IBM[®] Feature Pack for Web Services– LAB EXERCISE

Feature Pack for Web Services Top-down development of a JAX-WS service

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What this exercise is about

The objective of this lab is to show you how to develop a complete Web services application using the Feature Pack for Web Services for WebSphere Application Server V6.1.

You will take a top down approach beginning with only a WSDL file. It will then show you how to develop a Web Service, package your code and artifacts into an EAR file, install the EAR file as an application for WebSphere Application Server version 6.1, start the application, perform a simple test to confirm the application is deployed and started correctly, create a Web services client, and then do an end-to-end test using the client.

Lab requirements

The system on which you are installing WebSphere Application Server must be running a supported distributed operating system. For more information on supported operating systems, see the WebSphere Application Server V6.1 information center. In addition, the system must have the following resources available:

- An installation of IBM Web Services Feature Pack for WebSphere Application Server V6.1
- An installation of IBM Application Server Toolkit V6.1

What you should be able to do

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

• Perform an end-to-end test from the client to the Web Service and back.

Use a Top Down approach to develop a Web Service

- Take an existing WSDL file and, using the IBM WebSphere Application Server Toolkit Version 6.1, create a Web Service for the IBM Feature Pack for Web Services for WebSphere Application Server V6.1
- Package the Web Service into an EAR file
- Deploy the EAR file onto WebSphere Application Server V6.1
- Start the Web Service application
- Perform a simple test to confirm that the application is installed and listening at the expected URL
- Develop a client for the Web Service application
- Perform an end-to-end test from the client to the Web Service and back.

Introduction

The Feature Pack for Web Services builds on Web Services technologies available in WebSphere Application Server V6.1. A few of the major enhancements introduced in this Feature Pack are:

- A new JAX-WS programming model (with support for JAX-B, annotations, SOAP 1.2 and more)
- Support for WS-Reliable Messaging and WS-Secure Conversation
- Improved administration of Web Services configuration through the use of Policy Sets

Development models

Web services can be created using one of two approaches: top-down development and bottom-up development. Top-down Web services development involves creating a Web service from a WSDL file. Bottom-up Web services development involves creating a Web service from a Java file that contains code that will be the basis for implementing the Web service.

When creating a Web service using a top-down approach, first you design the implementation of the Web service by creating a WSDL file. You can do this using the WSDL Editor. You can then use the Web services wizard to create the Web service and skeleton Java[™] classes to which you can add the required code.

Although bottom-up Web service development may be faster and easier, especially if you are new to Web services, the top-down approach is the recommended way of creating a Web service – especially if interoperability is a concern. By creating the WSDL file first you will ultimately have more control over the Web service, and can eliminate interoperability issues that may arise when creating a Web service using the bottom-up method.

Lab Exercise – Top down development

Part 1: Create a dynamic Web project

In this portion of the lab you will create a dynamic Web project in the AST.

Part 2: Import the WSDL File

This part of the lab will show you how to import the WSDL file into the dynamic Web project you created in Part 1.

Part 3: Creating a Web service from the WSDL file

This section will show how to create a Web service from the WSDL file and how to export the EAR file containing that Web service.

Part 4: Install and deploy the application

This section will show how to install the EAR file from Part 3, how to start the Web Service application from the administrative console, and how to do some simple verification.

Part 5: Creating the client code

This section will show you how to develop a Web Services client for the Web Service that has been created. Then shows how to run the client and interact with the Web Service that was created and installed.

Exercise instructions

Instructions and subsequent documentation use symbolic references to directories which are listed as follows:

Reference Variable	Windows Location	
<was_home></was_home>	C:\WebSphere\AppServer	Linux /opt/WebSphere/AppServer
		AIX /usr/WebSphere/AppServer
<temp></temp>	C:\temp	/tmp
<hostname></hostname>	Host name or host address for the machine where the profiles are being created	Host name or host address for the machine where the profiles are being created

Note:

This Lab exercise assumes that the following software is already installed on your system. Use the documentation associated with the software to identify prerequisite software and hardware and for installation and verification instructions:

• This Lab exercise assumes that the following software is already installed on your system. Use the documentation associated with the software to identify prerequisite software and hardware and for installation and verification instructions: IBM WebSphere Application Server Version 6.1.0.9

- IBM WebSphere Application Server Version 6.1 Feature Pack for Web Services
- IBM WebSphere Application Server Toolkit Version 6.1.1.3 and the add-on for the Feature Pack for Web Services.

Part 1: Create a dynamic Web project

This section will describe the process of creating a Dynamic Web Project – an environment that will be used to build a Web Service application using the IBM WebSphere Application Server Toolkit version 6.1 (AST). The AST comes with IBM WebSphere Application Server V6.1 and this release of AST has specific support for the IBM WebSphere Application Server V6.1 Feature Pack for Web Services (WSFP).

____1. Start the AST workspace.

To start the AST:

Using the Start Menu:

Start-> All Programs -> IBM WebSphere -> Application Server Toolkit V6.1-> Application Server Toolkit

2. When prompted to select a workspace, keep the default workspace of C:\Documents and Settings\Administrator\AST\workspace and click OK.

🕀 Workspace Launcher		×
Select a workspace		
IBM WebSphere Application Server Toolkit, V6.1.1 stores your projects in a folder Choose a workspace folder to use for this session.	called a workspace	
Workspace: C:\Documents and Settings\Administrator\AST\workspace	•	Browse
Use this as the default and do not ask again	ОК	Cancel

_____3. This will open the AST. Close the welcome screen by clicking the **X** on the welcome tab and you will see the screen shown below.

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4. Creating a new Dynamic Web Project.

____a. Select **File** from the navigation bar. Select **New -> Project** to create a new project.

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____b. Expand the Web folder and select **Dynamic Web Project.** Click **Next**.

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Select a wizard Create a Dynamic Web project	
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____ c. For the Project Name enter **WSFPLab1**. Check the **Add project to an EAR** checkbox. Enter **WSFPLab1EAR** for the EAR Project Name. Click **Next**.

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Hint: Get started quick	y by selecting c	one of the pre	defined projec	t configurations.	
EAR Membership					
Add project to an E	AR				
EAR Project Name:	SFPLab1EAR				▼ New
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_____d. This will open the **Project Facets** panel. Click on the check box for **WebSphere 6.1 Web** Services Feature Pack and then click Finish.



____e. If you see a prompt asking to open the J2EE perspective, click Yes.



____f. The Dynamic Web Project should now be visible in the Project Explorer panel of the AST.



Part 2: Import the WSDL file

This section will describe the process of importing the WSDL File.

- ____1. Importing the WSDL.
 - ____a. Expand the **WSFPLab1** dynamic project in the Project Explorer panel of the AST.
 - ____b. Expand the **WebContent** folder.
 - ____ c. Expand the WEB-INF folder.



____ d. Right click on **WEB-INF**, select **New** and **Folder** to create a new folder to hold the WSDL document.

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____e. Enter a folder name of **wsdl** and click **Finish**.

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Enter or select the parent folder: WSFPLab/WebContent/WEB-INF	
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- ____f. Right click on the **wsdl** folder you just created and select **Import**.
- ____g. From the Import panel select File system and click Next.

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Select Import resources from the local file	system into an existing proje	ect.
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- ___h. On the **File system** panel select **Browse**. Navigate to the **C:\Labfiles\JAX-WS\ASTLab** directory.
- _____i. Select the checkbox on the left next to **ASTLab.** Then on the right make sure to select the checkbox for the **wsfpLab1.wsdl**. Click **Finish**.

- ____j. The WSDL document has now been added to the project. This is the WSDL that describes the Web Service that will be created, as well as how to access it. Some of the main WSDL elements are:
 - 1) The <service> element contains the name of the Web Service and its address.
 - 2) The <portType> element describes a Web Service. It specifies the operations that can be performed as well as the input and output messages for each operation.
 - 3) The <message> element describes the data that are used by an operation. Each message can consist of one or more parts. The parts are similar to parameters in a function call.
 - 4) The <types> element defines the data types that are used by the Web Service.
 - 5) The <binding> element defines the message format and protocol details for each port.

Part 3: Creating a Web service from the WSDL file

This section will describe the process creating a Web Service from the WSDL file that was imported in the previous step.

- _____1. Use the WSDL to create a Web Service.
 - ____a. Expand the **wsdl** folder in the project explorer.
 - ____b. Right click on the wsfpLab1.wsdl document and select New and then select Other.

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____ c. In the New window expand the Web Services folder and select **Web Service**.

____d. Select Next.

4 New				×
Select a wizard Create a new XML web service.				
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_____e. Change the **Web service runtime**. Click on **Web service runtime**: **IBM WebSphere JAX-RPC** to change the choice of runtimes.



____f. Select the **IBM WebSphere JAX-WS** runtime option, and click **OK**. This will insure that the Web Service created will comply with the JAX-WS specification.

💠 Service Deployment Configuration	×
Choose from the list of runtimes and deployment servers, or use the default settings.	
Server-Side Deployment Selection:]
Choose Web service runtime first Explore options	
Web service runtime: Apache Axis IBM WebSphere JAX-RPC IBM WebSphere JAX-WS	
Server:	
OK Cancel	

____g. In the same panel, position the slider bar for the client so that it shows "Start client".

🖶 Web Service			×
Web Services WebSphere v6.1 Server has only stub be created or started.	runtimes associated with it	so the server will not	2
Web service type: Top down Java bear Service definition: //WSFPLab1/WebCo	i Web Service Itent/WEB-INF/wsdl/wsfpL Configurat Server: Wi Web service Service EA	ab1.wsdl on: ebSphere v6.1 Server e runtime: IBM WebSph oject: WSFPLab1 R.project: WSFPLab1EA	Browse
Start client	Configurat Server: Wi Web servic Client proje Client EAR	on: <u>ebSphere v6.1 Server</u> <u>e runtime: IBM WebSph</u> <u>ect: WSFPLab1Client</u> <u>project: WSFPLab1Clier</u>	<u>ere JAX-WS</u>
0	< Back Next	> <u>Einish</u>	Cancel

____h. Select Finish. The AST will now create the implementation classes for the service described by the WSDL document. It will open the implementation class for the Web Service, which in this case is named LabServicePortTypeImpl.java.

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NOTE: Annotations are required for **JAX-WS** services, they have already been added by the tools; these can be found in the code at the **@javax.jws.WebService** line. The annotations identify each service, including its implementation class and the location of its WSDL document. They optionally identify any **Quality of Service** modules (e.g. **WS-Addressing**) to be engaged on the server. It is very important that these annotations be added. If the **@WebService** is not added, the Web Service will not deploy as a **JAX-WS** service. Additionally, the **serviceName** attribute defines what the service is called.

_____i. Change the following line to the code in LabServicePortImpl.java.

```
1) Change:
```

}

```
public class LabServicePortTypeImpl{
    public String submit(String request) {
        return null;
```

2) To:

```
public class LabServicePortTypeImpl{
public String submit(String request) {
    return ("Hello " + request);
}
```

____j. Save your changes with CTRL + S.

- ____ 5. Exporting the EAR file.
 - ____a. In the Project Explorer right-click on the WSFPLab1EAR folder to open the menu.
 - 🚭 J2EE LabServicePortType.java IBM WebSphere Application Server Tool File Edit Source Refactor Navigate Search Project Data Run Window He 📄 | 🏂 • 🜔 • 🐏 • 💁 • R 🗈 New Project B []]⊇ору Ctrl+C e.java 🖾 Copy Qualified Name 📴 <u>P</u>aste Ctrl+V m.ibm.was.wssam 🖃 🔁 WSF 💢 <u>D</u>elete Delete ÷... ax.jws.WebMetho ė... 🏞 Build Path Alt+Shift+T Ė... Refactor Import ۲ 🕨 📑 EAR file Export at -f 😵 🛛 Re<u>f</u>resh F5 🛃 Export... si ÷ Close Project Ē. 🔁 Close Unrelated Projects ė-6 e(name = "LabSe ÷... Validate ng(parameterSty Analysis Þ erface LabServi 🛋 Update EAR Libraries 🗞 Prepare for Deployment Fasks Properties Servei Run As ۲ infos Debug As Profile As T<u>e</u>am 🖻 🎾 👐 🐨 Compare With Restore from Local History... Source • PDE Tools ∎≎ Migrate 🛃 Start Properties Alt+Enter Velcome to Gmail - ...
 - ____b. Select Export and the EAR file.

____ c. Select WSFPLab1EAR for the EAR application. For the Destination select C:\LabFiles. Check the boxes to Export source files the source code and Overwrite existing file. Click Finish.

🕀 Export			×
EAR Export Export Enterprise	Application project to the local file system.	2	-C-
EAR application:	WSFPLab1EAR		•
Destination:	C:\Labfiles\WSFPLab1EAR.ear		Browse
♥ Export source	e files isting file	ß	
0		Einish	Cancel

Part 4: Install and deploy the application

This section describes how to install and deploy the EAR file that has been created to an installation of WebSphere Application Server Version 6.1 with the Feature Pack for Web Services installed. This will use the profile that was created in Part 1 of this lab.

____1. Start the application server.

____a. Open a command prompt and change to C:\WebSphere\AppServer\profiles\AppSrv01\bin.

____b. Run the command startserver server1.



____ c. Wait for the server to start.

2. Start the Integrated Solution Console (ISC). There are two ways to start the ISC.

___a. Using the Start Menu

Click on Start->Programs->IBM WebSphere->Application Server v6.1->Profiles->wslab->Administrative Console

____b. Using a browser. Start the browser and enter the following in the address window::

http://localhost:9060/ibm/console

_____ 3. Log in to the ISC as wsdemo.

Integrated Solutions Console
Welcome, enter your information.
User ID:
Log in
Note: After some time of inactivity, the system will log you out automatically and ask you to log in again.

_____4. Install theWSFPLab1EAR file.

____a. Expand **Applications** and click on **Enterprise Applications**. The ISC will display a screen similar to the one shown below.

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 Enterprise Applications Install New Application 	Start	Stop Install Update	Rollout Update	Remove File Export	
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🕀 Users and Groups	*				
H Monitoring and Tuning	I OTAI 3				
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Done				11.	

____b. In the Enterprise Applications panel, select the **Install** button.

____ c. Click **Browse** and browse to **C:\LabFiles** where you previously exported the EAR for this service.

File Upload							<u>?</u> ×
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____d. Select WSFPLab1EAR.ear and Click Open.

___e. Click Next.

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Gervers	C Remote file system	
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	Used only for standalone Web modules (.v	var
⊕ Security	files) and SIP modules (.sar files)	
🕀 Environment	How do you want to install the application?	
🕀 Services	• Promotione only when additional information is required.	
	onew me an instance of options and parameters.	
H Monitoring and Tuning	Next Cancel	
⊕ Troubleshooting 🚽		
Done		11.

____f. On the Select installation options panel click Next.

- ____ g. On the **Map modules to servers** panel click **Next**.
- ___h. On the **Summary** panel click **Finish.**

Application WSFPLab1EAR installed successfully.

To start the application, first save changes to the master configuration.

Changes have been made to your local configuration. You can:

<u>Save</u> directly to the master configuration.

Review changes before saving or discarding.

To work with installed applications, click the "Manage Applications" button.

Manage Applications

- _____i. Wait to see that the application installs successfully. The messages shown above will be displayed. Click **Save** to save the changes to the master configuration.
- ____j. The WSFPLab1EAR application has now been deployed.

_____ 5. Starting the application.

____a. Return to the **Enterprise Applications** panel. The ISC will display a screen similar to the one shown below.

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_ b. Check the box next to WSFPLab1EAR and click Start.

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Done				

____ c. Wait for the application to start. The following page will be displayed.

- _____6. Test the Web Service.
 - ____a. To verify that the Web service was deployed and started properly, a browser will be given the URL for the Web Service and it should display a message from the application server indicating that this is a Web service.

The default URL for the Web service can be built by concatenating the following:

<hr/>

The next steps show how to find this information and create this URL.

____b. The next steps show how to find this information and create this URL.to find the <HTTP URL Prefix>, in the **ISC** navigate to the **Enterprise Applications** panel. Select **WSFPLab1EAR**.

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http://localhost:9060/ibm/console/applicatio	DeploymentCollection.do?Edit/	Action=true&refId=ApplicationDeploy	ment_1179396587722&conte



____ c. Select Provide HTTP endpoint URL information.

____d. The value displayed in the window labeled HTTP URL prefix is what is needed for <HTTP URL Prefix>. In this case it is:

http://aimcp032.austin.ibm.com:9080

This URL will be different on other systems!

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🗄 Servers	Specifies Web ser	vices endpoi	int URL information for SOAP over HTTP bindings. You can select a def
Applications	can enter a custo define the endpo	m prefix. Clic ints in a pub'	ck Apply to copy the selected prefix to selected modules. This informat lished WSDL file.
 Enterprise Applications Install New Application 	Modules assig	ned to : Vir	rtual Host = default_host , Server = server1
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E Done			Local intranet

____e. Putting the URL prefix together with **/WSFPLab1/LabService** results in the URL for the Web Service. So with the above prefix the test URL would be:

http://aimcp032.austin.ibm.com:9080/WSFPLab1/LabService

____f. Open a new browser window and paste in the URL for your system. You should see a screen like that below.

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Integrated Solutions Console http://jim667:908PLab1/LabService	×
Hello! This is an Axis2 Web Service!	

Part 5: Creating the client code

In this section of the lab, a Java Web services client will be created to interact with the Web Service that has been created, deployed, and started.

- ____7. Import the client implementation code.
 - _____a. In the AST **Project Explorer** panel, expand **WSFPLab1Client.** This is the client project that was created by **AST** at the same time the Web Service was created. It contains the client side artifacts and files but does not implementation code. In the following steps you will import a template for the implementation code for a simple client and will make the changes needed for it to run against the Web service that you have installed.
 - _____b. Expand Java Resources and then expand src. Right click on the package named com.ibm.was.wssample.lab and then click on Import.

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	Analysis	•	6.1: Both th	e name and	LabServiceP	WSFPLab1C	lient/src/com/ib	line 30
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____ c. On the **Import** panel select File System and click **Next**.

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e lect nport resources from the local file system into an existing project.	Ľ
Select an import source:	
type filter text	
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_____d. Navigate to the C:\Labfiles\JAX-WS directory and click OK.

Import from directory	? ×
Select a directory to import from.	
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Folder: JAX-WS	
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____e. Select the checkbox on the left next to **simple.** Then on the right make sure to select only the checkbox for the **ClientForTopDownLab.java**. Click **Finish**.

🌐 Import				×
File system Import resources from the local file system.				
From directory: C:\Labfiles\JAX-WS			•	Browse
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Filter Types Select All Desel Into folder: WSFPLab1Client/src/com/ibm/	ect All	e/beta/lab		Bro <u>w</u> se
Options	varning			
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• Create selected folders only				
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8. Modify the client code - **ClientForTopDownLab.java** is built from a template for a JAX-WS standalone client. It must be modified so that it will work for this lab.

The lines that will require changes are preceded by one or more lines of the form:

//! Change - <instructions>

You will need to read the instructions and make the appropriate modifications.

<u>Until you make the changes needed, the file will fail compilation – this is deliberate.</u> Reference the wsdl that is in your browser window from the earlier step to identify the values to use for some of the changes you will need to make.

____a. Some of the statements in ClientForTopDownLab.java must be changed based on your environment. In the AST, expand the package **com.ibm.was.wssample.beta.lab.** Double click on the **ClientForTopDownLab.java** file contained within, to edit it.

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_____ 9. Change #1

Change from:

```
//! Change - The package name must agree with the package name where this
//! Change - file is placed in AST
package ???;
```

To:

```
//! Change - The package name must agree with the package name where this
//! Change - file is placed in AST
package com.ibm.was.wssample.beta.lab;
```

_____ 10. Change #2

Change from:

```
//! Change - The package name must agree with the package name where this
//! Change - file is placed in AST but use "/" as delimiter instead of "."
private static final String PACKAGE_NAME = ???;
//! Change - The value of the name attribute from
//! Change - the <wsdl:service ... > element
private static final String SERVICE_NAME = ???;
//! Change - The value of the "name" attribute from
//! Change - the <wsdl:port ... > element
private static final String PORT_NAME = ???;
To:
```

```
//! Change - The package name must agree with the package name where this
//! Change - file is placed in AST but use "/" as delimiter instead of "."
    private static final String PACKAGE_NAME = "com.ibm.was.wssample.beta.lab";
//! Change - The value of the name attribute from
//! Change - the <wsdl:service ... > element
    private static final String SERVICE_NAME = "LabService";
//! Change - The value of the "name" attribute from
//! Change - the <wsdl:port ... > element
private static final String PORT NAME = "LabServicePort";
```

_____ 11. Change #3

Change from:

```
//! Change - the URL to use to contact the Web Service
    private static final String
    URL_ENDPOINT = ???;
```

To (Use the endpoint appropriate for your system):

```
//! Change - the URL to use to contact the Web Service
    private static final String
    URL_ENDPOINT = "http://jim667:9080/WSFPLab1/LabService";
```

_____ 12. Change #4

Change from:

```
//! Change - Next real line is really like:
//! Change - <wsdl:portType.name> portTypeName =
//! Change - service.getPort(QNAME_PORT,<wsdl:portType.name>.class);
??? portTypeName = service.getPort(QNAME_PORT, ???.CLASS);
```

To:

```
//! Change - Next real line is really like:
//! Change - <wsdl:portType.name> portTypeName =
//! Change - service.getPort(QNAME_PORT,<wsdl:portType.name>.class);
LabServicePortType portTypeName = service.getPort(QNAME_PORT,
LabServicePortType.class);
```

_____ 13. Change #5

Change from:

```
//! Change - this line so that it is:
//! Change - String replyString = portTypeName.<operationName>(args);
//! Change - where you need to change <operationName> to the operation to invoke
//! Change - and "args" will be arguments to that operation
String replyString = portTypeName.???;
```

_____ 14. To::

```
//! Change - this line so that it is:
//! Change - String replyString = portTypeName.<operationName>(args);
//! Change - where you need to change <operationName> to the operation to invoke
//! Change - and "args" will be arguments to that operation
String replyString = portTypeName.submit("Welcome to Web Services");
```

- _____ 15. Save your changes with Ctrl + S.
- _____ 16. Changing the path.
 - ____a. Before you can run the client code, you must change the build path being used. In the Project Explorer right-click on **WSFPLab1Client** and select **Properties**.

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- Properties for WSFPLab2 _ 0 × type filter text Java Build Path Info 🍄 Order and Export 进 Source 🛛 🗁 Projects 🛛 📑 Libraries BeanInfo Path Build class path order and exported entries: Builders (Exported entries are contributed to dependent projects) - J2EE Module Dependenci Java Build Path WSFPLab2/src Up 🗄 Java Code Style □ ■ JRE System Library [WebSphere v6.1 JRE] 🗄 Java Compiler 🔲 🛋 WebSphere Application Server v6.1 [WebSpher - Javadoc Location 🔲 🛋 Web App Libraries - JSP Fragment EAR Libraries Select All Profile Compliance and Value 🔲 📓 com.ibm.jaxws.thinclient_6.1.0.jar - G:\IBM\Wi Project Facets Deselect All Project References - Qualities of Service - Server - SQLJ Applications - Targeted Runtimes - Task Tags - Validation Web Content Settings - Web Project Settings - WS-I BSP Compliance + XDoclet • • . ? OK Cancel
- ____b. Select Java Build Path. Then select the Libraries tab.

- Properties for WSFPLab2 type filter text **Java Build Path** Info 😕 Source 🛛 🗁 Projects 🛛 🛤 Libraries 🍄 Order and Export BeanInfo Path Builders JARs and class folders on the build path: J2EE Module Dependenci 🗄 📷 EAR Libraries Add JARs... Java Build Path 🗄 🔜 JRE System Library [WebSphere v6.1 JRE] 🗄 Java Code Style Add External JARs... 🗄 🔜 Web App Libraries 🗄 Java Compiler 🗄 🚎 WebSphere Application Server v6.1 [WebSphere Applic Javadoc Location Add Variable ... JSP Fragment Add Library.... - Profile Compliance and Va **Project Facets** Add ⊆lass Folder... - Project References - Qualities of Service Edit... -Refactoring History Server Remove SQLJ Applications - Targeted Runtimes Migrate JAR Ele ... - Task Tags - Validation - Web Content Settings - Web Project Settings WS-I BSP Compliance XDoclet • • . ? OK Cancel
- ____ c. Select the button for Add External JARs.

_____d. Select the IBM WebSphere Thin Client for Web Services jar file by navigating to:

C:\WebSphere\Appserver\Runtimes

and selecting the jar named **com.ibm.jaxws.thinclient_6.1.0.jar** and clicking **Open.**

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____e. In the Libraries list, select the entry named:

WebSphere Application Server v6.1[WebSphere Application Server v6.1stub]

Properties for WSFPLab2 type filter text Java Build Path 6. Info 进 Source 🗁 Projects 📑 Libraries 😽 Order and Export BeanInfo Path Builders JARs and class folders on the build path: J2EE Module Dependenci 🕀 🚽 com.ibm.jaxws.thinclient_6.1.0.jar - G:\IBM\WebSpher(Add JARs... Java Build Path 🗄 📷 EAR Libraries 🗄 Java Code Style Add External JARs... 🗄 🛋 JRE System Library [WebSphere v6.1 JRE] 🗄 Java Compiler 🕀 📷 Web App Libraries Add Variable... Javadoc Location 😟 🛋 WebSphere Application Server v6.1 [WebSphere Applic - JSP Fragment Add Library.... - Profile Compliance and Va Project Facets $\mathsf{Add}\,\underline{\mathsf{C}}\mathsf{lass}\,\mathsf{Folder}\dots$ **Project References** Qualities of Service <u>E</u>dit..., **Refactoring History** Server Remove SQLJ Applications Targeted Runtimes Migrate JAR Ele.. Task Tags Validation Web Content Settings Web Project Settings WS-I BSP Compliance ⊕ XDoclet • 4 4 . ? OK Cancel

and click Remove.

___ f. Click OK.

_____ 17. Running the client code.

____a. Expand WSFPLab1Client from the Project Explorer in the AST, expand Java Resources, expand src, expand simple and select ClientForTopDown.java

🖶 J2EE - ClientForTopDownLab.java - IBM We	bSphere Application Server Toolkit (Beta Refre	sh), ¥6.1.1				
Eile Edit Source Refactor Navigate Search	<u>Project Data Run Window Help</u>					
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AX-WS Web Services	<pre>BindingProvider.ENDPOINT_ADDRESS_PROPERTY, ORL_ENDPOINT //! Change - this line so that it is: //! Change - String replyString = portTypeName.<operationname>(args) //! Change - where you need to change <operationname> to the operati //! Change - and "args" will be arguments to that operation String replyString = portTypeName.submit("Welcome to Web Ser System.out.println("reply = " + replyString);</operationname></operationname></pre>					
E Labservice.java E LabservicePortProxy.java E LabservicePortType.java				<u> </u>		
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____b. Right-click ClientForBottomUp.java and select Run As and click Java Application.

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____ c. The following output should appear in the console of the AST.

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      Problems
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Summary

In this lab, you took a top-down development approach to build a Web Service starting with a WSDL file containing a description of the Web Service. You performed the following steps to do this:

- 1. Created a Dynamic Web Project in the AST
- 2. Imported the WSDL File into the Dynamic Web Project
- 3. Created a Web Service From the WSDL File and exported the EAR file containing that Web Service
- 4. Installed the EAR file, started the Web Service application, and performed simple verification
- 5. Developed a Web Services client for the Web Service, ran the client code and interacted with the Web Service you created.