



# Processing an Order in a Purchase Order System



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

Part No: 820-0596  
December 2008

Copyright 2008 Sun Microsystems, Inc. 4150 Network Circle, Santa Clara, CA 95054 U.S.A. All rights reserved.

Sun Microsystems, Inc. has intellectual property rights relating to technology embodied in the product that is described in this document. In particular, and without limitation, these intellectual property rights may include one or more U.S. patents or pending patent applications in the U.S. and in other countries.

U.S. Government Rights – Commercial software. Government users are subject to the Sun Microsystems, Inc. standard license agreement and applicable provisions of the FAR and its supplements.

This distribution may include materials developed by third parties.

Parts of the product may be derived from Berkeley BSD systems, licensed from the University of California. UNIX is a registered trademark in the U.S. and other countries, exclusively licensed through X/Open Company, Ltd.

Sun, Sun Microsystems, the Sun logo, the Solaris logo, the Java Coffee Cup logo, docs.sun.com, Java, and Solaris are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and other countries. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. in the U.S. and other countries. Products bearing SPARC trademarks are based upon an architecture developed by Sun Microsystems, Inc.

The OPEN LOOK and Sun<sup>TM</sup> Graphical User Interface was developed by Sun Microsystems, Inc. for its users and licensees. Sun acknowledges the pioneering efforts of Xerox in researching and developing the concept of visual or graphical user interfaces for the computer industry. Sun holds a non-exclusive license from Xerox to the Xerox Graphical User Interface, which license also covers Sun's licensees who implement OPEN LOOK GUIs and otherwise comply with Sun's written license agreements.

Products covered by and information contained in this publication are controlled by U.S. Export Control laws and may be subject to the export or import laws in other countries. Nuclear, missile, chemical or biological weapons or nuclear maritime end uses or end users, whether direct or indirect, are strictly prohibited. Export or reexport to countries subject to U.S. embargo or to entities identified on U.S. export exclusion lists, including, but not limited to, the denied persons and specially designated nationals lists is strictly prohibited.

DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

# Contents

---

|   |    |
|---|----|
| <b>1 Processing an Order in a Purchase Order System</b> .....                   | 5  |
| Tutorial Requirements .....   | 6  |
| Prerequisites .....   | 6  |
| System Requirements .....   | 6  |
| Software Needed for the Tutorials .....   | 6  |
| Project Overview .....  | 6  |
| Scenario Message Flow .....   | 7  |
| Core System Pieces .....  | 7  |
| Configuring the Tutorial Environment .....                                      | 8  |
| ▼ To check the status of GlassFish .....  | 8  |
| ▼ To configure GlassFish .....  | 8  |
| ▼ To start GlassFish .....  | 9  |
| Creating a New Project .....  | 9  |
| ▼ To Create a New Project .....   | 9  |
| Creating the XML Schemas .....  | 10 |
| Creating the inventory.xsd Schema .....   | 10 |
| Creating the purchaseOrder.xsd Schema .....                                     | 14 |
| Creating and Configuring the WSDL Documents .....                               | 15 |
| Creating the InventoryService WSDL Document .....                               | 15 |
| Creating the POService WSDL Document .....                                      | 17 |
| Creating the InventoryService BPEL Process .....                                | 19 |
| ▼ To create the InventoryService BPEL process .....                             | 19 |
| ▼ To Create the InventoryService business process using the BPEL Designer ..... | 19 |
| ▼ To specify the business logic for the InventoryService BPEL process .....     | 24 |
| Create the POService BPEL Process .....   | 27 |
| ▼ To create the POService BPEL process .....                                    | 28 |
| ▼ To Create the POService business process using the BPEL Designer .....        | 28 |
| ▼ To specify the business logic for the POService business process .....        | 31 |

|  |    |
|--|----|
| Building the Project .....   | 35 |
| ▼ To compile and package the project .....                                 | 36 |
| Creating and Deploying the Composite Application .....                     | 36 |
| ▼ To create the Composite Application project and add the JBI module ..... | 36 |
| ▼ To build and deploy the Composite Application .....                      | 37 |
| Testing the HTTP Binding Component Sample Project .....                    | 37 |
| ▼ To run the HTTP-SOAP-PO-JBI project .....                                | 37 |
| Project Summary .....  | 39 |

# Processing an Order in a Purchase Order System

---

This tutorial demonstrates various features of the HTTP Binding Component while creating a purchase order composite application. The project illustrates how to use the HTTP Binding Component to receive and send SOAP messages over HTTP. For more information about the HTTP Binding Component, see the [Open ESB web site](#).

This tutorial uses the following JBI Components:

- HTTP Binding Component
- BPEL Service Engine

You can download and review the [HTTP Purchase Order Project](#) sample for this tutorial. This is the same project that is created as a result of completing all of the steps in this tutorial.

For more information about working with the NetBeans IDE, see the [Docs and Support](#) page on the NetBeans web site.

## What you need to know

The following sections provide instructions on how to create, build, and deploy the Purchase Order Project.

- [“Tutorial Requirements” on page 6](#)
- [“Project Overview” on page 6](#)
- [“Configuring the Tutorial Environment” on page 8](#)

## What you need to do

These links take you to what you need to know before you create the Purchase Order Project.

- [“Creating a New Project” on page 9](#)
- [“Creating the XML Schemas” on page 10](#)
- [“Creating and Configuring the WSDL Documents” on page 15](#)
- [“Creating the InventoryService BPEL Process” on page 19](#)
- [“Create the POService BPEL Process” on page 27](#)

- “Building the Project” on page 35
- “Creating and Deploying the Composite Application” on page 36
- “Testing the HTTP Binding Component Sample Project” on page 37
- “Project Summary” on page 39

## Tutorial Requirements

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

### Prerequisites

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

### System Requirements

This tutorial assumes that your system meets the requirements specified in the *System Requirements* topic of the *NetBeans 6.1 Release Notes*.

### Software Needed for the Tutorials

Before you begin, you need to install the following software on your computer: NetBeans IDE 6.1 with SOA and GlassFish V2. These are included in the [GlassFish ESB](https://open-esb.dev.java.net/Downloads.html) download available from <https://open-esb.dev.java.net/Downloads.html>.

## Project Overview

The purchase order handling system in this scenario is represented by a web service implemented using Sun Java Application Server with the JBI framework.

## Scenario Message Flow

The message flow of the Purchase Order scenario is as follows:

1. The web client, using some client-side scripting language such as JavaScript, takes the purchase order information entered into the web form and packages it into a SOAP message. The format of the SOAP message is defined using a WSDL.
2. The SOAP message is sent to a web service endpoint hosted by the HTTP Binding Component.
3. The HTTP Binding Component transforms the SOAP message into a Normalized Message. The Normalized Message is sent to the Normalized Message Router.
4. The Normalized Message Router routes the Normalized Message to the BPEL Service Engine.
5. The BPEL Service Engine interprets the purchase order information and properly invokes other BPEL processes to fulfill the request.
6. The BPEL Service Engine creates a response message in the form of a Normalized Message. The Normalized Message is sent to the Normalized Message Router.
7. The HTTP BC receives the response message and converts it to a SOAP message. The SOAP Message is sent back to the web client as a proper response as defined by the WSDL document.
8. The web client takes the response and creates a human-readable HTML page to notify the user that the purchase order was either accepted or rejected.

Duke's Book Store uses an automated purchase order system with an open interface through which anyone can make a purchase. To accomplish this they use the Java Business Integration framework. Each process is implemented using the BPEL language. Every interface is exposed as a WSDL, with SOAP over HTTP as the underlying messaging and transport.

## Core System Pieces

The system's core pieces are the PurchaseOrder interface and the Inventory interface.

- The PurchaseOrder interface is defined using a WSDL document and has one operation called `sendPurchaseOrder`. The PurchaseOrder interface is implemented using one BPEL process exposed through SOAP over HTTP. That means that anyone who can send a SOAP message over HTTP to this service can make a purchase.
- The Inventory interface is defined using a WSDL document and has one operation called `isInventoryAvailable`. The Inventory interface is implemented using another BPEL process, invoked by the PurchaseOrder service, to determine whether there is sufficient inventory of each book to complete a purchase order. This service is also exposed through SOAP over HTTP. Anyone can make a call to this service, but the main caller of this service is the PurchaseOrder service.

# Configuring the Tutorial Environment

Before you can deploy your application, GlassFish V2 must be configured correctly and running.

## ▼ To check the status of GlassFish

**1** If the Services window is not visible, choose **Window → Services**.

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

The Servers node should contain a GlassFish V2 or Sun Java System Application Server subnode. If an application server node does not appear, go to [“To configure GlassFish” on page 8](#).

If a green arrow badge appears on the GlassFish V2 node, the server is running. If a green arrow badge does not appear, go to [“To start GlassFish” on page 9](#).

## ▼ To configure GlassFish

**1** If the Services window is not visible, 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, from the **Server** drop-down list, select **GlassFish V2**.

**4** (Optional) In the **Name** field, change the default name for the server.

The IDE uses this name to identify the server.

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

The Platform Location Folder page appears.

**6** In the **Platform Location** field, use the **Browse** button to navigate to and select the installation location of the application server.

The default installation location is different depending on the type of installation and the platform, as shown in the following table.



| Platform            | Installer | SOA Installation   | Tools Bundle Installation |
|---------------------|-----------|--------------------|---------------------------|
| Solaris OS<br>Linux | root      | /opt/SUNWappserver | /opt/SDK                  |
| Solaris OS<br>Linux | user      | ~/SUNWappserver    | ~/SDK                     |
| Mac OS X            | N/A       | ~/SUNWappserver    | ~/SDK                     |
| Windows             | N/A       | C:\Sun\AppServer   | C:\Sun\SDK                |

- 7** Select the Register Local Default Domain radio button and click Next.
- 8** Enter 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 GlassFish

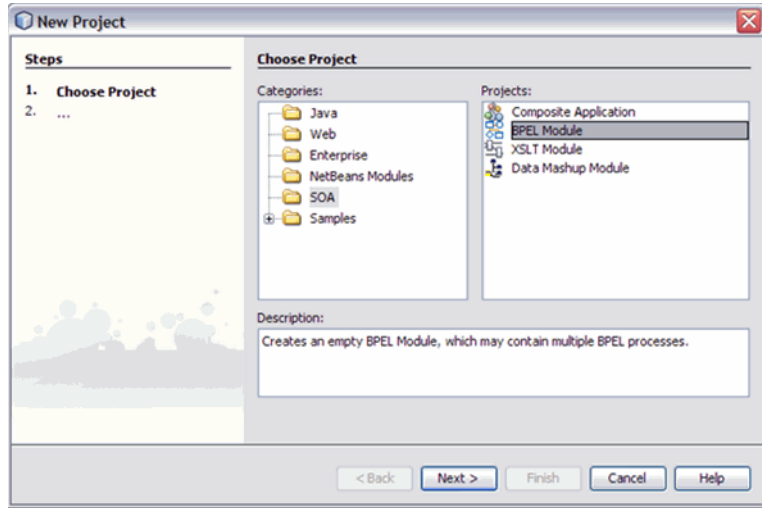
- 1** In the Services window, right-click the GlassFish V2 node and choose Start.
- 2** Wait until the following message appears in the Output window:  
Startup complete.  
When the server is running, the IDE displays a green arrow badge on the GlassFish V2 node.

## Creating a New Project

To create the Purchase Order Sample Project manually, start by creating a new project.

### ▼ To Create a New Project

- 1** From the main menu, choose File → New Project.  
The New Project dialog box appears.
- 2** Under Categories select SOA.
- 3** Under Projects, select BPEL Module, and click Next.



- 4 From the second page of the wizard, Name and Location, enter HTTP - SOAP - PO - BPEL for Project Name.
- 5 Click Finish.  
The HTTP-SOAP-PO-BPEL project now appears in the Projects window tree.

## Creating the XML Schemas

The next step in the Purchase Order sample project is to create the XML schemas

The HTTP-SOAP-PO-BPEL sample project includes two XML schema files. In this section, you create two new XML schema files for your BPEL Module project, `inventory.xsd` and `purchaseOrder.xsd`.

### Creating the `inventory.xsd` Schema

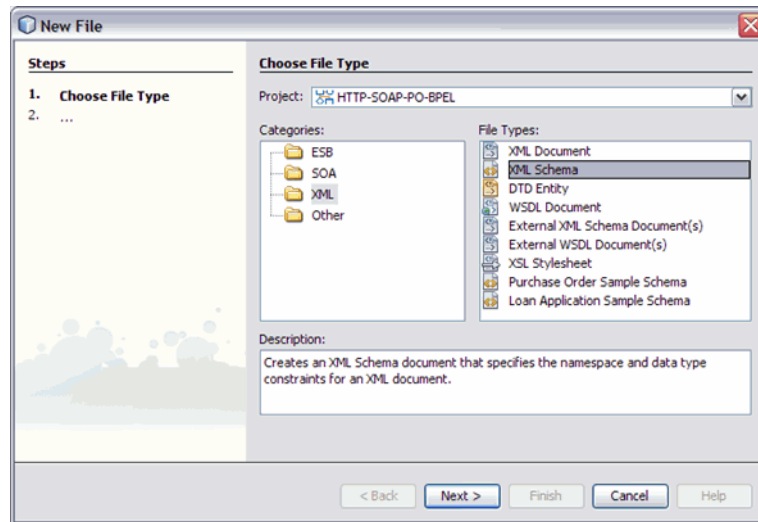
The `inventory.xsd` XML schema enables the BPEL Service Engine to check the current inventory for a requested item.

## ▼ To create the inventory.xsd schema

- 1 In the Projects window, right-click the HTTP - SOAP - PO - BPEL node and select New → Other from the pop-up menu.

The New File Wizard appears.

- 2 In the Categories field, select XML, and in the File Types field, select XML Schema.
- 3 Click Next.



- 4 From the second page of the wizard, Name and Location, type inventory as the File Name.

- 5 Click Finish.

In the Projects window, the Process Files node now contains a subnode named `inventory.xsd`. The Source Editor contains a tab for the XML schema file, `inventory.xsd`, with the Schema view open.

## ▼ To add a complex type to the XML Schema

- 1 From the Schema view of the `inventory.xsd`, right-click the Complex Type node and select Add Complex Type from the pop-up menu.

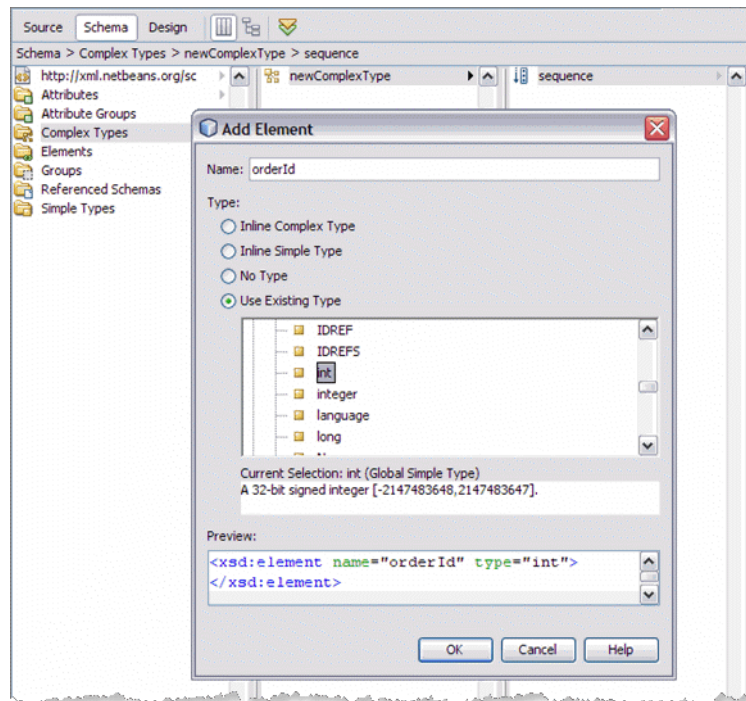
- 2 From the Add Complex Type dialog box, click OK. A complex type (`newComplexType`) is added to the second pane of the Schema window and a sequence node is added to the third pane of the Schema window.

## ▼ Add Local Elements to the XML Schema

- 1 From the Schema window, right-click the sequence node and select Add → Element from the pop-up menu.

The Add Element dialog box appears.

- 2 From the Add Element dialog box, do the following:
  - a. Enter `orderId` as the Name.
  - b. For Type, select Use Existing Type and select Built-in Types → int as the Current Selection.



- c. Click OK.

- 3 From the Schema window, right-click the sequence node again, and select Add → Element from the pop-up menu.**

The Add Element dialog box appears.

- 4 From the Add Element dialog box, do the following:**
  - a. Type `inventoryStatus` as the Name.**
  - b. For Type, select Use Existing Type and select Built-in Types → `boolean` as the Current Selection.**
  - c. Click OK.**

- 5 From the Schema window, right-click the sequence node again, and select Add → Element from the pop-up menu.**

- 6 From the Add Element dialog box, do the following:**
  - a. Type `inventoryStatusMessage` as the Name.**
  - b. For Type, select Use Existing Type and select Built-in Types → `string` as the Current Selection.**
  - c. Click OK.**

## ▼ To add a global element

- 1 From the left pane of the Schema window, right-click the Elements node, and select Add → Element from the pop-up menu.**
- 2 From the Add Element dialog box, do the following:**
  - a. Type `inventory` as the Name.**
  - b. For Type, select Use Existing Type and select Complex Type → `newComplexType` as the Current Selection.**
  - c. Click OK. A complex type (`inventory`) is added to the second pane of the Schema window.**

## ▼ To validate the XML Schema

- 1 From the Schema Editor toolbar, click the Validate XML button. Validation begins.**

- 2 The Outlook window of the IDE displays the validation status. If any errors occur, double-click each error message to see the location of the error and make any necessary corrections. Run validation again to verify corrections.
- 3 If your validation is successful, click `File → Save All()` to save your current changes.

## Creating the purchaseOrder.xsd Schema

### ▼ To create the purchaseOrder.xsd schema

- 1 In the Projects window, right-click the HTTP-SOAP-PO-BPEL → Process Files node and select `New → XML Schema` from the pop-up menu.  
The XML Schema wizard appears displaying the Name and Location page.
- 2 From the Name and Location page of the wizard, enter `purchaseOrder` as the File Name.
- 3 Click Finish. In the Projects window, the Process Files node now contains a subnode labeled `purchaseOrder.xsd`. The Source Editor contains a tab for the XML schema file, `purchaseOrder.xsd`, with the Schema view open.

### ▼ To add a complex type to the XML schema

- 1 From the Schema view of the `purchaseOrder.xsd`, right-click the Complex Type node and select `Add Complex Type` from the pop-up menu.
- 2 From the Add Complex Type dialog box, click OK. A complex type (`newComplexType`) is added to the second pane of the Schema window and a sequence node is added to the third pane of the Schema window.

### ▼ To add local elements to the XML schema

- 1 From the Schema window, right-click the sequence node and select `Add → Element` from the pop-up menu.  
The Add Element dialog box appears.
- 2 From the Add Element dialog box, do the following:
  - a. Type `orderId` as the Name.
  - b. For Type, select `Use Existing Type` and select `Built-in Types → int` as the Current Selection.

c. Click OK.

- 3 In the same manner, add three additional elements with the values shown in the following table:

| Name             | Type               | Current Selection | Type   |
|------------------|--------------------|-------------------|--------|
| customerId       | Use Existing Type  | Built-in Type     | int    |
| orderDescription | Use Existing Type. | Built-in Type     | String |
| price            | Use Existing Type. | Built-in Type     | double |

### ▼ To add a global element

- 1 From the left pane of the Schema window, right-click the Elements node, and select Add → Element from the pop-up menu.
- 2 From the Add Element dialog box, do the following:
  - a. Type purchaseOrder as the Name.
  - b. For Type, select Use Existing Type and select Complex Type → newComplexType as the Current Selection.
  - c. Click OK. A complex type (purchaseOrder) is added to the second pane of the Schema window.

### ▼ To validate the XML schema

- 1 From the Schema Editor's toolbar, click the Validate XML button. Validation begins.
- 2 If your validation is successful, click File → Save All to save your current changes.

## Creating and Configuring the WSDL Documents

The HTTP-SOAP-PO-BPEL project includes two WSDL documents, one for the inventory service, and one for the purchase order service.

### Creating the InventoryService WSDL Document

The InventoryService WSDL document enables the project to check product availability.

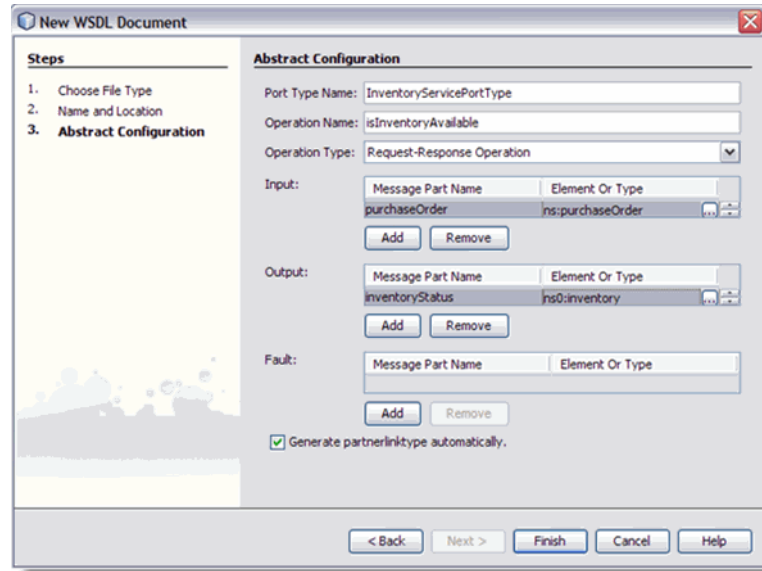
## ▼ To create the WSDL using the New WSDL Document wizard

- 1 **From the Projects window, right-click the HTTP-SOAP-PO-BPEL project and select New > WSDL Document from the pop-up menu.**

The New WSDL Document wizard appears displaying the Name and Location page.

- 2 **Enter `InventoryService` as the file name.**
- 3 **Select `Concrete WSDL Document` as the WSDL Type, `SOAP` as the Binding, and `Document Literal` as the Type. Click Next.**
- 4 **From the Page 3 of the wizard, Abstract Configuration, do the following:**
  - a. **For Operation Name, enter `isInventoryAvailable`.**
  - b. **Leave the Operation Type as the default value, Request-Response Operation.**
  - c. **For Input, enter `purchaseOrder` as the Message Part Name.**
  - d. **For the input Element or Type value, browse to and select `By File` → `src/purchaseOrder.xsd` → `Elements` → `purchaseOrder` as the value.**
  - e. **For Output, enter `inventoryStatus` as the Message Part Name.**
  - f. **For the output Element or Type value, browse to and select `By File` → `src/inventory.xsd` → `Elements` → `inventory` as the value.**
  - g. **Make sure that the `Generate partnerlinktype automatically` checkbox is selected, and click Next.**





- h. From page 4 of the wizard click **Finish**. The new WSDL is added to the project tree in the Projects window and the WSDL Editor appears in WSDL view.

### To configure the InventoryService WSDL document:

The InventoryService WSDL document uses the default SOAP WSDL properties. No changes are necessary.

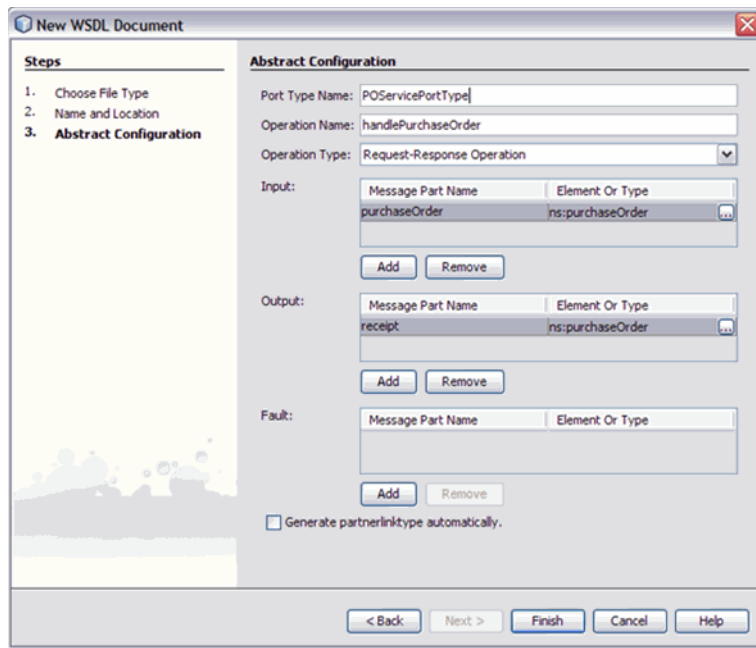
## Creating the POService WSDL Document

The POService WSDL document enables the project to send a purchase order.

### ▼ To create the POService WSDL document

- 1 From the Projects window, right-click the HTTP-SOAP-PO-BPEL project and select **New** → **WSDL Document** from the pop-up menu.
- 2 Enter **POService** as the file name.
- 3 Select **Concrete WSDL Document** as the **WSDL Type**, **SOAP** as the **Binding**, and **Document Literal** as the **Type**, and click **Next**.

- 4 From the page 3 of the wizard, **Abstract Configuration**, do the following:
  - a. For **Operation Name**, enter `handlePurchaseOrder`.
  - b. Leave the **Operation Type** as the default value, `Request-Response Operation`.
  - c. For **Input**, enter `purchaseOrder` as the **Message Part Name**.
  - d. For the **input Element or Type** value, browse to and select `By File` → `src/purchaseOrder.xsd` → `Elements` → `purchaseOrder` as the value.
  - e. For **Output**, enter `receipt` as the **Message Part Name**.
  - f. For the **output Element or Type** value, browse to and select `By File` → `src/purchaseOrder.xsd` → `Elements` → `purchaseOrder` as the value.
  - g. Make sure that the **Generate partnerlinktype automatically** checkbox is selected, and click **Next**.



- h. From page 4 of the wizard, click **Finish**. The new WSDL is added to the project tree in the **Projects** window and the **WSDL Editor** appears in **WSDL** view.

## To configure the POService WSDL document:

The POService WSDL document uses the default SOAP WSDL properties. No changes are necessary.

# Creating the InventoryService BPEL Process

The HTTP-SOAP-PO-BPEL project utilizes two BPEL processes, `InventoryService.bpel`, which creates a response message with the status of the inventory, and `POService.bpel`, which creates the purchase order response.

For this example the BPEL Designer's Design view and the BPEL Mapper are used to create the BPEL process.

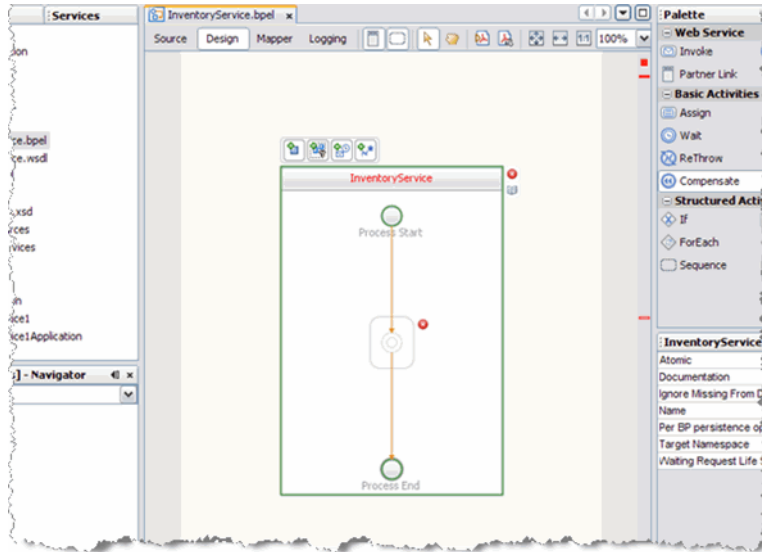
For more information about using the BPEL Designer, see *Developer Guide to BPEL Designer*.

## ▼ To create the InventoryService BPEL process

- 1 From the Project window, right-click the HTTP-SOAP-PO-BPEL project's `Process Files` directory and select `New → BPEL Process` from the pop-up menu. The `New BPEL Process` wizard appears displaying the `Name and Location` page.
- 2 From the `New BPEL Process` wizard, enter `InventoryService` for the `File Name`.
- 3 Click `Finish`. The BPEL Designer appears containing the new BPEL process.

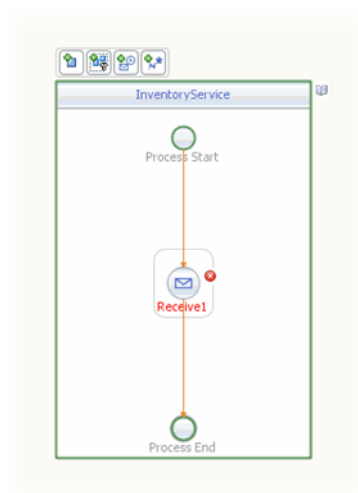
## ▼ To Create the InventoryService business process using the BPEL Designer

- 1 From the Project window, double-click `InventoryService.bpel`, under the project's `Process Files` directory. The `Design` view of the `InOutMapper.bpel` is displayed graphically in the IDE's BPEL Designer.



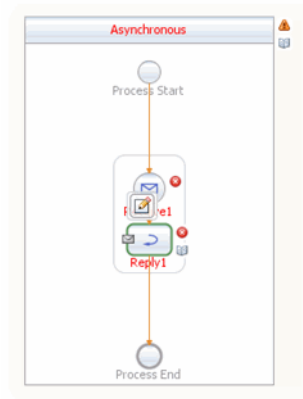
- 2 **Add a Receive element to the process flow. To do this, drag-and-drop the Receive element from the BPEL Designer Palette to the link between the Process Start and Process End in the designer's process flow.**

The IDE provides you with visual clues to show you where you can drop the selection. The Receive element is added to the Design view.

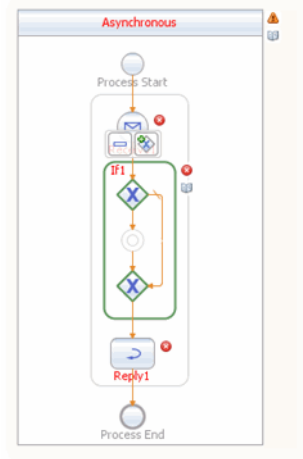


**3 Add a Reply element to the process flow between the Receive1 element and the Process End.**

The IDE provides you with visual clues to show you where you can drop the selection. The Reply1 web service is added to the process flow.

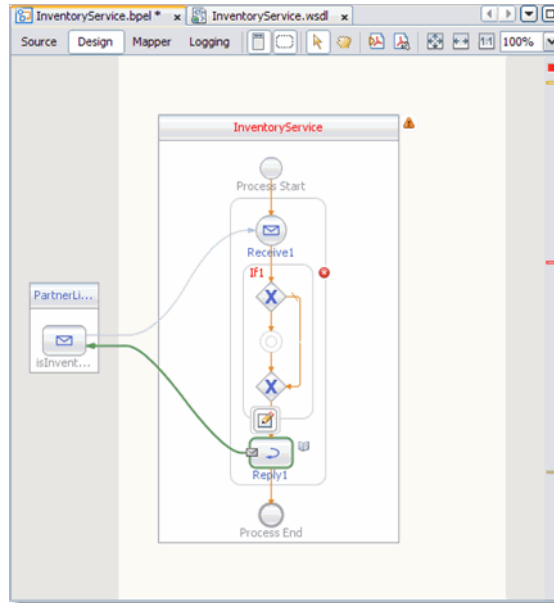


**4 Add an If activity to the process flow diagram between the Receive1 and Reply1 elements. To do this, drag-and-drop the If element from the BPEL Designer Palette to the link between the Receive1 and Reply1 elements in the InventoryService process flow.**

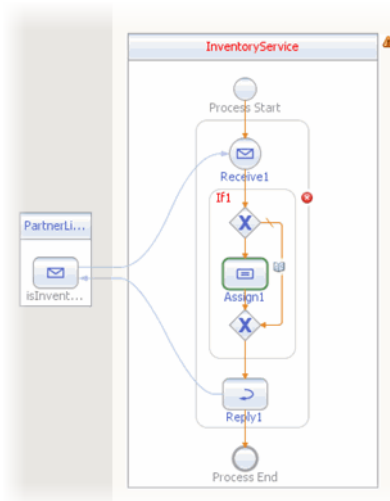


**5 Create a new Partner Link by dragging and dropping the InventoryService.wsdl file from the Projects window to the left side of the BPEL Designer canvas. The IDE provides you with visual clues to show you where you can drop the selection. The PartnerLink1 partner link is added to left side of the BPEL Designer canvas.**

- 6 Set the Receive1 element Partner Link to PartnerLink1 as follows:**
  - a. From the BPEL Designer's Design view, double-click the Receive1 element. The Receive1 [Receive] - Property Editor appears.**
  - b. From the property editor, select PartnerLink1 as the Partner Link value.**
  - c. Click the Input Variable field's Create button. The New Input Variable dialog box appears. Click OK to create the new input variable.**
  - d. Click OK. A partner link is now displayed between the PartnerLink1 and the Receive1 element in the Design view.**
  
- 7 Set the Reply1 element Partner Link to PartnerLink1 as follows:**
  - a. From the BPEL Designer's Design view, click the Reply1 element and click the Reply1 Edit button. The Reply1 [Reply] - Property Editor appears.**
  - b. From the property editor, select PartnerLink1 as the Partner Link value.**
  - c. Click the Output Variable field's Create button. The New Output Variable dialog box appears. Click OK to create the new output variable.**
  - d. Click OK. A partner link is now displayed between the PartnerLink1 and the Reply1 element in the Design view.**



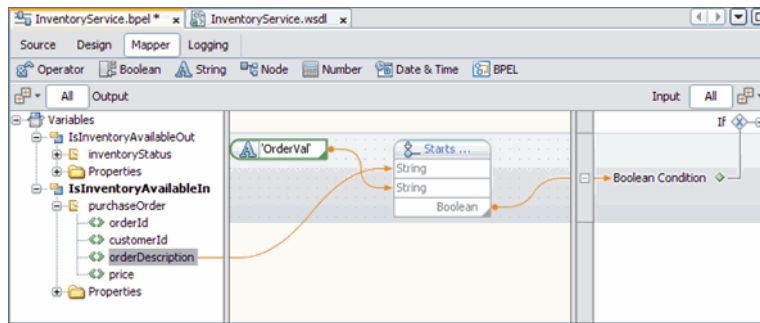
- 8 **Add an Assign element to the If1 element in the process flow. To do this, drag-and-drop the Assign activity from the BPEL Designer Palette to the link between the beginning and ending node of the If1 element. The Assign1 element is added to the InventoryService process flow.**



## ▼ To specify the business logic for the InventoryService BPEL process

- 1 Specify the business logic for the If1 element (not the Assign1 element) from the BPEL Mapper as follows:
  - a. Select the If1 element in the BPEL Designer's Design view, and click the Designer's Mapper button to open the BPEL Mapper.
 

The If1 activity is displayed in the BPEL Mapper window.
  - b. From the BPEL Mapper, expand the nodes in the Output pane.
  - c. From the BPEL Mapper toolbar's String menu, select Starts With. The Starts With function box appears in the Mapping pane.
  - d. Map the orderDescription node, under Variables → IsInventoryAvailableIn → purchaseOrder in the Output pane of the BPEL Mapper, to the first inbound String node of the Starts With function box. To do this, click on the orderDescription node, and drag your cursor to the String node of the Starts With function box. A link now joins the two nodes.
  - e. From the BPEL Mapper toolbar's String menu, select String Literal. A String Literal function box appears in the Mapping pane. Enter OrderVal, as the String Literal value.
  - f. Map the outbound OrderVal node of the String Literal function box to the inbound string2 node of the Starts With function box.
  - g. Map the outbound Boolean node of the Starts With function box to the Boolean Condition node, under If1 in the Input pane of the BPEL Mapper.



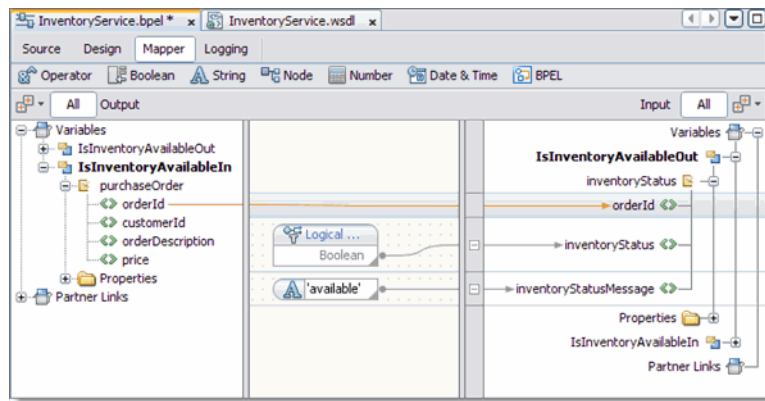


## 2 Specify the business logic for the Assign1 element from the BPEL Mapper as follows:

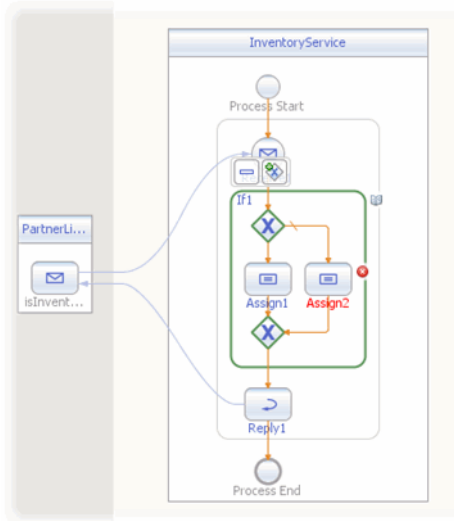
- a. From the BPEL Designer's Design view, select the Assign1 element and click the Mapper button to open the BPEL Mapper.

The Assign1 activity is displayed in the BPEL Mapper window.

- b. Map `orderId`, under `Variables` → `IsInventoryAvailableIn` → `purchaseOrder` in the **Output** pane of the BPEL Mapper, to `orderId`, under `Variables` → `IsInventoryAvailableOut` → `inventoryStatus` in the **Input** pane of the BPEL Mapper.
- c. From the BPEL Mapper toolbar's Boolean menu, select and drag `Logical True` to the Mapping pane. Map the outbound Boolean node of the Logical True function box to `inventoryStatus` under `Variables` → `IsInventoryAvailableOut` → `inventoryStatus` in the **Input** pane of the BPEL Mapper.
- d. From the BPEL Mapper toolbar's String menu, select `String Literal`. A `String Literal` function box appears in the Mapping pane. Enter `available`, as the `String Literal` value.
- e. Map the outbound `available` node of the `String Literal` function box to `inventoryStatusMessage`, under `Variables` → `IsInventoryAvailableOut` → `inventoryStatus` in the **Input** pane of the BPEL Mapper.



- 3 Add an Assign element to the Else of the If1 element in the process flow. To do this, drag-and-drop the Assign activity from the BPEL Designer Palette to the center of the ELSE branch of the If1 element. The Assign2 element is added to the InventoryService process flow.



**4 Specify the business logic for the Assign2 element from the BPEL Mapper as follows:**

- a. **Select the Assign2 element in the BPEL Designer's Design view, and click the Designer's Mapper button to open the BPEL Mapper.**

The Assign2 activity is displayed in the BPEL Mapper window.

- b. **From the BPEL Mapper, expand the nodes in the Output and Input panes.**

- c. **Map orderId, under Variables → IsInventoryAvailableIn → purchaseOrder in the Output pane of the BPEL Mapper, to orderId, under Variables → IsInventoryAvailableOut → inventoryStatus in the Input pane of the BPEL Mapper.**

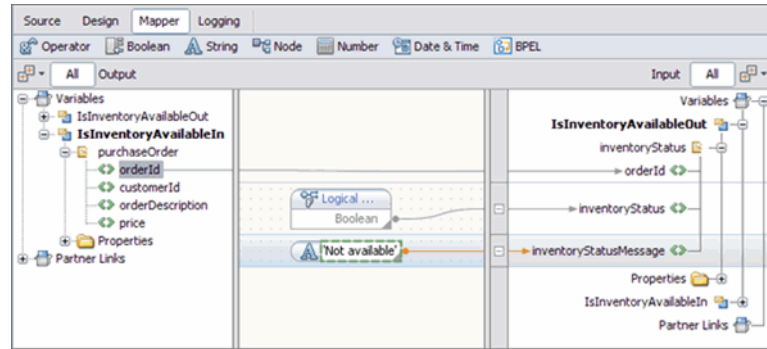
- d. **From the BPEL Mapper toolbar's Boolean menu, drag Logical False to the center pane of the Designer, inline with the inventoryStatus node under Variables → IsInventoryAvailableOut → inventoryStatus in the Input pane of the BPEL Mapper.**

The Logical False function box appears in the Mapping pane.

- e. **Map the outbound Boolean node of the Logical False function box, to the inventoryStatus node under Variables → IsInventoryAvailableOut → inventoryStatus in the Input pane of the BPEL Mapper.**

- f. **From the BPEL Mapper toolbar's String menu, select String Literal. Drag the String Literal function box inline with the inventoryStatusmessage node under Variables → IsInventoryAvailableOut → inventoryStatus in the Input pane of the BPEL Mapper and enter Not available, as the String Literal value.**

- g. **Map the outbound Not available node of the String Literal function box to inventoryStatusMessage under Variables → IsInventoryAvailableOut → inventoryStatus in the Input pane of the BPEL Mapper.**



5. **Validate your new BPEL process as follows:**
  - a. From the BPEL Designer's toolbar, click the Validate XML button. Validation of the BPEL process is performed. The results of the validation are displayed in the NetBeans IDE Output window.
  - b. If the validation process finds any errors, the Output window lists each error with a link to the point of error in the BPEL Designer. Double-click the hyperlink and refer to the error message for information on how to resolve the error.
  - c. Once you have resolved any errors, run validation again to ensure that there are no remaining errors or warnings.
  - d. Click Save All to save your changes.

## Create the POService BPEL Process

The next step in the Purchase Order sample project is to Create the POService BPEL Process.

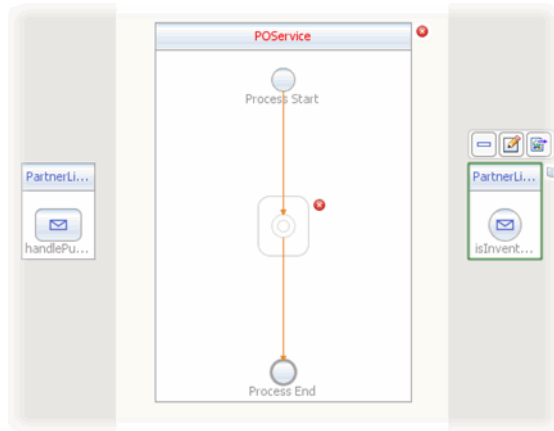
The POService.bpel, creates the purchase order response. The BPEL Designer's Design view and the BPEL Mapper are used to create the BPEL process.

## ▼ To create the POService BPEL process

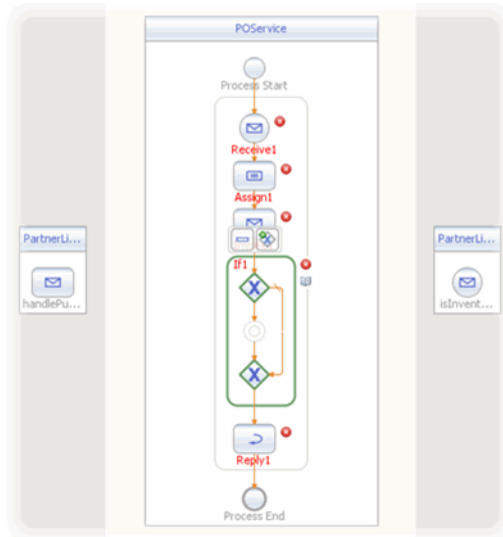
- 1 **From the Project window, right-click the HTTP-SOAP-PO-BPEL project and select New → BPEL Process from the pop-up menu.**
- 2 **From the New BPEL Process wizard, enter POService for the File Name.**
- 3 **Click Finish.**  
The POService.bpel file is added to the Projects window, and the BPEL Designer opens containing the new BPEL process.

## ▼ To Create the POService business process using the BPEL Designer

- 1 **From the Project window, right-click the HTTP-SOAP-PO-BPEL project and select New → BPEL Process from the pop-up menu.**
- 2 **From the New BPEL Process wizard, enter POService for the File Name.**
- 3 **Click Finish.**  
The POService.bpel file is added to the Projects window, and the BPEL Designer opens containing the new BPEL process.
- 4 **Create a new Partner Link by dragging the POService.wsdl file from the Projects window to the left side of BPEL Designer canvas.**  
The IDE provides clues to show where to place the POService.wsdl file.  
By placing the file on the left side, you create the partnerlink with the roll assigned as “My Role.” This can be verified from the Partnerlink1 Properties Editor.
- 5 **Create another Partner Link, in “Partner Role”, by dragging the InventoryService.wsdl file from the Projects window to the right side of the BPEL Designer canvas.**  
By placing this file on the right side of the BPEL Designer canvas, you create a partnerlink with the roll assigned as “Partner Roll.” This can be verified from the Partnerlink2 Properties Editor.  
Click OK to close the PartnerLink2 Property Editor. The PartnerLink2 partner link is added to the right side of the BPEL Designer canvas.

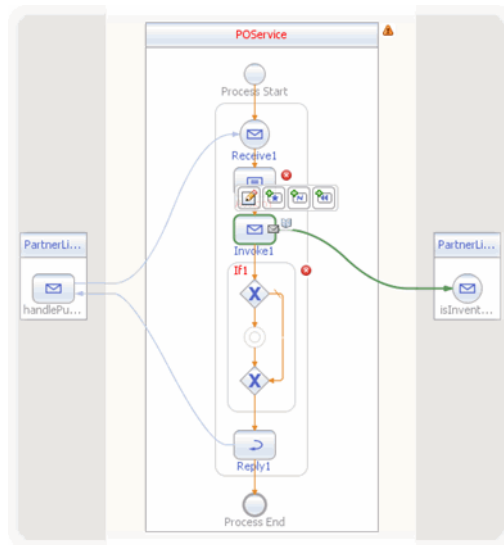


- 6 **Add a Receive element to the process flow. To do this, drag-and-drop the Receive element from the BPEL Designer Palette to the link between the Process Start and Process End in the designer's process flow. The Receive element is added to the process flow.**
- 7 **Add a Reply element to the process flow between the Receive1 element and the Process End. The Reply1 web service is added to the process flow.**
- 8 **Add an Invoke element to the process flow between the Receive1 element and the Reply1 element. The Invoke1 web service is added to the process flow.**
- 9 **Add an Assign element to the process flow between the Receive1 element and the Invoke1 element. The Assign1 web service is added to the process flow.**
- 10 **Add an If element to the process flow between the Invoke1 element and the Reply1 element. The If1 web service is added to the process flow.**



- 11 **Set the Receive1 element Partner Link to PartnerLink1 as follows:**
  - a. From the BPEL Designer's Design view, select the Receive1 element and click the Receive1 Edit button. The Receive1 [Receive] - Property Editor appears.
  - b. From the property editor, select PartnerLink1 as the Partner Link value.
  - c. Click the Input Variable field's Create button. The New Input Variable dialog box appears. Click OK to create the new input variable.
  - d. Click OK to close the property editor. A partner link is now displayed from the PartnerLink1 and the Receive1 element in the Design view.
  
- 12 **Set the Reply1 element Partner Link to PartnerLink1 as follows:**
  - a. From the BPEL Designer's Design view, select the Reply1 element and click the Reply1 Edit button. The Reply1 [Reply] - Property Editor appears.
  - b. From the property editor, select PartnerLink1 as the Partner Link value.
  - c. Click the Output Variable field's Create button. The New Output Variable dialog box appears. Click OK to create the new output variable.
  - d. Click OK. A partner link is now displayed between the PartnerLink1 and the Reply1 element in the Design view.

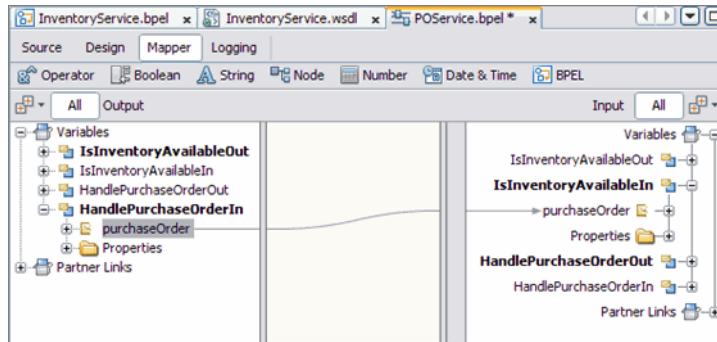
- 13 Set the Invoke1 element Partner Link to PartnerLink2 as follows:**
- From the BPEL Designer's Design view, select the Invoke1 element and click the Invoke1 Edit button. The Invoke1 [Invoke] - Property Editor appears.
  - From the property editor, select PartnerLink2 as the Partner Link value.
  - Click the Input Variable field's Create button. The New Input Variable dialog box appears. Click OK to create the new input variable.
  - From the property editor, click the Output Variable field's Create button. The New Output Variable dialog box appears. Click OK to create the new output variable.
  - Click OK. A partner link is now displayed between the PartnerLink2 and the Invoke1 element in the Design view.



## ▼ To specify the business logic for the POService business process

- Specify the business logic for the Assign1 element from the BPEL Mapper as follows:
  - Select the Assign1 element in the BPEL Designer's Design view, and click the Designer's Mapper button to open the BPEL Mapper. The Assign1 activity is displayed in the BPEL Mapper window.

- b. From the BPEL Mapper, expand the `HandlePurchaseOrderIn` node in the Output pane, and the `IsInventoryAvailableIn` nodes in the Input pane.
- c. Map `purchaseOrder`, under `Variables` → `HandlePurchaseOrderIn` in the Output pane of the BPEL Mapper, to `purchaseOrder`, under `Variables` → `IsInventoryAvailableIn` in the Input pane of the BPEL Mapper.

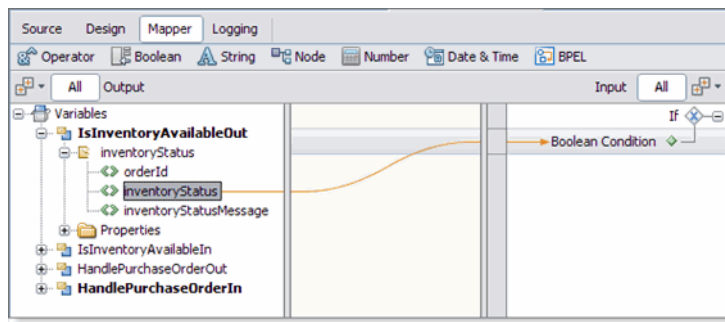


2 Specify the business logic for the `If1` element from the BPEL Mapper as follows:

- a. Select the `If1` element in the BPEL Designer's Design view, and click the Designer's Mapper button to open the BPEL Mapper.

The `If1` activity is displayed in the BPEL Mapper window.

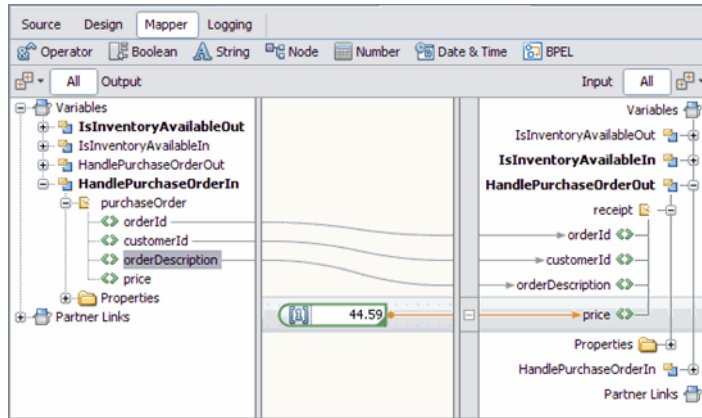
- b. Map `InventoryStatus`, under `Variables` → `IsInventoryAvailableOut` → `InventoryStatus` in the Output pane of the BPEL Mapper, to `Boolean Condition` under `If1` in the Input pane of the BPEL Mapper.





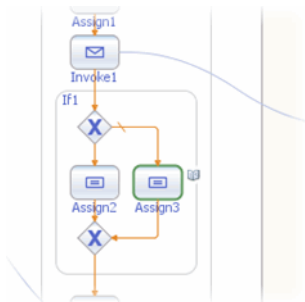
- 3 **Add an Assign element to the If1 element in the process flow. To do this, drag-and-drop the Assign activity from the BPEL Designer Palette to the link between the beginning and ending node of the If1 element. The Assign2 element is added to the InventoryService process flow.**
- 4 **Specify the business logic for the Assign2 element from the BPEL Mapper as follows:**
  - a. **Select the Assign2 element in the BPEL Designer's Design view, and click the Designer's Mapper button to open the BPEL Mapper.**

The Assign2 activity is displayed in the BPEL Mapper window.
  - b. **Map orderId, under Variables → HandlePurchaseOrderIn → purchaseOrder in the Output pane of the BPEL Mapper, to orderId, under Variables → HandlePurchaseOrderOut → receipt in the Input pane of the BPEL Mapper.**
  - c. **Map customerId, under Variables → HandlePurchaseOrderIn → purchaseOrder in the Output pane of the BPEL Mapper, to customerId, under Variables → HandlePurchaseOrderOut → receipt in the Input pane of the BPEL Mapper.**
  - d. **Map orderDescription, under Variables → HandlePurchaseOrderIn → purchaseOrder in the Output pane of the BPEL Mapper, to orderDescription, under Variables → HandlePurchaseOrderOut → receipt in the Input pane of the BPEL Mapper.**
  - e. **From the BPEL Mapper toolbar's Number menu, select Number Literal and drag Number Literal to the center pane of the Mapper. A Number Literal function box appears in the Mapping pane. Enter 44.59 as the Number Literal value.**
  - f. **Map the outbound 44.59 node of the Number Literal function box, to price, under Variables → HandlePurchaseOrderOut → receipt in the right pane of the BPEL Mapper.**



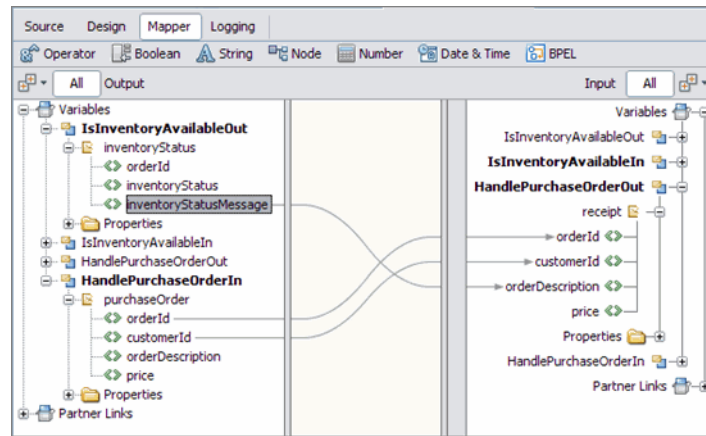
- 5 **Add an Assign element to the Else of the If1 element in the process flow. To do this, drag-and-drop the Assign activity from the BPEL Designer Palette to the center of the Else branch of the If1 element.**

The Assign3 element is added to the InventoryService process flow.



- 6 **Specify the business logic for the Assign3 element from the BPEL Mapper as follows:**
  - a. **Select the Assign3 element in the BPEL Designer's Design view, and click the Designer's Mapper button to open the BPEL Mapper.**  
The Assign3 activity is displayed in the BPEL Mapper window.
  - b. **Map orderId, under Variables → HandlePurchaseOrderIn → purchaseOrder in the Output pane of the BPEL Mapper, to orderId, under Variables → HandlePurchaseOrderOut → receipt in the Input pane of the BPEL Mapper.**
  - c. **Map customerId, under Variables → HandlePurchaseOrderIn → purchaseOrder in the Output pane of the BPEL Mapper, to customerId, under Variables → HandlePurchaseOrderOut → receipt in the Input pane of the BPEL Mapper.**

- d. **Map** inventoryStatusMessage, **under** Variables → IsInventoryAvailableOut → inventoryStatus **in the Output pane of the BPEL Mapper, to** orderDescription, **under** Variables → HandlePurchaseOrderOut → receipt **in the Input pane of the BPEL Mapper.**



- 7 **Validate your new BPEL process as follows:**
  - a. From the BPEL Designer's toolbar, click the Validate XML button. Validation of the BPEL process is performed. The results of the validation are displayed in the NetBeans IDE Output window.
  - b. If the validation process finds any errors, the Output window lists each error with a link to the point of error in the BPEL Designer. Double-click the hyperlink and refer to the error message for information on how to resolve the error.
  - c. Once you have resolved any errors, run validation again to ensure that there are no remaining errors or warnings.
- 8 **Click Save All to save your changes.**

## Building the Project

The next step to creating your project is to clean and build it, which means compiling, correcting, and packaging the project's components.

## ▼ To compile and package the project

- 1 In the Projects window, select the HTTP-SOAP-PO-BPEL project node.
- 2 From the NetBeans Toolbar, click the Clean and Build Main Project icon (hammer and broom).
- 3 The Output window displays the Ant output and any compilation errors. If any errors are found, double-click each error to go to the error location in the source code. Refer to the error message for information on how to resolve the error.

## Creating and Deploying the Composite Application

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

## ▼ To create the Composite Application project and add the JBI module

- 1 From the IDE's main menu, choose **File** → **New Project**.  
The New Project wizard opens.
- 2 In the **Categories** list, select the **SOA** node.
- 3 In the **Projects** list, select the **Composite Application**
- 4 Click **Next**.
- 5 In the **Project Name** field, type **HTTP - SOAP - PO - JBI** .
- 6 Click **Finish**.  
The Projects window now contains a project node for a Composite Application project called **HTTP - SOAP - PO - JBI**.
- 7 In the **Projects** window, right-click the **HTTP - SOAP - PO - JBI** project node and select **Add JBI Module** from the pop-up menu.  
The Select Project dialog box opens.

- 8 **Select the HTTP-SOAP-PO-BPEL project you created earlier in this tutorial and click Add Project JAR Files.**

The Select Project dialog box closes.

- 9 **In the Projects window, expand the HTTP-SOAP-PO-JBI project node and then expand the JBI Modules node.**

Notice that the HTTP-SOAP-PO-BPEL.jar node has been added.

## ▼ To build and deploy the Composite Application

- 1 **From the Projects window, right-click the HTTP-SOAP-PO-JBI project and select Build Project from the pop-up menu.**
- 2 **The Output window displays the Ant output and any compilation errors. If any errors are found, double-click each error to go to the error location in the source code. Refer to the error message for information on how to resolve the error.**
- 3 **Right-click the HTTP-SOAP-PO-JBI project node and select Deploy.**
- 4 **The IDE's Output window states BUILD SUCCESSFUL when Deployment has succeeded.**

## Testing the HTTP Binding Component Sample Project

The Test run feature allows you to test run your processes. BPEL processes are deployed to the BPEL runtime, which manages the process lifecycle.

## ▼ To run the HTTP-SOAP-PO-JBI project

- 1 **From the NetBeans IDE Projects window, right click Test under HTTP-SOAP-PO-JBI, and select New Test Case from the pop-up menu.**
- The New Test Case Wizard appears.
- 2 **From the New Test Case Wizard, type HTTPBC-Test1 as the Test Case Name, and click Next.**
  - 3 **From the Select the WSDL Document page of the wizard, expand the HTTP-SOAP-PO-BPEL node in the Select the WSDL Document field, and select POService.wsdl. Click Next.**
  - 4 **From the Select the Operation to Test page of the wizard, select the handlePurchaseOrder operation in the Select the Operation to Test field, and click Finish.**

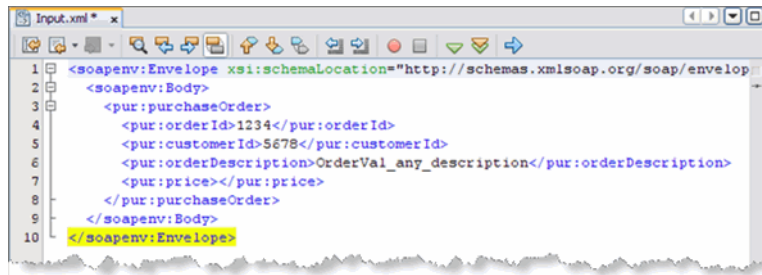
The Input.xml code is displayed in the Source Editor.

- 5 From the Source Editor, make the following changes to the Input.xml code:
  - a. Change the purchase order ID value in line 4 of the source code to 1234.
  - b. Change the customer ID value in line 5 of the source code to 5678.
  - c. Change the purchase order description value in line 6 of the source code to OrderVal\_any\_description.
  - d. Delete the value given for purchase price in line 7 of the source code.

---

**Note** – To display line numbers, right-click the left frame of the Source Editor and select Show Line Numbers from the pop-up menu.

---



```
1 <soapenv:Envelope xmlns:schemaLocation="http://schemas.xmlsoap.org/soap/envelop...
2 <soapenv:Body>
3 <pur:purchaseOrder>
4 <pur:orderId>1234</pur:orderId>
5 <pur:customerId>5678</pur:customerId>
6 <pur:orderDescription>OrderVal_any_description</pur:orderDescription>
7 <pur:price></pur:price>
8 </pur:purchaseOrder>
9 </soapenv:Body>
10 </soapenv:Envelope>
```

- 6 Click Save All to save your work.
- 7 From the IDE's Projects window, right-click HTTPBC-Test1 and select Run.
- 8 The first time you test run the project, the project fails and an Overwrite Empty Output message appears. Click Yes to save your current output file as the test output.
- 9 Now that your project has a test output message, run the test again. Right-click HTTPBC-Test1 and select Run.
- 10 Check the IDE's JUnit Test Results window to verify that the test passed successfully.
- 11 From the Projects window, double-click Output, under HTTP-SOAP-PO-JBI > Test > TestCase1. The message output, including the purchase price in line 8 of the code, is displayed in the Source Editor.

---

**Note** – You can also create a test case to check the Inventory Service by selecting `InventoryService.wsdl` as the WSDL document, and `isInventoryAvailable` as the operation.

---

## Project Summary

In this tutorial, you created a purchase order composite application project that uses the HTTP Binding Component. In doing so, you created a BPEL Module project named HTTP-SOAP-PO-BPEL, which includes two XML Schemas, two WSDL documents, and two BPEL processes. Next, you created a composite application project named HTTP-SOAP-PO-JBI, added your HTTP-SOAP-PO-BPEL project to the composite application as a JBI module, and deployed the composite application project. You then tested your composite application.

