Using the Java EE Service Engine to Create a Composite Application

Sun Microsystems, Inc.
4150 Network Circle
Santa Clara, CA 95054
U.S.A.

Part No: 820–7006
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081223@21808

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This tutorial is designed to showcase the Java EE Service Engine's functionality. This example is designed to show how the Java EE Service Engine implements a Web Service from a WSDL file accessing it through the HTTP Binding Component.

We will create a Composite Application so that Java EE SE will be used in the service and we will then run a test case to test our service. This tutorial also uses the features of the HTTP Binding Component.

What You Need to Know

These topics provide information you need to know before you start the tutorial:

- "Tutorial Requirements" on page 6
- "Tutorial Scenario" on page 6

What You Need to Do

This tutorial includes instructions on how to perform these tasks:

- "Configuring the Tutorial Environment" on page 7
- "Starting the GlassFish Software" on page 7
- "Enabling the JBI Framework" on page 9
- "Creating a Composite Application Project" on page 19
- "Building and Deploying the Composite Application Project" on page 22
- "Testing the Composite Application" on page 23

Tutorial Requirements

Before you proceed, make sure you review the requirements in this section.

Prerequisites

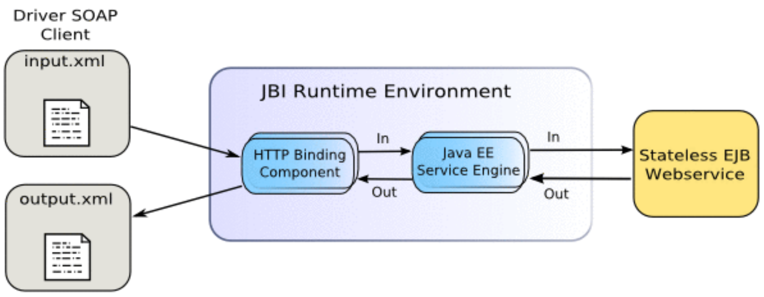
This tutorial assumes that you have some basic programming experience with the Java language and platform, and knowledge of the NetBeans IDE.

System Requirements

This tutorial assumes that your system meets the requirements specified in the System Requirements topic of the NetBeans IDE 6.1 Release Notes. NetBeans IDE runs on operating systems that support the Java VM (Virtual Machine).

Tutorial Scenario

The following sample illustrates how Java EE Service Engine implements a Web Service from WSDL.



Configuring the Tutorial Environment

Before you deploy your composite application, the application server and the appropriate JBI components must be configured correctly and must be running.

The following software is required for this tutorial:

- GlassFish ESB (Installation Instructions) includes the following:
  - GlassFish V2 Update Release 2 (UR2)
  - NetBeans IDE 6.1
  - Open ESB core components
  - Java Business Integration (JBI) service engines
  - Java Business Integration (JBI) binding components
  - Java Business Integration (JBI) component tooling
- JDK (Java Development Kit) 6

Note – Glassfish ESB installer installs all the components including NetBeans IDE. To download only the NetBeans IDE, see NetBeans IDE Download.

Note – You must have the JDK (Java Development Kit) software installed and JAVA_HOME set as an environment variable, prior to installing the GlassFish ESB or the installation will halt midway. See Installing the JDK Software and Setting JAVA_HOME for details.

Starting the GlassFish Software

The Java EE Service Engine starts together with GlassFish. Before deploying and performing test runs of a Composite Application project in the NetBeans IDE, make sure that the GlassFish Application Server is started.

▼ To Check the Status of the GlassFish V2 Application Server in the NetBeans IDE

1 **If the Services window is not visible, on the NetBeans IDE menubar choose** `Window` → `Services`.

2 **In the Services window, expand the** `Servers` **node.**

The `Servers` node should contain a `GlassFish V2` subnode. If the `GlassFish V2` node is not visible, see "To Register the GlassFish V2 Application Server with the NetBeans IDE" on page 8.

If a green arrow icon appears on the `GlassFish V2` node, the server is running. If no green arrow icon appears, see "To Start the GlassFish V2 Application Server in the NetBeans IDE" on page 8.

▼ To Register the GlassFish V2 Application Server with the NetBeans IDE

1. **If the Services window is not visible, on the NetBeans IDE menubar choose `Window` → `Services`.**
2. **In the Services window, right-click the `Servers` node and choose `Add Server` from the pop-up menu.**

   The Add Server Instance dialog box opens.
3. **In the Choose Server page of the dialog box, select GlassFish V2 from the Server drop-down list.**
4. **If you want to change the server name that the IDE uses to identify the server, type it in the Name field.**
5. **Click `Next`.**

   The Platform Location Folder page opens.
6. **In the Platform Location field, click `Browse` and select the installation location of the application server.**
7. **Select the `Register Local Default Domain` option and click `Next`.**
8. **Type the user name and password for the domain's administrator.**

   If you accepted the default values during the installation, the user name is `admin` and the password is `adminadmin`.
9. **Click `Finish`.**

▼ To Start the GlassFish V2 Application Server in the NetBeans IDE

1. **On the NetBeans IDE page, in the Services window, right-click the `GlassFish V2` node and choose `Start`.**

2 **Wait until the following message appears in the Output window:**

`"Application server startup complete."`

When the server is running, the IDE displays a green arrow icon on the GlassFish V2 node.

The Java EE Service Engineis represented as `sun-javaee-engine` in the Services window of the IDE, under the `GlassFish V2`→`JBI`→`Service Engines` nodes.

Enabling the JBI Framework

In some cases, you might have to enable the JBI framework to deploy a Java EE Service Engine component. The following command enables the JBI framework:

```
asadmin enable --user adminuser JBIFramework
```

Creating an EJB Module Project

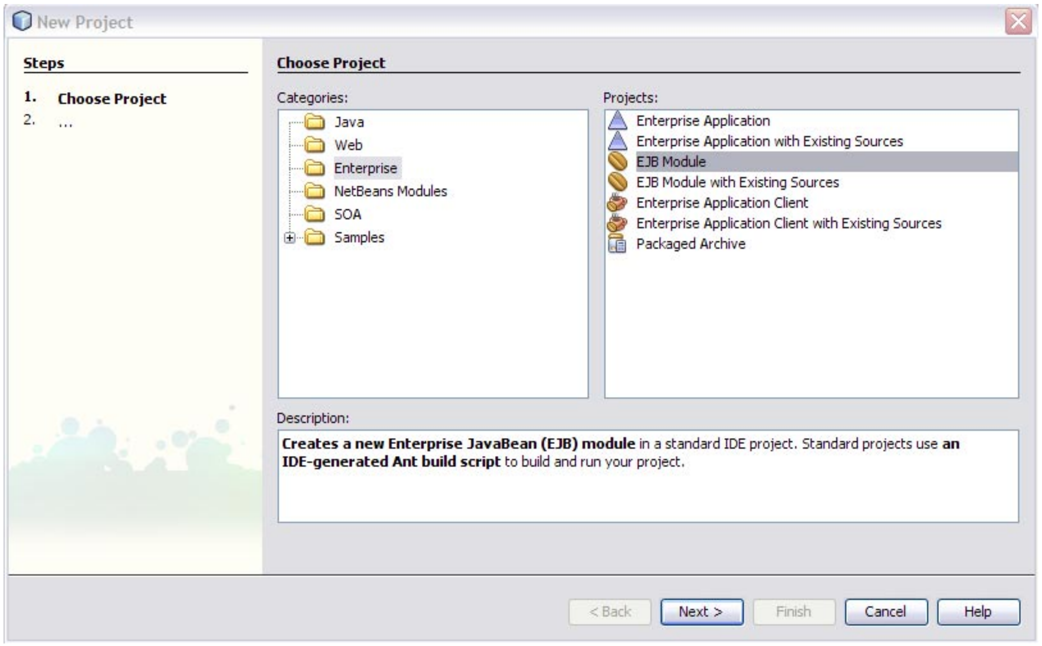
In this section you will create a new EJB module project called `Hello`. You will also create a WSDL document, a web service and then clean and build the EJB module project.

▼ To Create the EJB Module Project

1 **From the NetBeans IDE's main menu, choose `File` → `New Project`.**

The New Project wizard opens.

2 **In the Categories list, select the `Enterprise` node and in the Projects list select `EJB Module`.**

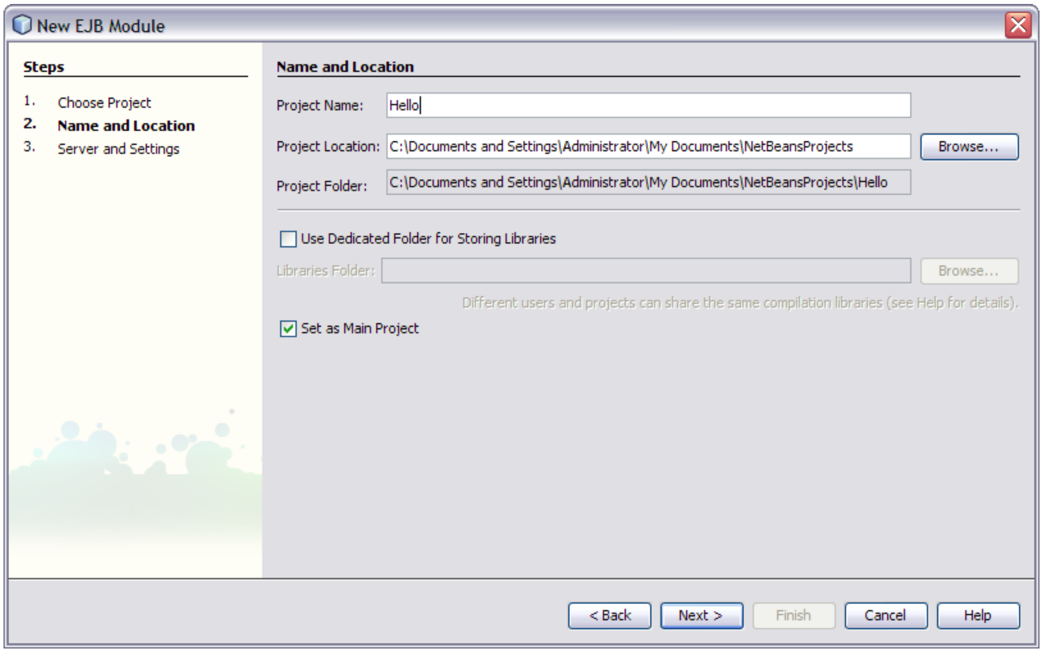


Creates a new Enterprise JavaBean (EJB) module in a standard IDE project. Standard projects use **an IDE-generated Ant build script** to build and run your project.

3 **Click `Next`.**

4 **In the Project Name field, type `Hello`.**

You may choose to change the Project Location or use the default location.



Project Name: Hello

Project Location: C:\Documents and Settings\Administrator\My Documents\NetBeansProjects

Project Folder: C:\Documents and Settings\Administrator\My Documents\NetBeansProjects\Hello

☐ Use Dedicated Folder for Storing Libraries

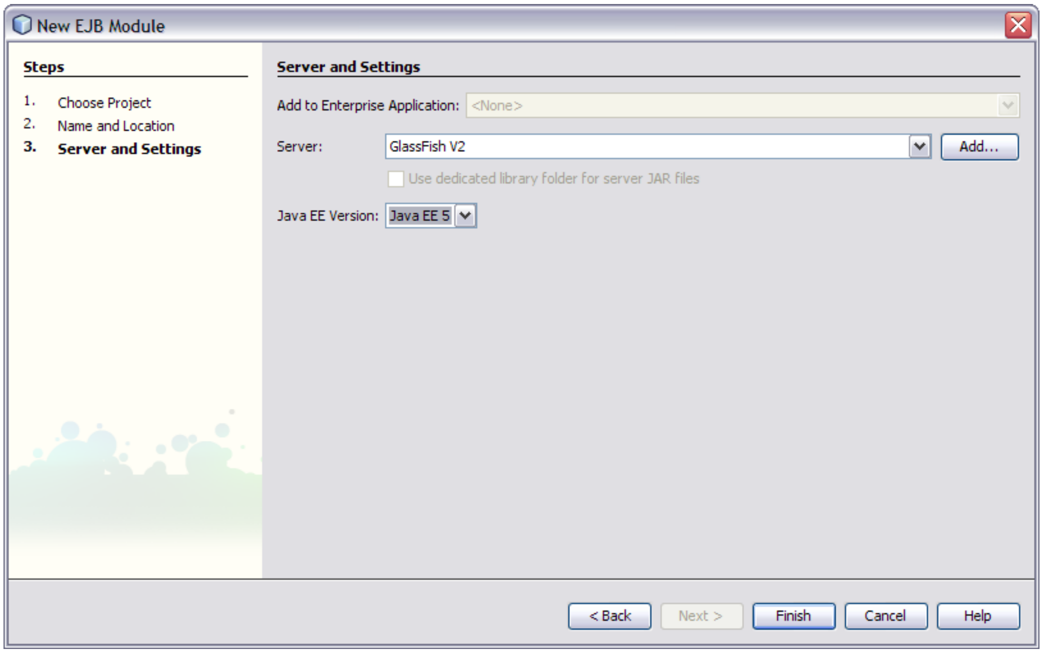
Libraries Folder:

Different users and projects can share the same compilation libraries (see Help for details).

☑ Set as Main Project

5 **Click** `Next`.

6 **In the Server field select your server and in Java EE Version field select the appropriate version.**



Server and Settings

Add to Enterprise Application: <None>

Server: GlassFish V2 Add...

Use dedicated library folder for server JAR files

Java EE Version: Java EE 5

7 **Click** `Finish`**.**

The Projects window now contains a node for a EJB Module project called Hello.

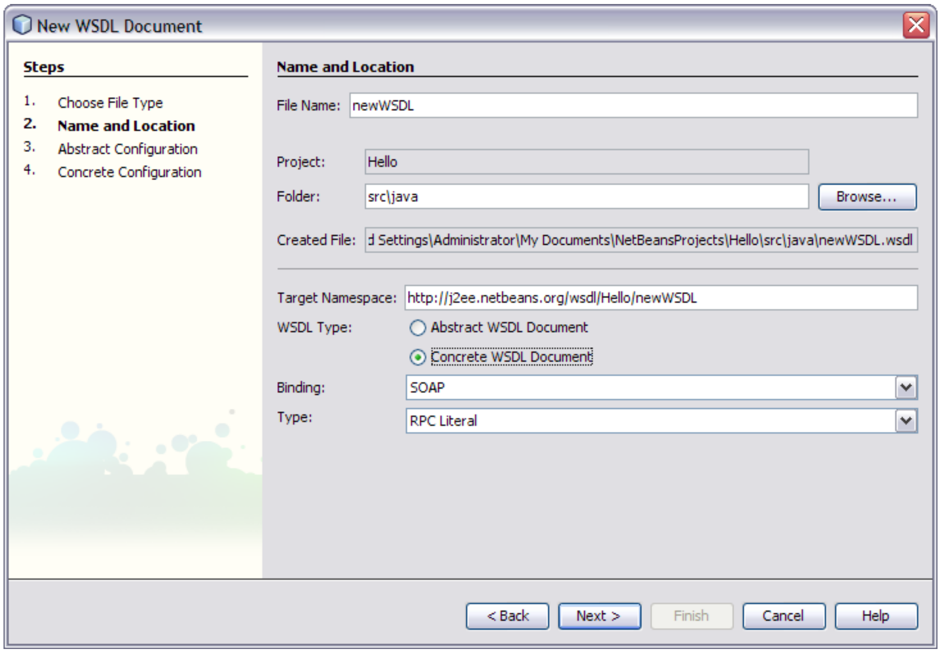
▼ To Create a WSDL Document

1 **In the Projects window of the IDE, right-click the** `Hello` **node and choose** `New` → `WSDL Document`**.**

2 **In the File Name field type** `HelloWSDL`**.**

3 **In the WSDL Type, select the** `Concrete WSDL Document` **option.**

4 **In the Binding field, select** `SOAP` **and in the Type field, select** `RPC Literal`**.**


New WSDL Document

Steps

1. Choose File Type
2. **Name and Location**
3. Abstract Configuration
4. Concrete Configuration

Name and Location

File Name: newWSDL

Project: Hello

Folder: src\java

Created File: d Settings\Administrator\My Documents\NetBeansProjects\Hello\src\java\newWSDL.wsdl

Target Namespace: http://j2ee.netbeans.org/wsdl/Hello/newWSDL

WSDL Type: Abstract WSDL Document [✓ Concrete WSDL Document]

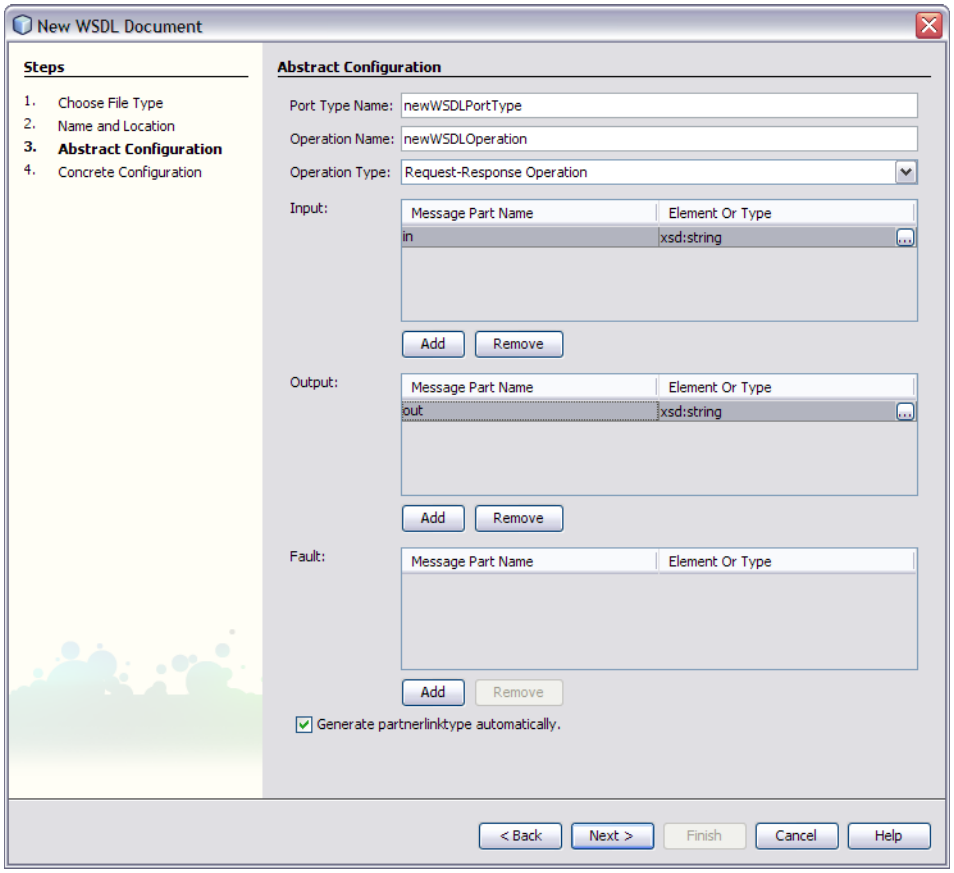
Binding: SOAP

Type: RPC Literal

5 **Click** `Next`**.**

6 **On the Abstract Configuration page, in Input, under the Message Part Name double-click** `Part1` **and change the value to** `in` **and press Return.**

7 **Doing the same way in Output, change** `Part2` **to** `out` **under Message Part Name and press Return.**



Abstract Configuration

Port Type Name: newWSDLPortType

Operation Name: newWSDLOperation

Operation Type: Request-Response Operation

Input:

Message Part Name	Element Or Type
in	xsd:string

Output:

Message Part Name	Element Or Type
out	xsd:string

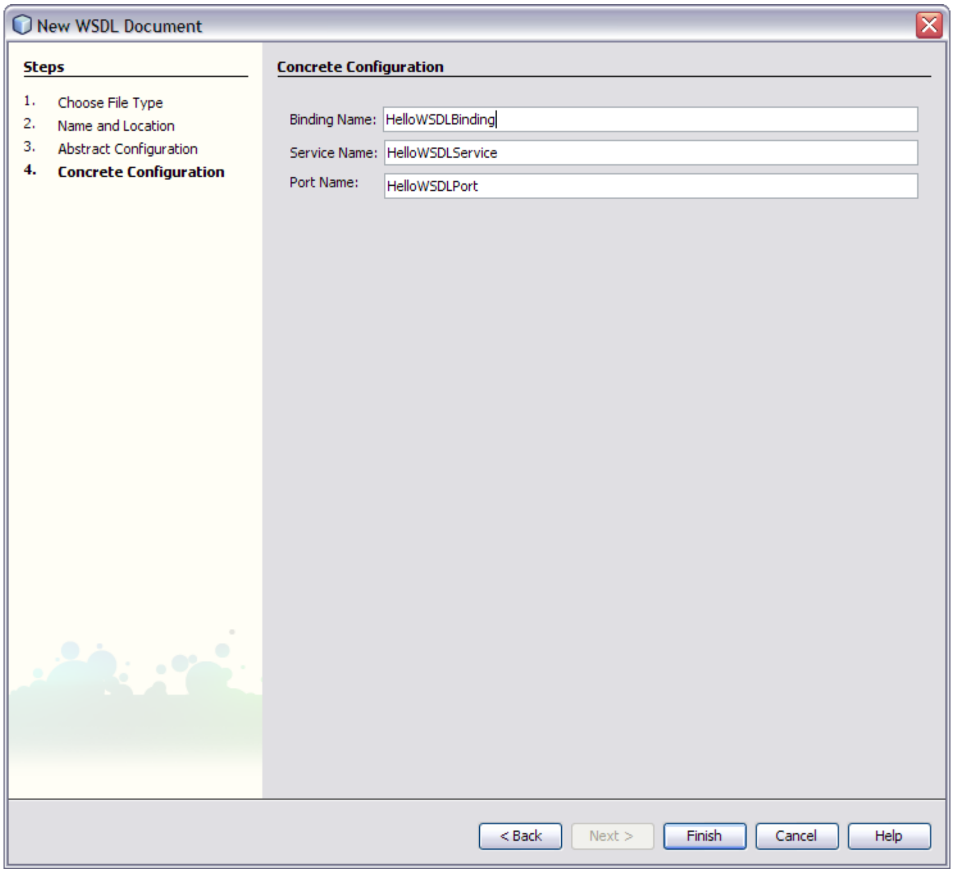
Fault:

Message Part Name	Element Or Type

✓ Generate partnerlinktype automatically.

8 **Click `Next`.**

9 **Choose the defaults and click `Finish` on the Concrete Configuration page.**

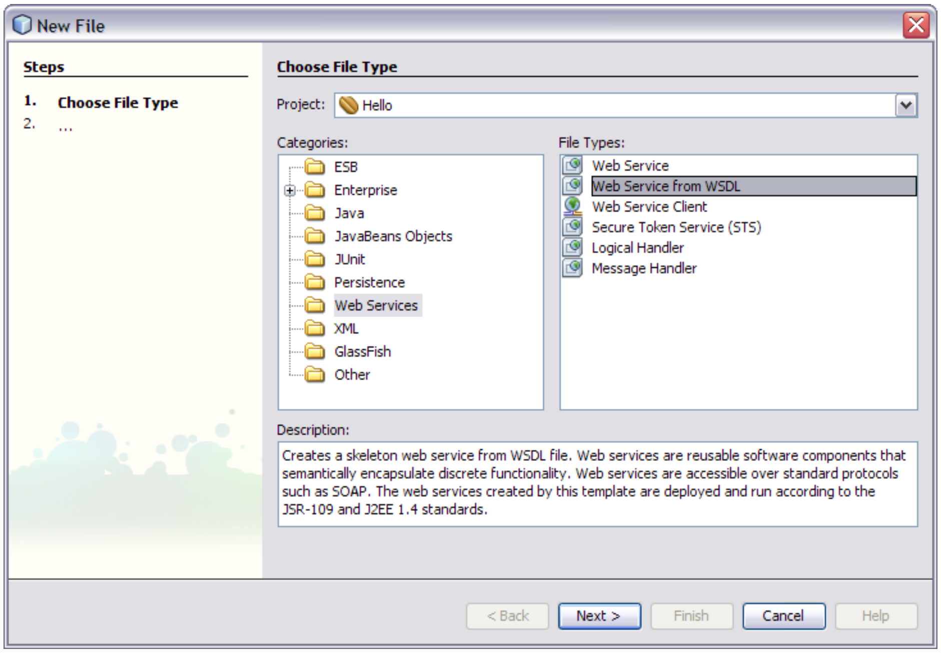


Binding Name: HelloWSDLBinding
Service Name: HelloWSDLService
Port Name: HelloWSDLPort

▼ To Create a Web Service from WSDL

1 **In the Projects window of the IDE, right-click the** `Hello` **node and choose** `New` → `Other`**.**

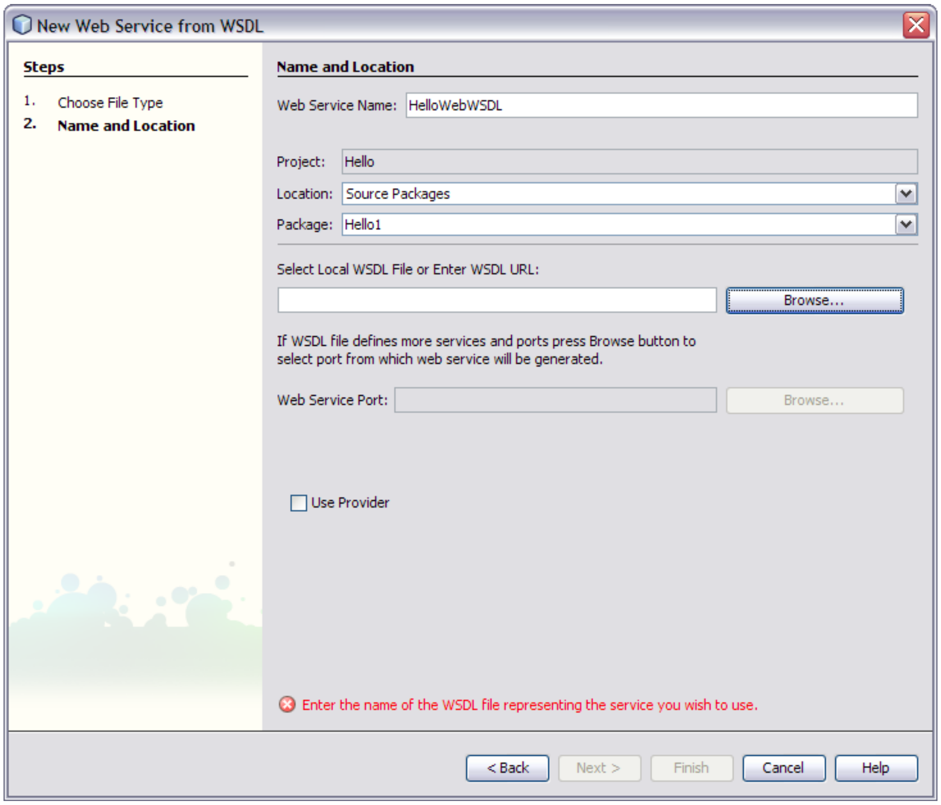
2 **In the Categories list select** `Web Services` **and in File Types select** `Web Service from WSDL`**.**



Creates a skeleton web service from WSDL file. Web services are reusable software components that semantically encapsulate discrete functionality. Web services are accessible over standard protocols such as SOAP. The web services created by this template are deployed and run according to the JSR-109 and J2EE 1.4 standards.

3 **Click** `Next`**.**

4 **Type the Web Service Name as** `HelloWebWSDL` **and the Package name as** `Hello1`**.**



Web Service Name: HelloWebWSDL

Project: Hello

Location: Source Packages

Package: Hello1

Select Local WSDL File or Enter WSDL URL:

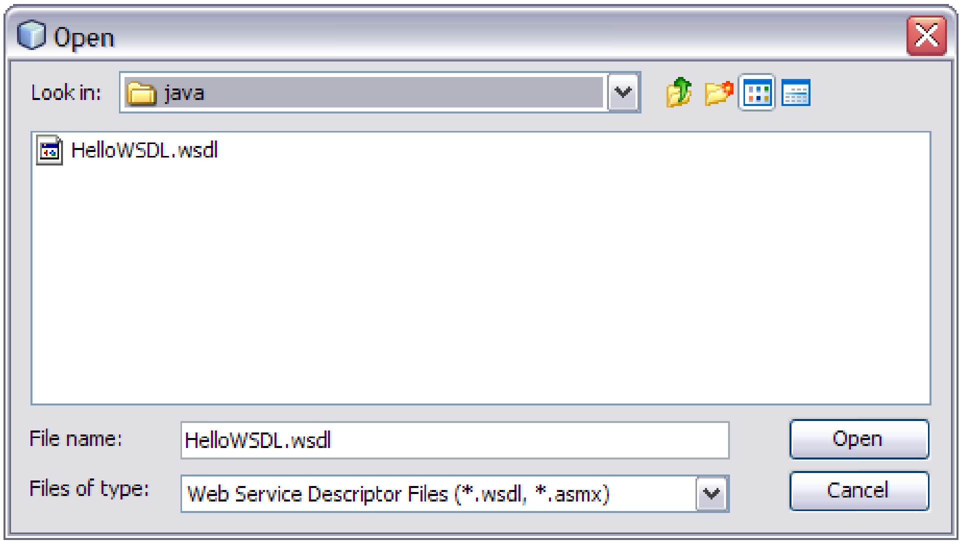
If WSDL file defines more services and ports press Browse button to select port from which web service will be generated.

Web Service Port:

☐ Use Provider

Enter the name of the WSDL file representing the service you wish to use.

5 **Click the Browse button to select local WSDL file or the WSDL URL and then click** `Open`**.**



Look in: java

HelloWSDL.wsdl

File name: HelloWSDL.wsdl

Files of type: Web Service Descriptor Files (*.wsdl, *.asmx)

Note – This WSDL File or the WSDL URL is located in the NetBeans Projects folder. For example: `C:\Documents and Settings\Administrator\My Documents\NetBeansProjects\Hello\src\java` This path is valid if you have used the default project location while creating the EJB module project.

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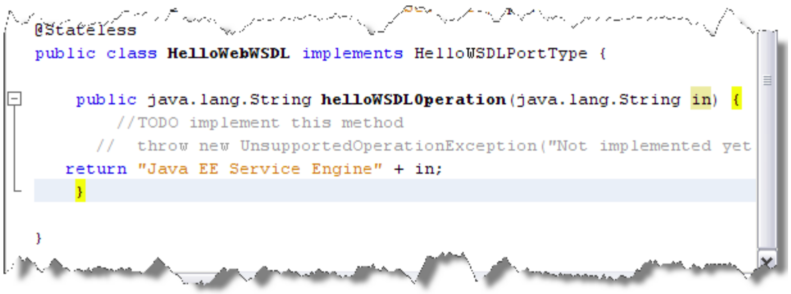
6. **Click** `Finish`**.**

7. **Click the Source button and add the following line to the** `public class`**.**

```
return "Java EE Service Engine" + in;
```



```
@Stateless
public class HelloWebWSDL implements HelloWSDLPortType {

    public java.lang.String helloWSDLOperation(java.lang.String in) {
        //TODO implement this method
      //   throw new UnsupportedOperationException("Not implemented yet
   return "Java EE Service Engine" + in;
    }

}
```

8. **From the NetBeans IDE toolbar click** `Save All` **button.**

▼ To Clean and Build the EJB Module Project

- **In the Projects window right-click the `Hello` node and choose `Clean and Build`.**

  When the build is complete the Output window reports `BUILD SUCCESSFUL`.

  If the Output window is not visible, choose `Window` → `Output` → `Output`.

Creating a Composite Application Project

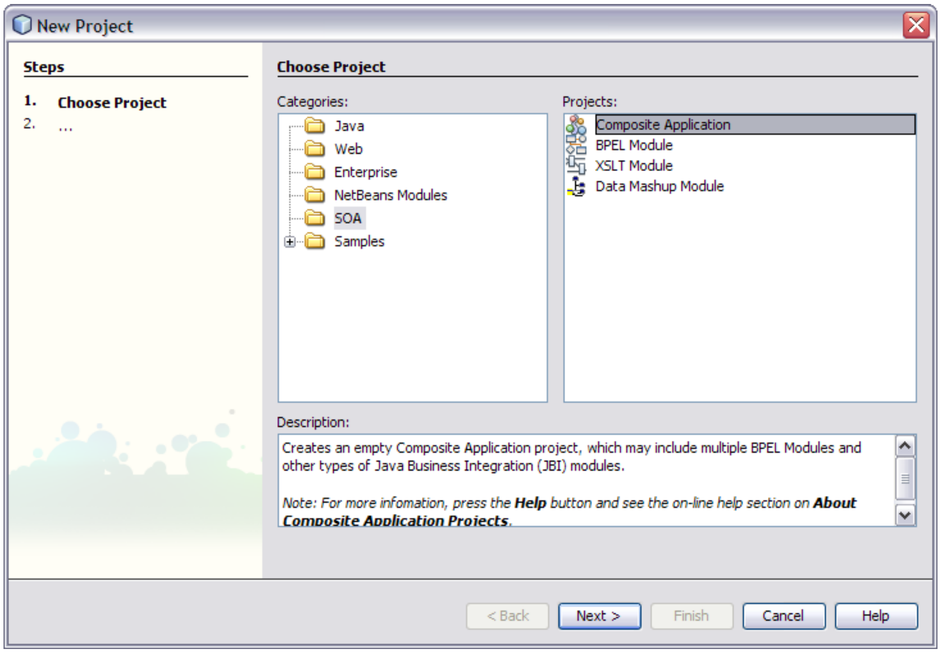
A EJB Module project is not directly deployable. You must first add a EJB Module project, as a JBI module, to a Composite Application project. You can then deploy the Composite Application project. Deploying the project makes the service assembly available to the application server and enables its service units to run.

▼ To Create a Composite Application Project

1. **From the NetBeans IDE's main menu, choose `File` → `New Project`.**

   The New Project wizard opens.

2. **In the Categories list, select the `SOA` node and in the Projects list select `Composite Application`.**

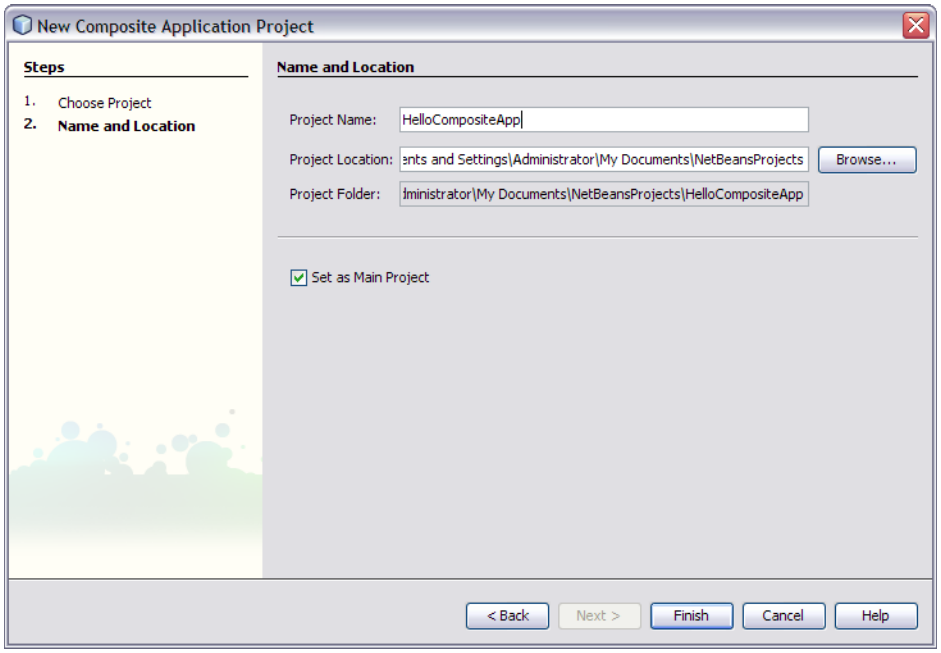


Creates an empty Composite Application project, which may include multiple BPEL Modules and other types of Java Business Integration (JBI) modules.

*Note: For more infomation, press the **Help** button and see the on-line help section on **About Composite Application Projects**.*

3 **Click `Next`.**

4 **In the Name and Location page, change the project name to `HelloCompositeApp`, and specify the location of project files or just use the default location.**



Project Name: HelloCompositeApp

Project Location: ents and Settings\Administrator\My Documents\NetBeansProjects

Project Folder: dministrator\My Documents\NetBeansProjects\HelloCompositeApp

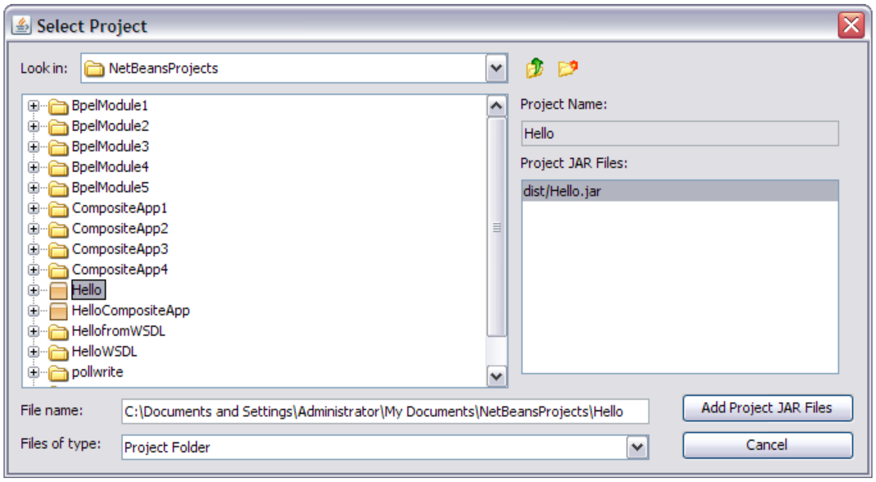
✓ Set as Main Project

5 **Leave the Set as Main Project option selected and click** `Finish`**.**

6 **To add the EJB Module as a JBI module to the Composite Application project, right-click** `HelloCompositeApp` **and choose** `Add JBI Module`**.**

The `Select Project` dialog box opens.

7 **Select the** `Hello` **project you created earlier and select** `dist/Hello.jar` **under Project JAR Files and click** `Add Project JAR Files` **button.**



The Select Project dialog box closes and the `Hello.jar` file is added to the JBI Modules node of the `HelloCompositeApp` Composite Application in the Projects window.

Building and Deploying the Composite Application Project

Deploying the project makes the service assembly available to the application server, which allows its service units to run. Before you deploy the EJB Module project, you must add the JBI module to the deployment project.

▼ To Build and Deploy the Composite Application

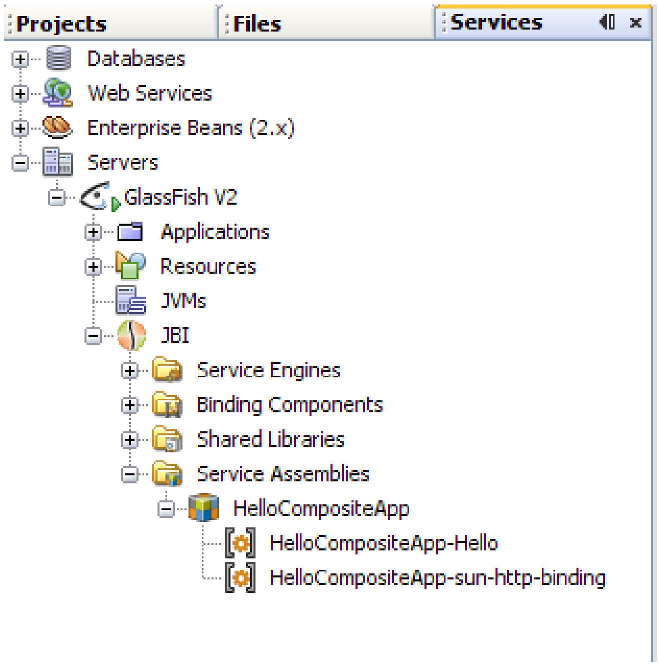
1. **Right-click the** `HelloCompositeApp` **node, and choose** `Build` **from the pop-up menu.**

   When the build is complete the Output window reports `BUILD SUCCESSFUL`.

2. **Right-click the** `HelloCompositeApp` **node, and choose** `Deploy`**.**

   Deployment is successful when you see the `BUILD SUCCESSFUL` message in the build.xml (run) tab of the Output window.

3. **Open the Services window of the IDE and expand** `Servers` → `GlassFish V2` → `JBI` → `Service Assemblies` **to see your new deployed Service Assembly.**



If you do not see the deployed project, right-click the Service Assemblies node and choose `Refresh`.

Testing the Composite Application

You can enhance the Composite Application project by adding test cases, binding to the operation, supplying input, and then using the Tester. You have to first add a test case and then run the test case.

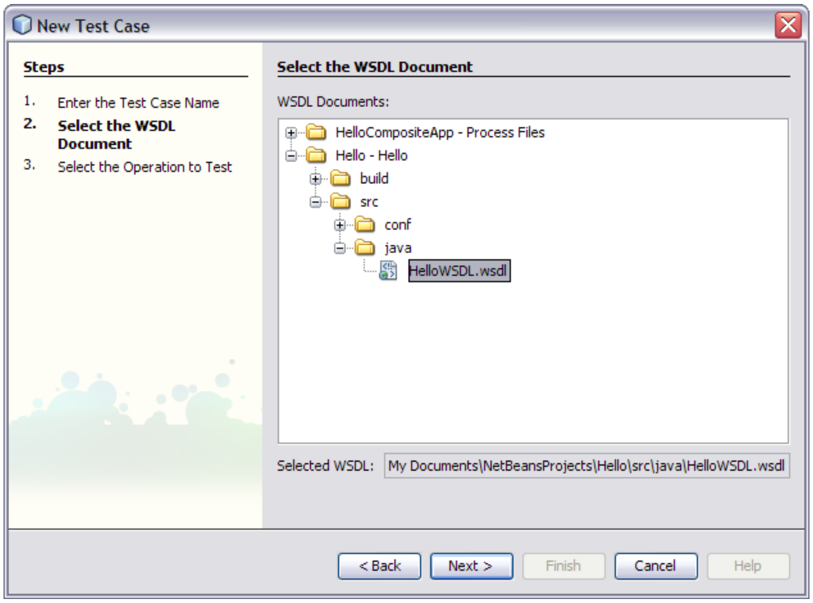
▼ To Add a Test Case

1 **In the Projects window of the IDE, expand the** `HelloCompositeApp` **project node, right-click the** `Test` **node, and choose** `New Test Case` **from the pop-up menu.**

The New Test Case wizard opens.

2 **Accept the default test case name, TestCase1, and click** `Next`**.**

3 **From the Select the WSDL Document page, expand the** `Hello - Hello`**,** `src`**,** `java` **nodes, and select** `HelloWSDL.wsdl`**.**


New Test Case

Steps

1. Enter the Test Case Name
2. **Select the WSDL Document**
3. Select the Operation to Test

Select the WSDL Document

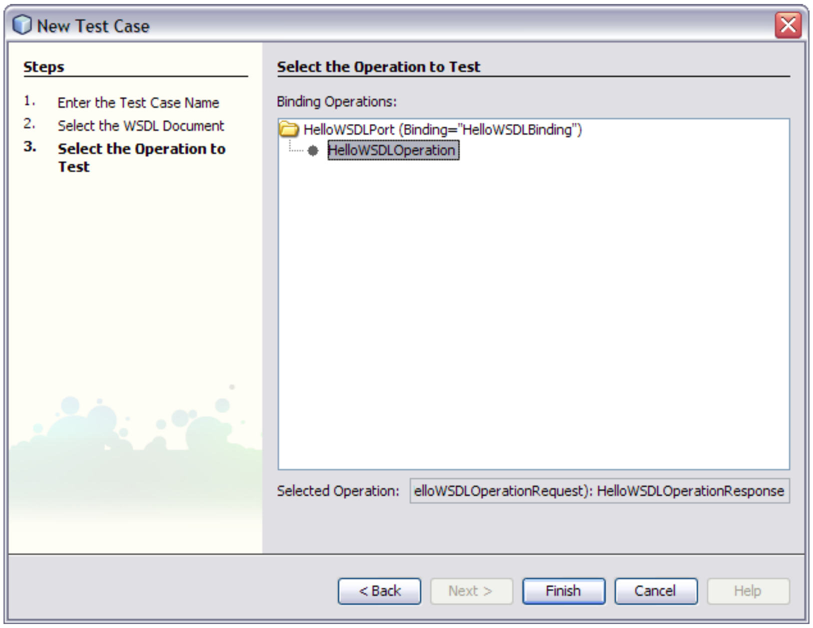
WSDL Documents:

```
HelloCompositeApp - Process Files
Hello - Hello
    build
    src
        conf
        java
            HelloWSDL.wsdl
```

Selected WSDL: My Documents\NetBeansProjects\Hello\src\java\HelloWSDL.wsdl

4 **Click** `Next`**.**

5 **From the Select the Operation to Test page, select** `HelloWSDLOperation` **and click** `Finish`**.**


New Test Case
Steps
1. Enter the Test Case Name
2. Select the WSDL Document
3. Select the Operation to Test
Select the Operation to Test
Binding Operations:
HelloWSDLPort (Binding="HelloWSDLBinding")
HelloWSDLOperation
Selected Operation:
elloWSDLOperationRequest): HelloWSDLOperationResponse
< Back
Next >
Finish
Cancel
Help

A new TestCase1 node is added under the project's Test node in the Projects window, containing two subnodes, `Input` and `Output`.

The Source Editor appears containing the Input file, `Input.xml`

Note – If the Source Editor does not contain a tab for Input.xml, double-click the Input node in the Projects window to open the file.

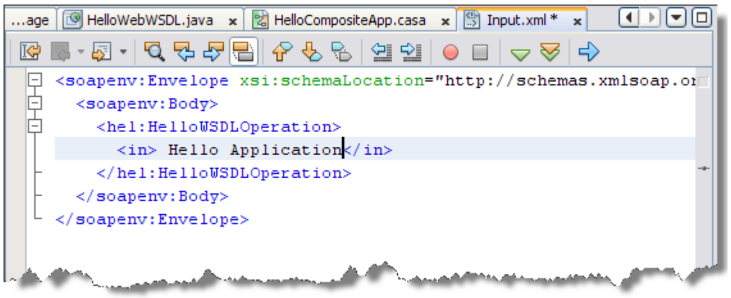
---

6 **From the Input.xml tab of the Source Editor, locate the line:**

```
<in>?string?</ in>
```

7 **Replace the string `?string?` with `Hello Application`, so that it appears as:**

```
<in> Hello Application</ in>
```



```
<soapenv:Envelope xsi:schemaLocation="http://schemas.xmlsoap.or
  <soapenv:Body>
    <hel:HelloWSDLOperation>
      <in> Hello Application</in>
    </hel:HelloWSDLOperation>
  </soapenv:Body>
</soapenv:Envelope>
```

8 **From the NetBeans IDE toolbar, click the Save All button.**

▼ To Run the Test Case

1 **In the Projects window, expand the `HelloCompositeApp` → `Test` → `TestCase1` nodes, right-click `TestCase1` for the specific test case, and then choose `Run`.**

In the Output window the first run correctly reports that it failed. This happens because the output produced does not match the (empty) `Output.xml` file, and the file's null content is replaced with the output of the first run.

2 **When the Overwrite Empty Output dialog box appears, click `Yes` to accept new output.**

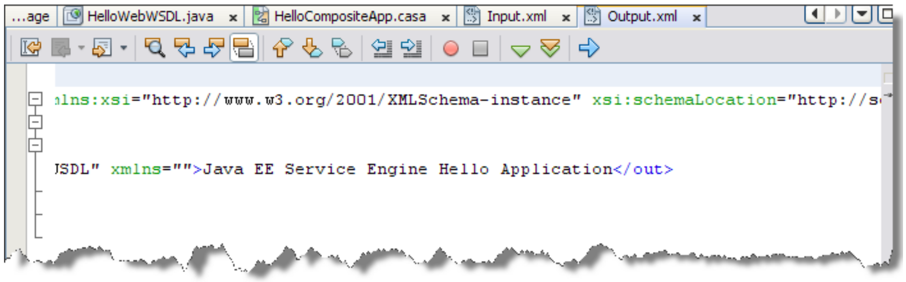
To compare the output with newly generated output, we have to right-click the generated Output file in the projects window and choose `Use Recent Result as Output` option. From the next run onwards the system compares the generated output with the `output.xml` file and provides the result.

3 **Run the test again.**

The test case is compared to the current output file and succeeds.

4 **To check the output, double-click the `Output` node under TestCase1.**

In the Output.xml tab, according to this tutorial example, the result should have a string as shown in the figure below.



```
lns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://s

JSDL" xmlns="">Java EE Service Engine Hello Application</out>
```

Summary

In this tutorial, you learned how the Java EE Service Engine implements a Web Service derived from WSDL, and you created and tested a composite application.

This tutorial demonstrates how to:

- Create a EJB Module project
- Create a WSDL document and a Web Service from WSDL
- Build and deploy a Composite Application project to GlassFish
- Create and run test cases