

10

Deployment Concepts

Objectives

After completing this lesson, you should be able to:

- Contrast autodeploy with manual deployment
- Configure and deploy Web applications via the Administration Console, command line, and WLST
- Configure deployment descriptors
- Test deployed applications
- Describe the role of Web servers
- Trace a typical Web interaction flow
- Contrast static and dynamic content and deployment
- Front-end deployed applications with a Web server

Road Map

- Deployment concepts
 - Autodeployment
 - Console deployment
 - Command-line deployment
- Developer deployment
- Front-end with a Web server



Overview of Deployment

Two views of deployment:

- Developers
 - Development environment
 - Single stand-alone machine
 - Deploy over and over again at will during the testing phase
- Administrators
 - Production environment
 - Multiple WebLogic Server instances or clusters
 - Deploy infrequently during maintenance schedules



What Is Deployed?

Deploy Java EE application in:

- Exploded form
 - Directory structure very important
 - Easier to update individual pieces
 - Harder to keep track of the whole collection
- Archive form
 - Similar to tar or zip, can be maintained with those tools
 - Type: .jar, .war, .ear, .rar, and so on
 - Contains code, metacode, descriptors (xml), directories



Deployment Process

Deploying an application involves the following tasks:

- **Preparing:** Choosing whether to package the application as an archived file or keep it in an exploded directory
- **Configuring:** Creating a deployment plan to maintain the configuration changes without changing the deployment descriptors
- **Deploying:** Targeting and distributing the application to servers in an Oracle WebLogic Server domain
 - Install or deploy
 - Update or redeploy
 - Delete or undeploy

Deployment Methods

- WLS supports three deployment methods:
 - Console deployment
 - Command-line deployment
 - Autodeployment
- Applications and EJBs can be deployed in an:
 - Archived file (`.ear`, `.war`, `.jar`)
 - Exploded (open) directory format

Deployment Tools

Several methods are available to deploy applications and shared libraries to the Oracle WebLogic Server, including:

- Administration Console
- WebLogic Scripting Tool (WLST)
- `weblogic.Deployer` Java class
- `wldeploy` Ant task
- Autodeployment folder



Console Deployment Method

Deploying with the console allows full administrator control:

- Installation of an application from a location of your choice
- Manual configuration of the application name
- Targeting the application to individual servers or clusters, or both
- Configuring the application without targeting it
- Activating deployment when desired

Console Deployment Production Mode

Best used with Production mode:

Change Center

View changes and restarts

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

Lock & Edit

Release Configuration

Domain Structure

- MedRecDomain**
- Environment
- Deployments
- Services
- Security Realms
- Interoperability
- Diagnostics

Settings for MedRecDomain

Configuration | Monitoring | Control | Security | Web Service Security

General | JTA | EJBs | Web Applications | Logging | Log Filters

Save

A domain is a collection of WebLogic Server instances that is managed by a : administrative options that apply to all servers in the current domain.

*** Name:** MedRecDomain

☐ **Enable Administration Port**

Administration Port: 9002

☒ **Production Mode:** true

☐ **Enable Cluster Constraints**

New buttons

No check box to disable

Preparing a New Application

Domain Structure

- MedRecDomain
 - Environment
 - Deployments**
 - Services
 - Security Realms
 - Interoperability
 - Diagnostics

Summary of Deployments

Control Monitoring

[Customize this table](#)

Deployments

Install Update Delete Start Stop

Showing 1 to 6 of 6 Previous Next

<input type="checkbox"/>	Name	State	Health	Type	Deployment Order
<input type="checkbox"/>				Web	100
<input type="checkbox"/>					100

Install Application Assistant

Back Next Finish Cancel

Locate deployment to install and prepare for deployment

Path: /home/oracle/wls_sysadm/labs/Lab8-1/exercise/retirement.war

Recently Used Paths: (none)

Current Location: 192.168.0.1 / home / oracle / wls_sysadm / labs / Lab8-1 / exercise

retirement.war

Back Next Finish Cancel

Select an application folder or archive on the file system.

Preparing a New Application: Targeting

Install Application Assistant

Back Next Finish Cancel

Choose targeting style

Targets are the servers, clusters, and virtual hosts on which this deployment will run. There are several ways you can target an application.

☒ **Install this deployment as an application** **1**

The application and its components will be targeted to the same locations. This is the most common usage.

☐ **Install this deployment as a library**

Application libraries are deployments that are available for other deployments to share. Libraries should be available on all of the targets running their referencing applications.

Back Next Finish Cancel

Deploy as a shared library.

Install Application Assistant

Back Next Finish Cancel

Select deployment targets

Select the servers and/or clusters to which you want to deploy

Available targets for retirement :

Servers

☐ MedRecAdmSvr

☒ **MedRecSvr3** **2**

Clusters

☐ MedRecClust1

- ☐ All servers in the cluster
- ☐ Part of the cluster
 - ☐ MedRecSvr2
 - ☐ MedRecSvr1

Back Next Finish Cancel

Preparing a New Application: Settings

Install Application Assistant

Back Next Finish Cancel

Optional Settings
You can modify these settings or accept the defaults

General

What do you want to name this deployment?
Name: retirement

Security

What security model do you want to use with this application?

- ☒ **DD Only: Use only roles and policies that are defined in the deployment**
- ☐ Custom Roles: Use roles that are defined in the Administration Console
- ☐ Custom Roles and Policies: Use only roles and policies that are defined
- ☐ Advanced: Use a custom model that you have configured on the realm

Source accessibility

How should the source files be made accessible?

- ☒ **Use the defaults defined by the deployment's targets**
- ☐ Copy this application onto every target for me

Recommended selection.

- ☐ I will make the deployment accessible from the following location

Location: /home/oracle/wls_sysadm/labs/Lab8-1/exercise/retire

Provide the location from where all targets will access this application's files. This is often a shared directory. You must ensure the application files exist in this the location.

Install Application Assistant

Back Next Finish Cancel

Review your choices and click Finish
Click Finish to complete the deployment. This may take a few moments to complete

Additional configuration
In order to work successfully, this application may require additional configuration. D

- ☐ Yes, take me to the deployment's configuration screen.
- ☒ **No, I will review the configuration later.**

Summary

Deployment: /home/oracle/wls_sysadm/labs/Lab8-1/exercise/retire
Name: retirement
Staging mode: Copy this application to every target for me
Security Model: DDOnly: Use only roles and policies that are defined in

Target Summary

Components	Targets
retirement	MedRecSvr3

Back Next Finish Cancel

Deploying or Undeploying Applications

Summary of Deployments

Control | Monitoring

Deployments

Install | Update | Delete | Start ▾ | Stop ▾

Showing 1 to 7 of 7 Previous | Next

<input type="checkbox"/>	Name	State	Health	Type	Deployment Order
<input checked="" type="checkbox"/>	retirement	Prepared	OK	Web Application	100

Install | Update | Delete | **Start ▾** | Stop ▾

Showing 1 to 7 of 7 Previous | Next

Choices: Prepared
Active, New,
Distribute Initializing

Servicing all requests
Servicing only administration requests

Select one or more applications.

Restrict access to administration network channel.

Start ▾ | **Stop ▾**

Showing 1 to 7 of 7 Previous

When work completes
Force Stop Now
Stop, but continue servicing administration requests

Wait for clients to disconnect or session timeout, or both.

Redeploying an Application

The image shows two screenshots from the Oracle WebLogic console. The top screenshot, labeled with a green circle '1', shows the 'Deployments' page. A green circle '2' highlights the 'Update' button in the top toolbar. Below the toolbar is a table with two rows: 'benefits' and 'retirement'. The bottom screenshot, labeled with a green circle '3', shows the 'Update Application Assistant' dialog. The 'Finish' button in the top toolbar is highlighted. The dialog text says 'Locate new deployment files' and 'You have elected to update the benefits application.' It shows the 'Source path' as '/home/oracle/wls_sysadm/labs/Lab4-1/exercise/benefits.war' and the 'Deployment plan path' as '(No value specified)'. Both screenshots have a red border.

Deployments

Install Update Delete Start Stop Showing 1 to 2 of 2 Previous Next

<input type="checkbox"/>	Name ^	State	Health	Type	Deployment Order
<input checked="" type="checkbox"/>	+ benefits	Active	OK	Web Application	100
<input type="checkbox"/>	+ retirement	Active	OK	Web Application	100

Install Update Delete Start Stop Showing 1 to 2 of 2 Previous Next

Update Application Assistant

Back Next Finish Cancel

Locate new deployment files

You have elected to update the benefits application.

Source path: /home/oracle/wls_sysadm/labs/Lab4-1/exercise/benefits.war
Change Path

Deployment plan path: (No value specified) Change Path

Back Next Finish Cancel

Starting and Stopping an Application

Settings for retirement

Overview Deployment Plan Configuration Security Targets **Control** Testing Monitoring Notes

This page is used to stop and start a Web application.

Module

Start ▼ Stop ▼ Showing 1 to 1 of 1 Previous | Next

<input checked="" type="checkbox"/>	Name ^	State	Type
<input checked="" type="checkbox"/>	<input type="checkbox"/> retirement	Active	Web Application
	<input type="checkbox"/> Web Services		
	None to display		

Start ▼ Stop ▼ Showing 1 to 1 of 1 Previous | Next

Start ▼

- Servicing all requests
- Servicing only administration requests

Editing Deployment Descriptors

Settings for retirement

Overview | Deployment Plan | **Configuration** | Security | Targets | Control | Testing | M

General | Logging | Workload | Instrumentation

In this page, you define the configuration of the application deployment descriptor file that is asso

Session cookies max age (in seconds):

Session Invalidation Interval (in seconds):

Session Timeout (in seconds):

☐ **Debug Enabled**

Maximum in-memory Sessions:

Monitoring Attribute Name:

☐ **Index Directory Enabled**

Index Directory Sort By:

Servlet Reload Check (in seconds):

Resource Reload Check (in seconds):

☐ **Session Monitoring Enabled**

Minimum Native File Size:

JSP Page Check (in seconds):

☐ **JSP Keep Generated**

-1 means infinite, no limit.

Part of autodeploy and FastSwap

Monitoring an Application

The monitoring features that are available vary by application type.

1



2

Settings for retirement

Overview | Deployment Plan | Configuration | Security | Targets | Control | Testing | **Monitoring** | Notes

Web Applications | Servlets | Sessions | PageFlows | Workload

Web Applications

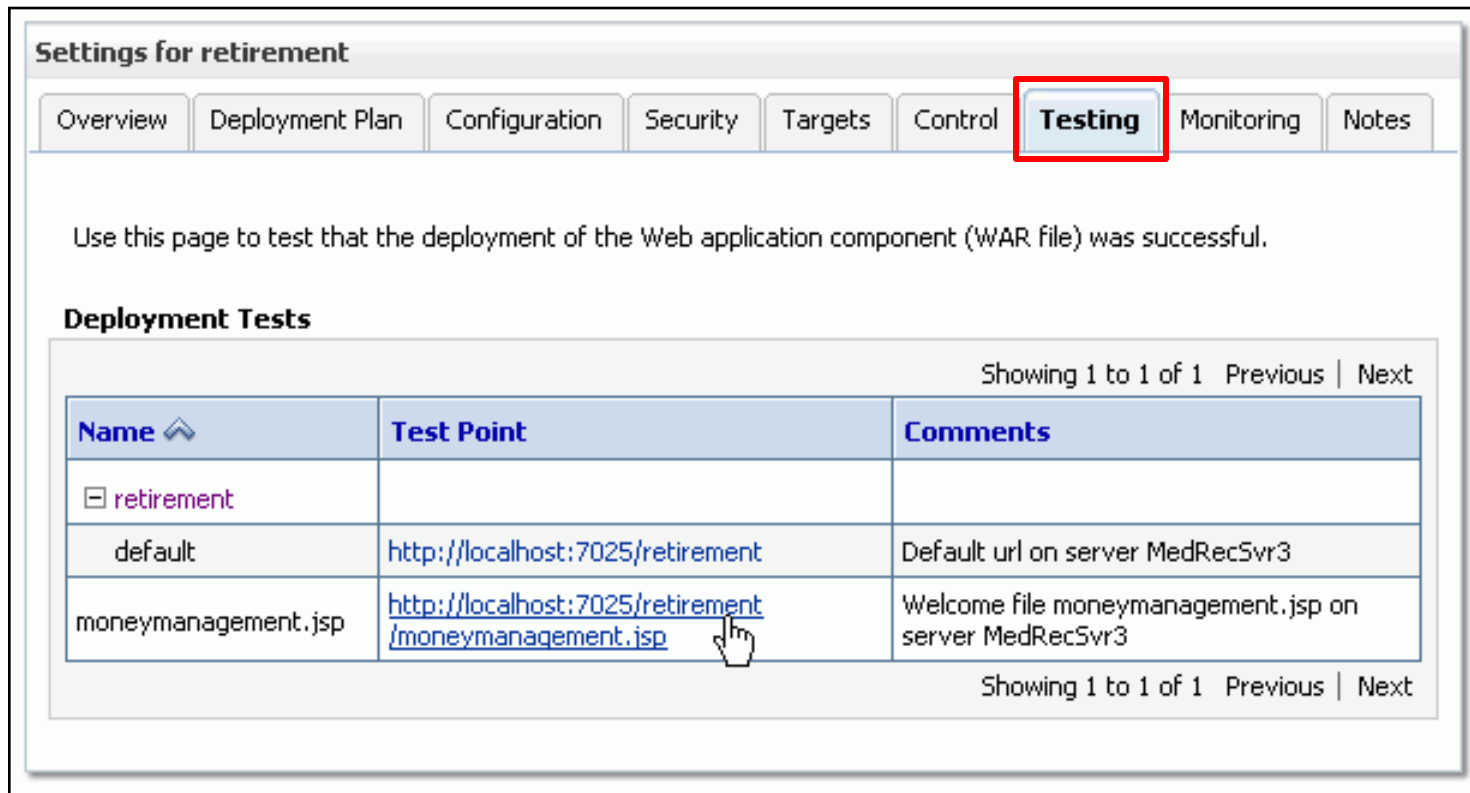
Showing 1 to 1 of 1 Previous | Next

Context Root	Application	Server	Machine	State	Active Server Count	Source Information	Servlets	Sessions	Sessions High	Total Sessions
/retirement	retirement	MedRecSvr3	MedRecMch2	Active	1	retirement.war	5	1	1	1

Showing 1 to 1 of 1 Previous | Next

Application Testing

You can test a deployed application using the Administration Console.



The screenshot shows the 'Settings for retirement' page in the Oracle Administration Console. The 'Testing' tab is highlighted with a red box. Below the tabs, a message states: 'Use this page to test that the deployment of the Web application component (WAR file) was successful.'

Deployment Tests

Showing 1 to 1 of 1 Previous | Next

Name ^	Test Point	Comments
<input type="checkbox"/> retirement		
default	http://localhost:7025/retirement	Default url on server MedRecSvr3
moneymanagement.jsp	http://localhost:7025/retirement/moneymanagement.jsp	Welcome file moneymanagement.jsp on server MedRecSvr3

Showing 1 to 1 of 1 Previous | Next

Deleting Applications

Summary of Deployments

Control | Monitoring

Deployments

Install | Update | **Delete** | Start ▾ | Stop ▾ | Showing 1 to 8 of 8 | Previous | Next

<input type="checkbox"/>	Name ^	State	Health	Type	Deployment Order
<input checked="" type="checkbox"/>	+ benefits	Prepared	✓ OK	Web Application	100
<input type="checkbox"/>	+ browser-starter	Active	✓ OK	Web Application	100

Install | Update | Delete | Start ▾ | Stop ▾

Delete Application Assistant

Delete Deployments

You have selected the following deployments to be removed from this domain configuration. Click 'Yes' to continue, or 'No' to cancel.

- benefits

Command-Line Deployment

- The `weblogic.Deployer` utility enables you to perform deployment operations similar to those available in the console.
- `weblogic.Deployer` actions can also be scripted with the Ant task `wldeploy`.

weblogic.Deployer Syntax:

```
% java weblogic.Deployer [options]
    [-deploy|-undeploy|-redploy|-start|-stop|-listapps]
    [file(s)]
```

Deployment with `weblogic.Deployer`

- Prepare and deploy a new application:

```
java weblogic.Deployer -adminurl t3://adminserver:7001  
  -username myuser -password welcome1 -name HRServices  
  -source /usr/HRServices.ear -targets serverA -deploy
```

- Redeploy an application:

```
java weblogic.Deployer -adminurl t3://adminserver:7001  
  -username myuser -password welcome1 -name HRServices  
  -redeploy
```

- Undeploy an application:

```
java weblogic.Deployer -adminurl t3://adminserver:7001  
  -username myuser -password welcome1 -name HRServices  
  -undeploy
```

- To list all deployed applications:

```
java weblogic.Deployer -adminurl t3://localhost:7001  
  -username myuser -password welcome1 -listapps
```

More weblogic.Deployer Examples

- To list all deployment tasks:

```
java weblogic.Deployer -adminurl t3://localhost:7001  
-username system -password welcome1 -listtask
```

- To cancel a deployment task:

```
java weblogic.Deployer -adminurl t3://localhost:7001  
-username system -password welcome1 -cancel -id tag
```

```
[oracle@wls-sysadm]$ java weblogic.Deployer  
-adminurl t3://localhost:7020  
-username weblogic -password Welcome1 -listapps  
weblogic.Developer invoked with options:  
-adminurl t3://localhost:7020 -username weblogic -listapps  
jsf [LibSpecVersion=1.2,LibImplVersion=1.2.9.0] <ACTIVE VERSION>  
jstl [LibSpecVersion=1.2,LibImplVersion=1.2.0.1] <ACTIVE VERSION>  
medrec  
Number of Applications Found : 3  
[oracle@wls-sysadm]$
```

Deploying Applications with WLST

WLST provides a number of deployment commands. You can use these commands to:

- Perform life-cycle operations on applications and stand-alone modules in an Oracle WebLogic Server instance
 - Deploy
 - Undeploy
 - Redeploy
- Update an existing deployment plan
- Start and stop a deployed application

Deploying an Application with WLST

Deploy an application (deployapp.py):

```
##
# WLST script for Deploying Java EE Application #
##

# Connect to the server
print 'Connecting to server .... '
connect('weblogic','welcome1','t3://localhost:7001')

appname = "mbeanlister"
applocation = "c:/domains/MedRecDomain/apps/mbeanlister"

# Start deploy
print 'Deploying application ' + appname
deploy(appname, applocation, targets='myserver',
        planPath='c:/myapps/plan/plan.xml')
print 'Done Deploying the application '+ appname
exit()
```

Deployment with WLST

Prepare and deploy a new application, or redeploy an existing one:

```
connect('myuser','mypass1','t3://adminserver:7001')
name = "HRServices"
location = "/usr/myapplications/HRServices.ear"

deploy(name, location, targets='serverA')
```

Other WLST deployment commands:

```
distributeApplication(location, targets='serverA')
startApplication(name)
redeploy(name)
stopApplication(name)
listApplications()
```

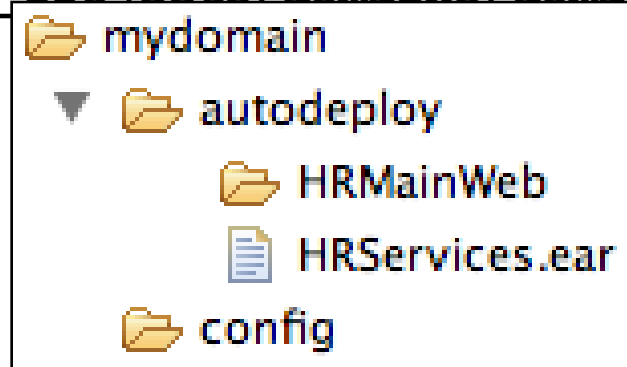
Road Map

- Deployment concepts
- Development deployment
 - Autodeployment
 - FastSwap
- Front-end with a Web server



Autodeployment

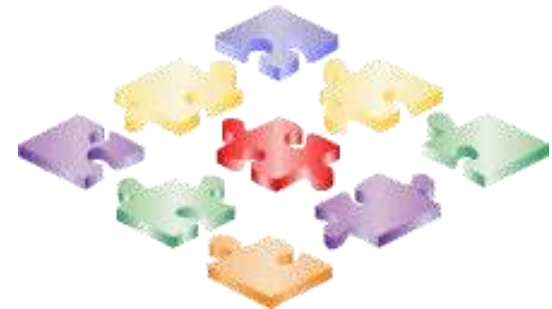
- By default, the autodeployment feature is enabled only if the domain is *not* running in production mode.
- When enabled:
 - The administration server monitors its “autodeploy” folder for new, updated, or removed applications
 - Applications are targeted only to the administration server
 - Developers can quickly test or experiment with an application
- `<WL_HOME>/user_projects/domains/domain/autodeploy`



Autodeploying Using an Expanded Directory

If the following conditions are true, you are a candidate for autodeploy. Consider autodeploy if the application is:

- In the development phase
- Being updated frequently
- Deploying to a single machine (for example, only the administration server)



FastSwap and On-Demand Deployment

- WebLogic's FastSwap feature is:
 - Enabled using the WebLogic deployment descriptors
 - Available only if the domain is *not* running in production mode
 - Applicable only to Web applications that are *not* archived
- When enabled:
 - WebLogic automatically reloads the modified Java class files within applications
 - Developers can perform iterative development without an explicit redeployment
- On-demand deployment:
 - `weblogic.xml`:
`<fast-swap>true</fast-swap>`

Production Mode Flag

When Production Mode is disabled, applications can be dynamically deployed.

- An application poller is enabled in development mode.

The screenshot displays the Oracle WebLogic Administration Console interface. On the left, the 'Change Center' shows 'View changes and restarts' with a note that configuration editing is enabled. Below it, the 'Domain Structure' tree lists 'MedRecDomain' with sub-items: Environment, Deployments, Services, Security Realms, Interoperability, and Diagnostics. A yellow callout points to the 'MedRecDomain' node, stating 'No "Lock" or "Release" buttons'. The main panel is titled 'Settings for MedRecDomain' and has tabs for Configuration, Monitoring, Control, Security, and Web Service Security. Under the 'Configuration' tab, there are sub-tabs for General, JTA, EJBs, Web Applications, Logging, and Log Filters. The 'General' sub-tab is active, showing a 'Save' button and a description of a domain. Below this, the '* Name:' field is set to 'MedRecDomain'. There is an unchecked checkbox for 'Enable Administration Port' and an 'Administration Port:' field set to '9002'. At the bottom, the 'Production Mode' checkbox is unchecked and highlighted with a red box. A mouse cursor points to this checkbox. A yellow callout points to the 'Production Mode' text, stating 'Doesn't say "false," it is simply blank.'

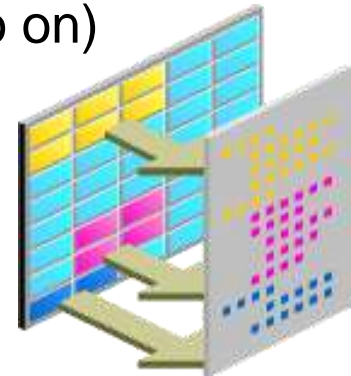
Road Map

- Deployment concepts
- Development deployment
- Front-end with a Web server
 - Web servers defined
 - HTTP
 - Static and dynamic content
 - Redirection

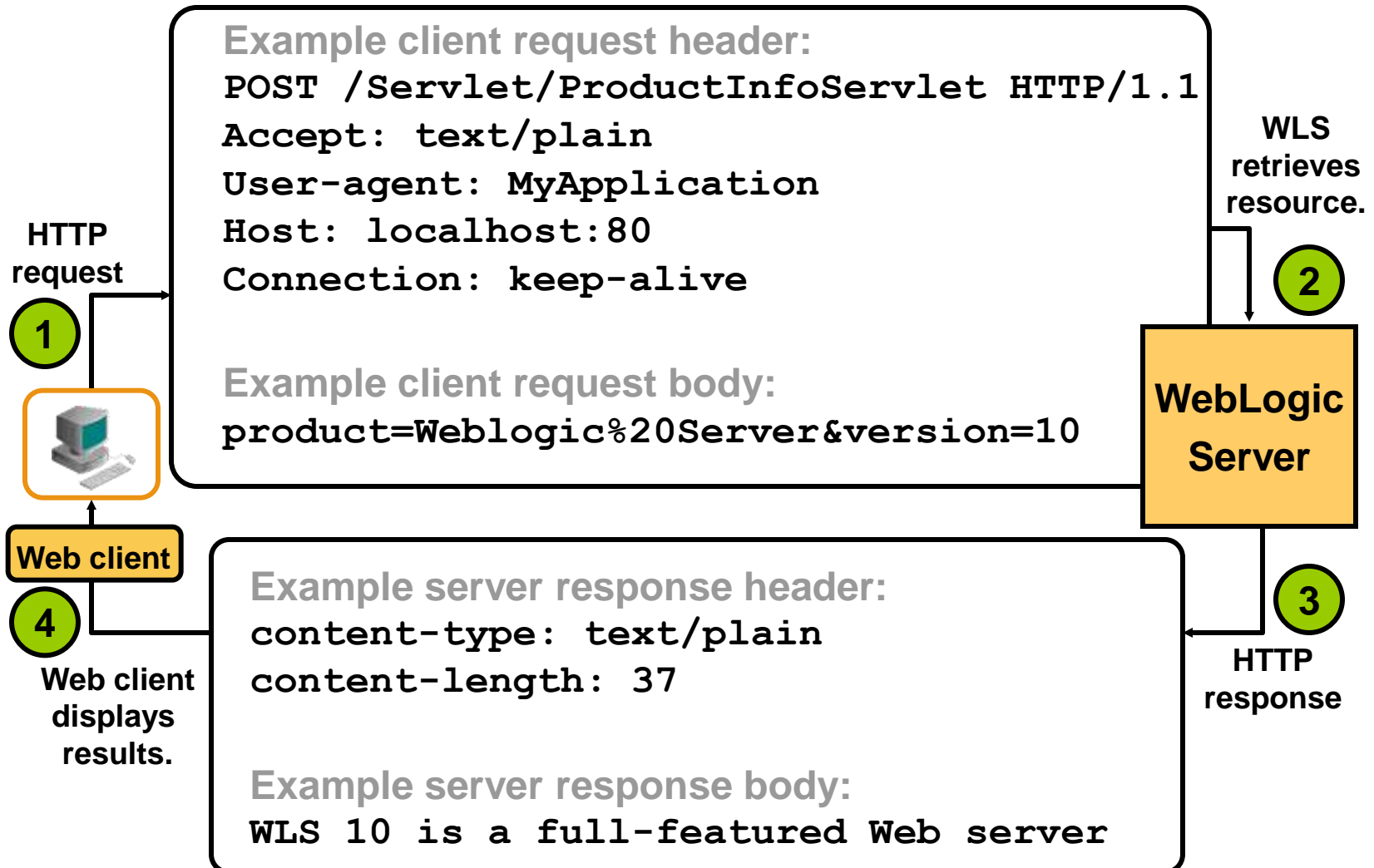


Role of Web Servers

- Web servers are responsible for handling HTTP requests from clients.
- Web servers typically return:
 - Static content (HTML pages, graphics, media, and so on)
 - Dynamic content (generated by servlets, JSPs, CGIs, JSF, Struts, and so on)



A Typical Web Interaction



MIME Types

- Multipurpose Internet Mail Extensions (MIME) is a protocol for identifying and encoding binary data.
- All HTTP response data is encoded with a MIME content type.
- Browsers interpret HTTP response data differently depending on the MIME type of the data:
 - HTML pages are parsed and displayed.
 - PDF documents can be sent to Adobe Acrobat.
 - Application code can be directly executed.

HTTP Status Codes

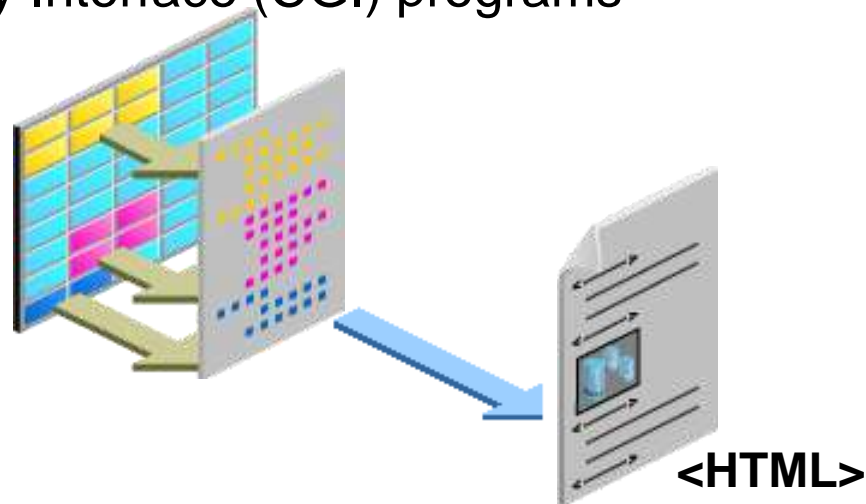
- HTTP status codes indicate to the client whether or not the request was successful, and if not, provide the client a reason for a failed request.
- They are used by clients to provide alternate behavior.
- Some representative codes are:
 - Indicating success:
 - The default status code is 200, which indicates success.
 - Reason for failure:
 - A status code of 404 tells the client the requested resource was not found.
 - Providing alternate behavior:
 - If a browser receives a 401 status code, the browser prompts the user for an ID and password to log in.

Static Content

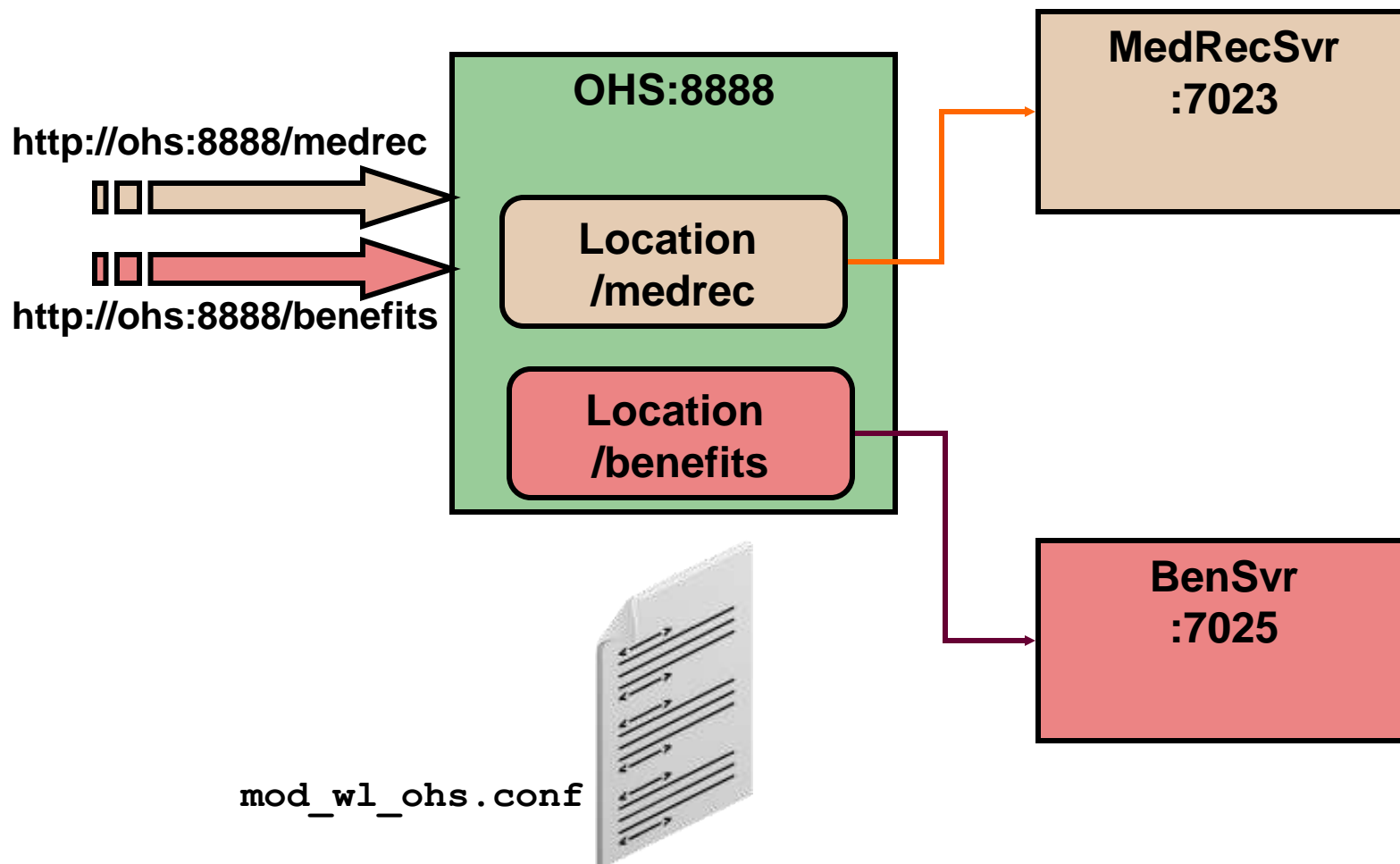
- Static content documents are predefined on the server and do not change.
- Oracle WebLogic Server can be used to serve static content such as:
 - HTML documents
 - Images
 - Media
 - PDF documents
- Oracle WebLogic Server can serve static documents:
 - Over standard HTTP
 - Through SSL using HTTPS

Dynamic Content

- Dynamic content documents may change based on the client's request.
- Dynamic content often involves a database query.
- HTML documents can be created using various means including:
 - Servlets
 - Common Gateway Interface (CGI) programs
 - JSPs
 - JSF
 - Struts



Configuring Oracle HTTP Server to Serve Multiple WebLogic Servers



`mod_wl_ohs.conf`

The main sections of `mod_wl_ohs.conf` are:

- **LoadModule:** Is enabled by default to load the `weblogic_module` when OHS starts
- **IfModule:** Specifies the host and port details of the WLS server or cluster. For example:

```
<IfModule mod_weblogic.c>  
    WebLogicCluster wls-sysadm:7023,wls-  
    sysadm:7025  
</IfModule>
```
- **Location:** Specifies the root context of the application and advises OHS that WLS will handle requests for that application. For example:

```
<Location /medrec>  
    SetHandler weblogic-handler  
</Location>
```


Verifying Ports Used by OHS

If OHS is running, you can verify ports using the `opmnctl status` command with the `-l` option:

```
/u01/app/oracle/product/fmw/11.1.0/webtier/instances/instance2/bin
```

```
[oracle@edvmr1p0 bin]$ ./opmnctl status -l
```

```
Processes in Instance: instance2
```

ias-component	process-type	pid	status	uid	memused	uptime
ports						
ohs2	OHS	4253	Alive	559158019	358996	18:11:13
https:8889,https:4443,http:8888						

```
[oracle@edvmr1p0 bin]$
```

Quiz

Which environment supports FastSwap?

1. Production mode, archived files
2. Production mode, expanded files
3. Development mode, archived files
4. Development mode, expanded files
5. All of the above

Quiz

What is the `web.xml` tag indicating the test point for testing applications?

1. `<welcome-file>`
2. `<test-point>`
3. `<deploy>`
4. `<monitor>`
5. `<debug>`

Quiz

It is possible to deploy an exploded directory that contains JAR files.

1. True
2. False

Summary

In this lesson, you should have learned how to:

- Enable autodeploy with manual deployment
- Configure and deploy Web applications via the Administration Console, command line, and WLST
- Redeploy and remove applications
- Configure deployment descriptors
- Test deployed applications
- Front-end deployed applications with a Web server