughput         Avg. Response Times (ms)         Percentile Response Time         Avg. Wait Times in queue (ms)	
Optionally filter the selected data	a sets to come from a specific ODR.
OK Cancel	

- \_\_\_\_e. Click **Cancel**. You will return to this function later to set up charting for the service policies related to the XDStock application.
- \_\_\_\_\_f. At the top left corner of the pane, click on the **Extended Deployment** tab.

Extended Reports	
Open new chart tab	
Chart Group:	
hostACell01	

\_\_\_\_\_g. The **Extended Deployment** tab (the equivalent of navigating to Runtime Operations / Extended Deployment, except that operation alerts are not reloaded) shows you the stability and location of on-demand routers, core groups, core components, and nodes.

## Lab exercise: Dynamic operations for WebSphere endpoints

Extended Deployment	Reports					
Stability: Ø						
On Demand Routers	Core Groups	Core components	Nodes			
Preferences						
****						
Name 🛟	Name 🗘 Node 🗘 Type 🗘 Stability 💆 Avg. Throughput 🗘					
<u>odr</u>	h	ostANode01		On demand router	$\otimes$	0.0
Total 1						

h. Click on the various tabs to review the status of the core groups, components, and nodes. Below is a snapshot of all core components displaying as "Stable". If any one of the resources in any of the 4 tabs display as unstable, click on the specific resource to get more information about the issue.

Extended Deployment	Reports							
Stability: Ø								
On Demand Routers	Core Groups	Core components Nodes	Core components Nodes					
Preferences								
*** *								
Name 🛟		Scope 🗘	Stability ሷ	Current location 💲				
ARFMController		hostACell01	$\otimes$	hostACell01/hostANode01/odr				
Application Placement Controller ho		hostACell01	$\otimes$	hostACell01/hostACellManager01/dmgr				
Async PMI Bridge hostACell01		$\otimes$	hostACell01/hostBNode01/nodeagent					
DWLM Controller		AccountManagement_DC (hostACe	ll01) 🛇	hostACell01/hostBNode01/nodeagent				
DWLM Controller		StockTrade_DC (hostACell01)	$\otimes$	hostACell01/hostBNode01/nodeagent				
DWLM Controller		FinancialAdvice_DC (hostACell01)	$\otimes$	hostACell01/hostBNode01/nodeagent				
DWLM Controller		Tomcat_DC (hostACell01) 🛇 hostACell01/hostANo		hostACell01/hostANode01/nodeagent				
Health Controller		hostACell01	$\oslash$	hostACell01/hostACellManager01/dmgr				
Node Detect Bridge hostACell01		$\otimes$	hostACell01/hostACellManager01/dmgr					
Work Profiler Controller	Work Profiler Controller hostACell01							
Total 10								

# Part 8: Charting and verifying application server placement

\_\_\_\_35. In the Navigation panel, expand **Runtime operations**, and then click on **Reports**.

Extended Deployment Reports	]	
Reports Preferences	More informa	ation about this page
Open new chart tab		
Chart Group:		
hostACell01		
hostACell01		
2.00	Preferences	
1.00		
.00		
	Time	
	4/3/07 16:01:38	
Add data Chi	ange scope Remove View Table	
Select Pattern Data Set Type	Data Set Data Metric Data Filter	Scale 💆
Save current group of chart tab	s configuration as chart group	Save
Saved chart groups:		
Remove Chart Group		

- 36. Click on Add data.
- 37. In the Data Set Type pulldown, select Service Policy. In the Data Set area, select the four Service Policies you previously defined (in other words, do NOT select Default\_SP). You can press and hold the Ctrl key and left click to make individual selections. In the Available metrics area, select Avg. Response Times (ms). Then click OK.

Organize the metrics by data set You can further organize the metrics in Alternatively, to view metrics from the	the chart by selecting a specific data set.
as data set".	
Data Set Type	Data Set
Service Policy	Silver_SP Gold_SP Default_SP Bronze_SP Platinum_SP
Choose metrics from the selected da Available metrics Concurrent Requests Avg. Throughput Avg. Response Times (ms) Percentile Response Time Avg. Wait Times in queue (ms)	ta set to add to the chart ta sets to come from a specific ODR.
Lancel Cancel	

.38. The specific service policies you chose will appear within the list below the charting area. Since there is no HTTP traffic yet, no data will be charted and the goal lines do not appear within the chart.

Add data Change scope Remove View Table						
Select	Pattern	Data Set Type	Data Set	Data Metric	Data Filter	Scale 🙆
	+	Service Policy	Silver_SP	Avg. Response Times (ms)		1.0
	+	Service Policy	Gold_SP	Avg. Response Times (ms)		1.0
	+	Service Policy	Bronze_SP	Avg. Response Times (ms)		1.0
	•	Service Policy	Platinum_SP	Avg. Response Times (ms)		1.0

Note: Do not close the administrative console. You will come back to it after starting the load generator.

Note: In this lab you will use Apache JMeter to generate a simulated load on the XDStock application. This tool is freely available from http://jakarta.apache.org/JMeter/

- 39. Start JMeter on hostA, the machine running the deployment manager and the ODR.
  - \_\_\_\_a. Open a Command Prompt and navigate to C:\LabFilesXD\PlacementLab.
  - \_\_\_\_\_b. Type jmeter MicroWebApp\ PlacementLab.jmx and press enter. The necessary jars will be loaded to run the test tool. Once that is complete, a GUI will appear that allows you to run the test tool.
  - \_\_\_\_ c. Click this graphical symbol in the left pane to expand the plan:



This plan will drive a moderate amount of load against each of your Web modules.

🍃 Apache JMeter	
<u>File</u> Edit <u>R</u> un <u>O</u> ptions	Help
Placement Lab     HTTP Request [	Test Plan
💽 💽 Platinum	Name: Placement Lab
🕒 💽 Gold	Comments:
🗣 <u> </u> Silver	
🕒 💽 Bronze	
🛛 🖵 🗊 WorkBench	User Defined Variables
	Name:
	Add Delete

\_\_\_\_d. Click **HTTP Request Defaults.** If **hostA** is not the server node name where the odr is running, overtype this field with your odr server node name.

🐌 PlacementLab.jmx (C:\LabFilesXD\PlacementLab\Placeme				
<u>F</u> ile Edit <u>R</u> un <u>O</u> ptions <u>H</u> elp				
📍 🏳 👗 Placement Lab	UTTR Request Defaults			
🚽 🚽 🚟 HTTP Request Defaults	HITP Request Defaults			
🕨 🗠 💽 Platinum	Name: HTTP Request Defaults			
🕨 🗢 🖺 Gold	Protocol: http			
📔 👇 <u> </u> Silver				
🗣 📅 Bronze	Server Name or IP: hostA			
WorkBench	Path:			
	Port Number: 80			

- \_\_\_\_e. Click **Run** then click **Start** to start the stress tool using these plan settings.
- \_\_\_\_\_f. Observe the application average response times in the administrative console. The data is plotted with policy goals shown and might be hard to view. Click on **Preferences**, set the Chart Size to Medium, and click **OK**. The data will then look similar to the snapshot below. If you still have problems seeing the data, experiment with temporarily unchecking "Display policy goals" in **Preferences**, although you will probably want to set "Display policy goals" on later.



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- 40. Stop the stress tool and add additional sessions for Platinum within JMeter.
  - \_\_\_\_a. Click **Run** and then **Stop** menu in the stress tool.
  - \_\_\_\_b. Check back in Reports in the administrative console. Note that machine utilizations have gone down.



Time

\_\_\_\_ c. In the JMeter interface, change the number of threads for the Platinum group to 10.

📴 PlacementLab.jmx (C:\LabFilesXD\PlacementLab\PlacementLab.jmx) - Apache JMeter 📃 🗖 🗙				
<u>File Edit Run Options Help</u>				
Placement Lab Placement Lab Platinum Gold Silver Bronze WorkBench	Thread Group         Name: Platinum         Action to be taken after a Sampler error			

\_\_\_\_\_d. Restart the load by selecting **Start** from the **Run** menu.

\_ 41. Observe the Reports chart in the administrative console. Note that the average response time for Platinum\_SP (associated with StockTrade running on hostCNode01) will increase. This is because you have increased the number of requests for the StockTrade Web application (because StockTrade's service policy is **Platinum**).



- \_42. Within JMeter, change the sessions to produce more stress on Platinum service policy.
  - \_\_\_\_\_a. Stop the current test plan by selecting **Run > Stop**.
  - \_\_\_\_b. Increase the number of threads for Platinum start at 20, for example.
- 43. Click **Run >Start** to restart the stress tool with the new settings.
- 44. Observe the Reports chart in the administrative console. The utilization for the node running the StockTrade dynamic cluster will increase because that dynamic cluster instance is running both the StockTrade and StockQuery applications, and StockTrade is more heavily loaded (StockTrade gets the Platinum requests while StockQuery gets the Bronze requests.) Under lighter loads, the response time for both Platinum and Bronze requests will be nearly the same but as the load increases, preference will be given to the Platinum http requests.

The utilization of the node running StockTrade will approach 100% and eventually the StockTrade or StockQuery transaction Class will fail to meet their response-time goals. After several minutes of this high processor activity, you should see that a new StockTrade server instance has been started on the nodeB to handle some of the requests to the StockTrade dynamic cluster.

**NOTE:** The amount of stress that is required to fully utilize your node is dependent upon your environment (for example, RAM and processor speed). So, if the StockTrade server instance on hostBNode01 is not started, then increase the stress for Platinum by 10 and try again. If both machines become overloaded, try reducing the number of threads for http requests using the nodeB machine (FinancialAdvice and AccountManagement).

## Lab exercise: Dynamic operations for WebSphere endpoints

- 45. Stop the Stress tool
  - \_\_\_\_a. Select **Stop** from the **Run** menu.
- 46. Set the dynamic clusters' Operational Mode to Supervised in the administrative console
  - \_\_\_\_a. Expand Servers.
  - \_\_\_\_b. Click **Dynamic Clusters**.
  - \_\_\_\_ c. Select all of the dynamic clusters
  - \_\_\_\_\_d. Select **Supervised** in the drop-down list.

New Delete Manual V Set Mode Manual Supervised					
Select	Name 🛟	Automatic	Туре 🗘	Op	erational mode 🗘 ሷ
	AccountManad	gement DC	WebSphere application server	3	Automatic
	<u>FinancialAdvic</u>	e DC	WebSphere application server	3	Automatic
	StockTrade D	<u>)C</u>	WebSphere application server	3	Automatic
Total 3					

\_\_\_\_e. Click Set mode.

New Delete Manual 💉 Set Mode							
Select	Name 🛟	Туре 🗘	Operational mode 🗘 👲				
	AccountManagement DC	WebSphere application server	😴 Supervised				
	FinancialAdvice DC	WebSphere application server	😴 Supervised				
	StockTrade_DC WebSphere application server						
Total	Total 3						

- \_\_\_\_ 47. Manually set initial conditions again.
  - \_\_\_\_a. Expand Servers.
  - \_\_\_\_b. Select Application Servers.
  - \_\_\_\_ c. Select all dynamic cluster instances that are started.
  - \_\_\_\_ d. Press the Stop button.
  - \_\_\_\_e. Wait for confirmation that all servers are stopped.
  - \_\_\_\_f. Select the dynamic cluster instances AccountManagement\_DC\_hostBNode01, FinancialAdvice\_DC\_hostBNode01 and StockTrade\_DC\_hostCNode01.

- \_\_\_\_ g. Press the Start button.
- \_\_\_\_h. Wait for confirmation that the servers are started.
- \_ 48. Start the stress again.
  - \_\_\_\_a. Select Start from the Run menu to start the stress.
- \_\_\_\_ 49. Review the Runtime Tasks to see what tasks are suggested by Extended Deployment.
  - \_\_\_\_a. Expand System administration and then expand Task Management. Click Runtime Tasks.

Environment							
Ξsy	System administration						
-	Cell						
	Extended Repository Service						
-	Save Changes to Master Repository						
	Deployment manager						
	Nodes						
	Middleware nodes						
=	Node agents						
-	Middleware Descriptors						
	Node groups						
Ξ	Task Management						
	Notifications						
	Runtime Tasks						
-	Console Preferences						
-	Job scheduler Runtime Tasks						
	Visualization Data Service						

After the stress has run for a while, a task will appear (depending on the processor load and hardware and RAM available, the particular task may vary).

Accept	1627052335	DCPC0303I: The Application Placement Controller detected	New	Minor	PlacementPlanExecuter_StockTradeCell (hostBNode01:nodeagent)	2005-05-22 12:05:00	2
V	DCPC0303I: The Application Application Placement Controller detected that additional resources can be allocated to these service classes: {Platinum_SP=40, Bronze_SP=40, Gold_SP=40} . Though none of the service classes are projected to breach service policy goals, the placement of dynamic cluster instances can be modified to improve service level performance. Review the strategy for modifying the placement of dynamic cluster instances in the action plan.					2	

**Note:** In Supervised mode you must manually determine whether to accept or deny these tasks. This is different from the Automatic operational mode, which allows Extended Deployment to run the tasks on its own. If you do not take action for some time the task will expire, not allowing the runtime task to run.

\_\_\_\_ b. Select the Task ID to better understand the suggested action. This will open a new window with the task information and, depending on the Task, optionally an action plan.

Action plan to resolve the situation

The action plan expires at 2007-04-19 17:00:05.

```
Step 1 : Start server StockTrade_DC_hostBNode01 on node hostBNode01.
```

\_\_\_\_ c. Disable the runtime task. Select Close in the drop-down list. Select the check box beside the Runtime Task. Click Execute. Selecting Close tells the system that you will manually take the recommended action. Had you selected Accept the system would have taken the action on your behalf. Selecting Deny tells the system you do not want the task to occur.



- \_\_\_\_ 50. Stop the stress by selecting **Stop** from the **Run** menu in JMeter.
- 51. Set the dynamic clusters' Operational Mode to Manual.
  - \_\_\_\_\_a. In the Navigation panel, expand **Servers** and click **Dynamic Clusters**.
  - \_\_\_\_b. Select all of the dynamic clusters in the table.
  - \_\_\_\_ c. Select Manual in the drop-down list.

New	New Delete Manual 🖌 Set Mode						
D	D 👯 🦃	Manual Supervised Automatic					
Select	Name 🛟		Туре 🗘	Operational mode 🗘 ሷ			
	AccountManagement DC		WebSphere application server	Supervised			
	FinancialAdvice_DC_		WebSphere application server	😴 Supervised			
	StockTrade D		WebSphere application server	😴 Supervised			
Total 3							

\_\_\_ d. Click Set mode.

New Delete Manual 💙 Set Mode						
Select	Name 🛟	Туре 🛟	Operational mode 💲 👲			
	AccountManagement DC	WebSphere application server	🔯 Manual			
	FinancialAdvice_DC	WebSphere application server	🔯 Manual			
	StockTrade_DC_	WebSphere application server	🔯 Manual			
Total 3						

- \_\_\_\_ 52. Stop the servers.
  - \_\_\_\_a. In the Navigation panel, expand Servers and select Application Servers.
  - \_\_\_\_b. Select all of the running dynamic cluster instances.
  - \_\_\_ c. Click **Stop**.

Lab exercise: Dynamic operations for WebSphere endpoints

\_\_\_\_\_d. Wait for confirmation that the servers have been stopped.

Lab exercise: Dynamic operations for WebSphere endpoints

# What you did in this exercise

In this exercise, you configured WebSphere Extended Deployment for Application Server Placement. You learned how to create the on-demand router, dynamic clusters, Service Policies and transaction classes for your business goals. The visualization features added to the product provides an easy and quick method to review the individual services and the overall WebSphere cell. With a stress tool you were able to observe how Extended Deployment reacts to the different loads to meet the service goals that you defined.

# Appendix A – Starting a middleware node from the administrative console

The "Lab Requirements" section of this lab shows a multi-machine environment that is required to complete the exercise. This section will walk you through creating such an environment, provided that you have already completed the installation lab exercise.

1. In the administrative console, expand **System administration**, and then click on **Middleware nodes**.



2. Select the middleware node you want to start. Then in the "Select operational action" pulldown, select **Start agent**, then click **Run**.

Mic	ddlewar	re nodes						? _
	Middle	ware nodes						
	Use this page to manage nodes in the application server environment. A node corresponds to a physical computer system with a distinct IP host address. The following table lists the managed and unmanaged nodes in this cell. Add new nodes to the cell and to this list by selecting the add node administrative action.						n with a distinct IP host st by selecting the add	
	🕀 Pref	erences				$\sim$		
	Sel	ect an administrative action	- Perform	Stop agen	t 🚽	Rup	Select mode	▼ Set mode
Select operational action								
	Select	Name 🛟	Version 🗘	Restart ag Restart all	ent servers	<u>ದಿ</u>	Status ሷ	Maintenance mode ሷ
4		wsbeta156_	XDA 6.1.0.0	Run discov	ery		*	
		wsbeta156Node_	ND 6.1.0.7 WXDCG 6.1.0	.0	<b>⊕</b>		€	

\_ 3. Type in the values for **Remote node user ID** and **Remote node user password**. Then click **OK**.

## Lab exercise: Dynamic operations for WebSphere endpoints

The start ag have admin	jent process utilizes remote node authentication to ensure security. The user credentials should or execute priveledges.
Please ente will be prep >Install Tar	r the user credentials to execute the start agent command on the selected node. This informat opulated with the credentials (if specified) for the node on the Centralized Install Manager- get panel.
■ wsbeta15	5
Remote no userID	de user ID
Remote n	ode user password

\_ 4. The list will display and the Status field should indicate "Started" → . If it displays as still "Stopped", click the Refresh icon 👲.

#### Middleware nodes

Use this page to manage nodes in the application server environment. A node corresponds to a physical computer system address. The following table lists the managed and unmanaged nodes in this cell. Add new nodes to the cell and to this lis node administrative action.

#### Preferences

Sel	Select an administrative action 💌 Perform Start agent 🔍 Run Select mode							
D (								
Select	Name 🛟	Version 🗘	Synchronization ሷ	Status ሷ				
	wsbeta156_	XDA 6.1.0.0	<b>⊕</b>	٠				

The lab instructions use Apache JMeter to generate a simulated load on the XDStock application. This tool is freely available from http://jakarta.apache.org/JMeter/

However, you are free to use your favorite load generator. These are the URLs used in the classroom:

- http://hostA/FinancialAdvice/CpuAndSleepBound?countMax=100000000& sleepInterval=70000&sleepLength=35&countMean=100000&deterministic=true
- http://hostA/StockQuery/CpuAndSleepBound?countMax=100000000& sleepInterval=70000&sleepLength=35&countMean=100000&deterministic=true
- http://hostA/AccountManagement/CpuAndSleepBound?countMax=100000000& sleepInterval=70000&sleepLength=35&countMean=100000&deterministic=true
- http://hostA/StockTrade/CpuAndSleepBound?countMax=100000000& sleepInterval=70000&sleepLength=35&countMean=100000&deterministic=true

If you use the included JMeter test plan, you may need to change the host name to match your configuration, first select "HTTP Request Defaults" in the test plan and change "Server Name or IP" to the host name for the server hosting the on-demand router.

🦆 PlacementLab.jmx (C:\LabFi	ilesXD\PlacementL	ab\PlacementLab.jmx) - Apache	JMeter 📃 🗆 🔀
<u>File Edit Run Options Help</u>			0/0 🗆
Placement Lab	HTTP Reques Name: HTTP Req Server Name or IF Port Number: 80 Protocol (default I Path:	st Defaults uest Defaults hostA Send Parameters With the Re Value 10000000 70000 35 100000 Add Delete Delete Nbedded Resources from HTML File	quest:

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