Oracle® Fusion Middleware

Tutorial for Running and Building an Application with Oracle SOA Suite

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Oracle Fusion Middleware Tutorial for Running and Building an Application with Oracle SOA Suite, 11*g* Release 1 (11.1.1)

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Contents

6 Creating the Second Half of the OrderProcessor BPEL Process

Preface

Welcome to the *Oracle Fusion Middleware Tutorial for Running and Building an Application with Oracle SOA Suite*.

Audience

This tutorial is intended for developers to create and deploy an SOA composite application using Oracle SOA Suite.

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Related Documents

For more information, see the following documents:

- *Oracle Fusion Middleware Getting Started with Oracle SOA Suite*
- *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*
- *Oracle Fusion Middleware Administrator's Guide for Oracle SOA Suite*

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

1

Introduction to the SOA Sample Application

The WebLogic Fusion Order Demo application of the Fusion Order Demo demonstrates using Oracle SOA Suite for processing orders from a Web shopping store front. This tutorial focuses on running and building the WebLogic Fusion Order Demo application.

This chapter contains the following sections:

For an overview of Oracle SOA Suite, see *Oracle Fusion Middleware Getting Started with Oracle SOA Suite*.

1.1 Introduction to Fusion Order Demo

Run by a fictitious company called Global Company, the Fusion Order Demo provides two main parts, the Store Front module and the WebLogic Fusion Order Demo application.

The StoreFront module sells electronic devices through a storefront-type Web application.

The StoreFront module contains the following projects:

- `StoreFrontService`: This project provides access to the storefront data and provides transaction support to update data for customers, orders, and products.
- `StoreFrontUI`: This project provides Web pages that the customer uses to browse the storefront, place orders, register on the site, view order information, and update the user profile.

The `StoreFrontUI` project uses JavaServer Faces (JSF) as the view technology, and relies on the Oracle ADF Model layer to interact with Oracle Application Development Framework (Oracle ADF) Business Components in the `StoreFrontService` project.

For a detailed description of the StoreFront module and its projects, see the *Oracle Fusion Middleware Fusion Developer's Guide for Oracle Application Development Framework*.

Once a customer places an order, the WebLogic Fusion Order Demo application processes the order.

1.2 Setting Up the Development Environment for Creating the WebLogic Fusion Order Demo Application

To prepare for the creation of the WebLogic Fusion Order Demo application, complete the following tasks.

- Task 1: Install Oracle JDeveloper Studio
- Task 2: Install the Fusion Order Demo Application
- Task 3: Install Oracle SOA Suite
- Task 4: Create a Connection to an Oracle WebLogic Server

1.2.1 Task 1: Install Oracle JDeveloper Studio

Install Oracle JDeveloper 11*g* Studio Edition to create the WebLogic Fusion Order Demo application. You can download Oracle JDeveloper from:

`http://www.oracle.com/technology/products/jdev/11/index.html`

Ensure that you download and install 11*g* and that it is the Studio Edition, not the Java Edition. You can verify these details in Oracle JDeveloper from the **Help** > **About** menu option.

In order to create and deploy SOA composite applications and projects, you must install the Oracle SOA Suite extension. For instructions on installing this extension for Oracle JDeveloper, see the *Oracle Fusion Middleware Installation Guide for Oracle JDeveloper*.

1.2.2 Task 2: Install the Fusion Order Demo Application

Throughout this tutorial, you must view or use content from Fusion Order Demo in your Oracle JDeveloper environment. The Fusion Order Demo is contained within a ZIP file.

To access the ZIP file:

1. Download the Fusion Order Demo application ZIP file (`FusionOrderDemo_R1.zip`). You can download the ZIP file from:

   `http://www.oracle.com/technology/products/jdev/samples/fod/index.html`

2. Unzip the file to a temporary directory.

   This tutorial refers to this directory as *`DEMO_DOWNLOAD_HOME`*. When you create the WebLogic Fusion Order Demo application, create the application in a working application directory, such as `C:\fod`. This tutorial refers to the working application directory location as *`MY_FOD_HOME`*. When requested, copy needed files from the *`DEMO_DOWNLOAD_HOME`* directory to *`MY_FOD_HOME`*.

1.2.3 Task 3: Install Oracle SOA Suite

To successfully deploy and run the Fusion Order Demo applications, you must complete an installation for Oracle SOA Suite. Installing Oracle SOA Suite requires creating schemas for Oracle SOA Suite in an Oracle database, installing Oracle WebLogic Server, installing Oracle SOA Suite, and configuring a domain in Oracle WebLogic Server to support both Oracle SOA Suite and Oracle Enterprise Manager. Specifically, the domain contains an Administration Server and a Managed Server. The Administration Server hosts Oracle Enterprise Manager Fusion Middleware Control

for performing administrative tasks; the Managed Server is an instance of an Oracle WebLogic Server used to host deployed applications. For instructions on installing and configuring Oracle SOA Suite, see the *Oracle Fusion Middleware Installation Guide for Oracle SOA Suite*.

After successfully completing the installation process, perform the following additional configuration steps:

1. Enable the credentials that are included in the StoreFront module by adding a setting to the configuration file for the domain:

   a. Locate the configuration file set for the Oracle SOA Suite domain in the following directory:

      (UNIX) *MW_HOME*/user_projects/domains/*domain_name*/bin/setDomainEnv.sh
      (Windows) *MW_HOME*\user_projects\domains*domain_name*\bin\setDomainEnv.cmd

   b. Add the following option to the JAVA_PROPERTIES (UNIX) or the SET JAVA_PROPERTIES (Windows) line:

      ```
      -Djps.app.credential.overwrite.allowed=true
      ```

   c. If the Oracle WebLogic Server Administration Server is running, stop it:

      On UNIX, as the root user, change directories to directory *MW_HOME*/user_projects/domains/*domain_name*/bin and enter the following command:

      ```
      ./stopWebLogic.sh
      ```

      On Windows, from the Windows **Start** menu, select **All Programs** > **Oracle WebLogic** > **User Projects** > *domain_name* > **Stop Admin Server**.

   d. Start the Administration Server:

      On UNIX, from directory *MW_HOME*/user_projects/domains/*domain_name*/bin, enter the following command:

      ```
      ./startWebLogic.sh
      ```

      On Windows, from the Windows **Start** menu, select **All Programs** > **Oracle WebLogic** > **User Projects** > *domain_name* > **Start Admin Server**.

      When prompted on UNIX, enter your Oracle WebLogic Server user name and password. The password is not visible as you type.

      The Administration Server is started when the command window displays the following messages:

      ```
      <Server state changed to RUNNING>
      <Server started in RUNNING mode>
      ```

      Leave the command window open, although you may minimize it. The Administration Server is now running and ready for use.

   e. When the Administration Server is in RUNNING mode, start the SOA managed server, if it is not running. In a command window, enter the following command all on one line:

      On UNIX, from directory *MW_HOME*/user_projects/domains/*domain_name*/bin, enter the following command:

      ```
      ./startManagedWebLogic.sh managed_server_name admin_url username password
      ```

On Windows, from directory *MW_HOME*\user_projects\domains*domain_name*\bin, enter the following command:

```
startWebLogic.cmd managed_server_name admin_url username password
```

Substitute the following values:

Element	Value
managed_server	The name of the Managed Server. For example: soa_server1
admin_url	The URL of the Oracle WebLogic Server. For example: http://soahost:7001
username	The Oracle WebLogic Server administrator. For example: weblogic
password	The password of the Oracle WebLogic Server administrator. For example: welcome1

2. If you are deploying remotely from one computer that has Oracle JDeveloper to another computer that has the Oracle SOA Suite installation with Oracle WebLogic Server, modify the JAVA_HOME and PATH environment variables on the computer with the Oracle SOA Suite installation.

   Oracle JDeveloper requires changes to these variables for running the scripts that deploy the composite services. You set the JAVA_HOME variable to include the path to the Oracle WebLogic Server JDK, and set the PATH variable to include the path to the Oracle WebLogic Server bin directory for ant.

   On UNIX, use the export command. For example:

   ```
   export JAVA_HOME=$MW_HOME/jdk160_11
   export PATH=$PATH:MW_HOME/modules/org.apache.ant_1.7.0/bin
   ```

   On Windows, perform the following steps to modify the variables:

   a. Open Control Panel from the Windows Start menu and double-click the **System** icon.

   b. In the System Properties dialog, select the **Advanced** tab and click **Environment Variables**.

   c. In the Environment Variables dialog, locate the JAVA_HOME system variable and ensure that it is set to the location of the Oracle WebLogic Server JDK.

      If there is no JAVA_HOME variable defined, click **New** and in the New System Variable dialog, enter a variable name of JAVA_HOME and a variable value pointing to the Oracle WebLogic Server JDK, such as C:\weblogic\jdk160_11. Click **OK** to set the new system variable.

   d. Double-click the Path system variable and ensure that it includes the path to the Oracle WebLogic Server ant\bin directory. If it does not, add the path to the end of the variable value. For example:

      ```
      ;C:\weblogic\modules\org.apache.ant_1.7.0\bin
      ```

      Click **OK** to set the new system variable.

e. Click **OK** twice more to dismiss the Environment Variables and the System Properties dialogs.

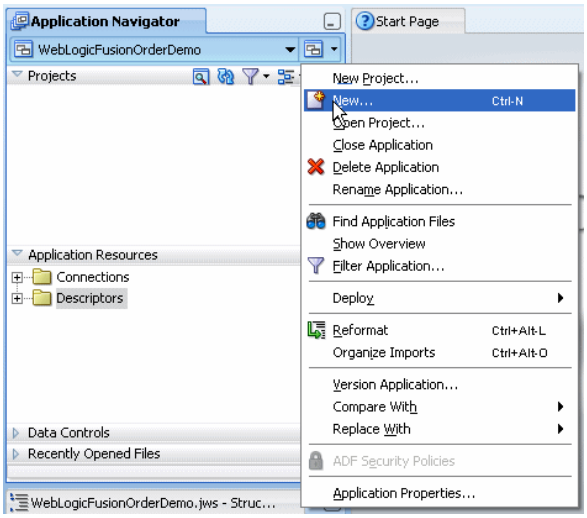
1.2.4 Task 4: Create a Connection to an Oracle WebLogic Server

To create a connection to the Oracle WebLogic Server configured for Oracle SOA Suite during installation.

1. Start Oracle JDeveloper:

   ```
   (UNIX) ORACLE_HOME/jdev/bin/jdev
   (Windows) JDEV_ORACLE_HOME\jdeveloper\JDev\bin\jdev.exe
   ```

2. From the **Application Menu**, select **New**.

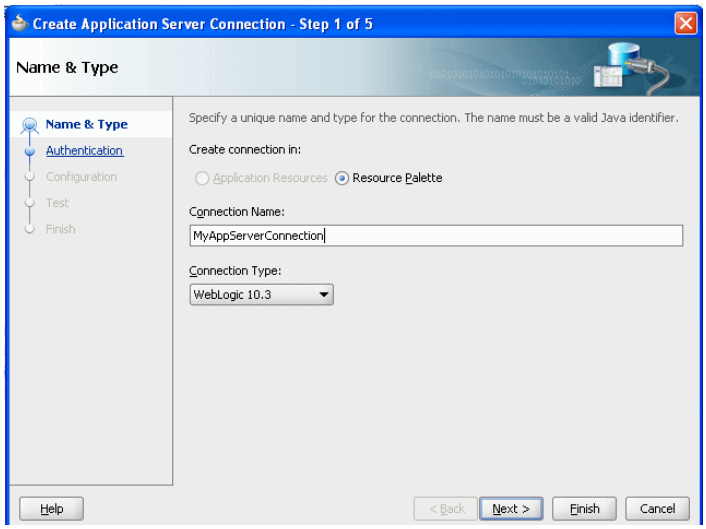


3. In the New Gallery dialog, in the **Categories** tree, select **General**, and then **Connections**.

4. Select **Application Server Connection** and click **OK**.

   The Create Application Server Connection Type page displays.

5. Enter `MyAppServerConnection` in the **Connection Name** field and select **WebLogic 10.3** from the **Connection Type** list.



6. Click **Next**.

   The Authentication page is displayed.

7. Enter `weblogic` for the **User Name** and the password for that administrator in the **Password** field.

8. In the Configuration page, enter the following values:

Element	Value
Weblogic Hostname (Administration Server)	Name of the DNS name or IP address of the Administration Server of the Oracle WebLogic Server
Port	The address of the port on which the Administration Server is listening for requests (7001 by default)
WLS Domain	The domain name for Oracle WebLogic Server

9. Click **Next**.

   The Test page displays.

10. Click **Test Connection**.

    The following message should appear:

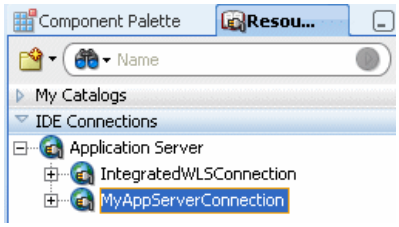
```
Testing JSR-88                          ... success.
Testing JSR-88-LOCAL                    ... success.
Testing JNDI                            ... success.
Testing JSR-160 DomainRuntime           ... success.
Testing JSR-160 Runtime                 ... success.
Testing JSR-160 Edit                    ... success.
Testing HTTP                            ... success.
Testing Server MBeans Model             ... success.

8 of 8 tests successful.
```

    If the test is unsuccessful, ensure that Oracle WebLogic Server is running, and retry the test.

11. Click **Finish**.

12. In the Resource Palette, under **IDE Connections**, expand **Application Server** to see the application server connection that you created.



1.3 Viewing the WebLogicFusionOrderDemo Application Artifacts

This tutorial focuses on building the WebLogic Fusion Order Demo application for Fusion Order Demo. To begin, spend time viewing the `WebLogicFusionOrderDemo` application artifacts in Oracle JDeveloper:

1. Start Oracle JDeveloper.

2. From the JDeveloper main menu, choose **File > Open**.

3. In the Open dialog, browse to *DEMO_DOWNLOAD_HOME*/CompositeServices and select **WebLogicFusionOrderDemo.jws**. Click **Open**.

   The following figure shows the Application Navigator after you open the file for the application workspace.

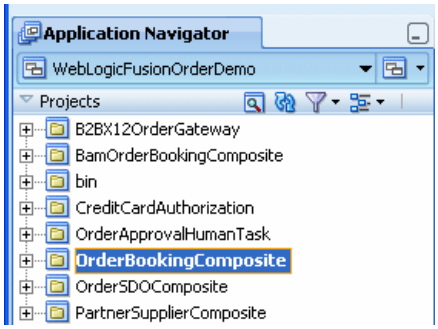


   Table 1–1 describes each of the projects in the WebLogicFusionOrderDemo application workspace:

Table 1–1 Projects in the WebLogicFusionOrderDemo Application

Project	Description
B2BX12OrderGateway	This project contains a composite for Oracle B2B. This composite is not used in this tutorial.
BamOrderBookingComposite	This project contains the OrderBookingComposite composite with Oracle BAM addition. Specifically, it uses the Oracle BAM adapter and Oracle BAM sensors to send active data into Oracle BAM dashboard. This composite is not used in this tutorial.
bin	This project contains a build script for deploying all the SOA projects. It also contains templates for seeding JMS connector information, demo topics, and demo users.
CreditCardAuthorization	This project provides the service needed by OrderBookingComposite project to verify the credit card information of a customer.
OrderApprovalHumanTask	This project provides a task form for approving orders from the OrderBookingComposite project.
OrderBookingComposite	This project processes an order submitted in the Store Front module UI. This project contains the main process for the WebLogic Fusion Order Demo application.
OrderSDOComposite	This project simulates the StoreFrontService service of the Store Front module for testing purposes.
PartnerSupplierComposite	This project contains a composite containing a BPEL process for obtaining a quote from a partner warehouse. It is referenced as a service from the composite for the OrderBookingComposite project.

4. From the **Application Menu**, select **Close** to close the sample application.

1.4 Understanding the OrderBookingComposite Flow

Composites enable you to easily assemble multiple technology components into one SOA application. A composite groups service components and uses wires to connect components. OrderBookingComposite is the main project of the WebLogic Fusion

Order Demo application, containing a composite application for processing orders from Global Company. This composite demonstrates how services, both internal to an enterprise, and external at other sites, can be integrated using the SOA architecture paradigm to create one cohesive ordering system.

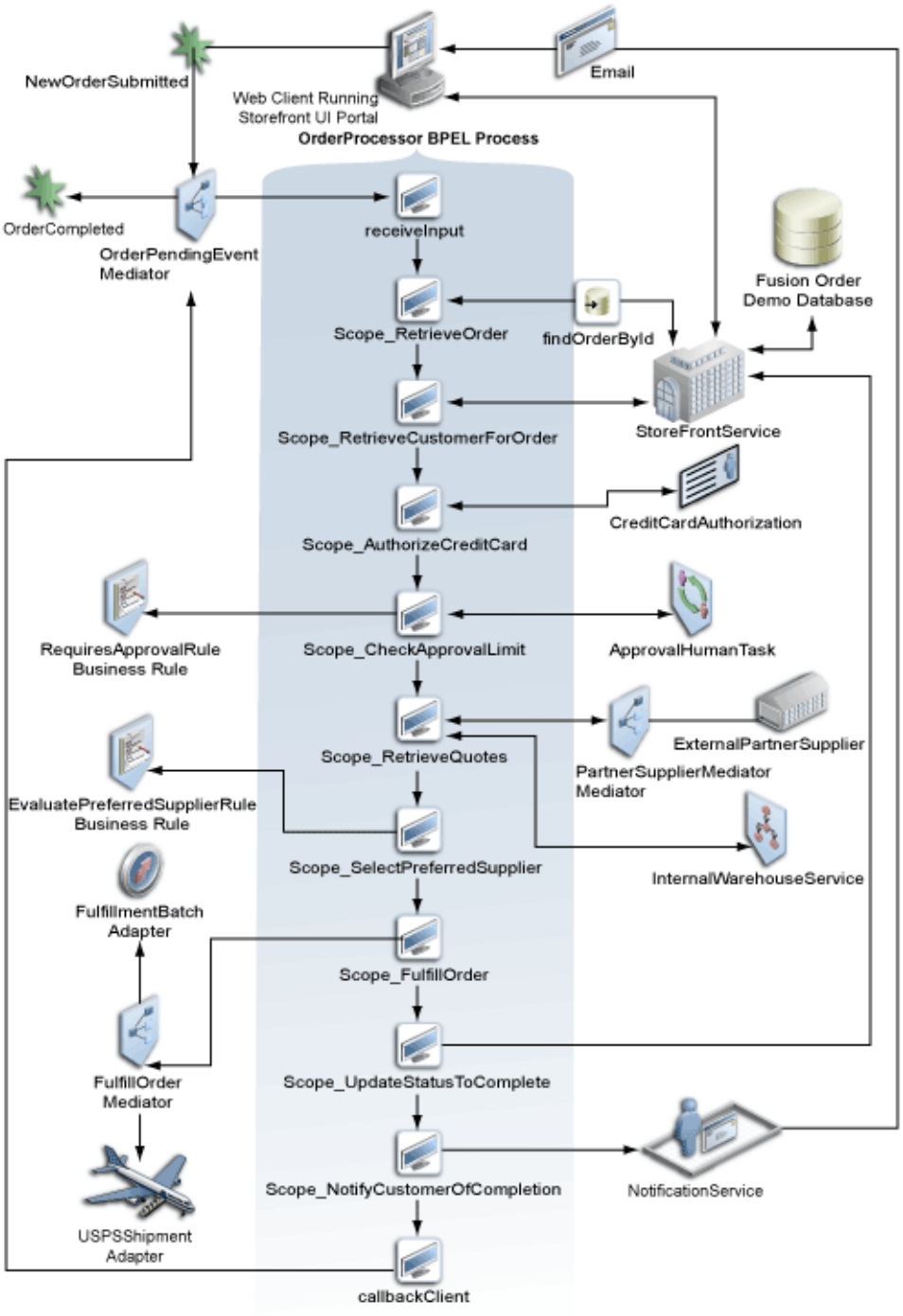
The `OrderBookingComposite` composite utilizes the following Oracle SOA Suite components:

- Oracle Mediator
- Oracle BPEL Process Manager
- Oracle Human Workflow (using a human task)
- Oracle Business Rules
- Oracle Messaging Service

At the center of `OrderBookingComposite` composite is the `OrderProcessor` BPEL process. It orchestrates all the existing services in the enterprise for order fulfillment with the right warehouse, based on the business rules in the process.

Figure 1–1 shows an overview of the `OrderBookingComposite` composite for the WebLogic Fusion Order Demo application, followed by a step-by-step description of the composite flow for how the application processes an order.

Figure 1–1 OrderBookingComposite Flow



When a new customer registers in Global Company's storefront UI, the Web client sends the customer's information to the internal customer service application called `StoreFrontService`. `StoreFrontService` then stores the customer information in a database. The customer can then browse products, add them to their online shopping cart, and place the order.

When a registered customer attempts onto Global Company's storefront UI, the UI invokes the `StoreFrontService` and provides authentication. A registered user

builds up their shopping cart, and places an order. When the order is submitted, the following events take place:

After an order is placed, the following sequence occurs to complete the order:

1. Oracle ADF Business Component writes the order to a database with schema for Fusion Order Demo, and raises a `NewOrderSubmitted` event using the Event Delivery Network (EDN). The data associated with this event is the order ID.
2. Because the `OrderPendingEvent` mediator subscribes to the `NewOrderSubmitted` event, the EDN layer notifies the `OrderPendingEvent` mediator of the new order.
3. The `OrderPendingEvent` mediator receives the order and routes the input order ID to the `OrderProcessor` BPEL process.
4. The `OrderProcessor` BPEL process receives the order ID from the database, using a bind entity activity to bind to the exposed Oracle ADF Business Component `StoreFrontService` service.

   Some of the information about the order used later in the process is:

   - Customer ID
   - Items the customer purchased
   - Credit card used
   - Shipping address chosen
5. The BPEL process initiates `StoreFrontService`, passing it the order ID, to retrieve information about the customer.
6. The BPEL process then sends the purchase amount, credit card type, and credit card number to `CreditCardAuthorizationService`, which verifies if the customer's credit card is valid.

   If credit card is not valid, the BPEL process cancels the order.

   If credit card is valid, the BPEL process sends the order to the `RequiresApprovalRule` business rule to determine if the order requires approval by management.
7. The `RequiresApprovalRule` business rule evaluates if manual approval is required. The business rule contains a rule that requires manual approval for orders over $2,000.
8. For those orders requiring manual approval, the BPEL process invokes the `ApprovalHumanTask` human task, which routes a message to a manager, who then approves or disapproves the order.
9. If the order is approved, the BPEL process sends the order information to the following suppliers in parallel to obtain a bid:

   - Internal supplier by using the `InternalWarehouseService` BPEL process, also located in `OrderBookingComposite`
   - External supplier by using the `PartnerSupplierMediator` mediator, which in turn routes to the `ExternalPartnerSupplier` BPEL process, located in another composite called `PartnerSupplierComposite`
10. The two suppliers respond with their bids, and the BPEL process send the bids to the `EvaluatePreferredSupplierRule` business rule.
11. The `EvaluatePreferredSupplierRule` business rule chooses the supplier with the lower of the two bids.

12. The BPEL process invokes the `FulfillOrder` mediator, which performs the following two operations:
    - Stores the order in a temporary queue and uploads it to the fulfillment system in batch mode overnight
    - Routes the order to USPS
13. Once the order is fulfilled, the BPEL process sets the order to `complete`.
14. The BPEL process invokes the `NotificationService` service, which sends the customer an E-mail notification with the purchase order information.
15. When the order completes, the `OrderPendingEvent` mediator publishes the `OrderCompleted` business for the `OrderProcessor` process.

When an order is updated, the following occurs:

1. The `UpdateOrderStatus` mediator publishes business event `OrderUpdateEvent` and sends the order ID to the `OrderProcessor` BPEL process.
2. The `OrderUpdateEventMediator` mediator subscribes to business event `OrderUpdateEvent`, sends the order ID to `StoreFrontService`, and waits for the `StoreFrontService` to respond with updated details about the order.

2

Running the Sample Application

This chapter describes how to deploy Fusion Order Demo, place an order, and monitor the order as it is processed by the WebLogic Fusion Order Demo application. It explains two different order scenarios for the Web client and how to monitor orders processed through the business flow.

Before following the instructions in this chapter, perform all the procedures in Chapter 1.

This chapter includes the following sections:

2.1 Deploying the Fusion Order Demo Applications

To run the demo, deploy the applications for the Store Front module and the WebLogic Fusion Order Demo application, performing the following tasks:

2.1.1 Task 1: Install the Schema for the Fusion Order Demo Application

To install the schema for the sample application:

1. Start Oracle JDeveloper 11*g* and from the main menu choose **File** > **Open**.
2. In the Open dialog, browse to *DEMO_DOWNLOAD_HOME*/`Infrastructure` and select **Infrastructure.jws**. Click **Open**.
3. When prompted to migrate files to the 11.1.1.1.0 format, click **Yes**. When the migration is complete, click **OK**.
4. In the Application Navigator, expand **MasterBuildScript** and then **Resources**, and double-click **build.properties**.

5. In the editor, modify the following properties for your environment:

Element	Value
`jdeveloper.home`	The root directory where you have Oracle JDeveloper 11*g* installed. For example: `C:/JDeveloper/11`
`jdbc.urlBase`	The base JDBC URL for your database in the format `jdbc:oracle:thin:@<`*`yourhostname`*`>`. For example: `jdbc:oracle:thin:@foddb-server`
`jdbc.port`	The port for your database. For example: `1521`
`jdbc.sid`	The SID of your database. For example: `ORCL` or `XE`
`db.adminUser`	The administrative user for your database. For example: `system`
`db.demoUser.tablespace`	The tablespace name for the Fusion Order Demo users. For example: `USERS`

6. From the JDeveloper main menu, choose **File > Save All**.
7. In the Application Navigator, under the **Resources** node, right-click **build.xml** and choose **Run Ant Target > buildAll**.
8. When prompted, enter the administrative-user password for your database.

   The **buildAll** command then creates the `FOD` user and populates the tables in the `FOD` schema. In the Apache Ant - Log, a series of SQL scripts display, followed by:

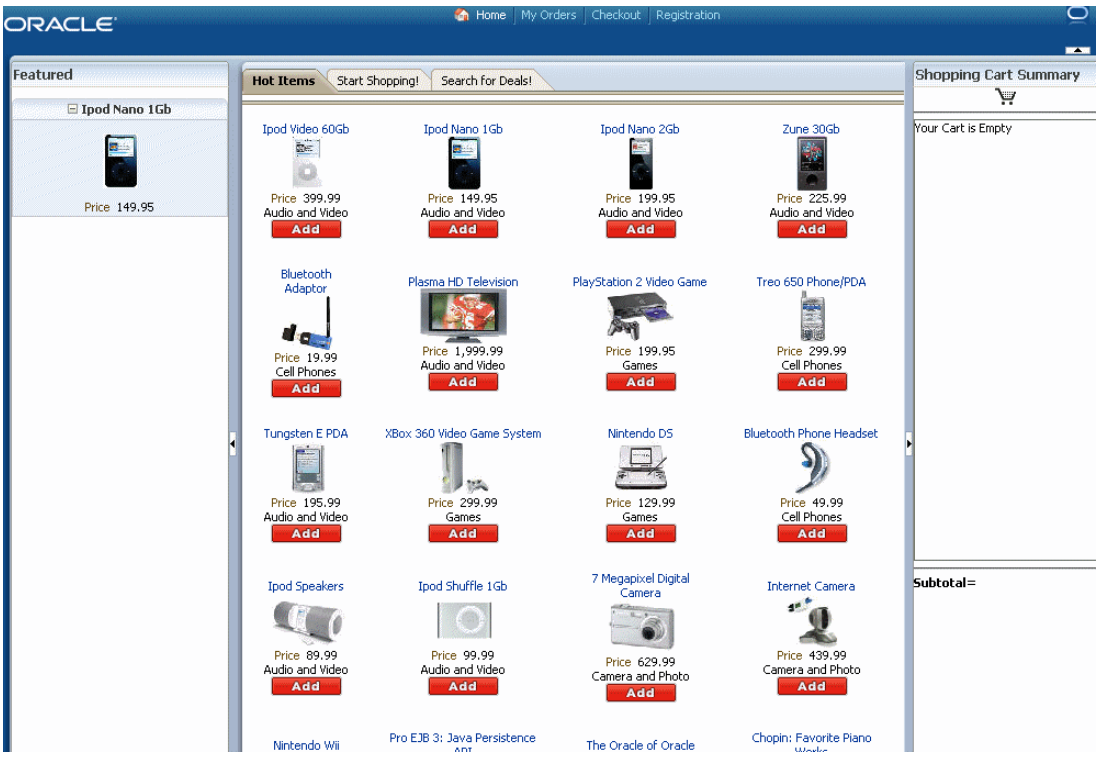
   ```
   buildAll:
   BUILD SUCCESSFUL
   Total time: nn minutes nn seconds
   ```

   For more information on the demo schema and scripts, see the `README.txt` file in the `MasterBuildScript` project.

2.1.2 Task 2: Deploy the Store Front Module

You place orders by running the `home.jspx` page in the `StoreFrontUI` project of the Store Front module. The `StoreFrontUI` project uses JavaServer Faces (JSF) as the view technology, and relies on the Oracle ADF Model layer to interact with Oracle ADF Business Components in the `StoreFrontService` project.

Figure 2–1 StoreFrontUI Home Page



From the home page, you can browse the Web site as an anonymous user, then log in as a registered customer to place an order.

The Fusion Order Demo application ships with predefined customer data. Because the Fusion Order Demo application implements Oracle ADF Security to manage access to Oracle ADF resources, only the authenticated user can view orders in their cart. The following table shows the preregistered customers. You place orders as `ngreenbe` later in this chapter.

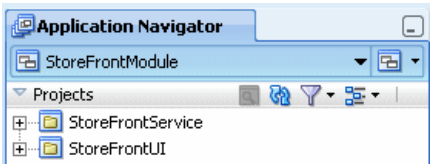
Username	Password	Application Role
`ngreenbe`	`welcome1`	Customer (`CUST`)
`sking`	`welcome1`	Staff (`STAFF`)
`pbrown`	`welcome1`	Supplier (`SUPP`)

To learn more about the Store Front module and to understand its implementation details, see *Oracle Fusion Middleware Fusion Developer's Guide for Oracle Application Development Framework*.

To deploy the Store Front module:

1. Choose **File** > **Open**.
2. In the Open dialog, browse to *`DEMO_DOWNLOAD_HOME`*`/StoreFrontModule` and select **StoreFrontModule.jws**. Click **Open**.
3. When prompted to migrate files to the 11.1.1.1.0 format, click **Yes**. When the migration is complete, click **OK**.

   The following figure shows the Application Navigator after you open the file for the application workspace.



4. Deploy the services used by the Store Front module to send orders to the `OrderBookingComposite` composite.
   a. In the Application Navigator, right click **StoreFrontModule** and choose **Deploy** > **StoreFrontModule_SDOServices** > **to** > **MyAppServerConnection**. You created this connection in Section 1.2.4, "Task 4: Create a Connection to an Oracle WebLogic Server."
   b. In the Select Deployment Targets dialog, select the Managed Server for the Oracle WebLogic Server, such as **soa_server**, and click **OK**
   c. In the Deployment Configuration dialog, accept the default MDS repository name and partition name, and then click **Deploy**.
5. Deploy the Store Front module. From the Application menu, select **Deploy** > **StoreFrontModule** > **to** > **MyAppServerConnection**.

2.1.3 Task 3: Deploy the WebLogic Fusion Order Demo Application

To deploy the WebLogic Fusion Order Demo application to an Oracle SOA Suite installation, containing an Oracle WebLogic Server domain with an Administration Server and a Managed Server.

1. In the Application Navigator, select **WebLogicFusionOrderDemo**.
2. Expand **bin** and then **Resources**, and double-click **build.properties**.
3. In the editor, modify the following properties for your environment:

Parameter	Value
`oracle.home`	The root directory where you have Oracle JDeveloper 11*g* installed. For example: `C:\\Oracle\\Middleware\\jdeveloper\\`
`soa.only.deployment`	`false` You set this property to `true` if you are using the `OrderSDOComposite` composite to place orders. This tutorial assumes you are using the Store Front Module to place orders. Therefore, you must modify this property to `false`.
`admin.server.host`	The DNS name or IP address of the Administration Server for Oracle SOA Suite for hosting applications. For example: `soahost`
`admin.server.port`	The port of the Administration Server. For example: `7001`
`managed.server`	The DNS name or IP address of the Managed Server for Oracle SOA Suite for hosting applications. For example: `soahost`

Parameter	Value
managed.server.port	The port of the Managed Server for Oracle SOA Suite for hosting applications. For example: 8001
server.user	The Oracle WebLogic Server administrator. For example: weblogic
server.password	The password of the Oracle WebLogic Server administrator. For example: welcome1
server.targets	The name of the Managed Server. For example: soa_server
soa.server.oracle.home	The location of where to store the deployment plans for the adapters. For example: C:\\AS11gR1SOA
foreign.mds.type	The location of the Oracle Metadata Repository. Leave the default value to jdev. You do not have to specify the values for the following parameters: ▪ jdbc-userid ▪ jdbc-password ▪ jdbc.url These parameters are ignored when the value is set it jdev. For an environment in which you are deploying from a server location without Oracle JDeveloper, then specify db and supply values for the jdbc-userid, jdbc-password, and jdbc.url parameters to specify the location of the MDS Repository.

4. From the JDeveloper main menu, choose **File > Save All**.
5. In the Application Navigator, under the **Resources** node, right-click **build.xml** and choose **Run Ant Target** and select the following ant targets in the following sequential order:

Target	Description
1. setupWorkspaceForJDeveloperUse	This script sets up the application workspace in Oracle JDeveloper.
2. seedFodJmsResources	This script populates the JMS resources for the Fulfillment mediator.
3. seedDemoUsers	This script adds jstein as the user to approve orders for over $2,000. When you run the demo, you place an order for $2,000 and log in to the Oracle BPM Worklist as jstein and approve the order. If you do not run this script, the OrderProcessor BPEL process generates a recoverable error and assigns the task to the weblogic administrator.
4. compile-build-all	This script compiles and builds all the SOA composites.

Target	Description
5. `compile-deploy-all`	This script compiles, builds, and deploys all the SOA composites to the Managed Server for Oracle SOA Suite.

Do not run the next target in the sequence until the previous one completes successfully. In the **Apache Ant - Log**, ensure you see the following message before proceeding to the next script:

```
BUILD SUCCESSFUL
Total time: nn minutes nn seconds
```

For more information about the `ant` targets, see the following resources:

- Appendix B, "ant Scripts"
- `Readme.txt` file in the *`DEMO_DOWNLOAD_HOME`*`/CompositeServices/`

2.2 Placing Two Orders in the Store Front

The ordering process begins in the storefront UI, where a user shops for and orders products. When an order is submitted, the Application Development Framework Business Component writes the order to database and raises an `NewOrderSubmitted` business event using the Events Delivery Network (EDN). The `OrderPendingEvent` mediator subscribes this event, and initiates the main BPEL process, `OrderProcessor`, to process the order.

In this task, place two orders, one for under $2000 and the other for over $2000. By placing these order, you can see how orders totalling more than $2000 require human approval.

To place orders:

1. Access the storefront from the following URL:

   `http://`*`hostname`*`:`*`port`*`/StoreFrontModule/faces/home.jspx`

   where *`hostname`* is the DNS name or IP address of the Oracle WebLogic Server for Oracle SOA Suite and *`port`* is the address of the port on which the Managed Server for the Oracle WebLogic Server is listening for requests (8001 by default).

   You begin the order process by browsing the product catalog. When you click **Add** next to a product, the site updates the shopping cart region to display the item.

2. Place an order for under $2000:

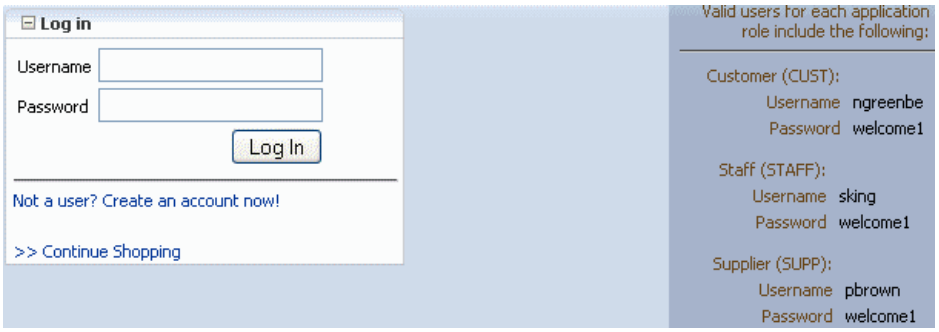
   a. Click the **Ipod Nano 1 Gb** for $149.95 and click **Add**.

   b. Click the **Ipod Nano 2 Gb** for $199.95 nd click **Add**.

      The following shows the cart summary with the two products added. The summary displays a subtotal purchase total of $349.90 for the two items that appear in the cart.

c. Click the **Checkout** link, located in the middle of the menu bar.

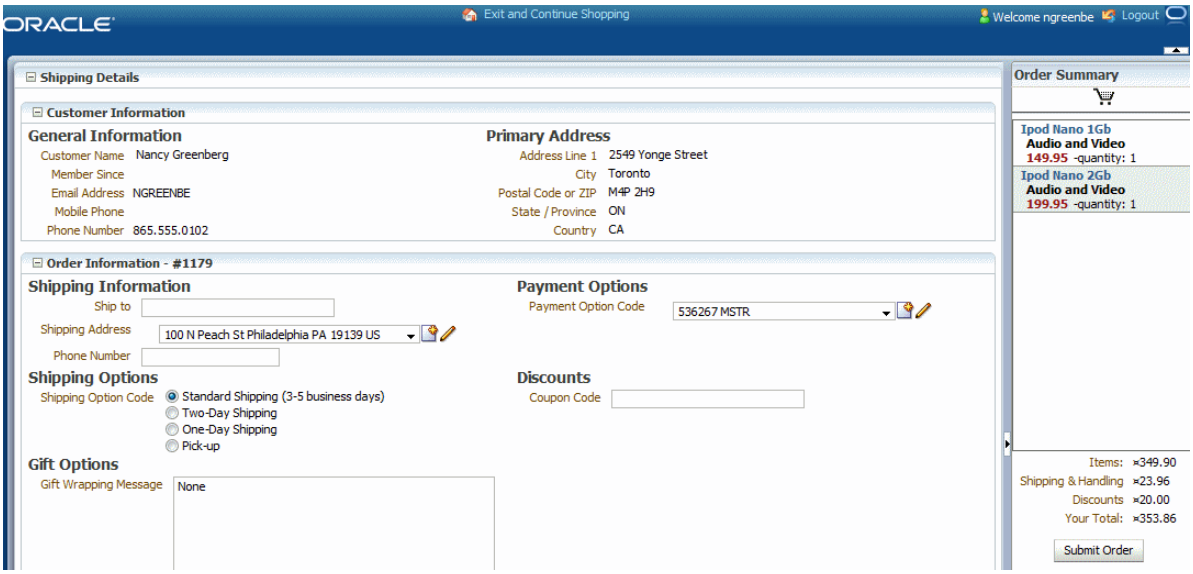
A login dialog displays.



d. Enter `ngreenbe` and `welcome1` in the **Username** and **Password** fields, respectively.

e. Click **Log In**.

The Shipping Details page displays.



f. In the **Order Information #*order_id*** section, take note of the order ID, as you need it for a later task. In this example, the order ID is 1179.

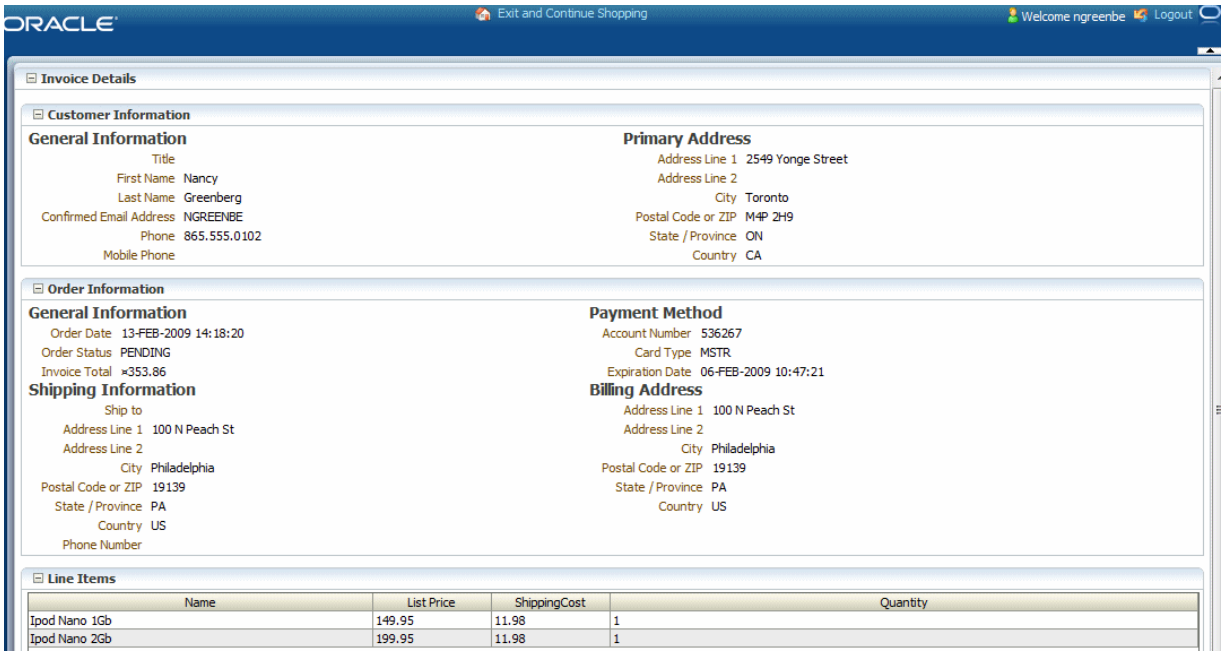
g. In the **Shipping Information** section, take note of the following default settings:

- 100 N Peach St Philadelphia PA 19139 US

- 536267 MSTR

h. In the **Order Summary** section, take note of the order total, which is $353.86 and click **Submit Order** to complete the first order.

The Invoice Details page displays.



3. Click the **Exit and Continue Shopping** link, located in the menu bar, to return to the home page.

4. Place an order for over $2000:

   a. Click the **Plasma HD Television** for $1,999.99 and click **Add**.

   b. Click the **Playstation 2 Video Game** for $199.95 and click **Add**.

      The **Shopping Cart Summary** section displays a subtotal purchase total of $2,199.94 for the two items that appear in the cart.

   c. Click the **Checkout** link.

      The Shipping Details page displays.

   d. In the **Order Information** ***#order_id*** section, take note of the order ID, as you need it for a later task. In this example, the order ID is 1180.

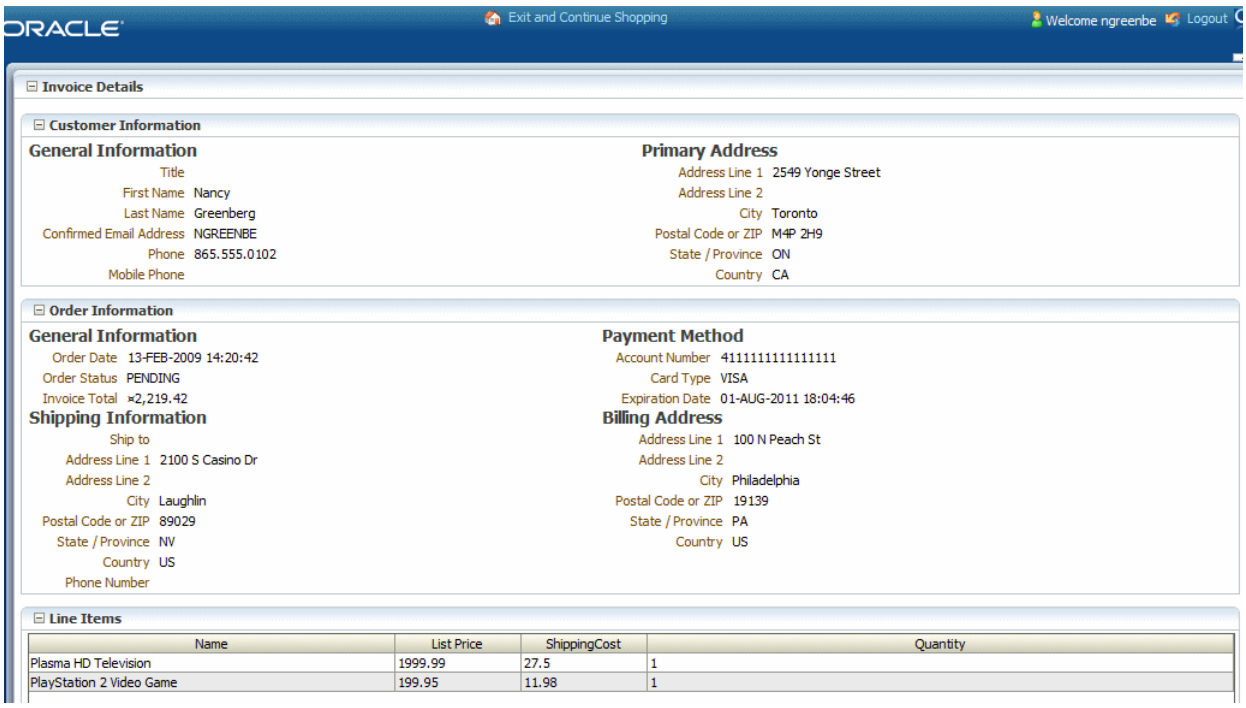
   e. In the **Shipping Information** section, modify any of the options, such as the address in the **Shipping Address** field and the credit card in the **Payment Options** section. Take note of the settings you select.

      - 2100 S Casino Dr. Laughlin NV 89029 US

      - 4111111111111111 VISA

   f. In the **Order Summary** section, take note of the order total, which is $2,219.42 and click **Submit Order** to complete the second order.

      The Invoice Details page displays.



5. Click the **Logout** link, located in the right-hand-side of the menu bar, to log `ngreenbe` out of the session.

2.3 Starting Fusion Middleware Control to Monitor Orders

To start Oracle Enterprise Manager Fusion Middleware Control to monitor orders:

1. Use Mozilla FireFox, version 2.0 or higher, or Internet Explorer, version 7.0 or higher, to access the following URL:

   `http://hostname:port/em`

   where *hostname* is the host name and *port* is the port of the Fusion Middleware Control for the Oracle SOA Suite installation.

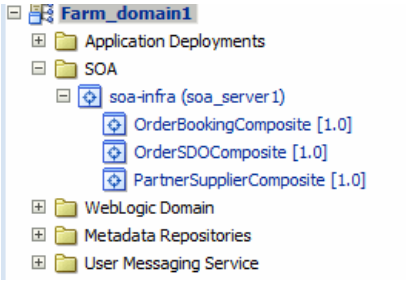
   The login dialog appears.

2. Enter `weblogic/password` and click **Login**

   where:

   - `weblogic` is the Fusion Middleware Control Console administrator user name
   - *password* is the password you provided for the `weblogic` administrator during installation

3. From the navigation pane, expand **SOA** > **soa-infra** to see the deployed applications:



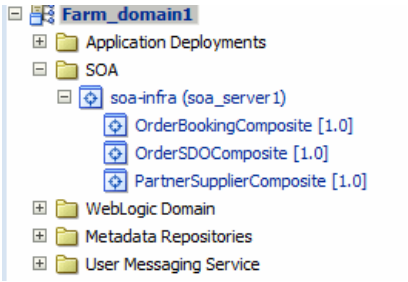
OrderBookingComposite and **PartnerSupplierComposite** are the two main composites in the WebLogic Fusion Order Demo application.

2.4 Monitoring the First Order

You now monitor the first order sent from the Store Front module to the `OrderBookingComposite` composite from the Fusion Middleware Control. This order was submitted by Nancy Greenberg for $353.86.

To monitor the first order:

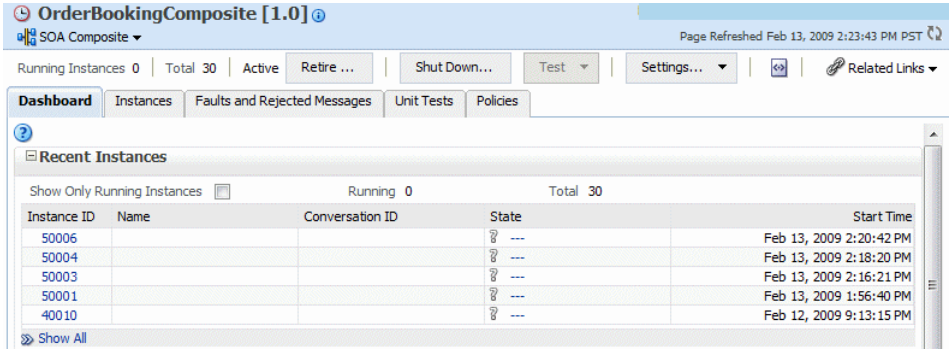
1. From the navigation pane, expand **SOA** > **soa-infra** to see the deployed applications:



OrderBookingComposite and **PartnerSupplierComposite** are the two main composites in the WebLogic Fusion Order Demo application.

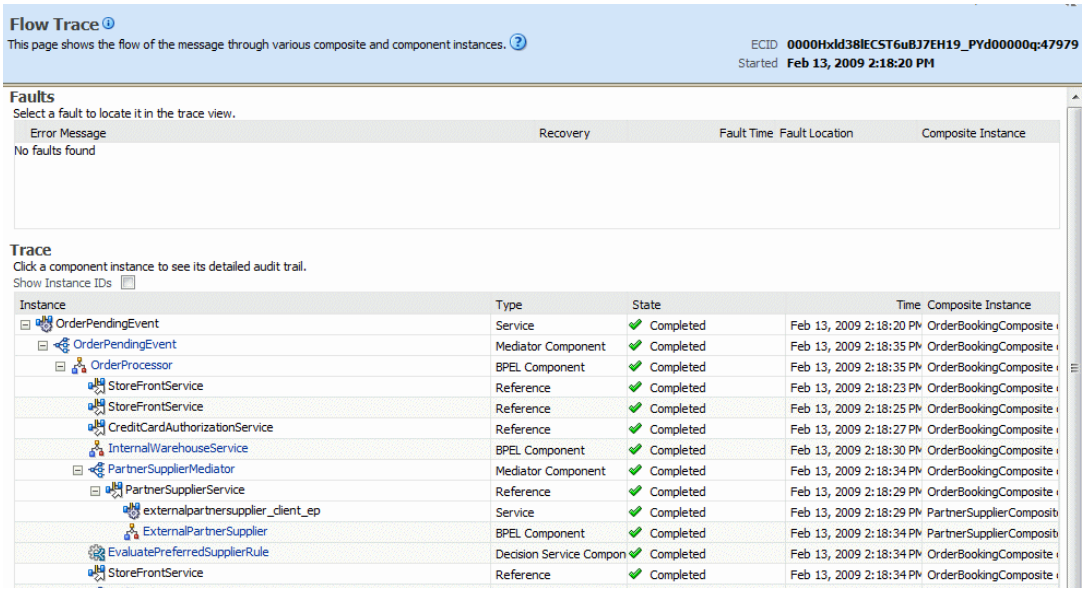
2. Click the **OrderBookingComposite** composite.

The SOA Infrastructure home page displays. The upper part of the page displays details about recent SOA composite application instances, recent faults, and rejected messages. The topmost two instances in the **Recent Instances** table represents the instance of the SOA composite application you created when you placed orders in Section 2.2, "Placing Two Orders in the Store Front."



3. In the **Recent Instances** section, click the second instance, representing the order for $353.86. Note the instance number.

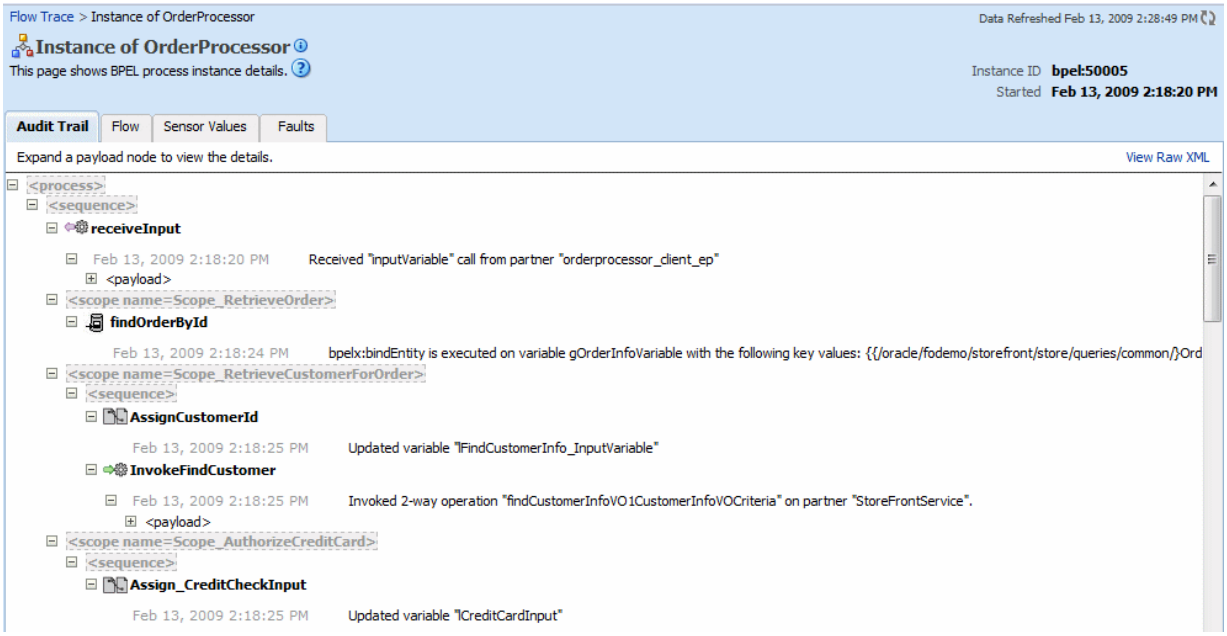
The Flow Trace page displays. The **Trace** section shows the sequence of the message flow through the services, service components, and references that comprise the SOA composite application.



The **Trace** section displays the state of each service component within the `OrderBookingComposite` composite. Notice all the service components have a status of **Completed**, indicating that the order was successfully processed.

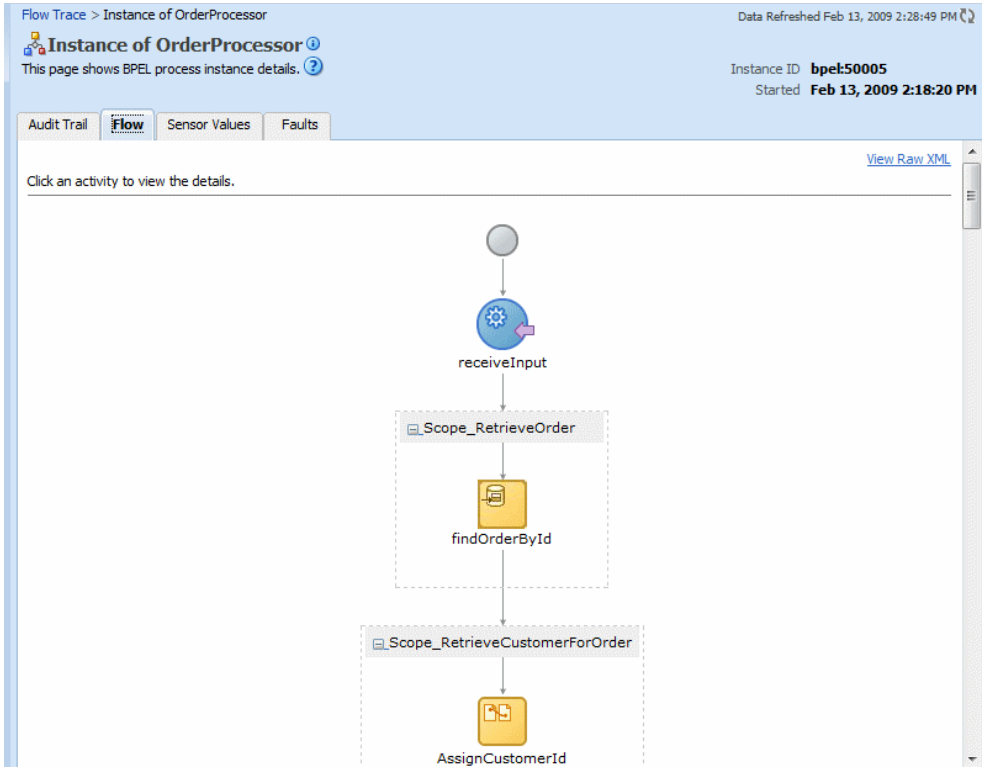
4. Click the **OrderProcessor** BPEL process service component in the **Instance** column to view instance more carefully.

   The **Audit Trail** tab of the Instance of OrderProcessor window displays execution details about the activities in the BPEL process. Notice, too, the instance you selected displays in the **Instance ID** field on the right side.

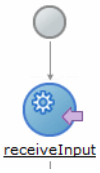


5. Click the **Flow** tab to see a visual representation of the instance.

   A visual representation of the BPEL process activities appears. The icons in the flow are referred to as activities. You can click them to view their details.



6. Click the first activity, the blue, circle receive activity labeled **receiveInput**.

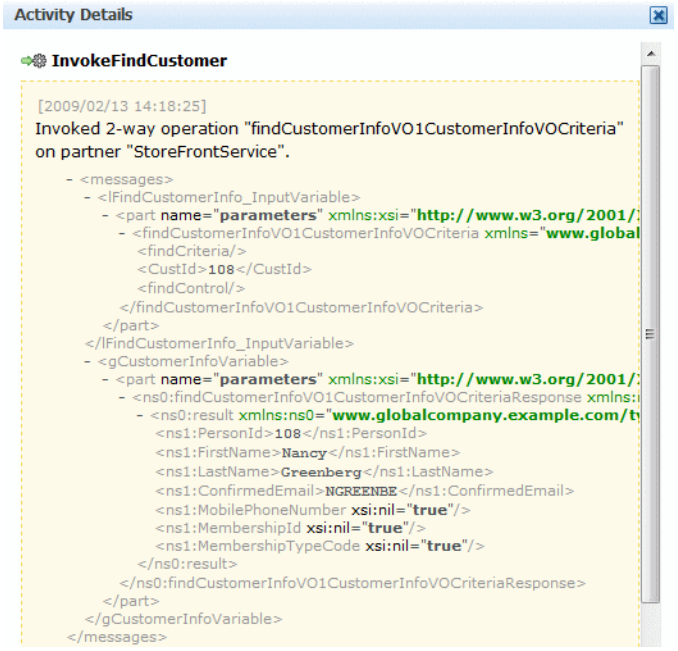


The Activity Details dialog displays the XML input to this BPEL process instance. It shows the order ID (`orderID`) you were given when you placed the order through the Store Front module. In this example, the order ID is 1179.

7. Click **X** or **Close** to the dismiss the Activity Details dialog.
8. Scroll further in the process to the **Scope_RetrieveOrder** activity and click **findOrderByID** to order ID as input to variable `gOrderInfoVariable`:

```
bpelx:bindEntity is executed on variable gOrderInfoVariable with the following
key values:
{{/oracle/fodemo/storefront/store/queries/common/}OrderId=1179}
```

9. Click **X** or **Close** to the dismiss the Activity Details dialog.
10. Scroll to the **Scope_RetrieveCustomerForOrder** scope and click the **InvokeFindCustomer** activity to see the `StoreFrontService` service being invoked and returning the customer information. Note the following in the Activity Details window:
    - `lFindCustomerInfo_InputVariable` represents the input variable to the `StoreFrontService` service. The `CustId` parameter represents the ID of the customer of customer `ngreenbe`.
    - `gCustomerInfoVariable` represents the output from the `StoreFrontService` service, which returns the customer information for back to the BPEL process.



11. Click **X** or **Close** to the dismiss the Activity Details dialog.
12. Scroll to the **Scope_AuthorizeCreditCard** scope and click **InvokeCheckCreditCard** to see the `CreditCardAuthorization` service being invoked and returning the status of the credit card.

    Note the following in the Activity Details window:
    - `lCreditInput` represents the input variable to the `CreditCardAuthorizationService` service. Parameters `CCType`, `CCNumber`, and `PurchaseAmount` represent the input credit card type, number, and order total. These values are set as follows:

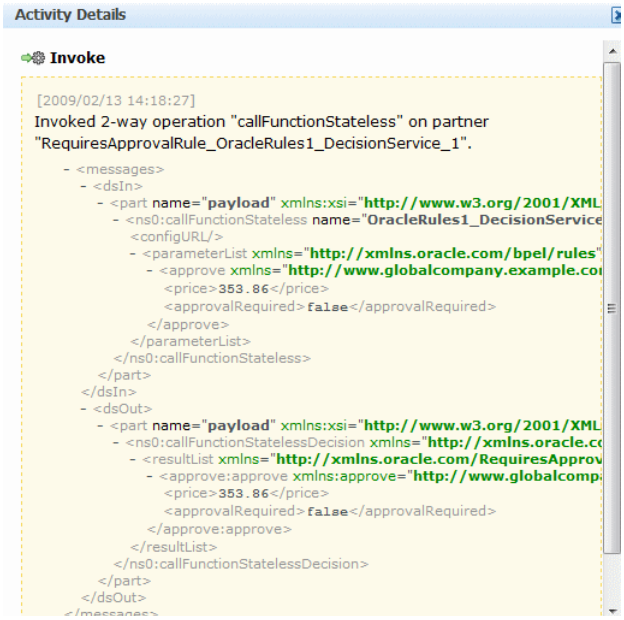
      ```
      <CCType>MSTR</CCType>
      <CCNumber>536267</CCNumber>
      <PurchaseAmount>353.86</PurchaseAmount>
      ```

    - `lCreditCardOuput` shows the service returned a status of `APPROVED`. Therefore, the `OrderProcessor` BPEL process continues.
13. Click **X** or **Close** to the dismiss the Activity Details dialog.

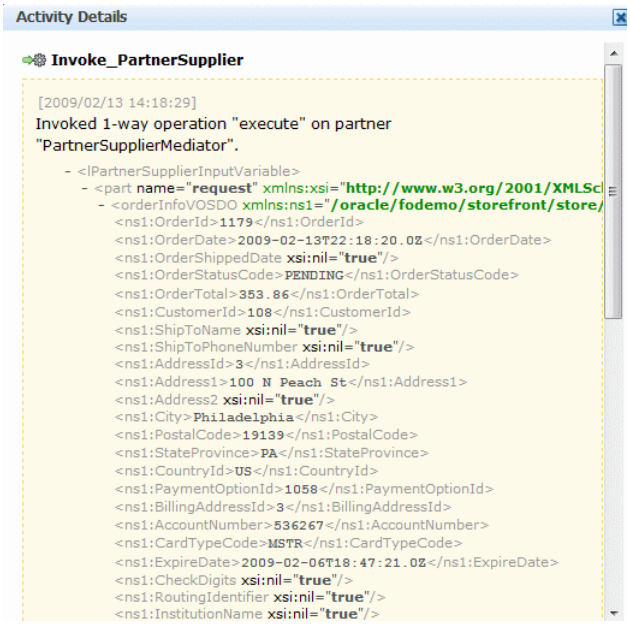
14. Scroll to the **Scope_CheckApprovalLimit** scope and click the **Invoke** link under the **BusinessRule_ApprovalRequired** to see the **RequiresApprovalRule** business rule being invoked.

    Note the following in the Activity Details window:

    - `dsIn` represents the input variable sent to the business rule. The `approve` parameter shows the invocation of the rules engine at run time. The `price` parameter shows the order total was $353.86. The rule engine requires this input to determine whether human approval is required.
    - `dsOut` shows the output from the business rule. The `approvalRequired` parameter has a value `false`. Because this order is under $2,000, no human approval is required. Therefore, the return value is set to `false`.

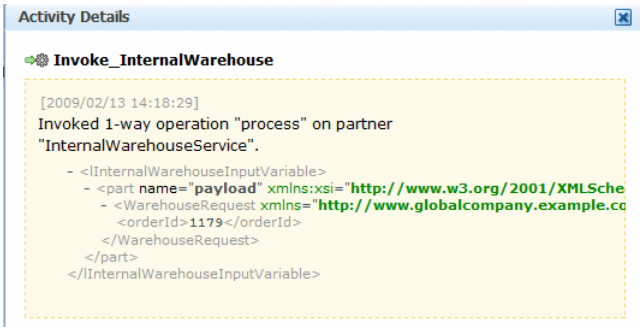


15. Click **X** or **Close** to the dismiss the Activity Details dialog.
16. In the **Scope_RetrieveQuotes** scope, perform the following:
    a. Click the **Invoke_PartnerSupplier** link to see the order information being sent to the `PartnerSupplierMediator` mediator. The `PartnerSupplierMediator` routes the order information to the `ExternalPartnerSupplier` BPEL process, located in `PartnerSupplierComposite` composite.



b. Click **X** or **Close** to the dismiss the Activity Details dialog.

c. Click the **Invoke_InternalWarehouse** link to see the order ID being sent to the `InternalWarehouseService` BPEL process through the `lInternalWarehouseInputVariable` variable:



d. Click **X** or **Close** to the dismiss the Activity Details dialog.

17. In the **Scope_SelectPreferredSupplier** scope, click the **Invoke** link under **BusinessRule_SelectPreferredSupplier** to see the **EvaluatePreferredSupplierRule** business rule being invoked.

Note the following in the Activity Details window:

- `dsIn` represents the input variable sent to the business rule. The `warehouse`, `deliveryDate`, and `orderTotal` parameter values provide the input to the business rule. The rule engine uses this input to pick the supplier with the lowest shipping price to fulfill the order.

  The returned input data for the two warehouse suppliers is as follows:

```
<warehouse>InternalWarehouse</warehouse>
<deliveryDate>2009-02-13</deliveryDate>
<orderTotal>1000</orderTotal>
...
<warehouse>PartnerWarehouse</warehouse>
<deliveryDate>2009-02-13</deliveryDate>
```

```
<orderTotal>353.86</orderTotal>
```

The `InternalWarehouse` supplier returns a static value of $1,000 for all orders.

- `dsOut` shows the output from the business rule. The `warehouse` parameter value shows the selected warehouse supplier. The `PartnerWarehouse` supplier was selected, because it provided a lower quote.

18. Click **X** or **Close** to the dismiss the Activity Details dialog.
19. In the **Scope_FulfillOrder** scope, click **Invoke_FulfillOrder** link to see the order information being sent to the `FulfillOrder` mediator. The `FulfillOrder` mediator stores the order in a temporary queue and routes the order to USPS for shipment.

20. Click **X** or **Close** to the dismiss the Activity Details dialog.
21. Scroll to the **Scope_NotifyCustomerOfCompletion** scope and click the **InvokeNotificationService** link to see the output E-mail notification sent to Nancy Greenberg.
22. Click **X** or **Close** to the dismiss the Activity Details dialog.
23. Close the Flow Trace window.

2.5 Monitoring the Second Order

You now monitor the second order you submitted for $2,219.42 as Nancy Greenberg. This order is processed differently than the first order, because the order amount is for more than $2,000. Therefore, it requires human approval. In this task, monitor the order with the Fusion Middleware Control, approve the order with Oracle BPM Worklist, and see the order complete in the Fusion Middleware Control.

To monitor the second order, complete the following tasks:

- Task 1: View the Order in the Fusion Middleware Control
- Task 2: Use the Oracle BPM Worklist to Approve the Order
- Task 3: View the Approval in the Fusion Middleware Control

2.5.1 Task 1: View the Order in the Fusion Middleware Control

1. From the SOA Infrastructure home page, in the **Recent Instances** section, click the first instance, representing the order for $2,219.42.

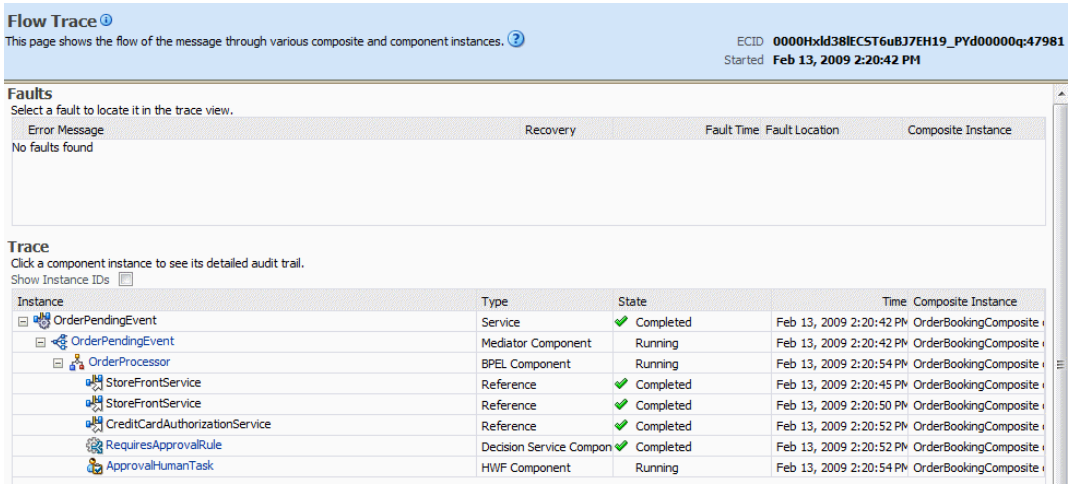
   The Flow Trace page displays.

2. Click the **OrderProcessor** BPEL process service component in the **Instance** column.

   The **Audit Trail** tab of the Flow Trace window displays execution details about the activities in the BPEL process.

3. In the **Recent Instances** section, click the first instance, representing the order for 2,219.42. Note the instance number.

   The Flow Trace page displays.



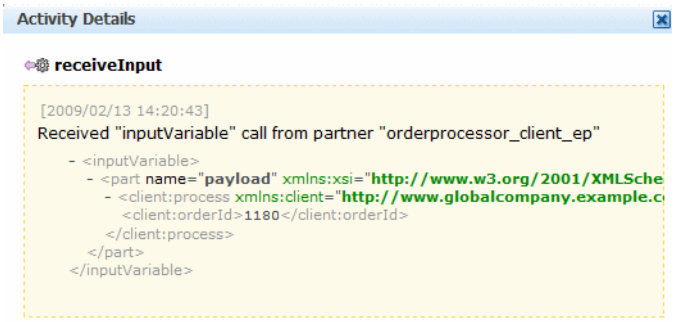
   Unlike the first order, notice in the **Trace** section how the service components in the **OrderBookingComposite** composite are not all complete and the process is stopped at the **ApprovalHumanTask** component.

4. Click the **OrderProcessor** BPEL process service component in the **Instance** column to look at the instance more carefully in the Instance of OrderProcessor window.

5. Click the **Flow** tab to see a visual representation of the instance.

6. Click the **receiveInput**. activity to see the order ID you placed.

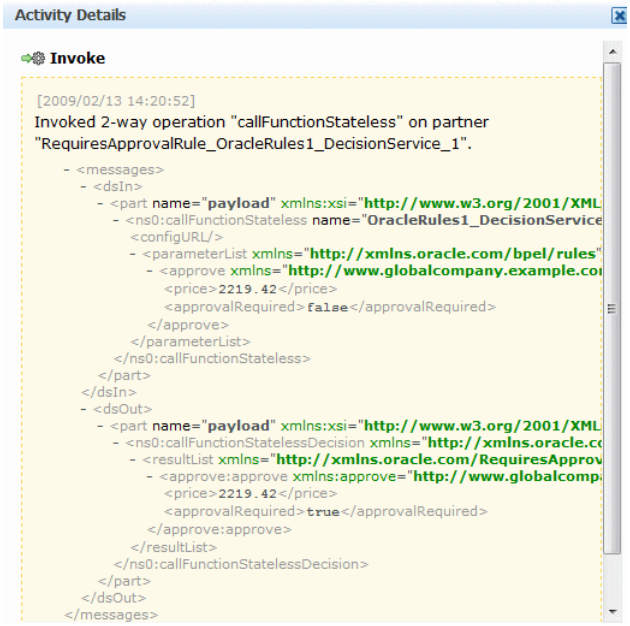
The Activity Details dialog displays the XML input to this BPEL process instance. It shows the order ID (`orderID`) you were given when you placed the order through the Store Front module. In this example, the order ID is 1180.



7. Click **X** or **Close** to the dismiss the Activity Details dialog.
8. Scroll to the **Scope_CheckApprovalLimit** scope and click the **Invoke** link under the **BusinessRule_ApprovalRequired** to see the **RequiresApprovalRule** business rule being invoked.

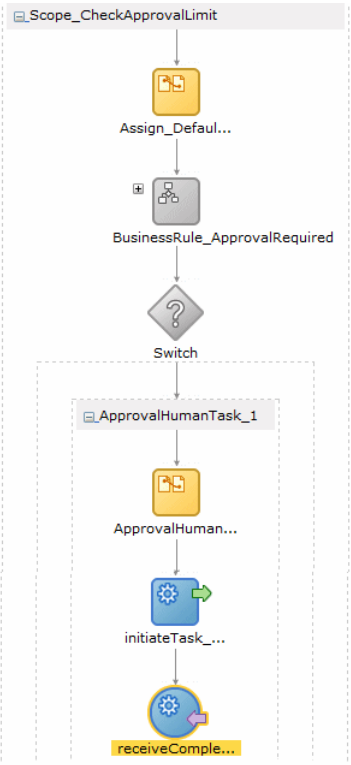
   Note the following in the Activity Details window:

   - `dsIn` represents the input variable sent to the business rule. The `approve` parameter shows the invocation of the rules engine at run time. The `price` parameter shows the order total was $2,219.42.
   - `dsOut` shows the output from the business rule. The `approvalRequired` parameter has a value `true`. Because this order is over $2,000, human approval is required. Therefore, the return value is set to `true`.



9. Click the **Collapse** icon (**-**) icon on the **BusinessRule_ApprovalRequired** to collapse it.
10. Scroll toward the bottom of the **Scope_CheckApprovalLimit** scope to see the `ApprovalHumanTask` human task was initiated after the business rule. The switch under the business rule is like a `if-then-else`, `case`, or `switch`

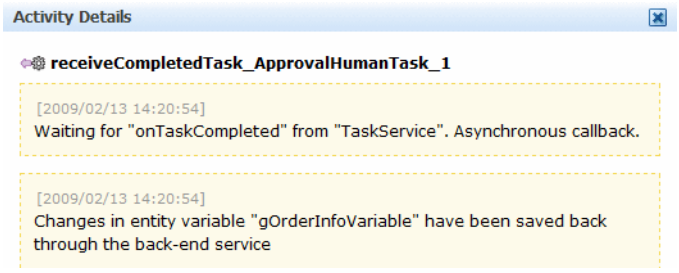
statement in other programming languages. In this case, if approval is required, this switch submits data to the `ApprovalHumanTask` human task.



11. Click the **initiateTask_ApprovalHumanTask_1** activity.
12. In the Activity Details dialog, scroll to the `initiateTaskResponseMessages` variable to see the `assigneeUsers` parameter. This parameter specifies the human task has been assigned to user `jstein`:

```
- <assigneeUsers>
   <id>jstein</id>
   <type>user</type>
</assigneeUsers>
```

13. Click **X** or **Close** to the dismiss the Activity Details dialog.
14. Click the **receiveCompletedTask_ApprovalHumanTask_1** activity to see the human task is awaiting approval.



15. Click **X** or **Close** to the dismiss the Activity Details dialog, but do not close the Flow Trace page, as you need it to view order processing when it completes.

2.5.2 Task 2: Use the Oracle BPM Worklist to Approve the Order

To approve the order, use the Oracle BPM Worklist:

1. Use Internet Explorer 7 or Mozilla Firefox 2.0.0.2 to access the following URL:

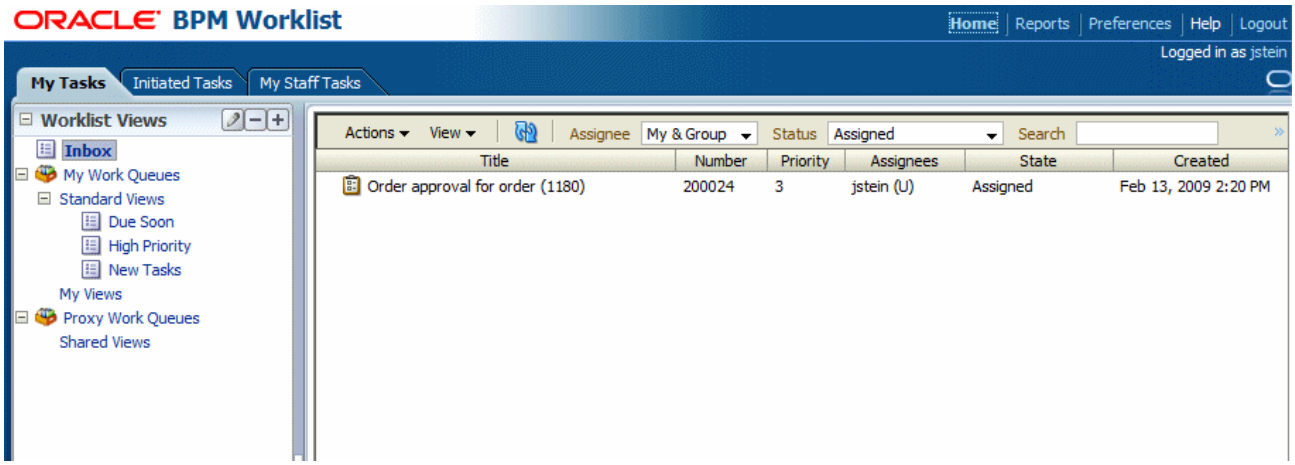
   `http://hostname:port/integration/worklistapp/faces/home.jspx`

   where *hostname* is the DNS name or IP address of the Oracle WebLogic Server for Oracle SOA Suite and *port* is the address of the port on which the Managed Server for the Oracle WebLogic Server is listening for requests (8001 by default).

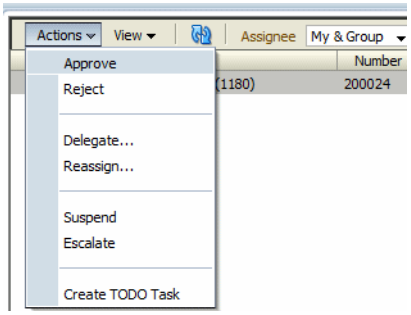
   The login dialog appears.

2. Enter `jstein` in the **Username** field and `welcome1` in the **Password** field and click **Login**.

3. The **Inbox** shows the order number 1180 is awaiting approval.



4. Select the order from the table and from the **Actions** menu, select **Approve**.



5. Click **OK** to acknowledge the approval message.

   The **My Tasks** tab updates so that no worklist tasks are currently assigned to `jstein`.

   With the order approval completed, the processing for the order is now complete.

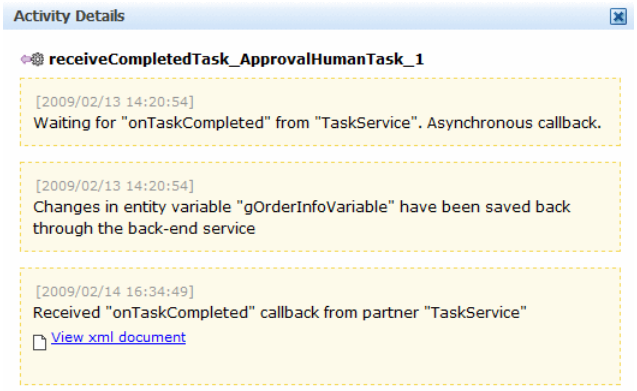
2.5.3 Task 3: View the Approval in the Fusion Middleware Control

To verify the order completed processing with Fusion Middleware Control:

1. Go back to the Flow Trace page and click the **Refresh** icon, located in the top right corner:

2. Scroll toward the bottom of the **Scope_CheckApprovalLimit** scope to see the `ApprovalHumanTask` human proceeded.

3. Click the **receiveCompletedTask_ApprovalHumanTask_1** activity to see the human task.



4. Click **X** or **Close** to the dismiss the Activity Details dialog.

5. In the **Scope_SelectPreferredSupplier** scope, click the **Invoke** link under **BusinessRule_SelectPreferredSupplier** to see the **EvaluatePreferredSupplierRule** business rule being invoked.

   Note the following in the Activity Details window:

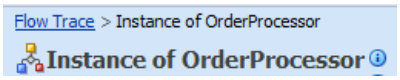
   - `dsIn` represents the input variable sent to the business rule. The `warehouse`, `deliveryDate`, and `orderTotal` parameter values provide the input to the business rule. The rule engine uses this input to pick the supplier with the lowest shipping price to fulfill the order.

     The returned input data for the two warehouse suppliers is as follows:

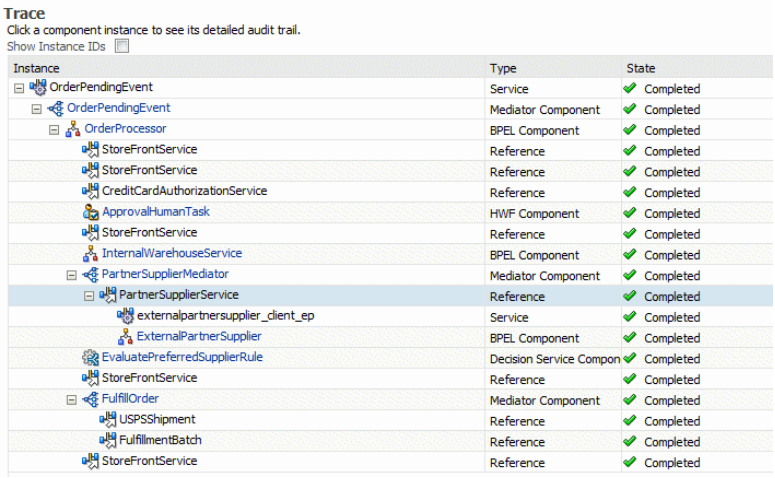
     ```
     <warehouse>InternalWarehouse</warehouse>
     <deliveryDate>2009-03-13</deliveryDate>
     <orderTotal>1000</orderTotal>
     ...
     <warehouse>PartnerWarehouse</warehouse>
     <deliveryDate>2009-03-13</deliveryDate>
     <orderTotal>2219.42</orderTotal>
     ```

- The `warehouse` parameter value shows the selected warehouse supplier. The `InternalWarehouse` supplier was selected, because it provided a lower quote.

6. Click **X** or **Close** to the dismiss the Activity Details dialog.
7. In the Instance of OrderProcessor window, click the **Flow Trace** breadcrumb to return to the main Flow Trace window.



Notice in the **Trace** section how the service components in the **OrderBookingComposite** composite are now all complete.



8. Close the Flow Trace window.

2.6 Undeploying the Composites for the WebLogic Fusion Order Demo Application

The remainder of this tutorial describes how to build the composite applications for the WebLogic Fusion Order Demo applications. Because you deploy the composite applications during the development process, you can now undeploy the completed ones.

To undeploy the composite applications:

1. Access Undeploy SOA Composite wizard in Fusion Middleware Control through the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Infrastructure Home Page...	From the SOA Composite Menu...
1. Select **SOA Deployment** > **Undeploy**. The Select Composite page appears. 2. In the **SOA Composite Deployments** section, select **OrderBookingComposite** and **PartnerSupplierComposite** to undeploy them, and click **Next**.	1. Right-click **soa-infra**. 2. Select **SOA Deployment** > **Undeploy**. The Select Composite page appears. 3. In the **SOA Composite Deployments** section, select **OrderBookingComposite** and **PartnerSupplierComposite** to undeploy, and click **Next**.	1. Click the **Deployed Composites** tab. 2. In the **Composite** table, select both **OrderBookingComposite** and **PartnerSupplierComposite**. 3. Above the **Composite** table, click **Undeploy**.	Select **SOA Deployment** > **Undeploy.**

The Confirmation page appears.

2. Click **Undeploy**. Note that you are warned if you are about to undeploy the last remaining revision of a deployed composite application.

   Processing messages are displayed.

3. When undeployment has completed, click **Close**.

3

Creating the SOA Application

This chapter describes how to create the WebLogic Fusion Order Demo application in Oracle JDeveloper for Fusion Order Demo. It also describes how to create the `PartnerSupplierComposite` during the creation of the application.

Before following the instructions in this chapter, perform all the procedures in Chapter 1.

This chapter contains the following sections

- Section 3.1, "About the PartnerSupplierComposite Composite"
- Section 3.2, "Creating the WebLogicFusionOrderDemo Application and the PartnerSupplierComposite Composite"

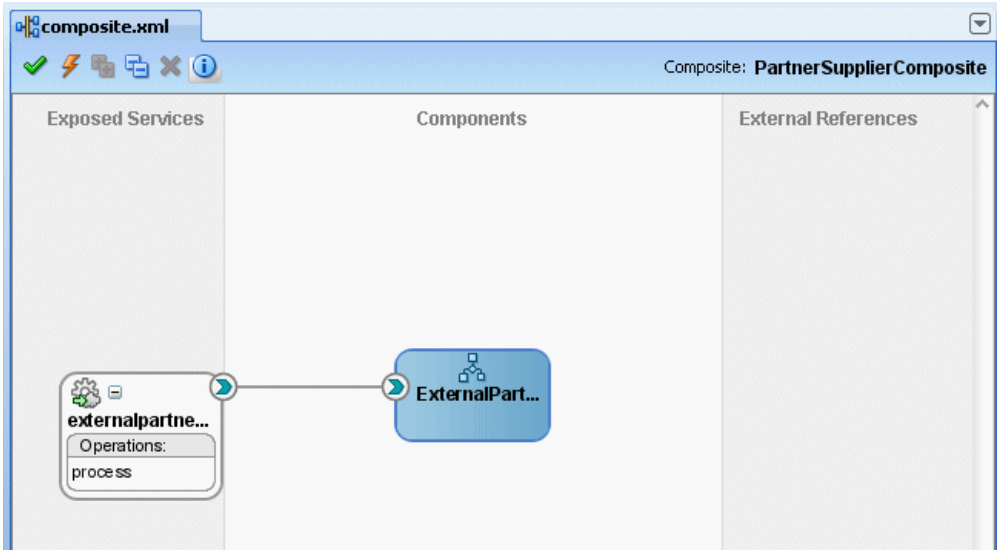
See Chapter 1, "Introduction to the SOA Sample Application," for an overview of the WebLogic Fusion Order Demo application.

3.1 About the PartnerSupplierComposite Composite

The `PartnerSupplierComposite` composite contains a BPEL process, `ExternalPartnerSupplier`. In the `OrderBookingComposite` composite, the `Scope_RetrieveQuotes` scope of the `OrderProcessor` BPEL process uses this process to obtain a quote from an external partner warehouse. When you create the `Scope_RetrieveQuotes` scope and the `ExternalPartnerSupplier` Web service in Chapter 6, "Creating the Second Half of the OrderProcessor BPEL Process," you reference the `ExternalPartnerSupplier` BPEL process.

Figure 3–1 shows `PartnerSupplierComposite` in the SOA Composite Editor.

Figure 3–1 PartnerSupplierComposite



3.2 Creating the WebLogicFusionOrderDemo Application and the PartnerSupplierComposite Composite

In this procedure, you create the WebLogic Fusion Order Demo application, the `PartnerSupplierComposite` project, and the `ExternalPartnerSupplier` BPEL process. It contains the following tasks:

- Task 1: Create the WebLogicFusionOrderDemo Application and the PartnerSupplierComposite Composite
- Task 2: Create the ExternalPartnerSupplier BPEL Process
- Task 3: Modify the ExternalPartnerSupplier BPEL Process
- Task 4: Deploy the PartnerSupplierComposite Composite
- Task 6: Initiate a Test Instance for the PartnerSupplierComposite Composite

3.2.1 Task 1: Create the WebLogicFusionOrderDemo Application and the PartnerSupplierComposite Composite

Note: Oracle SOA Suite is not automatically installed with Oracle JDeveloper. Before you can create an SOA application and project, you must install the Oracle SOA Suite extension. For instructions on installing this extension for Oracle JDeveloper, see the *Oracle Fusion Middleware Installation Guide for Oracle JDeveloper*.

To create the WebLogic Fusion Order Demo application:

1. Open the New Gallery by choosing **File** > **New**.
2. Click the **Current Project Technologies** tab.
3. From either the **All Technologies** tab or the **Current Project Technologies** tab, in the **Categories** tree, select **General**, and then **Applications**.
4. From the **Items** list, select **SOA Application**.

5. Click **OK**.
6. On the Name your application page, enter the following values:

Element	Value
Application Name	`WebLogicFusionOrderDemo`
Directory	Specify directory location *`directory_path`*`\CompositeServices`, such as `C:\fod\CompositeServices`. Oracle JDeveloper creates this directory, which acts as a container for all the projects. This tutorial refers to the application directory that you specified as *`MY_FOD_HOME`*.
Application Package Prefix	Do not enter a value.

7. Click **Next**.
8. On the Name your project page, enter the following values:

Element	Value
Project Name	`PartnerSupplierComposite`
Directory	Accept the default directory location, *`MY_FOD_HOME`*`\CompositeServices\PartnerSupplierComposite`. Oracle JDeveloper creates this directory for all the contents of the `PartnerSupplierComposite` composite project.
Project Technologies	**SOA**

9. Click **Next**.
10. On the Configure SOA Settings page, from the **Composite Template** section, select **Composite With BPEL**.
11. Click **Finish**.

    The Create BPEL Process dialog displays.

3.2.2 Task 2: Create the ExternalPartnerSupplier BPEL Process

Now, continue with the creation of the `ExternalPartnerSupplier` BPEL process:

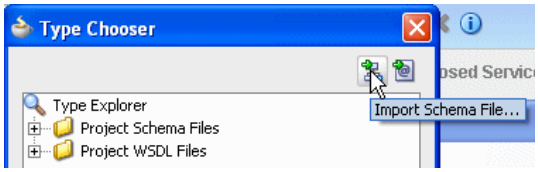
1. In the Create BPEL Process dialog, enter the following values:

Element	Value
Name	`ExternalPartnerSupplier`
Namespace	`http://www.partnersupplier.example.com/ns/warehouse`
Template	**Asynchronous BPEL Process**
Expose as a SOAP service	Select this check box to create a BPEL process connected to an inbound SOAP service binding component.

2. In the **Input** field, import the complete schema located in the *`DEMO_DOWNLOAD_HOME`* directory.
   a. In the **Input** field, click the **Browse Input Elements** icon.

The Type Chooser dialog displays.

b. Click the **Import Schema File** icon.



The Import Schema File dialog displays.

c. Click the **Browse Resources** icon to the right of the **URL** field.

The SOA Resource Browser displays.

d. Select **File System** and in the **Location** section, search for `Warehouse.xsd` in *`DEMO_DOWNLOAD_HOME`*`/CompositeServices/PartnerSupplierComposite/xsd` and click **OK**.

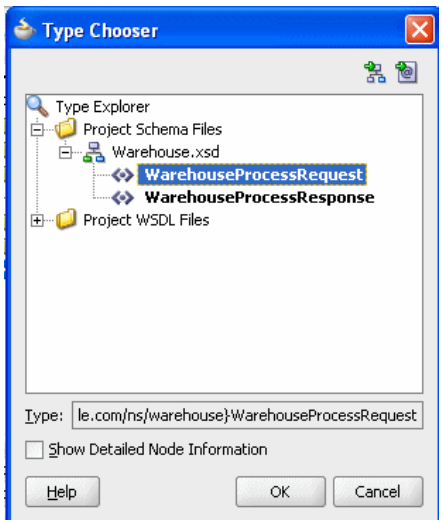
e. In the Import Schema dialog, ensure the `Warehouse.xsd` now displays in the **URL** field and the **Copy to Project** option is selected, and then click **OK**.

The Localized Files dialog displays, prompting you to import the `Warehouse.xsd` schema file and any dependent files, which includes the `ExternalPartnerSupplier.wsdl` WSDL file.

f. Deselect option **Maintain original directory structure for imported files** and click **OK** to import the files.

The Type Chooser dialog displays.

g. Expand **Project Schema Files** > **Warehouse.xsd** and select **WarehouseProcessRequest** and then click **OK**.



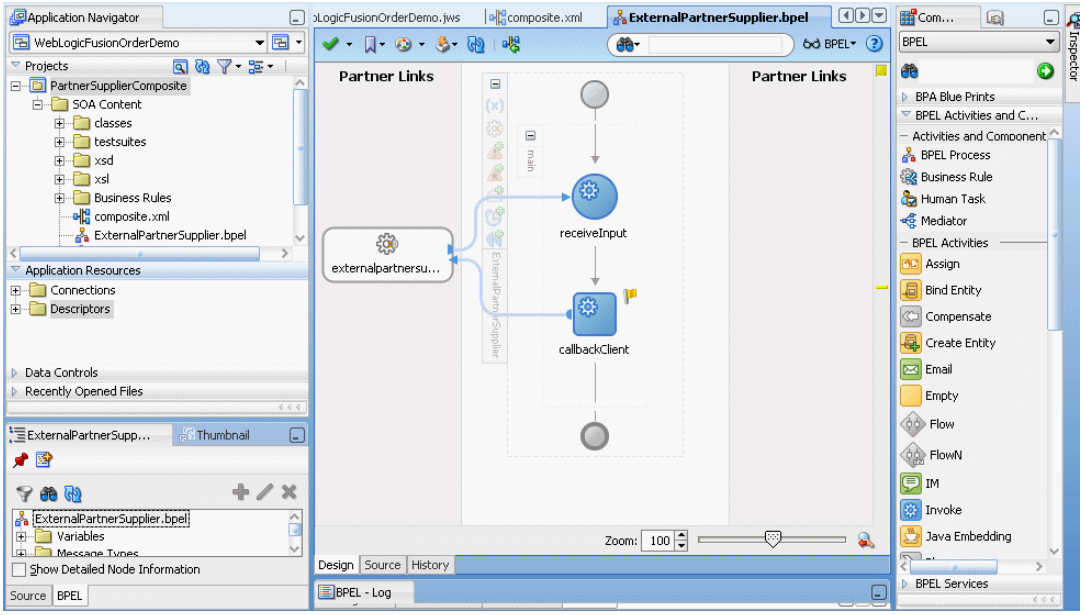
3. In the Create BPEL Process dialog, import the elements from the `Warehouse.xsd` file for the output:

a. In the **Output** field, click the **Browse Output Elements** icon.

The Type Chooser dialog displays.

b. Expand **Project Schema Files** > **Warehouse.xsd** and select **WarehouseProcessResponse**, and then click **OK**.

4. In the Create BPEL Process dialog, click **OK**.

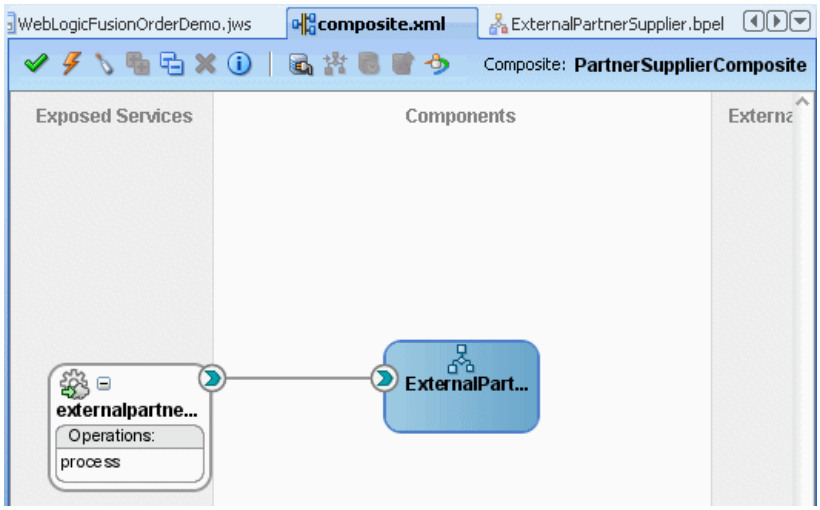


The designer displays three tabs:

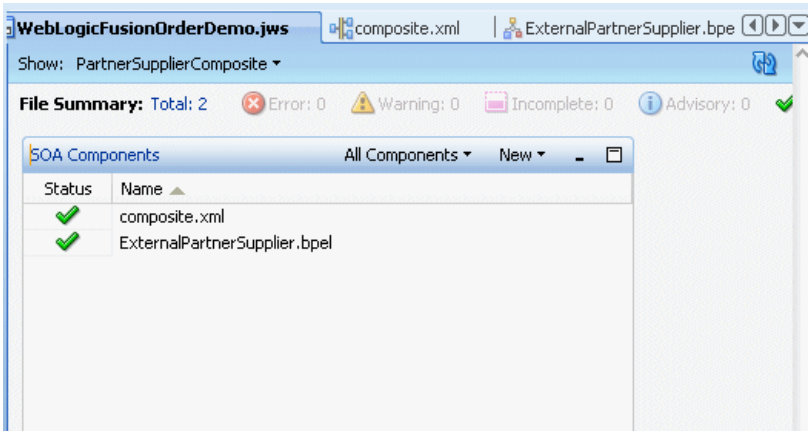
Tab	Description
WebLogicFusionOrderDemo.jws	This tab shows the contents of the application workspace. The Application Overview is the home for all files you can create in this application. If this tab does not display, from the Application menu, select **Show Overview**. For an introduction to the Application Overview, click **F1** on the tab to display the online help.
composite.xml	This tab displays the `PartnerSupplierComposite` composite in the SOA Composite Editor. For an overview of the SOA Composite Editor, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.
ExternalPartnerSupplier.bpel	This tab displays the `ExternalPartnerSupplier` BPEL process in the BPEL Designer. For an overview of the BPEL Designer, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

Notice, too, the `PartnerSupplierComposite` project displays in the Application Navigator.

5. Click the **composite.xml** tab to view `PartnerSupplierComposite` composite. SOAP service binding component `external_partnersupplier_client` in the left swim lane provides the outside world with an entry point into the SOA composite application.



6. Click the **WebLogicFusionOrderDemo.jws** tab to view the contents of the `WebLogicFusionOrderDemo` application.



7. Select **Save All** from the **File** main menu to save your work.

3.2.3 Task 3: Modify the ExternalPartnerSupplier BPEL Process

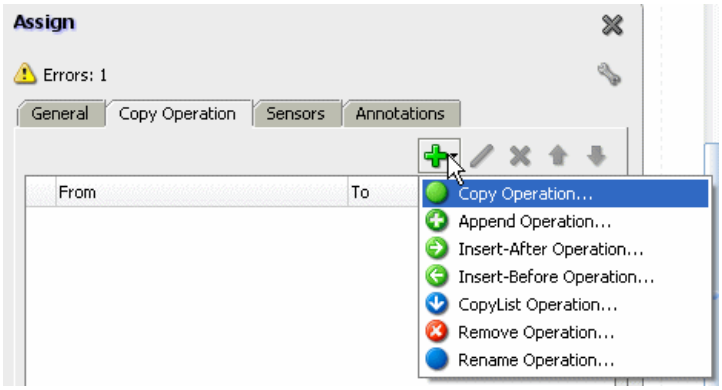
Next, you create an assign activity to take the purchase amount and the order date and the current date as input variables to the `ExternalPartnerSupplier` service. An assign activity transfers data between variables, expressions, and other elements.

1. Click the **ExternalPartnerSupplier** tab.
2. Create the assign activity:
   a. From the Component Palette, drag an **Assign** activity below the **receiveInput** receive activity.
   b. Rename this activity by double-clicking the name underneath the icon. Do not double-click the activity icon itself.
   c. In the edit field, change the name to `AssignResponse`.
   d. Double-click the assign activity.

      The Assign dialog displays.

3. Assign the purchase amount of the input to the `OrderTotal` variable for the `ExternalPartnerSupplier` service:

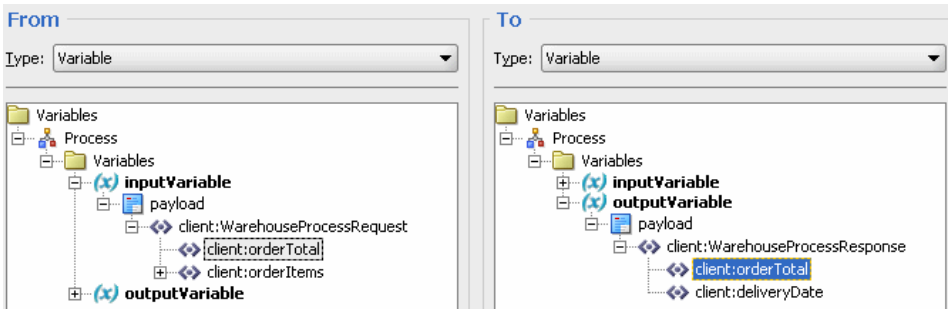
   a. From the dropdown list, select **Copy Operation**:

   The Create Copy Operation dialog appears.

   b. On the **From** side, leave the **Type** selection as **Variable** and expand **Variables** > **inputVariable** > **payload** > **client: WarehouseProcessRequest** and select **client:orderTotal**.

   c. On the **To** side, leave the **Type** selection as **Variable** and expand **Variables** > **outputVariable** > **payload** > **client: WarehouseProcessResponse** and select **client:orderTotal**.

   d. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

   The Copy Operation tab in the Assign updates to show the operation you created.

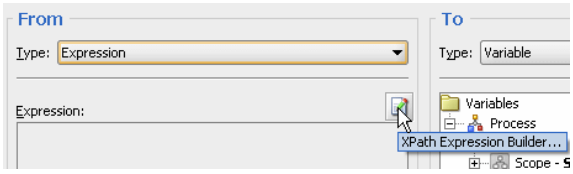
4. Assign the current date to the output `deliveryDate` variable for the `ExternalPartnerSupplier` service:

   a. From the dropdown list in the Assign dialog, select **Copy Operation**.

   The Create Copy Operation dialog appears.

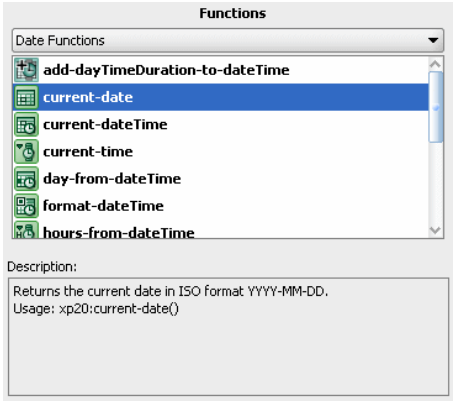
   b. On the **From** side, from the **Type** list, select **Expression**.

   c. Select the **XPath Expression Builder** icon.



The Expression Builder displays.

d. In the **Functions** section in the lower right, from the menu, select **Date Functions**, and then select **current-date** from the menu options.

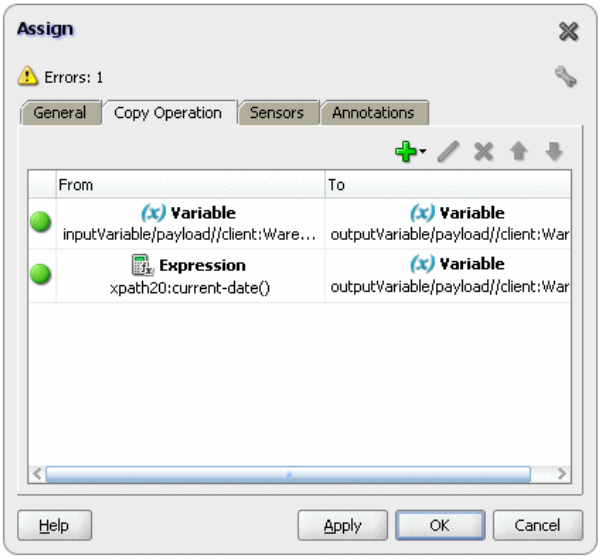


e. Click **Insert Into Expression**, and then click **OK** to return to the Create Copy Operation dialog.

f. On the **To** side, leave the **Type** selection as **Variable** and expand **Variables** > **outputVariable** > **payload** > **client:WarehouseResponse** and select **client:deliveryDate**.

g. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

The Copy Operation tab in the Assign dialog updates to show the two operations you created.



5. In the Assign dialog, click **OK**.

6. Select **Save All** from the **File** main menu to save your work.
7. Click **X** in the **ExternalPartnerSupplier.bpel** tab to close the process.
8. Click **X** in the **composite.xml** tab to close the composite.

   The `PartnerSupplierComposite` composite and `ExternalPartnerSupplier` BPEL process are now complete.

3.2.4 Task 4: Deploy the PartnerSupplierComposite Composite

To deploy the `PartnerSupplierComposite` composite:

1. In the Application Navigator, right-click **PartnerSupplierComposite** and select **Deploy** > **PartnerSupplierComposite** > to **MyAppServerConnection**.

   The SOA Deployment Configuration Dialog displays.

2. Accept the default settings and click **OK**.
3. When prompted with the Authorization Request dialog, enter `weblogic` in the `Username` field and the password in the `Password` field.

   In SOA - Log, a series of validations display, followed by:

```
BUILD SUCCESSFUL
Total time: nn seconds
```

3.2.5 Task 6: Initiate a Test Instance for the PartnerSupplierComposite Composite

In this task, you initiate a test instance of the `PartnerSupplierComposite` composite from the Test Web Service page in Fusion Middleware Control to verify the assign activity is working properly.

To initiate a test instance of the `PartnerSupplierComposite` composite:

1. Start Fusion Middleware Control. See Section 2.3.
2. From the SOA Infrastructure menu, select **SOA Administration** and select **Common Properties**.
3. On the Common Properties page, enter the following values to collect data for running instances:

Element	Value
Audit Level	**Development**
Capture Composite Instance State	Click to enable.

4. Click **Apply** to apply changes.
5. Access the Test Web Service page through the following options:

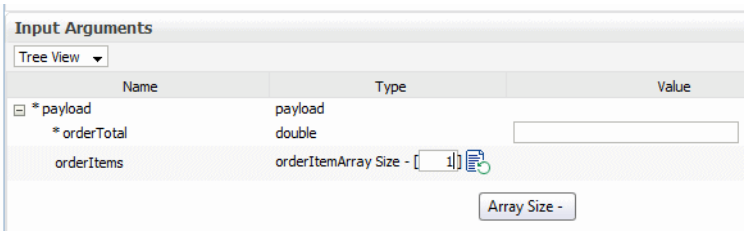
From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Composite Menu...
1. Select **Home**. 2. Select the **Deployed Composites** tab. 3. In the **Composite** section, select **PartnerSupplierComposite**. 4. At the top of the page, click **Test**.	1. Under **soa-infra**, select **PartnerSupplierComposite**. 2. At the top of the page, click **Test**.	Select **Test Service** > **externalpartnersupplier_client_ep**.

The Test Web Service page for initiating an instance appears. This page provides many options for initiating an instance. At a minimum, you must specify the XML payload data to use in the **Input Arguments** section.

The WSDL file and endpoint URL are populated automatically based on the service you selected to test. The endpoint URL is derived from the WSDL and can be overridden to invoke that service at a different location. The port of the current service is displayed.

6. In the **Inputs Arguments** section, enter the input arguments for the Web service:

   a. In the **orderItemArray Size** field, enter `1` and then click the **Array Size** icon.

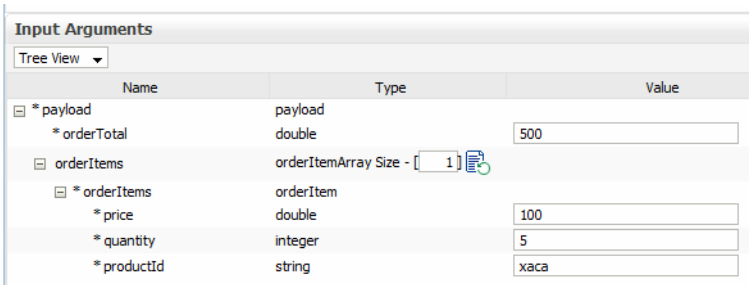


   b. Expand **orderItems** > **orderItems** in the tree, and enter values for the following fields:

   - **OrderTotal**

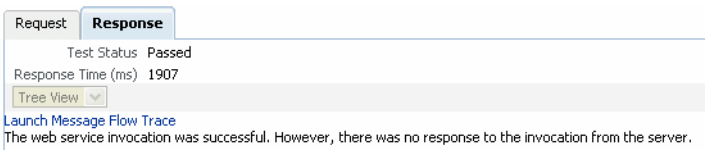
   - **quantity**

   - **productId**

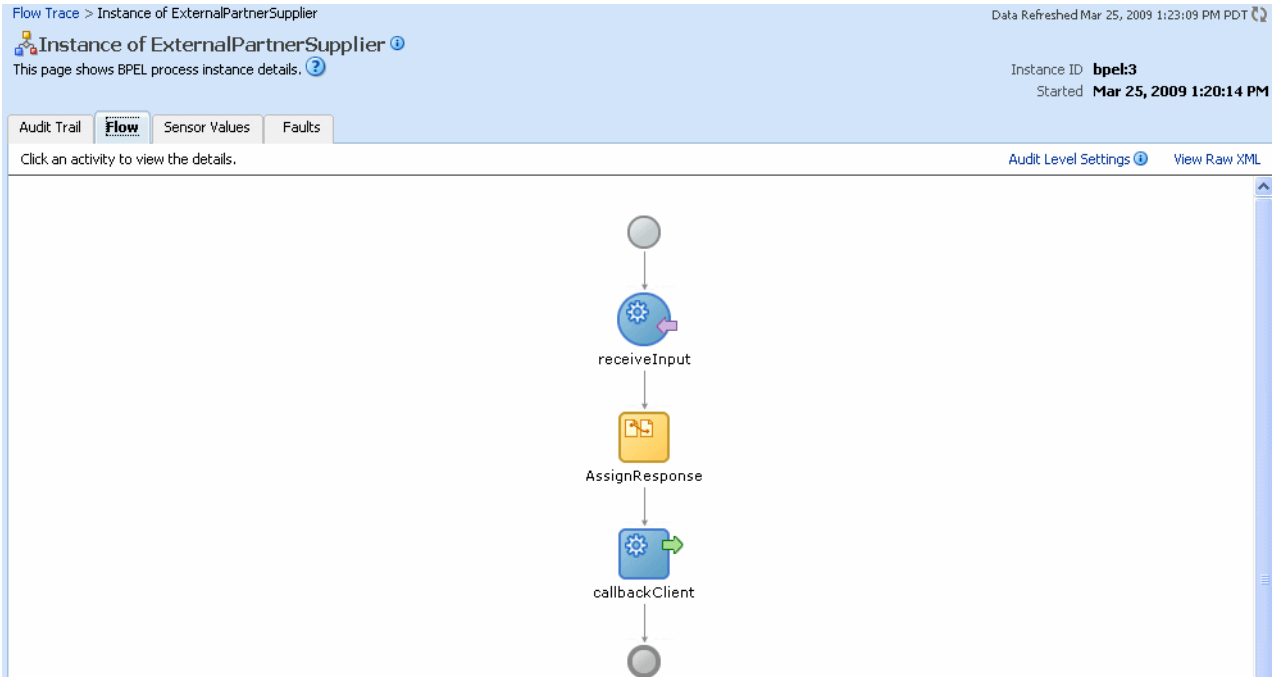


7. Click **Test Web Service**.

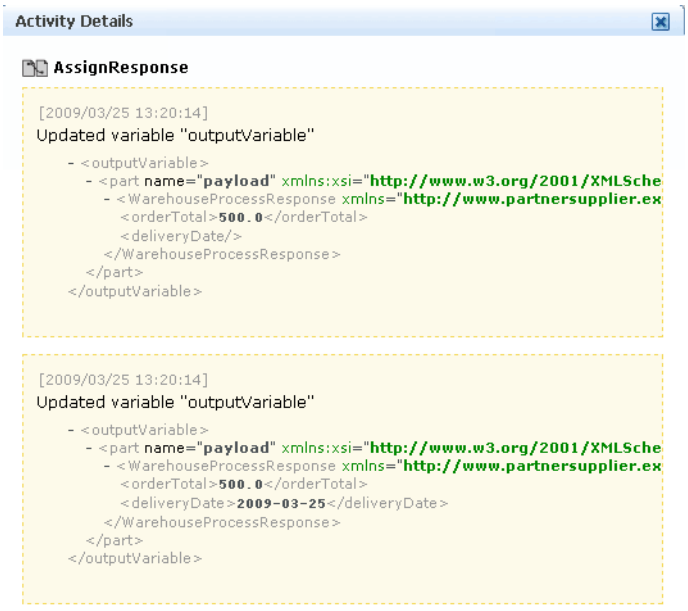
   The test results appear in the **Response** tab upon completion.



8. Click **Launch Message Flow Trace** to access the flow trace of the instance.
9. In the Flow Trace window, in the **Trace** section, click the **ExternalPartnerSupplier** instance.
10. In the Flow Trace window for the instance, click the **Flow** tab.



11. Click the **AssignResponse** activity to see the value you entered for `OrderTotal` being copied to the `outputVariable`.



12. Click **X** or **Close** to the dismiss the Activity Details dialog.
13. Close the Flow Trace window.

4

Creating the OrderBookingComposite Composite

This chapter describes how to create the `OrderBookingComposite` composite of the WebLogic Fusion Order Demo application. This chapter assumes you have performed all the tasks in Chapter 3, "Creating the SOA Application."

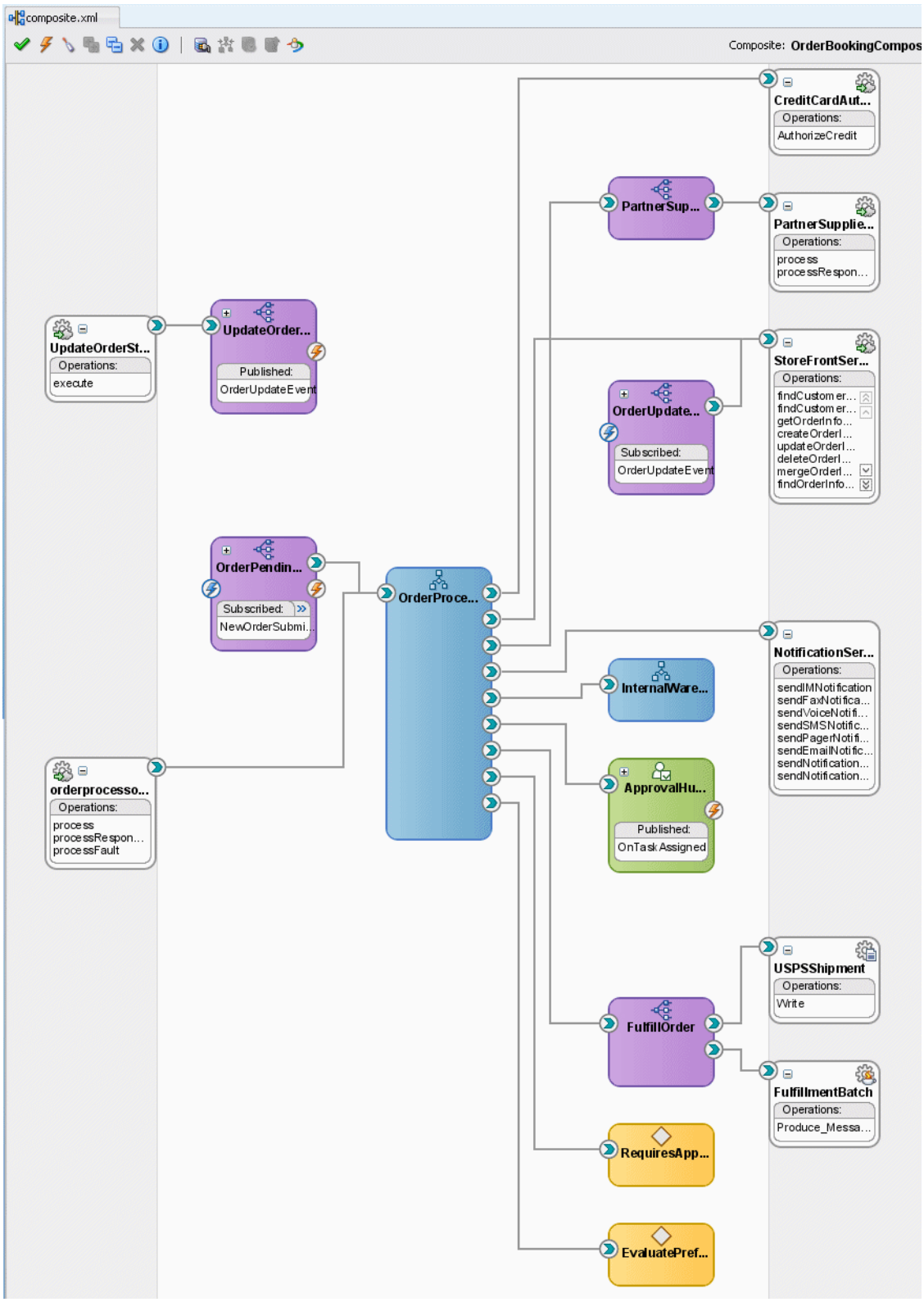
This chapter contains the following sections:

- Section 4.1, "About the OrderBookingComposite Composite"
- Section 4.2, "Approaches for Creating OrderBookingComposite"
- Section 4.3, "Creating the OrderBookingComposite Project"
- Section 4.4, "About the OrderProcessor Process"

4.1 About the OrderBookingComposite Composite

Chapter 1, "Introduction to the SOA Sample Application," describes the flow of the `OrderBookingComposite` composite. Figure 4–1 shows the `OrderBookingComposite` composite in the SOA Composite Editor.

Figure 4–1 OrderBookingComposite



The left swim lane of the SOA Composite Editor contains references that send messages to external services. Table 4–1 describes the services referenced by service components within the `OrderBookingComposite` composite.

Table 4–1 Exposed Services in OrderBookingComposite Composite

Exposed Services	Description
orderprocessor_client_ep	This service provides an entry into the OrderProcessor BPEL process, providing an entry point into the OrderBookingComposite composite to process electronic orders from the Store Front module.
UpdateOrderStatus_ep	This service provides an entry into the UpdateOrderStatus mediator.

The designer (middle section) of the SOA Composite Editor contains service components. Table 4–2 describes the service components used in the OrderBookingComposite composite.

Table 4–2 Service Components in OrderBookingComposite Composite

Service Component	Type	Description
ApprovalHumanTask	Human Task	This component enables a manager to approve or reject an order.
EvaluatePreferredSupplierRule	Business Rule	This component chooses the shipment supplier based on the lowest bid.
FulfillOrder	Mediator	This component routes order information to either the USPSShipment file adapter and the FulfillmentBatch JMS adapter.
InternalWarehouseService	BPEL	This component provides a delivery date (to compete with the price from PartnerSupplierMediator mediator). This process is used to demonstrate invoking an asynchronous process from BPEL.
OrderPendingEvent	Mediator	This component subscribes to event NewOrderSubmitted from the Oracle Application Development Framework (ADF) Business Component of StoreFrontService, which contains the order ID. OrderPendingEvent consumes the event, transforms it, and passes the order ID to the OrderProcessor BPEL process.
OrderProcessor	BPEL	This component receives the order ID information, processes the order, and orchestrates all necessary services within the enterprise to complete the order.
OrderUpdateEventMediator	Mediator	This component subscribes to event OrderUpdateEvent from the UpdateOrderStatus mediator. The OrderUpdateEventMediator transforms the event and passes the order ID from the OrderProcessor BPEL process to StoreFrontService, which sends back the order status and order information, which the mediator transforms.

Table 4–2 (Cont.) Service Components in OrderBookingComposite Composite

Service Component	Type	Description
PartnerSupplierMediator	Mediator	This component initiates the PartnerSupplierService, which options a delivery date and order total from theExternalPartnerSupplier BPEL process in the PartnerSupplierComposite for a given order from an external partner warehouse (to compete with the price obtained from InternalWarehouseService BPEL process.
RequiresApprovalRule	Business Rule	This business rule determines if manual approval is required.
UpdateOrderStatus	Mediator	This component publishes business event OrderUpdateEvent. The mediator transforms the order ID and status and passes it to the OrderProcessor BPEL process. The OrderUpdateEventMediator consumes the business event.

The right swim lane of the SOA Composite Editor contains references that send messages to external services. Table 4–3 describes the services referenced by OrderBookingComposite composite.

Table 4–3 References in OrderBookingComposite Composite

Service Component	Type	Description
CreditCardAuthorization	Web Service	This synchronous service provides the credit card type, account number, and purchase amount to the OrderProcessor BPEL process.
StoreFrontService	Web Service	This synchronous service provides customer ID information to the OrderProcessor BPEL process.
FulfillmentBatch	JMS Adapter	This adapter provides a JMS queue for storing all fulfillment orders for overnight batch processing. The JMS adapter is used to write the order information to the specified JMS queue.
PartnerSupplierService	Web Service	This asynchronous service provides the lowest bid for the order from PartnerSupplierComposite composite.
NotificationService	Web Service	This synchronous service provides an Oracle Messaging Service for notifying the customer of the order.
USPSShipment	File Adapter	This adapter ships the order using USPS.

4.2 Approaches for Creating OrderBookingComposite

When creating a complex composite, you can use the following approaches for building:

- Top-Down: You analyze your business processes and identify activities in support of your process. When creating a composite, you define all the SOA components through the SOA Composite Editor. You create all the services first, and then build the BPEL process, referencing the created services.
- Bottom-Up: You analyze existing applications and assets to identify those that can be used as services. As you create a BPEL process, you build the services on as-needed basis. This approach works well when IT must react to a change.

For the tutorial, you use the bottom-up approach, so you can learn to build the composite in discrete segments.

4.3 Creating the OrderBookingComposite Project

In this procedure, you create the `OrderBookingComposite` project and the `OrderProcessor` BPEL process. This procedure contains the following tasks:

- Task 1: Create the OrderBookingComposite Project
- Task 2: Create the OrderProcessor BPEL Process
- Task 3: Add the ADF Business Components Service Runtime Library

4.3.1 Task 1: Create the OrderBookingComposite Project

To create the `OrderBookingComposite` project for the WebLogic Fusion Order Demo application:

1. Right-click the **WebLogicFusionOrderDemo** application name in the **Application Navigator** and select **New Project**.

   The New Gallery dialog displays.

2. From either the **All Technologies** tab or the **Current Project Technologies** tab, in the **Categories** tree, select **SOA Tier**.

3. In the **Items** list, select **SOA Project**.

4. Click **OK**.

   The Create SOA Project dialog appears.

5. Enter the following values:

Element	Value
Project Name	`OrderBookingComposite`
Directory	Accept the default directory location, *`MY_FOD_HOME`*`\CompositeServices\OrderBookingComposite`. Oracle JDeveloper creates this directory for all the contents of the `OrderBookingComposite` project.
Project Technologies	**SOA**

6. Click **Next**.

7. In the Configure SOA Settings page, from the **Composite Template** section, select **Composite With BPEL**.

8. Click **Finish**.

   The Create BPEL Process dialog displays.

4.3.2 Task 2: Create the OrderProcessor BPEL Process

Now, continue with the creation of the `OrderProcessor` BPEL process:

1. In the Create BPEL Process dialog, enter the following values:

Element	Value
Name	`OrderProcessor`
Namespace	`http://www.globalcompany.example.com/ns/OrderBookingService`
Template	**Asynchronous BPEL Process**
Expose as a SOAP service	Select this check box to create a BPEL process connected to an inbound SOAP service binding component.

2. In the **Input** field, import the complete schema located in the *DEMO_DOWNLOAD_HOME* directory.
   a. In the **Input** field, click the **Browse Input Elements** icon.

      The Type Chooser dialog displays.

   b. Click the **Import Schema File** icon.

      The Import Schema File dialog displays.

   c. Click the **Browse Resources** icon to the right of the **URL** field.

      The SOA Resource Browser displays.

   d. Select **File System** and in the **Location** section, search for `InternalWarehouse.xsd` in *DEMO_DOWNLOAD_HOME*`/CompositeServices/OrderBookingComposite/xsd` and click **OK**.

   e. In the Import Schema dialog, ensure the `InternalWarehouse.xsd` now displays in the **URL** field and the **Copy to Project** option is selected, and then click **OK**.

      The Localized Files dialog displays, prompting you to import the `InternalWarehouse.xsd` schema file.

   f. Deselect the **Maintain original directory for imported files** option and click **OK** to import the files.

      The Type Chooser dialog displays.

   g. Expand **Project Schema Files** > **InternalWarehouse.xsd** and select **WarehouseRequest** and then click **OK**.

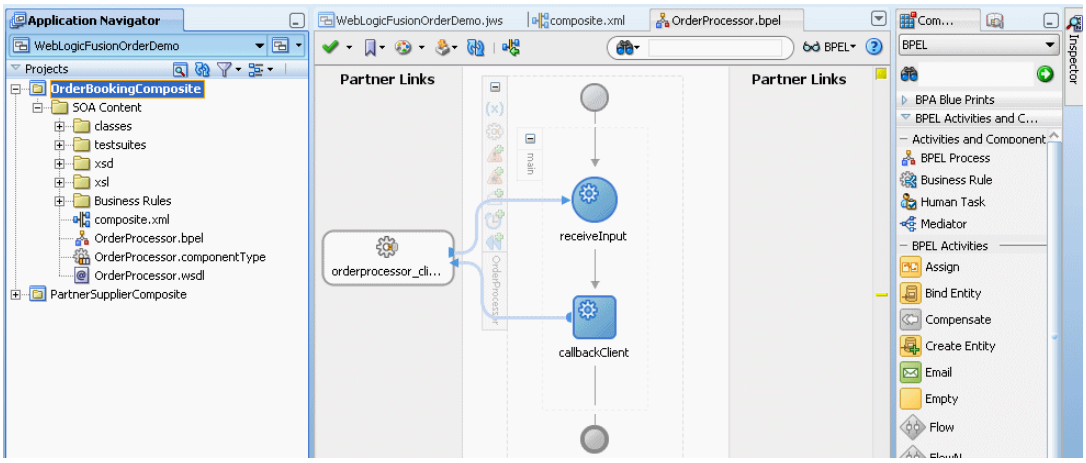
3. In the Create BPEL Process dialog, import the elements from the `InternalWarehouse.xsd` file for the output:
   a. In the **Output** field, click the **Browse Output Elements** icon.

      The Type Chooser dialog displays.

   b. Expand **Project Schema Files** > **InternalWarehouse.xsd** and select **WarehouseResponse** and then click **OK**.

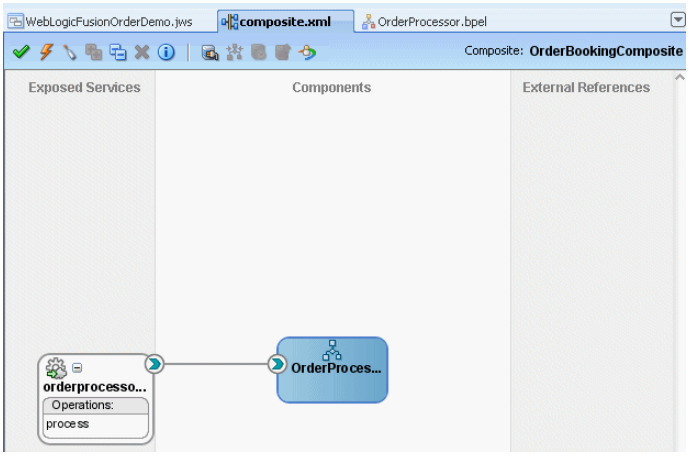
4. In the Create BPEL Process dialog, click **OK**.

   The `OrderProcessor` BPEL process displays in the designer. Notice, too, the `OrderBookingComposite` project displays in the Application Navigator.



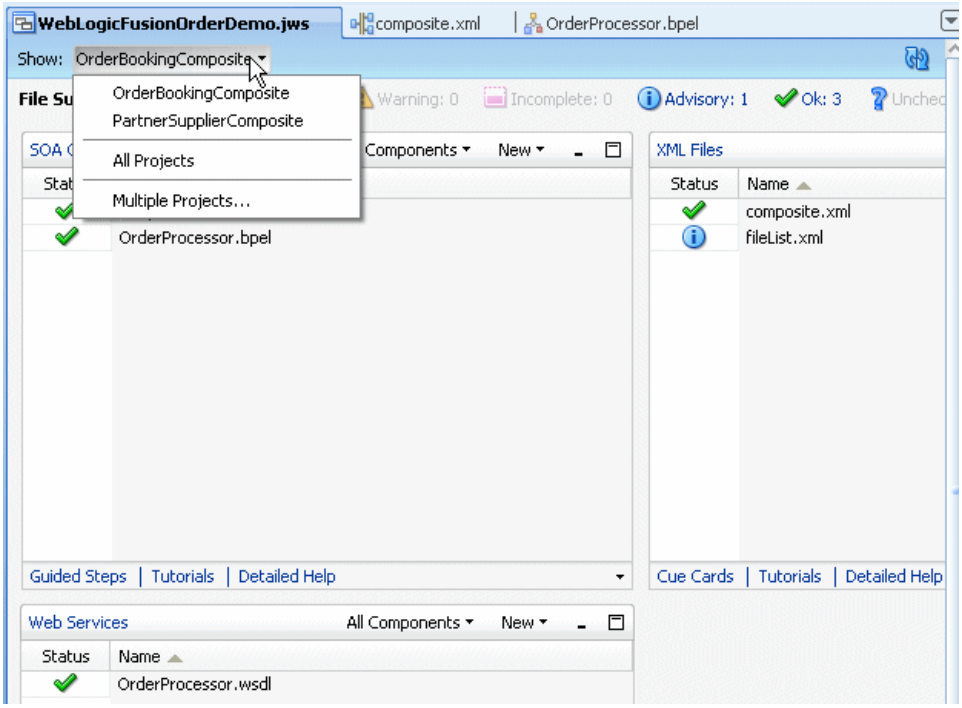
In Chapter 5, "Creating the First Half of the OrderProcessor BPEL Process," you create services and building blocks for placing an order.

5. Click the **composite.xml** tab to view `OrderBookingComposite`. SOAP service binding component `orderprocessor_client_ep` in the left swim lane provides the outside world with an entry point into the SOA composite application.



6. Click the **WebLogicFusionOrderDemo.jws** tab to view the contents of the `WebLogicFusionOrderDemo` application

7. From the **Show** list, select **OrderBookingComposite** to view the contents of the `OrderBookingComposite` application.



8. Select **Save All** from the **File** main menu to save your work.

4.3.3 Task 3: Add the ADF Business Components Service Runtime Library

To add the ADF Business Components service run-time library:

1. In the Application Navigator, right-click **OrderBookingComposite** and select **Project Properties**.
2. Select **Libraries and Classpath**, and from the Libraries and Classpath page, and click **Add Library**.
3. In the Add Library dialog, select **BC4J Service Runtime**, and then click **OK**.
4. In the Libraries and Classpath page, click **OK**.

4.4 About the OrderProcessor Process

The `OrderProcessor` process represents the main flow in the WebLogic Fusion Order Demo application. It sends the order information to the appropriate services at the appropriate times. For example, it contacts the `CreditAuthorizationService` service to check the customer's credit card, and if the credit card is acceptable, it contacts the internal and external warehouses to get price quotes for the order.

The `OrderProcessor` project is a large project. This chapter begins by giving an overview of the major blocks in the project, and then it goes into detail on how to create each block.

Table 4–4 lists the major blocks in the `OrderProcessor` process:

Table 4–4 Major Blocks in the OrderProcessor Process

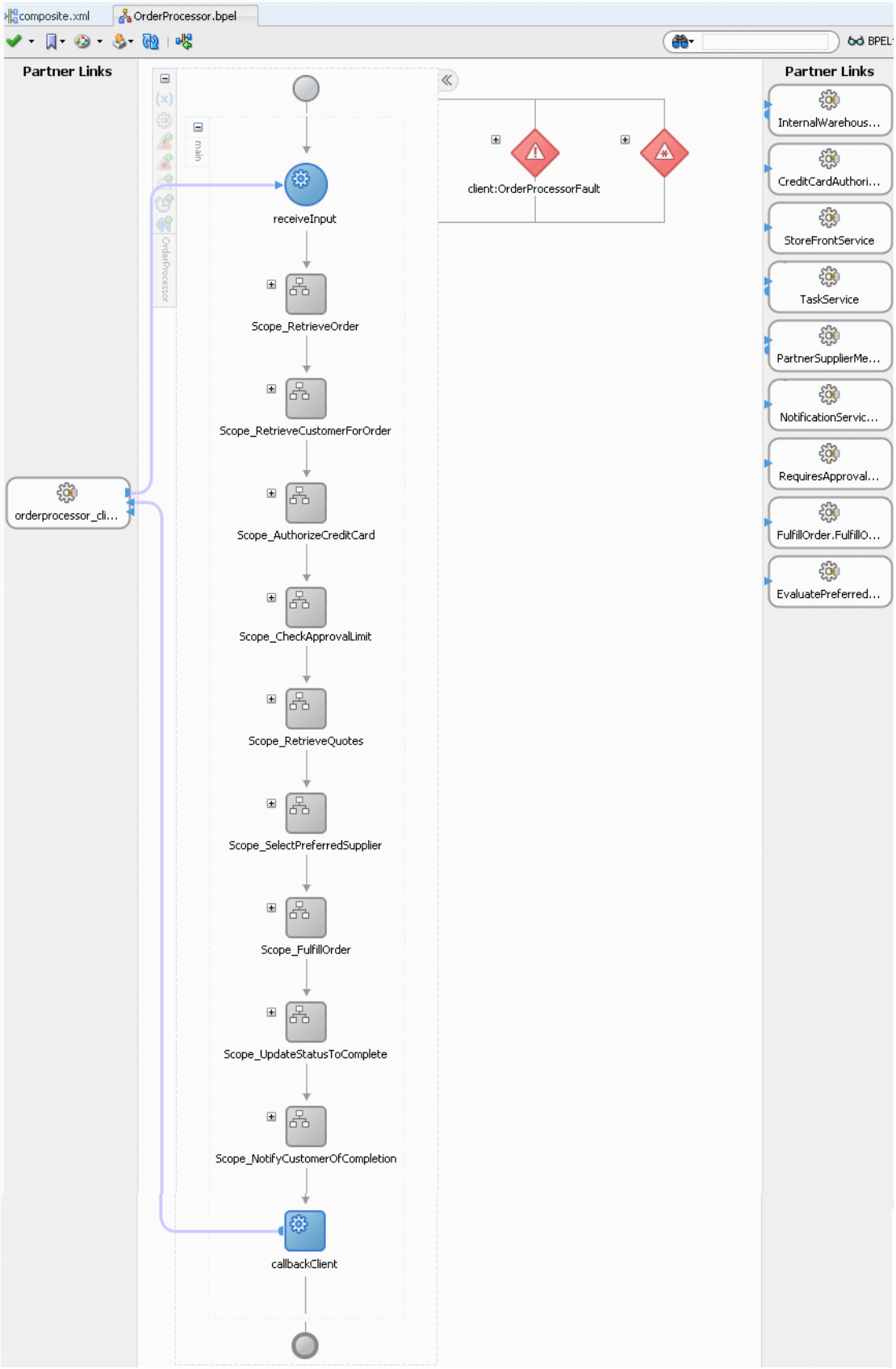
Block	Type	Description
`receiveInput`	Receive activity	This activity receives the order ID for incoming requests.

Table 4–4 (Cont.) Major Blocks in the OrderProcessor Process

Block	Type	Description
Scope_RetrieveOrder	Scope	This scope retrieves order information from the database. It uses a bind entity activity to point to order data in an Oracle Application Development Framework (ADF) Business Component data services provider.
Scope_ RetrieveCustomerForOrder	Scope	This scope calls the StoreFrontService service to retrieve customer information.
Scope_ AuthorizeCreditCard	Scope	This scope verifies that the customer has acceptable credit using the CreditCardAuthorizationService service.
Scope_ CheckApprovalLimit	Scope	This scope does the following: ■ Initiates the RequiresApproval business rule that evaluates the amount of the order to determine whether an order must be approved by a manager. ■ For an order where approval is required, uses a switch to initiate the ApprovalHumanTask human task for a manager to approve or not approve the order. For approved orders, the OrderProcessor process continues with the rest of the activities. For rejected orders, the process throws a fault and does not continue. ■ For orders where approval is not required, the switch is not initiated. ■ Sets the variables for the price amount and credit card status used by the RequiresApprovalRule business rule.
Scope_RetrieveQuotes	Scope	This scope sends order information to two suppliers, an external partner warehouse and an internal warehouse, and the warehouses return their bids for the orders.
Scope_ SelectPreferredSupplier	Scope	This scope initiates the SelectPreferredSupplier business rule for selecting a shipping supplier with the lowest bid.
Scope_FulfillOrder	Scope	This scope calls the FulfillOrder mediator component, which determines the shipping method for the order.
Scope_ UpdateStatusToComplete	Scope	This scopes assigns a final status of complete to the order.
Scope_ NotifyCustomerofCompletion	Scope	This scope uses the Oracle User Messaging Service to send an email to the customer who placed the order.
callbackClient	Invoke activity	This invoke activity notifies the client that it is done.

Figure 4–2 shows the `OrderProcessor` process in the BPEL Designer of the Oracle JDeveloper with the blocks minimized. Exercises in Chapter 5 and Chapter 6 expand the blocks to show their contents and describe how to create the blocks.

Figure 4–2 Minimized View of the Blocks in OrderProcessor



5

Creating the First Half of the OrderProcessor BPEL Process

This chapter describes how to create the first half of the `OrderProcessor` BPEL process for the `OrderBookingComposite` composite. This chapter assumes you have performed all the tasks from Chapter 3 through Chapter 4.

This chapter contains the following sections:

5.1 Overview of Tasks for Creating the First Half of OrderProcessor

Table 5–1 lists and describes the tasks for creating the first half of the `OrderProcessor` BPEL process for the `OrderBookingComposite` composite.

Table 5–1 Tasks for Creating the First Half of the OrderProcessor BPEL Process for OrderBookingComposite

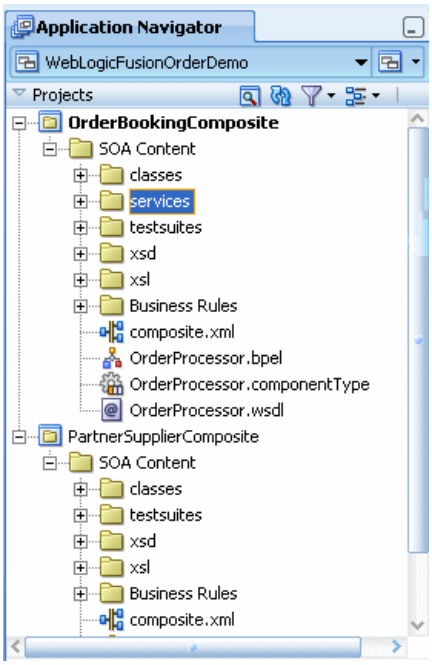
Task	Description	See
Copy Services Used by the `OrderProcessor` BPEL Process	Copy the service definitions you reference later during the modification of the `OrderProcessor` BPEL process.	Section 5.2
Add the `StoreFrontService` Service	Reference the `StoreFrontService` service.	Section 5.3
Wire the `OrderProcessor` BPEL Process to the `StoreFrontService` Service	Connect `StoreFrontService` to the `OrderProcessor` BPEL process.	Section 5.4
Create the `gOrderInfoVariable` Variable	Create variable `gOrderInfoVariable` as input for when an order is placed. To create this variable, you create it as an entity variable.	Section 5.5
Create the `Scope_RetrieveOrder` Scope	Create the `Scope_RetrieveOrder` scope to obtain the order ID using the `gOrderInfoVariable` entity variable.	Section 5.6
Create the `Scope_RetrieveCustomerForOrder` Scope	Create the `Scope_RetrieveCustomerForOrder` scope to call the `StoreFrontService` service to retrieve customer information.	Section 5.7
Create `CreditCardAuthorizationService` Service	Reference the `CreditCardAuthorizationService` service, which checks whether the customer's credit card is valid.	Section 5.8
Create the `Scope_AuthorizeCreditCard` Scope	Create the `Scope_AuthorizeCreditCard` scope to initiate the `CreditCardAuthorizationService` service to retrieve customer information.	Section 5.9
Create Catch Branches for the `Scope_AuthorizeCreditCard` Scope	Add catch branches to the `Scope_AuthorizeCreditCard` scope for orders in which the credit card number is not provided or the credit type is not valid.	Section 5.10
Create the `RequiresApprovalRule` Business Rule	Create a business rule activity to specify the `RequiresApprovalRule` business rule. This rule specifies that if the order total is $2,000 or more, then a manager's approval is required. Another activity uses the output from the business rule to either automatically approve the order or use a human task to obtain manager approval.	Section 5.11
Create the `Switch_ApprovalRequired` Switch to the `Scope_CheckApprovalLimit` Scope	For an order that requires manual approval because the order total is $2,000 or more, you create the `SwitchApprovalRequired` switch in the `ScopeCheckApprovalLimit` scope with a `<case>` branch that passes control to the `ApprovalHumanTask` human task activity. This human task enables a manager to approve or reject the orders. This switch does not apply to orders that do not require manual approval.	Section 5.12

5.2 Copying Services Used by the OrderProcessor BPEL Process

Copy the service definitions you reference later during the modification of the `OrderProcessor` BPEL process:

1. Copy directory `services` from *DEMO_DOWNLOAD_HOME*`\CompositeServices\OrderBookingComposite` to directory *MY_FOD_HOME*`\CompositeServices\OrderBookingComposite`.
2. In the Application Navigator, select **OrderBookingComposite** and then click the **Refresh** icon.

   The **OrderBookingComposite** folder in Oracle JDeveloper updates with the **services** folder.



5.3 Adding the StoreFrontService Service

The `StoreFrontService` service contains order and customer information. Perform the following tasks to reference this synchronous service:

- Task 1: Copy the WSDL Needed for StoreFrontService
- Task 2: Create a Web Service for StoreFrontService

5.3.1 Task 1: Copy the WSDL Needed for StoreFrontService

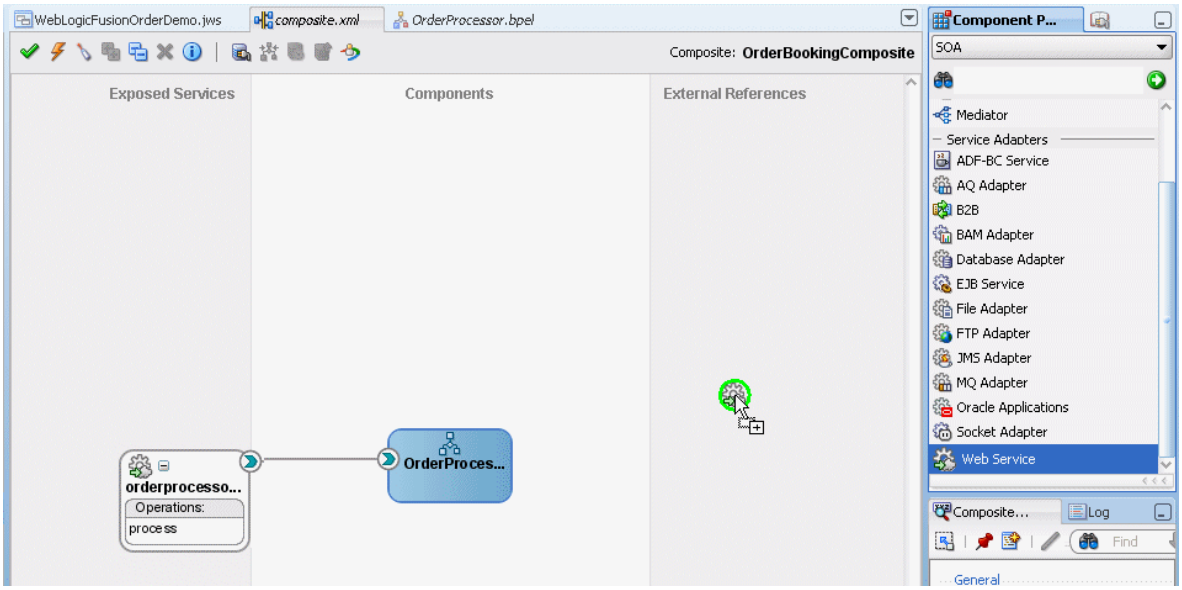
To copy the WSDL for the `StoreFrontService` service:

1. Copy `StoreFrontServiceRef.wsdl` from *DEMO_DOWNLOAD_HOME*`\CompositeServices\OrderBookingComposite` to directory *MY_FOD_HOME*`\CompositeServices\OrderBookingComposite`.
2. In the Application Navigator, select **OrderBookingComposite** and then click the **Refresh** icon.

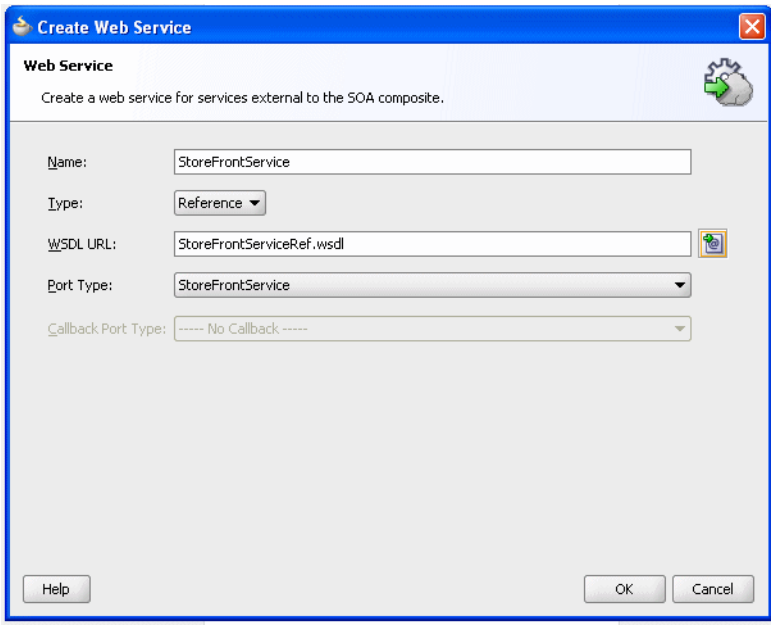
5.3.2 Task 2: Create a Web Service for StoreFrontService

To create a Web service for the `StoreFrontService` service:

1. Click the **composite.xml** tab to view the SOA Composite Editor again.
2. From the Component Palette, drag a **Web Service** from the **Service Adapters** list into the right swim lane (**External References**) of the SOA Composite Editor.



The Create Web Service dialog appears.

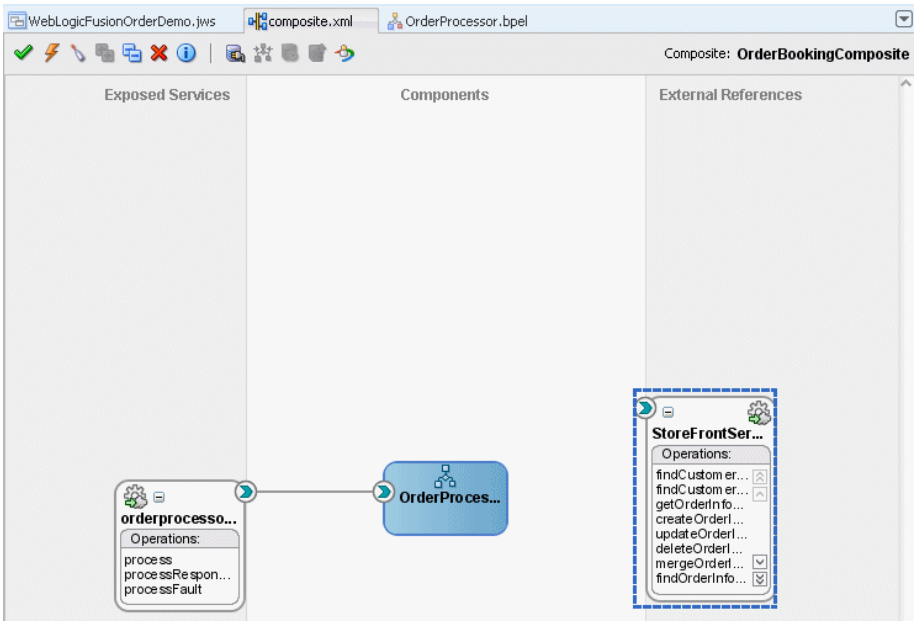


3. Enter and select the following values:

Element	Value
Name	`StoreFrontService`
Type	**Reference**
WSDL URL	Click the **Find existing WSDLs** icon and select `StoreFrontServceRef.wsdl` from *`MY_FOD_HOME`*`\OrderBookingComposite`

4. Accept the other defaults, and then click **OK**.

   The `StoreFrontService` service displays in the SOA Composite Editor.

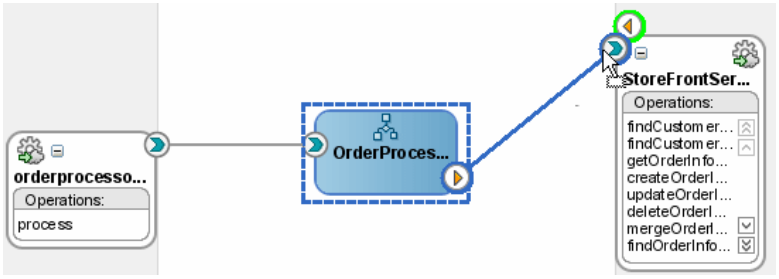


If you receive an error, then it is likely you did not add the BC4J Runtime Service library the `OrderBookingComposite` project. See Section 4.3.3 to add the library.

5.4 Wiring the OrderProcessor BPEL Process to the StoreFrontService Service

To wire (connect) the `StoreFrontService` service to the `OrderProcessor` BPEL service component:

1. Drag a wire from the **OrderProcessor** BPEL process interface to the **StoreFrontService** reference handle.

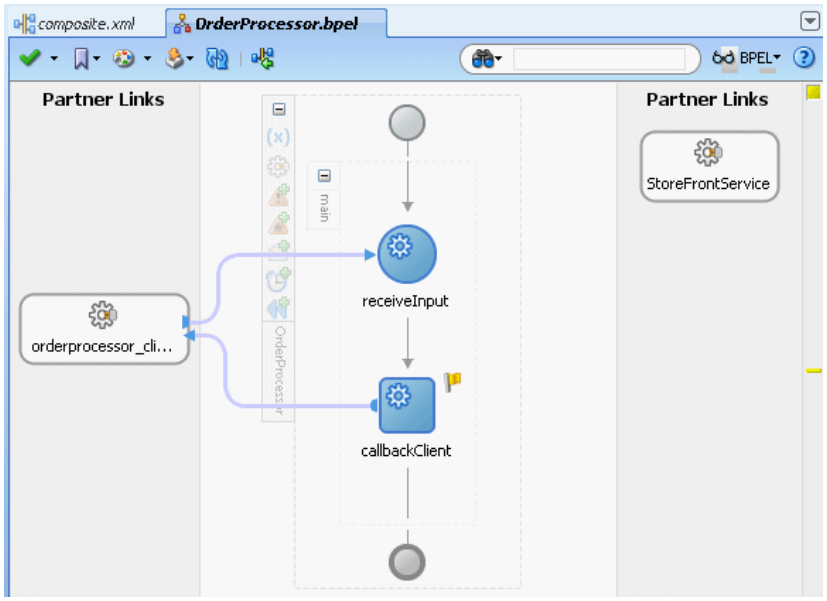


2. Click **Source** at the bottom of the visual editor to review the wiring:

```
<wire>
  <source.uri>OrderProcessor/StoreFrontService</source.uri>
  <target.uri>StoreFrontService</target.uri>
</wire>
```

3. Click **Design** at the bottom of the visual editor.
4. Click the **OrderProcessor.bpel** tab to view the BPEL process again.

   The `StoreFrontService` service displays in the BPEL Designer.



5. Select **Save All** from the **File** main menu to save your work.

5.5 Creating the gOrderInfoVariable Variable

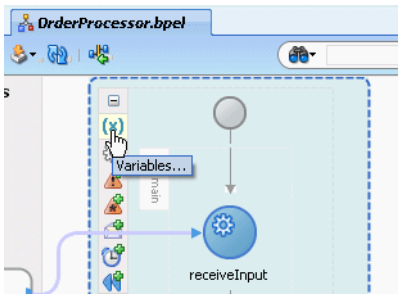
In this task, you create variable `gOrderInfoVariable` as input for when an order is placed. The letter `g` is used to distinguish this variable as a global variable that can be used throughout the BPEL process. This tutorial requests that you create global variables with a letter `g` prefix and local variables for individual scopes with a letter `l` prefix. You can use a local variable only within a scope.

In previous releases, variables and messages exchanged within a BPEL business process were disconnected payload (a snapshot of data returned by a Web service) placed into an XML structure. In some cases, the user required this type of fit. In other cases, this fit presented challenges.

For this release, the entity variable can be used with an Oracle ADF Business Component data provider service using SDO-based data.

To create an entity variable for the purchase order ID and select the `StoreFrontService` as a partner link to invoke the Oracle ADF Business Component application:

1. In the canvas workspace for the **OrderProcessor** BPEL process, click the **Variables** icon.



The Variables dialog displays.

2. Click the **Create** icon to add a variable.

   The Create Variable dialog displays.

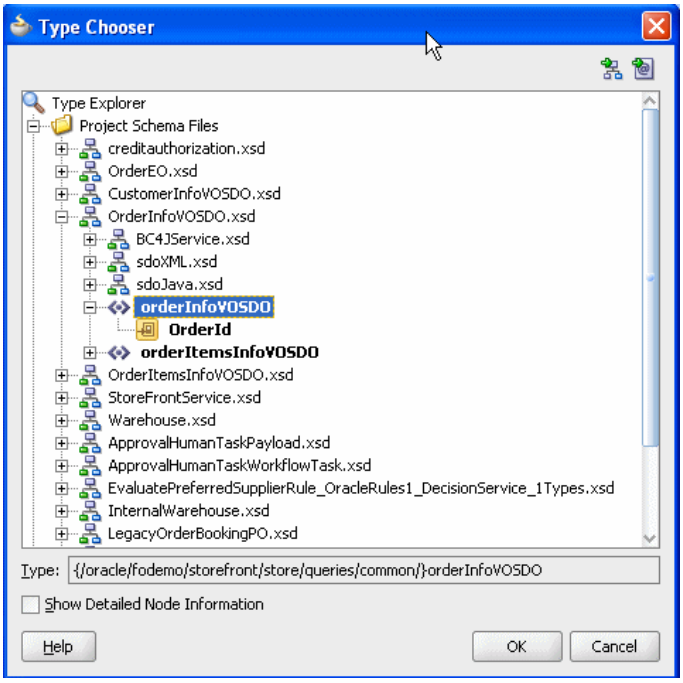
3. In the **Name** field, enter `gOrderInfoVariable`. Use the letter `g` to distinguish this variable as a global variable that can be used throughout the process.

4. In the **Type** section, select **Element** and then select the **Search** icon to the right of the **Element** field.

   The Type Chooser dialog appears with a list of available services.

5. Expand **Project Schema Files** > **OrderInfoVOSDO.xsd** > **orderInfoVOSDO**.

   OrderId represents the order in the Oracle ADF Business Component of the `StoreFrontService`.



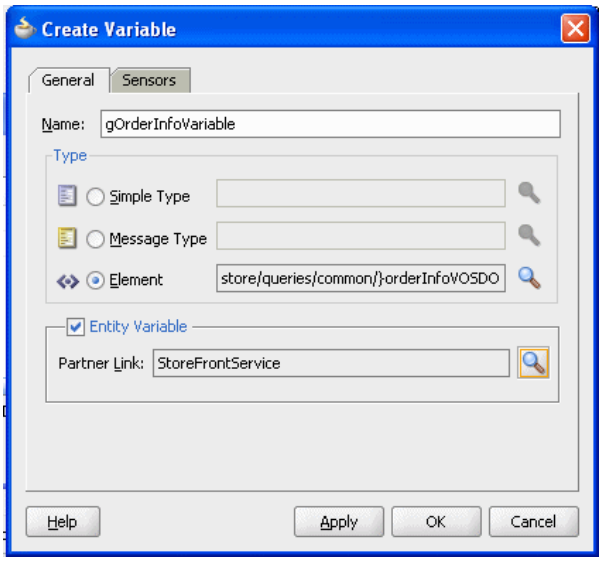
6. Select **orderInfoVOSDO**, and then click **OK**.

7. In the Create Variable dialog, click the **Entity Variable** check box and select the **Search** icon to the right of the **Partner Link** field.

   The Partner Link Chooser window displays.

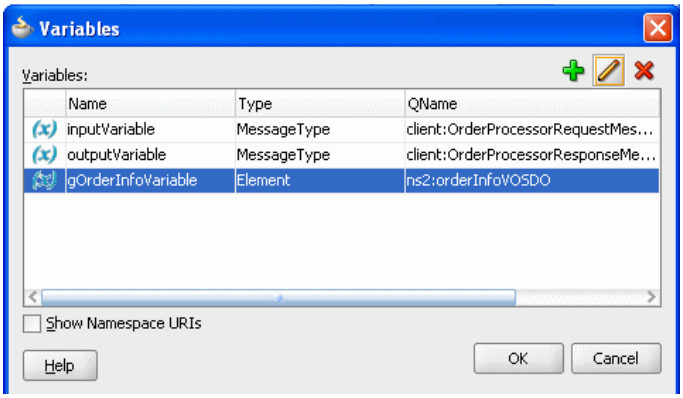
8. Expand **Process** > **Partner Links** and select **StoreFrontService**, and then click **OK**.

   The Create Variable dialog shows the element and service information.



9. Click **OK** in the Create Variable dialog.

   The Variables dialog updates with the `gOrderInfoVariable` entity variable.

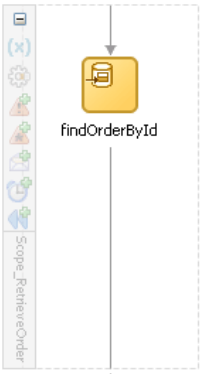


10. Click **OK** in the Variables dialog.

5.6 Creating the Scope_RetrieveOrder Scope

The `Scope_RetrieveOrder` scope uses a bind entity activity to obtain the order ID using the `gOrderInfoVariable` entity variable.

Figure 5–1 Scope_RetrieveOrder



A scope activity does not actually execute or do anything, it simply holds other activities. Scopes are analogous to curly braces in Java. You can use them to break up your process into logical chunks.

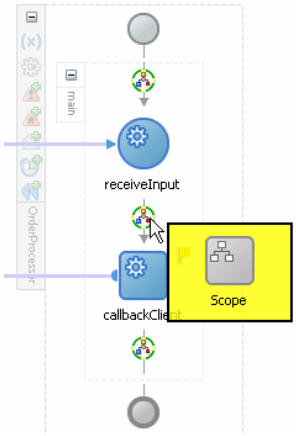
To create this scope, perform these tasks:

- Task 1: Add the Scope_RetrieveOrder Scope
- Task 2: Create findOrderById Bind Entity Activity

5.6.1 Task 1: Add the Scope_RetrieveOrder Scope

To create the `Scope_RetrieveOrder` scope:

1. From the Component Palette, drag a **Scope** activity below the **receiveInput** activity.



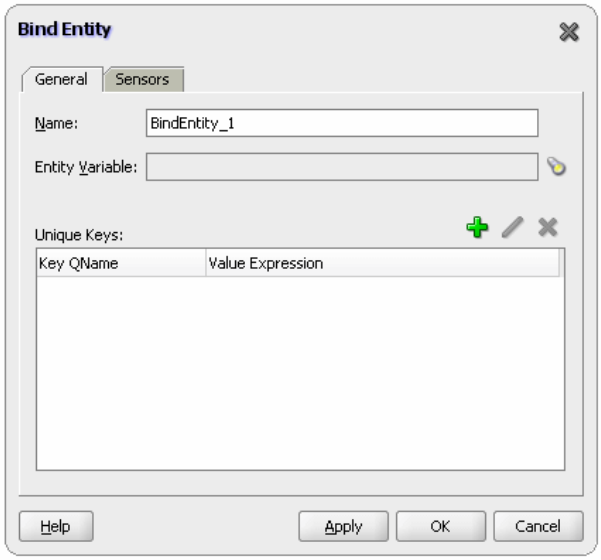
2. Rename this activity by double-clicking the name underneath the icon. Do not double-click the activity icon itself.
3. In the edit field, change the name to `Scope_RetrieveOrder`.
4. Click the **Expand** (+) icon to expand the **Scope_RetrieveOrder** scope.

5.6.2 Task 2: Create findOrderById Bind Entity Activity

To create a key to point to the data in the Oracle ADF Business Component data provider service:

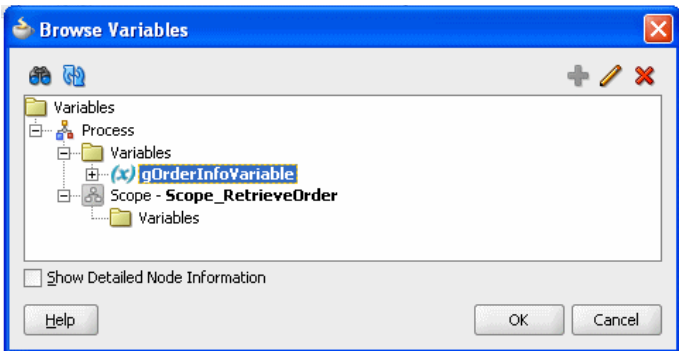
1. From the Component Palette, drag a **Bind Entity** activity into the **Scope_RetrieveOrder** scope.
2. Double-click the **Bind Entity** activity.

   The Bind Entity window displays.



3. In the **Name** field, enter `findOrderById`.
4. Click the **Search** icon next to the **Entity Variable** field.

   The Browse Variables dialog appears.
5. Select the **gOrderInfoVariable** variable you created in Section 5.5, and then click **OK**.



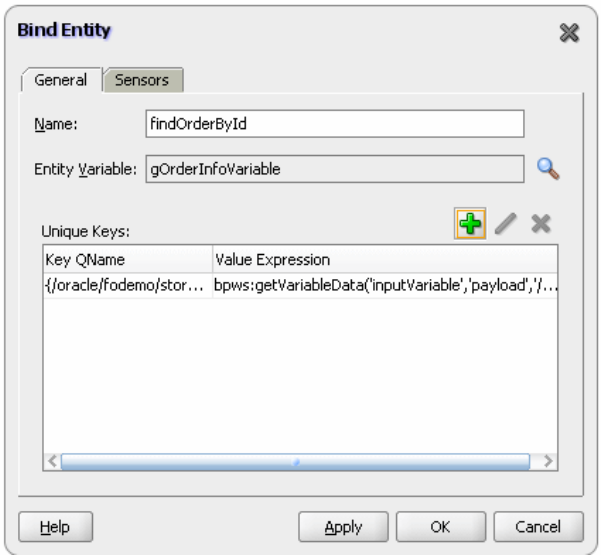
6. In the **Unique Keys** section of the Bind Entity window, click the **Create** icon to create a key for retrieving the order ID from the database.

   The Specify Key dialog appears.
7. Configure the following settings to define the binding key:

Element	Procedure
Key Local Part	1. Click the **Browse Entity Variable** icon. It is the icon to the right of the **Key Local Part** field. The Browse Entity Key dialog appears. 2. Expand **Variables** > **gOrderInfoVariable** > **ns4:orderInfoVOSDO** and select element **ns4:OrderId**. Do no select the **OrderId** key. The namespace number values (for example, **ns1**, **ns2**) can vary. 3. Click **OK**.
Key Namespace URI	Leave the default for the namespace URI for the key.
Key Value	1. Click the **Expression Builder** icon. The Expression Builder dialog appears. 2. In the **BPEL Variable** section, expand **Variables** > **inputVariable** > **payload** > **ns4:WarehouseRequest** and select **ns4:orderId**. 3. Click **Insert Into Expression**. 4. Click **OK** in the Specify Key dialog.

8. Click **OK** to close the Specify Key dialog.

   A name-pair value appears in the **Unique Keys** table.



9. Click **OK** to close the Bind Entity window.

   When the bind entity activity is executed at run time, the `gOrderInfoVariable` entity variable is ready to be used. Otherwise, a run-time fault results.

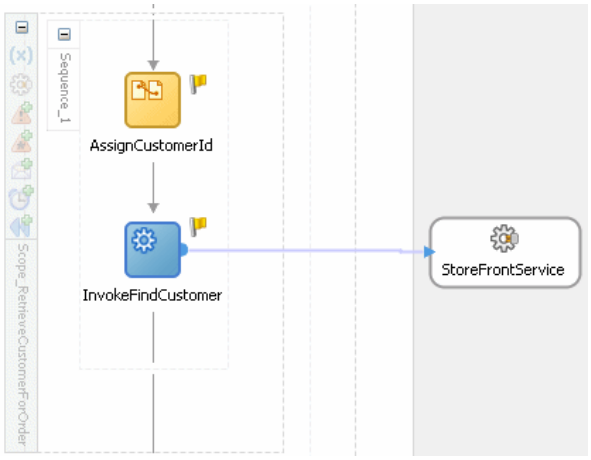
10. Click the **Collapse** (**-**) icon to minimize the **Scope_RetrieveOrder** scope.

5.7 Creating the Scope_RetrieveCustomerForOrder Scope

The `Scope_RetrieveCustomerForOrder` scope calls the `StoreFrontService` service to retrieve customer information. It assigns the customer ID from global variable `gOrderInfoVariable` to local variable `lFindCustomerInfo_`

`InputVariable` for the scope. The scope then uses an invoke activity to call the `StoreFrontService` service. The invoke activity provides the `lFindCustomerInfo_InputVariable` variable as input to the service, and the `StoreFrontService` service returns information about the customer, such as the customer name and email address, back to the BPEL process through the `gCustomerInfoVariable` global variable.

Figure 5–2 Scope_RetrieveCustomerForOrder



To create this scope, perform the following tasks:

- Task 1: Add the Scope_RetrieveCustomerForOrder Scope
- Task 2: Create the InvokeCustomerService Activity
- Task 3: Create the AssignCustomerId Activity
- Task 4: Deploy the OrderBookingComposite Composite
- Task 5: Deploy the OrderSDOComposite Composite
- Task 6: Initiate a Test Instance for the OrderBookingComposite Composite

5.7.1 Task 1: Add the Scope_RetrieveCustomerForOrder Scope

To create the `Scope_RetrieveCustomerForOrder` scope:

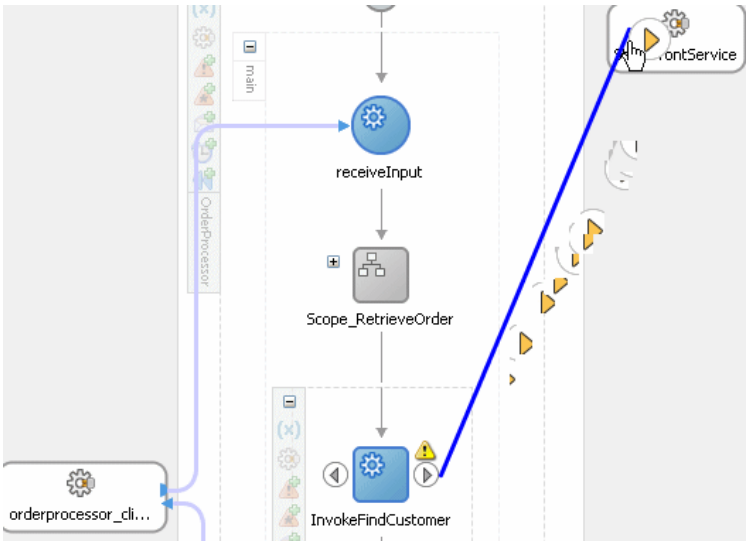
1. From the Component Palette, drag a **Scope** activity below the **Scope_RetrieveOrder** activity.
2. Rename this activity by double-clicking the name underneath the icon. Do not double-click the activity icon itself.
3. In the edit field, change the name to `Scope_RetrieveCustomerForOrder`.
4. Click the **Expand** (+) icon to expand the **Scope_RetrieveCustomerForOrder** scope.

5.7.2 Task 2: Create the InvokeCustomerService Activity

An invoke activity invokes a service and passes it data, and in this case, wait for a response from the service with the return data. To call the `StoreFrontService` service, you create an invoke activity:

1. From the Component Palette, drag an **Invoke** activity into the **Scope_RetrieveCustomerForOrder** scope.

2. Rename this activity by double-clicking name underneath the icon. Do not double-click the invoke icon itself.
3. In the edit field, change the name to `InvokeFindCustomer`.
4. Drag the mouse from the right side of **InvokeFindCustomer** to the **StoreFrontService** partner link.



The Edit Invoke dialog appears and is automatically filled in with the following information:

Element	Value
Name	**InvokeFindCustomer**
Partner Link	**StoreFrontService**
Operation	**findCustomerInfoV01** You change the value for this field in the next step.

5. In the **Operation** field, change the selection to **findCustomerInfoVO1CustomerInfoVOCriteria**.
6. Click the **Automatically Create Input Variable** icon. It is the first icon to the right of the **Input Variable** field.

   The Create Variable dialog appears for the input variable. This variable provides input data to the `StoreFrontService` service, namely the ID of the customer.
7. Enter and select the following values:

Element	Value
Name	`lFindCustomerInfo_InputVariable` Use the letter `l` to distinguish this variable as a local variable that can be used only within this scope. This tutorial requests that you create global variables with a letter `g` prefix and local variables for individual scopes with a letter `l` prefix. You can use a local variable only within a scope.

Element	Value
Global Variable/Local Variable	**Local Variable**, because this variable is not needed for other scopes in the process

8. Click **OK** to close the Create Variable dialog.

   The Edit Invoke dialog populates with the variable in the **Input Variable** field.

9. Click the **Automatically Create Output Variable** icon. It is the first icon to the right of the **Output Variable** field.

   The Create Variable dialog appears for the output variable. This variable provides output data to the `StoreFrontService` service, such as the customer's ID, name, contact information, and membership information.

10. Enter and select the following values:

Element	Value
Name	`gCustomerInfoVariable` Use the letter `g` to distinguish this variable as a global variable that can be used throughout the process.
Global Variable/Local Variable	**Global Variable**, because other scopes in the process use this variable

11. Click **OK** to close the Create Variable dialog.

    The Edit Invoke dialog populates with the variable in the **Output Variable** field.

12. In the Edit Invoke dialog, click **OK** to save the variable settings.

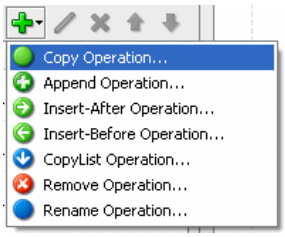
5.7.3 Task 3: Create the AssignCustomerId Activity

In this task, you create an assign activity to take the customer ID and send it to the input variable for the `StoreFrontService` service.

1. From the Component Palette, drag an **Assign** activity above the **InvokeFindCustomer** invoke activity.
2. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.
3. In the edit field, enter `AssignCustomerId`.
4. Double-click the **AssignCustomerId** activity.

   The Assign dialog displays.

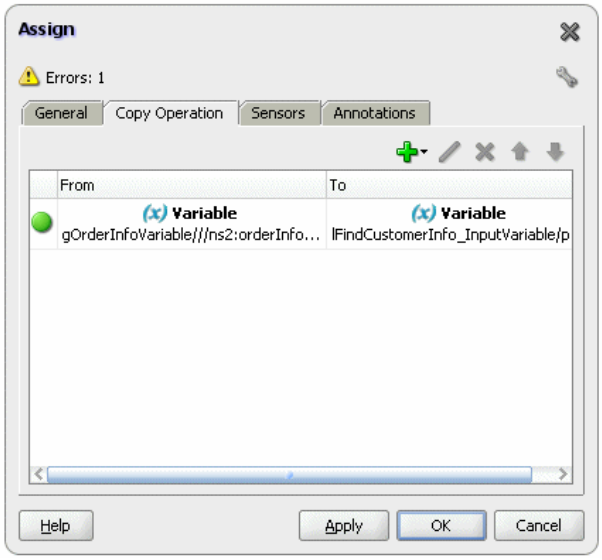
5. From the dropdown list, select **Copy Operation**:



   The Create Copy Operation dialog appears.

6. On the **From** side, expand **Variables** > **gOrderInfoVariable** > **ns4:orderInfoVOSDO** > **ns4:CustomerId**. The namespace number values (for example, **ns1**, **ns2**) can vary.
7. On the **To** side, expand **Scope - Scope_RetrieveCustomerForOrder** > **Variables** > **lFindCustomerInfo_InputVariable** > **parameters** > **ns4:findCustomerInfoVO1CustomerInfoVOCriteria** and select **ns4:CustId**. The namespace number value can vary.
8. Click **OK** to close the Create Copy Operation dialog.

   The Copy Operation tab in the Assign updates to show the operation you created.



9. In the Assign dialog, click **OK**.
10. Click the **Collapse** (**-**) icon to minimize the **Scope_RetrieveCustomerForOrder** scope.
11. Select **Save All** from the **File** main menu to save your work.

5.7.4 Task 4: Deploy the OrderBookingComposite Composite

To deploy the `OrderBookingComposite` composite:

1. In the Application Navigator, right-click **OrderBookingComposite** and select **Deploy** > **OrderBookingComposite** > to **MyAppServerConnection**. You created the `MyAppServerConnection` connection in Section 1.2.4, "Task 4: Create a Connection to an Oracle WebLogic Server."

   The SOA Deployment Configuration Dialog displays.
2. Accept the default settings and click **OK**.
3. When prompted with the Authorization Request dialog, enter `weblogic` in the `Username` field and the password in the `Password` field.

   In SOA - Log, a series of validations display, followed by:

```
BUILD SUCCESSFUL
Total time: nn seconds
```

5.7.5 Task 5: Deploy the OrderSDOComposite Composite

To initiate a test instance of the `OrderBookingComposite` composite, you must deploy a service using the `StoreFrontService.wsdl`. If you performed the tasks in Section 2.1.2 and have the Store Font module currently running, then you can use it to test the `OrderBookingComposite` composite. You can proceed to Section 5.7.6, "Task 6: Initiate a Test Instance for the OrderBookingComposite Composite." If you do not have the Store Front module currently running, then deploy the `OrderSDOComposite` composite, available from the sample application.

To deploy the `OrderSDOComposite` composite:

1. In the Application Navigator, select **WebLogicFusionOrderDemo** for the sample application in the *DEMO_DOWNLOAD_HOME* directory.
2. In the Application Navigator, right-click **OrderSDOComposite** and select **Deploy** > **OrderSDOComposite** > to **MyAppServerConnection**.

   The SOA Deployment Configuration Dialog displays.
3. Accept the default settings and click **OK**.
4. When prompted with the Authorization Request dialog, enter `weblogic` in the `Username` field and the password in the `Password` field.

   In SOA - Log, a series of validations display, followed by:

   ```
   BUILD SUCCESSFUL
   Total time: nn seconds
   ```
5. In the Application Navigator, select **WebLogicFusionOrderDemo** for the application you currently building in the *MY_FOD_HOME* directory.

5.7.6 Task 6: Initiate a Test Instance for the OrderBookingComposite Composite

In this task, you can initiate a test instance of the `OrderBookingComposite` composite in one of two ways:

- You can use the Store Front module by submitting an order, similarly to the first order described in Section 2.2 and monitor the order instance described in Section 2.4. The order should progress through the `Scope_RetrieveCustomerForOrder` scope.
- Use the `OrderSDOComposite` composite by initiating a test instance of the `OrderSDOComposite` composite from the Test Web Service page in Fusion Middleware Control. Use the steps described next.

To initiate a test instance of the `OrderSDOComposite` composite:

1. Access the Test Web Service page in Fusion Middleware Control through the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Composite Menu...
1. Select **Home**. 2. Select the **Deployed Composites** tab. 3. In the **Composite** section, select **OrderBookingComposite**. 4. At the top of the page, click **Test**.	1. Under **soa-infra**, select **OrderBookingComposite**. 2. At the top of the page, click **Test**.	Select **Test Service** > **orderprocessor_client_ep**.

2. In the **Inputs Arguments** section of the Test Web Service page, in the **orderID** field, enter an ID under `1000`.
3. Click **Test Web Service**.

   The test results appear in the **Response** tab upon completion.
4. Click **Launch Message Flow Trace** to access the flow trace of the instance.
5. In the Flow Trace window, in the **Trace** section, click the **OrderProcessor** BPEL process.
6. In the Flow Trace window for the instance, click the **Flow** tab.
7. Click the various activities to see the flow through the `Scope_RetrieveCustomerForOrder` scope.
8. Click **X** or **Close** to the dismiss the Activity Details dialog.
9. Close the Flow Trace window.

5.8 Creating CreditCardAuthorizationService Service

The `CreditAuthorizationService` service checks whether the customer's credit card is valid. You create it by creating a Web service based on a WSDL from the `FusionOrderDemo_R1.zip`.

- Task 1: Copy WSDL File Needed for CreditCardAuthorizationService
- Task 2: Create a Web Service for CreditCardAuthorizationService

Later, in Section 5.8, "Creating CreditCardAuthorizationService Service," you create a scope for the `OrderProcessor` BPEL process to call this service.

5.8.1 Task 1: Copy WSDL File Needed for CreditCardAuthorizationService

Copy `CreditCardAuthorizationService.wsdl` from directory *`DEMO_DOWNLOAD_HOME`*`\CompositeServices\OrderBookingComposite` to directory *`MY_FOD_HOME`*`\CompositeServices\OrderBookingComposite`.

5.8.2 Task 2: Create a Web Service for CreditCardAuthorizationService

In Section 5.3.2, "Task 2: Create a Web Service for StoreFrontService," you created a reference to the Web service from the SOA Composite Editor. In this task, you create the reference from the BPEL Designer.

To create a Web service for the `CreditCardAuthorizationService` service:

1. From the Component Palette, drag a **Partner Link (Web Service/Adapter)** from the **BPEL Services** list into the right swim lane of the BPEL Designer.

   The Create Partner Link dialog appears.
2. Enter and select the following values:

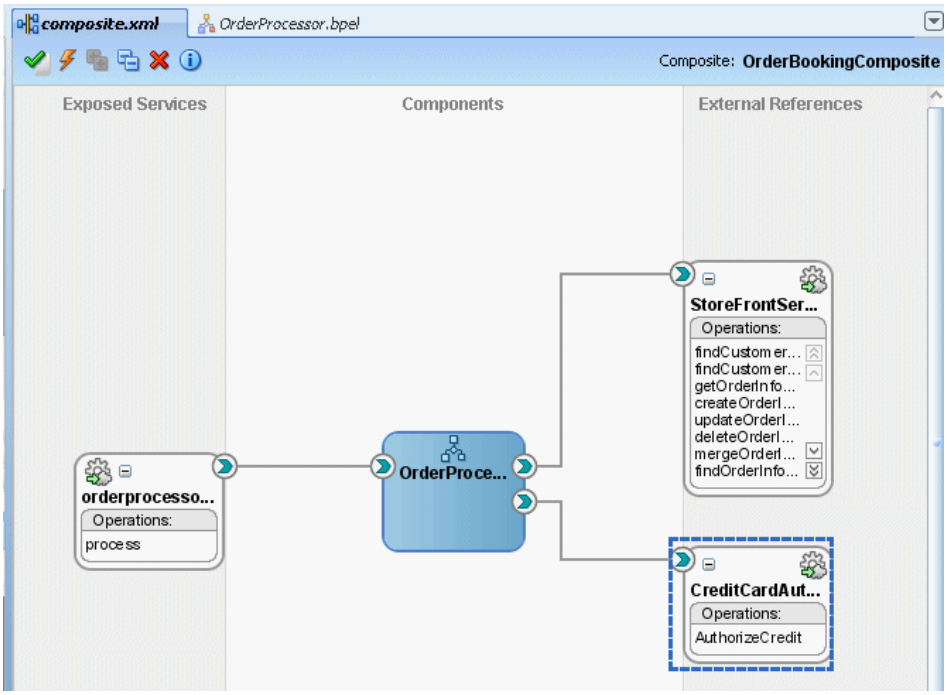
Element	Value
Name	`CreditCardAuthorizationService`
WSDL file	Browse and select `CreditAuthorizationService.wsdl` from *`MY_FOD_HOME`*`\OrderBookingComposite`.

Element	Value
Partner Link Type	Leave the default as **CreditCardAuthorizationService**.
Partner Role	`CreditAuthorizationPort`
My Role	Leave the default as **Not Specified**, since this service is synchronous

3. Click **OK**.

   The `CreditCardAuthorizationService` service displays in the right swim lane.

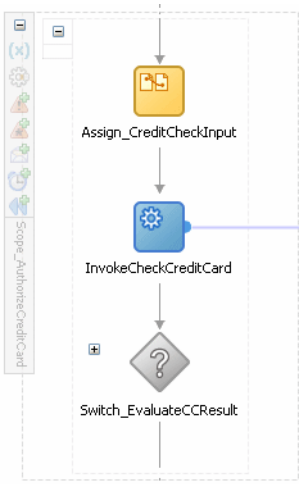
   If you click the **composite.xml** tab, you can see the `CreditCardAuthorizationService` service automatically propagates to the SOA Composite Editor.



5.9 Creating the Scope_AuthorizeCreditCard Scope

The `Scope_AuthorizeCreditCard` scope calls the `CreditCardAuthorizationService` service to retrieve customer information. It assigns the order total, credit card type, and the account number from global variable `gOrderInfoVariable` to local variable `lCreditCardInput` for the scope. The scope then uses an invoke activity to call the `CreditCardAuthorizationService` service. The invoke activity provides the `lCreditCardInput` variable as input to the service, and the `CreditCardAuthorizationService` service returns the status back to the BPEL process through the `lCreditCardCardOutput` local variable. This switch activity checks the results of the credit card validation.

Figure 5–3 Scope_AuthorizeCreditCard



To create this scope, perform the following tasks:

- Task 1: Add the Scope_AuthorizeCreditCard Scope
- Task 2: Create the InvokeCheckCredit Invoke Activity
- Task 3: Create the Assign_CreditCheckInput Activity
- Task 4: Create Switch Activity

5.9.1 Task 1: Add the Scope_AuthorizeCreditCard Scope

To create the `Scope_AuthorizeCreditCard` scope:

1. Back in the **OrderProcessor.bpel** tab, from the Component Palette, drag a **Scope** activity from the **Component Palette** section below the **Scope_RetrieveCustomerForOrder** scope.
2. Rename this activity by double-clicking the name underneath the icon. Do not double-click the activity icon itself.
3. In the edit field, change the name to `Scope_AuthorizeCreditCard`.
4. Click the **Expand** (+) icon to expand the **Scope_AuthorizeCreditCard** scope.

5.9.2 Task 2: Create the InvokeCheckCredit Invoke Activity

To create an invoke activity to call `CreditCardAuthorizationService` service:

1. From the Component Palette, drag an **Invoke** activity into the **Scope_AuthorizeCreditCard** scope.
2. Rename this activity by double-clicking name underneath the icon. Do not double-click the invoke icon itself.
3. In the edit field, change the name to `InvokeCheckCreditCard`.
4. Drag the mouse from the right side of **InvokeCheckCreditCard** to the **CreditCardAuthorizationService** partner link.

   The Edit Invoke dialog appears and is automatically filled in with the following information:

Element	Value
Name	**InvokeCheckCreditCard**
Partner Link	**CreditCardAuthorizationService**
Operation	**AuthorizeCredit**

5. Click the **Automatically Create Input Variable** icon. It is the first icon to the right of the **Input Variable** field.

   The Create Variable dialog appears for the input variable. This variable provides input data to `CreditCardAuthorizationService` service.

6. Enter and select the following values:

Element	Value
Name	`lCreditCardInput`
Global Variable/Local Variable	**Local Variable**.

7. Click **OK** to close the Create Variable dialog.

   The Edit Invoke dialog populates with the variable in the **Input Variable** field.

8. Click the **Automatically Create Output Variable** icon. It is the first icon to the right of the **Output Variable** field.

   The Create Variable dialog appears for the output variable. This variable returns status from `CreditCardAuthorizationService` service.

9. Enter and select the following values:

Element	Value
Name	`lCreditCardOutput`
Global Variable/Local Variable	**Local Variable**

10. Click **OK** to close the Create Variable dialog.

    The Edit Invoke dialog populates with the variable in the **Output Variable** field.

11. In the Edit Invoke dialog, click **OK** to save the settings.

5.9.3 Task 3: Create the Assign_CreditCheckInput Activity

Next, you create an assign activity to take the credit card type, credit card number, and purchase amount and assign it to the input variable for the `CreditAuthorizationService` service.

1. Create an assign activity to assign data to the input variables for the `CreditCardAuthorizationService` service:

   a. From the Component Palette, drag an **Assign** activity above the **InvokeCheckCreditCard** invoke activity.

   b. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.

   c. In the edit field, enter `Assign_CreditCheckInput`.

d. Double-click the **Assign_CreditCheckInput** activity.

The Assign dialog displays.

2. Assign an input variable for the purchase amount to the `CreditCardAuthorizationService` service:

a. From the dropdown list, select **Copy Operation**.

The Create Copy Operation dialog appears.

b. Select the following values:

Element	Value
From	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderInfoVariable** > **ns4:orderInfoVOSDO** and select **ns4:OrderTotal**. **Note:** The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Scope - Scope_AuthorizeCreditCard** > **Variables** > **lCreditCardInput** > **Authorization** > **ns8:AuthInformation** and select **ns8:PurchaseAmount**.

c. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

The Copy Operation tab in the Assign dialog updates to show the copy operation.

3. Assign an input variable for the type of credit card to the `CreditCardAuthorizationService` service:

a. From the dropdown list, select **Copy Operation**.

The Create Copy Operation dialog appears.

b. Select the following values:

Element	Value
From	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderInfoVariable** > **ns4:orderInfoVOSDO** and select **ns4:CardTypeCode**. **Note:** The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Scope - Scope_AuthorizeCreditCard** > **Variables** > **lCreditCardInput** > **Authorization** > **ns8:AuthInformation** and select **ns8:CCType**.

c. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

The Copy Operation tab in the Assign dialog updates to show the copy operation.

4. Assign an input variable for the credit card account number to the `CreditCardAuthorizationService` service:

a. From the dropdown list, select **Copy Operation**.

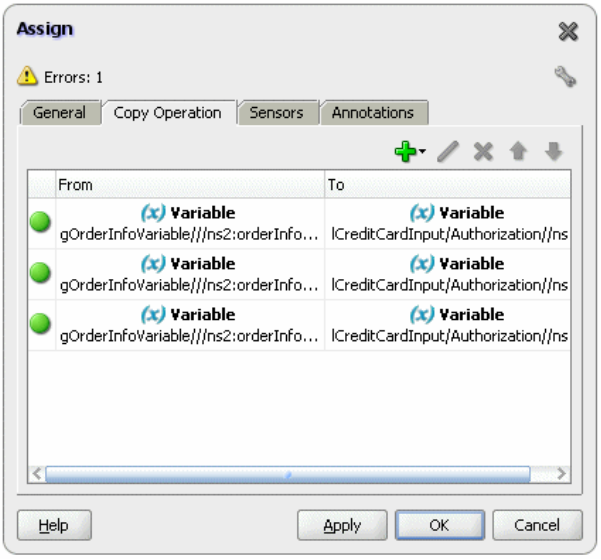
The Create Copy Operation dialog appears.

b. Select the following values:

Element	Value
From	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderInfoVariable** > **ns4:orderInfoVOSDO** > **ns4:AccountNumber**. **Note:** The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Scope - Scope_AuthorizeCreditCard** > **Variables** > **lCreditCardInput** > **Authorization** > **ns8:AuthInformation** and select **ns8:CCNumber**.

c. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

The Copy Operation tab in the Assign dialog updates to show three copy operations.



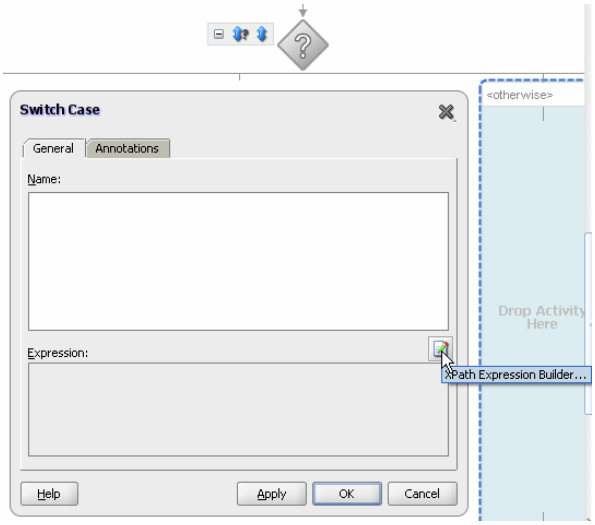
5. In the Assign dialog, click **OK**.

6. Select **Save All** from the **File** main menu to save your work.

5.9.4 Task 4: Create Switch Activity

To create the switch activity to check the results of the credit card validation:

1. From the Component Palette, drag a **Switch** activity below the **InvokeCheckCreditCard** invoke activity.
2. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.
3. In the edit field, enter `Switch_EvaluateCCResult`.
4. Click the **Expand** (+) icon to expand the switch.
5. Specify the conditions for the **<case>** branch to handle cases where a customer's credit card is not valid. This information is stored in the `lCreditCardOuput` variable.
   a. Double-click the title bar of the **<case>** box to display the Switch Case dialog.
   b. In the Switch Case dialog, click the **XPath Expression Builder** icon above the **Expression** box to display the Expression Builder dialog.



   c. In the Expression Builder dialog, in the **BPEL Variables** box, select **Scope - Scope_AuthorizeCreditCard** > **Variables** > **lCreditCardOuput** > **status** and select **ns8:status**. The namespace number values (for example, **ns1**, **ns2**) can vary.

      The Content Preview box shows what to insert. For example:

      ```
      bpws:getVariableData('lCreditCardOutput','status','/ns8:status')
      ```

   d. Click **Insert Into Expression**.

      The Expression box updates with the three parameters.

   e. Append `!= 'APPROVED'` to the expression in the **Expression** box so that the expression looks like this:

      ```
      bpws:getVariableData('lCreditCardOutput','status','/ns6:status') !=
      'APPROVED'
      ```

   f. Click **OK** to close the Expression Builder.
   g. In the Switch Case dialog, click **OK**.

6. Remove the unneeded **<otherwise>** branch.
   a. Right-click the **<otherwise>** branch and select **Delete** from the menu.
   b. When prompted to remove the branch, click **Yes**.
7. Create the **Throw** activity in the remaining **<case>** branch.

   For those orders not approved, this activity throws a fault called **Throw_Fault_CC_Denied**. The `OrderProcessor` process terminates after executing this throw activity.
   a. From the Component Palette, drag a **Throw** activity into the **<case>** branch.
   b. Double-click the new throw activity.

      The Throw activity dialog displays.
   c. Enter the following values:

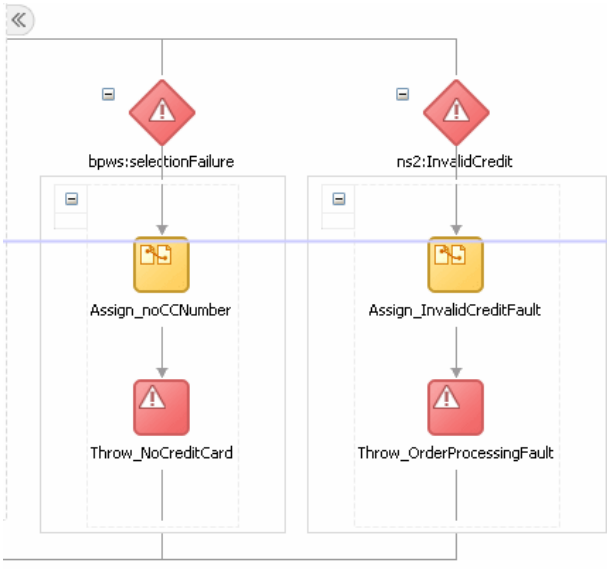
Element	Value
Name	`Throw_Fault_CC_Denied`
Namespace	`http://www.globalcompany.example.com/ns/OrderBookingService`
Local Part	`OrderProcessorFault`
Fault Variable	Do not enter a value.

   d. Click **OK**.
8. Click the **Collapse** (**-**) icon to minimize the switch.
9. Select **Save All** from the **File** main menu to save your work.

5.10 Creating Catch Branches for the Scope_AuthorizeCreditCard

Add catch branches to the `Scope_AuthorizeCreditCard` scope for orders in which the credit card number is not provided or the credit type is not valid. Figure 5–4 shows the catches for the scope.

Figure 5–4 Catches in Scope_AuthorizeCreditCard



To create the catches for this scope, perform the following tasks:

- Task 1: Modify the OrderProcessor.wsdl File for the gOrderProcessorFaultVariable Variable
- Task 2: Create the gOrderProcessorFaultVariable Variable
- Task 3: Add Catch Branches to the Scope_AuthorizeCreditCard

5.10.1 Task 1: Modify the OrderProcessor.wsdl File for the gOrderProcessorFaultVariable Variable

You create the `gOrderProcessorFaultVariable` variable as input for the branches in the next task. This variable uses the `OrderProcessorFault` element from the `OrderProcessor.wsdl` file, which you must create in the `OrderProcessor.wsdl` file.

To create this variable:

1. From the Application Navigator, double-click **OrderProcessor.wsdl**.

   The WSDL Editor displays, which is a specialized schema-driven editor for editing WSDL documents.

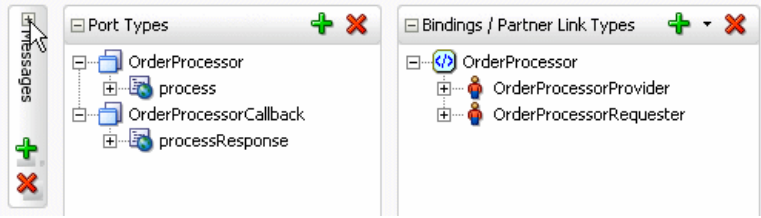
2. Click the **Source** tab and add the following definition to the `wsdl:definitions` section.

   ```
   xmlns:xsd="http://www.w3.org/2001/XMLSchema"
   ```

3. Click the **Design** tab.

4. Create the `OrderProcessorFault` message:

   a. Click the **Expand** (+) icon in the **Messages** section.



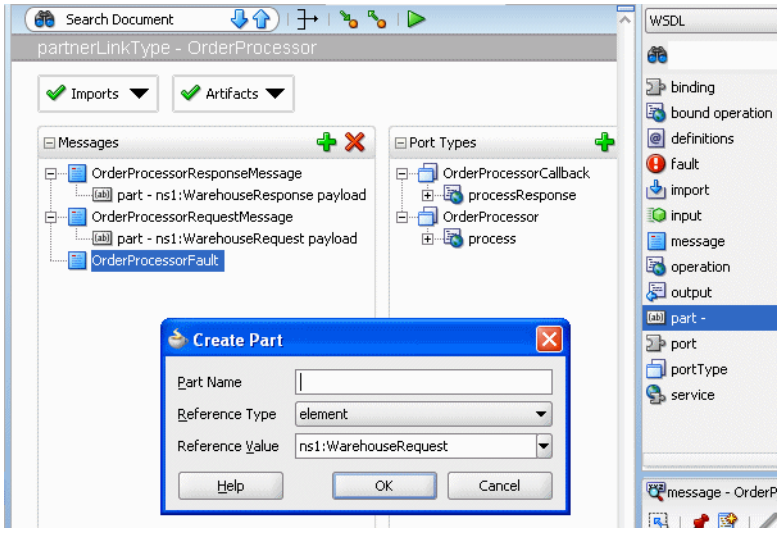
b. Click the **Add** icon to add a new message.

The Create Message dialog displays.

c. In the **Message Name** field, enter `OrderProcessorFault`, and then click **OK**.

d. Select **OrderProcessorFault** in **Messages**.

e. Select **OrderProcessorFault** and then select **part** in the right side WSDL component palette.



The Create Part dialog displays.

f. Enter and select following values:

Element	Value
Part Name	`code`
Reference Type	**type**
Part Name	`xsd:string`

g. Click **OK** in the Create Part dialog.

h. Select **OrderProcessorFault** and then select **part** in the right side of WSDL component palette.

The Create Part dialog displays.

i. Enter and select the following values:

Element	Value
Part Name	`orderId`
Reference Type	**type**
Part Name	`xsd:string`

j. Click **OK** in the Create Part dialog.

k. Select **OrderProcessorFault** and then select **part** in the right side WSDL component palette.

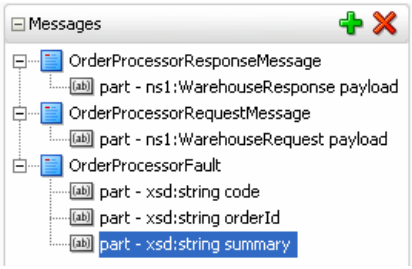
The Create Part dialog displays.

l. Enter and select the following values:

Element	Value
Part Name	`summary`
Reference Type	**type**
Part Name	`xsd:string`

m. Click **OK** in the Create Part dialog.

The **Messages** section displays the parts for the `OrderProcessorFault` message.



5. Create the `processFault` operation for `OrderProcessorCallback`:

a. In the **Port Types** section, select **OrderProcessorCallback** and then select **operation** in the right side WSDL component palette.

The Create Operation dialog displays.

b. Enter and select the following values:

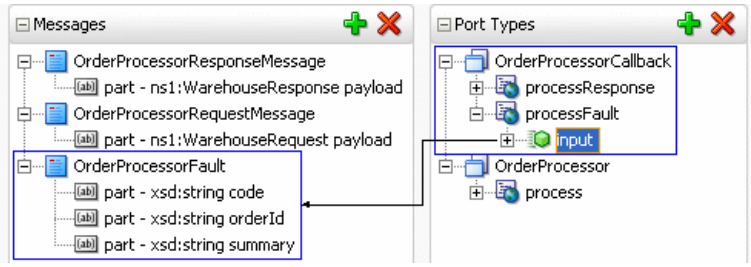
Element	Value
Operation Name	`processFault`
Operation Type	**Request Response**
Input	**client:OrderProcessorFault**
Output	**client:OrderProcessorResponseMessage**

c. Click **OK** in the Create Operation dialog.

d. In the **Port Types** section, expand **OrderProcessorCallback** and **processFault**.

e. Right-click the unneeded **output** in **processFault** and select **Delete**.

f. Expand **processFault** > **input** > **OrderProcessorFault** > **OrderProcessor** to see the parts.



6. Select **Save All** from the **File** main menu to save your work.
7. Click **X** in the **OrderProcessor.wsdl** tab to close the WSDL Editor.

5.10.2 Task 2: Create the gOrderProcessorFaultVariable Variable

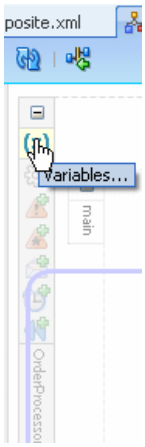
You now create the `gOrderProcessorFaultVariable` variable as input for the branches in the next task.

To create this variable:

1. In the workspace for the **OrderProcessor** BPEL process, click the **Variables** icon.

   The Variables dialog displays.

2. Click the **Add** icon to add a variable.

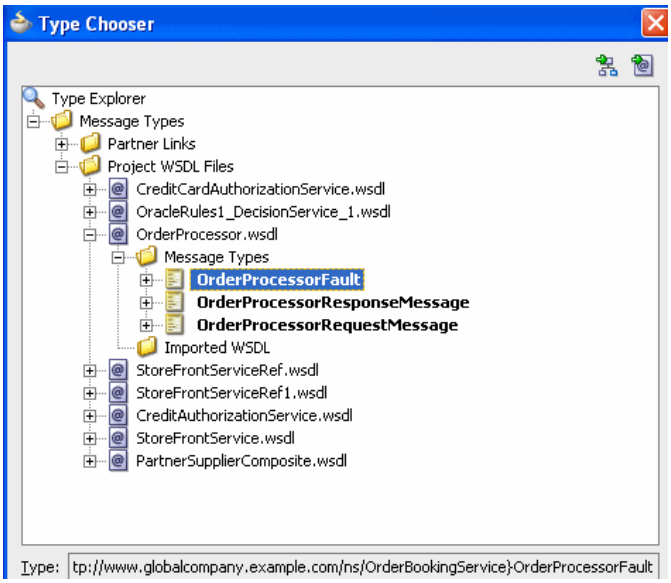


   The Create Variable dialog displays.

3. In the **Name** field, enter `gOrderProcessorFaultVariable`.
4. In the **Type** section, select **Message Type** and then select the **Browse** icon to the right of the **Message Type** field.

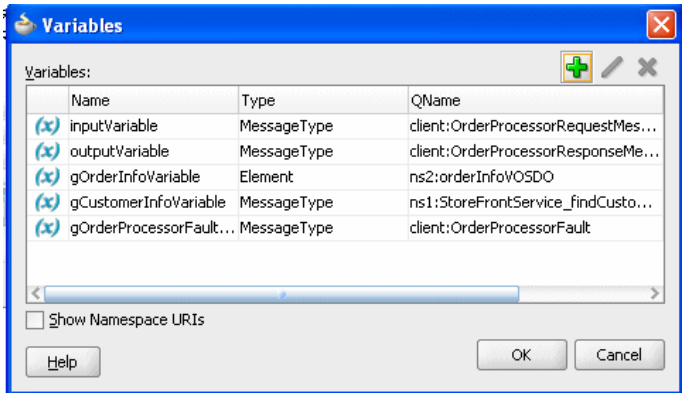
   The Type Chooser dialog appears with a list of available services.

5. Expand **Message Types** > **Project WSDL Files** > **OrderProcessor.wsdl** > **Message Types** and select **OrderProcessorFault**, which you added to the WSDL file in Section 5.10.2, "Task 2: Create the gOrderProcessorFaultVariable Variable."



6. Click **OK** to close the Type Chooser dialog.
7. In the Create Variables dialog, click **OK**.

   The Variables dialog updates with the `gOrderProcessorFault` variable.

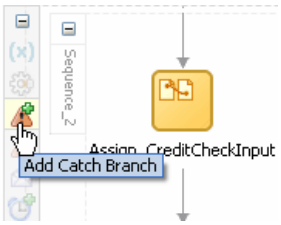


8. Click **OK** in the Variables dialog.

5.10.3 Task 3: Add Catch Branches to the Scope_AuthorizeCreditCard

To add catches to the `Scope_AuthorizeCreditCard` scope:

1. Click the **Add Catch Branch** icon for the scope, as shown in the following figure:



2. Double-click the catch to display the Catch dialog.
3. In the **Fault QName** section, click the **Browse** icon.

4. In the Fault Chooser dialog, expand **System Faults** and select **selectionFailure**, and then click **OK**. This catch provides a built-in system fault. It is raised from the `Assign_CreditCheckInput` activity if any of the fields are blank, such as no account number.
5. Click **OK** in the Catch dialog.
6. Click the **Expand** (+) icon to expand the **selectionFailure** catch.
7. In the **selectionFailure** catch, create an assign activity to assign expression `'CreditCardCheck - NO CreditCard'` as input to global variable `gOrderProcessorFaultVariable` for orders without credit card numbers.
   a. From the Component Palette, drag an **Assign** activity into the branch.
   b. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.
   c. In the edit field, enter `Assign_noCCNumber`.
   d. Double-click **Assign_noCCNumber**.

      The Assign dialog displays.
   e. From the dropdown list, select **Copy Operation**.

      The Create Copy Operation dialog appears.
   f. Enter and select the following values:

Element	Value
From	
▪ **Type**	**Expression**
▪ **Expression**	`string('CreditCardCheck - NO CreditCard')`
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderProcessorFaultVariable** and select **code**. You created this variable in Section 5.10.2, "Task 2: Create the gOrderProcessorFaultVariable Variable."

   g. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

      The Copy Operation tab in the Assign dialog updates to show the copy operation.
   h. In the Assign dialog, click **OK**.
8. In the **selectionFailure** catch, insert a throw activity after assign activity `Assign_noCCNumber`, so the `Scope_AuthorizeCreditCard` scope throws a fault:
   a. From the Component Palette, drag a **Throw** activity below **Assign_noCCNumber**.
   b. Double-click the new throw activity.

      The Throw activity dialog displays.
   c. Enter the following values:

Element	Value
Name	`Throw_NoCreditCard`
Namespace	`http://www.globalcompany.example.com/ns/OrderProcessor`
Local Part	`OrderProcessorFault`

d. Click the **Browse Fault Variables** icon next to the **Fault Variable** field.

e. In the Variable Chooser dialog, select the **gOrderProcessFaultVariable** and click **OK**.

f. Back in the Throw dialog, click **OK**.

9. Click the **Collapse** (**-**) icon to minimize the catch.
10. Click the **Add Catch Branch** icon for the scope to create a second catch.
11. Double-click the new catch to display the Catch dialog.
12. Enter the following values:

Element	Value
Namespace	`http://www.globalcompany.example.com/ns/CreditCardAuthorizationService`
Local Part	`InvalidCredit`

13. Click **OK** in the Catch dialog.
14. Click the **Expand** (**+**) icon to expand the **InvalidCredit** catch.
15. In the **InvalidCredit** catch, assign data to take the credit card type and assign it to global variable `gOrderProcessorFaultVariable` for orders without a valid credit card type.

a. From the Component Palette, drag an **Assign** activity into the branch.

b. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.

c. In the edit field, enter `Assign_InvalidCreditFault`.

d. Double-click **Assign_InvalidCreditFault**.

The Assign dialog displays.

e. From the dropdown list, select **Copy Operation**.

The Create Copy Operation dialog appears.

f. Enter and select the following values:

Element	Value
From	
▪ **Type**	**Expression**

Element	Value

■ **Expression**	**1.** Select the **XPath Expression Builder** icon.
	The Expression Builder displays.
	2. In the **BPEL Variables** section, expand **Variables** > **gOrderInfoVariable** > **ns8:orderInfoVOSDO** and select **CardTypeCode**.
	3. Click **Insert Into Expression**.
	The Expression box updates with the following expression:
	`bpws:getVariableData('gOrderInfoVariable','/ns2:orderInfoVOSDO/ns8:CardTypeCode')`
	4. Prepend the expression with the following Expression box, enter the following:
	`concat(`
	5. Append the expression with the following Expression box, enter the following:
	`, ' is not a valid creditcard type')`
	The expression should now looks like the following:
	`concat(bpws:getVariableData('gOrderInfoVariable','/ns4:orderInfoVOSDO/ns4:CardTypeCode'), ' is not a valid creditcard type')`
	6. Click **OK** to close the Expression Builder.

To	
■ **Type**	**Variable**
■ **Variable**	Expand **Variables** > **gOrderProcessorFaultVariable** and select **summary**.

g. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

The Copy Operation tab in the Assign dialog updates to show the copy operation.

16. In the **InvalidCredit** catch, assign data expression `'CreditCardCheck - NOT VALID'` to global variable `gOrderProcessorFaultVariable`.

a. From the dropdown list in the Assign dialog, select **Copy Operation**.

The Create Copy Operation dialog appears.

b. Enter and select the following values:

Element	Value
From	
■ **Type**	**Expression**

Element	Value
▪ **Expression**	`string('CreditCardCheck - NOT VALID')`
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderProcessorFaultVariable** and select **code**.

c. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

The Copy Operation tab in the Assign dialog updates to show the copy operation.

d. In the Assign dialog, click **OK**.

17. In the **InvalidCredit** catch, insert a throw activity after assign activity `Assign_InvalidCreditFault`, so the `Scope_AuthorizeCreditCard` scope throws a fault:

a. From the Component Palette, drag a **Throw** activity below **Assign_InvalidCreditFault**.

b. Double-click the new throw activity.

The Throw activity dialog displays.

c. Enter the following values:

Element	Value
Name	`Throw_OrderProcessingFault`
Namespace	`http://www.globalcompany.example.com/ns/OrderProcessor`
Local Part	`OrderProcessorFault`

d. Click the **Browse Fault Variables** icon next to the **Fault Variable** field.

e. In the Variable Chooser dialog, select the **gOrderProcessFaultVariable** and click **OK**.

f. Click **OK** in the Throw dialog.

18. Click the **Collapse** (**-**) icon to minimize the catch.

19. Click the **Collapse** (**-**) icon to minimize the **Scope_AuthorizeCreditCard** scope.

20. Select **Save All** from the **File** main menu to save your work.

5.11 Creating the RequiresApprovalRule Business Rule

You create a business rule activity to specify the `RequiresApprovalRule` business rule. This rule specifies that if the order total is $2,000 or more, then a manager's approval is required.

Another activity uses the output from the business rule to either automatically approve the order or use a human task to obtain manager approval.

When you add a business rule activity to a BPEL process, you can create input and output variables to provide input to the business rule activity, and to obtain results from the business rule activity.

To use business rules with Oracle JDeveloper, you perform the following:

- Add a business rule activity to the BPEL process
- Create input and output variables in the BPEL process
- Create an Oracle Business Rules dictionary in the project

If you want, you can associate a business rule service component created in the SOA Composite Editor with a BPEL process service component. You create this association with the business rule activity of the BPEL process. This activity creates a business rule partner link. This activity also enables you to create copy operation assignments between the fact data in your rule set and BPEL variables. When complete, a business rule activity is created that consists of assign and invoke activities to the business rule partner link.

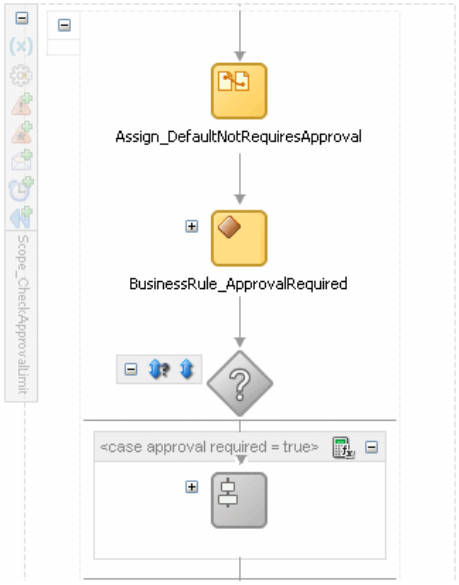
To create the `RequiresApprovalRule` business rule, perform the following tasks:

- Section 5.11.1, "Task 1: Create Scope_CheckApprovalLimit Scope"
- Section 5.11.2, "Task 2: Add the lOrderApproved Variable"
- Section 5.11.3, "Task 3: Create the Assign_DefaultNotRequiresApproval Assign Activity"
- Section 5.11.4, "Task 4: Create the RequiresApprovalRule Business Rule"
- Section 5.11.5, "Task 5: Reference the RequiresApprovalRule Dictionary in the BPEL Designer"
- Section 5.11.6, "Task 6: Define a Variable in Rules Designer"
- Section 5.11.7, "Task 7: Add a New Rule for the Ruleset in Rules Designer"
- Section 5.11.8, "Task 8: Redeploy the OrderBookingComposite Composite"
- Section 5.11.9, "Task 9: Initiate a Test Instance for the OrderBookingComposite Composite"

5.11.1 Task 1: Create Scope_CheckApprovalLimit Scope

The `Scope_CheckApprovalLimit` scope invokes the `RequiresApprovalRule` business rule, as shown in Figure 5–5.

Figure 5–5 Scope_CheckApprovalLimit Scope



To add the scope:

1. From the Component Palette, drag a **Scope** activity below the **Scope_AuthorizeCreditCard** scope.
2. Rename this activity by double-clicking the name underneath the icon. Do not double-click the activity icon itself.
3. In the edit field, change the name to `Scope_CheckApprovalLimit`.
4. Click the **Expand** (+) icon to expand the **Scope_CheckApprovalLimit** scope.

5.11.2 Task 2: Add the lOrderApproved Variable

In this task, you create local variable `lOrderApproved` variable, which provides input to a business rule variable.

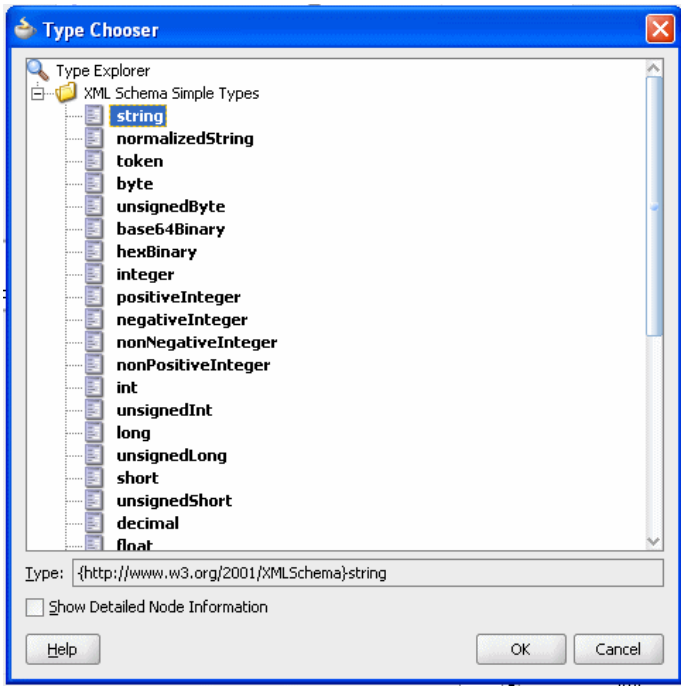
To create this variable:

1. In the workspace for the **Scope_CheckApprovalLimit** scope, click the **Variables** icon.

   The Variables dialog displays.
2. Click the **Add** icon to add a variable.

   The Create Variable dialog displays.
3. In the **Name** field, enter `lOrderApproved`.
4. In the **Type** section, select **Simple Type** and then select the **Browse XML Schema Types** icon to the right of the field.

   The Type Chooser dialog appears with a list of available services.
5. Select **string** under **XML Schema Simple Types**.



6. Click **OK** in the Type Chooser dialog.
7. Click **OK** in the Create Variable dialog.

   The Variables dialog updates with the `lOrderApproved` variable.
8. Click **OK** in the Variables dialog.

5.11.3 Task 3: Create the Assign_DefaultNotRequiresApproval Assign Activity

In this task, you create an assign activity to take the order total and send it to the input variable for the business rule.

To assign an input variable for the purchase price to the business rule:

1. From the Component Palette, drag an **Assign** activity into the **Scope_CheckApprovalLimit** scope.
2. Rename this activity by double-clicking the name underneath the icon. Do not double-click the assign icon itself.
3. In the edit field, enter `Assign_DefaultNotRequiresApproval`.
4. Double-click the **Assign_DefaultNotRequiresApproval** activity.

   The Assign dialog displays.
5. From the dropdown list, select **Copy Operation**:

   The Create Copy Operation dialog appears.
6. Enter and select the following values:

Element	Value
From	
▪ **Type**	**Expression**
▪ **Expression**	`string('false')`

Element	Value
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Scope - Scope_CheckApprovalLimit** > **Variables** and select **lOrderApproved**, which is the variable you created in Section 5.11.2, "Task 2: Add the lOrderApproved Variable."

7. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

   The Copy Operation tab in the Assign dialog updates to show the copy operation.
8. In the Assign dialog, click **OK**.
9. Select **Save All** from the **File** main menu to save your work.

5.11.4 Task 4: Create the RequiresApprovalRule Business Rule

To create the business rule:

1. Click the **composite.xml** tab to view the SOA Composite Editor.
2. Drag a **Business Rule** service component into the SOA Composite Editor.

   The Create Business Rule dialog displays.
3. In the **Name** field, enter `RequiresApprovalRule` to be the name of the Oracle Business Rules dictionary.
4. Leave the default for the **Package** field.
5. In the **Inputs/Outputs** section, from the **Add** menu, select **Input** to select the input for the business rule:

   The Type Chooser dialog displays.
6. Import the complete schema located in the *`DEMO_DOWNLOAD_HOME`* directory:
   a. Click the **Import Schema File** icon.

      The Import Schema File dialog displays.
   b. Select **File System** and in the **Location** section, browse for `OrderBookingRules.xsd` in *`DEMO_DOWNLOAD_HOME`*`/CompositeServices/OrderBookingComposite/xsd` and click **OK**.
   c. In the Import Schema dialog, ensure the `OrderBookingRules.xsd` now displays in the **URL** field and the **Copy to Project** option is selected, and then click **OK**.

      The Localized Files dialog displays, prompting you to import the `OrderBookingRules.xsd` schema file.
   d. Deselect the **Maintain original directory for imported files** option and click **OK** to import the file.

      The Type Chooser dialog displays.
7. Select the input for the business rule:

a. In the Type Chooser dialog, expand **OrderBookingRules.xsd** and select **approve**.

b. Click **OK** to return to the Create Business Rules dialog.

8. In the **Inputs/Outputs** section, select the output for the business rule:

a. From the **Add** menu, select **Output**.

The Type Chooser dialog displays.

b. Expand **OrderBookingRules.xsd** and select **approve**.

c. Click **OK** to return to the Create Business Rules dialog.

9. Click **OK** to create the business rule.

The **RequiresApprovalRule** business rule displays in the composite.

10. Select **Save All** from the **File** main menu to save your work.

11. Double-click **RequiresApprovalRule** in the SOA Composite Editor.

Oracle JDeveloper displays the Rules Designer, with the dictionary in the **RequiresApprovalRule.rules** tab.

For an overview of the Rules Designer, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

As part of the Business Rule designer, a new rule dictionary is created with the following pre-loaded data:

- XML fact type model based on the input and output metadata information of the business rule activity.
- A new ruleset that must be completed by adding rules to it.
- A new service with the input and output contract of the business rule activity. The service is being invoked from the activity at run time.
- A new business rule service component for the rule dictionary. You wire it to the BPEL process in Section 5.11.5, "Task 5: Reference the RequiresApprovalRule Dictionary in the BPEL Designer."

You modify this rule in a later task. Therefore, do not close the tab.

5.11.5 Task 5: Reference the RequiresApprovalRule Dictionary in the BPEL Designer

To reference the `RequiresApprovalRule` in the `Scope_CheckApprovalLimit` scope:

1. Click the **OrderProcessor.bpel** tab.

2. From the Component Palette, drag a **Business Rule** activity below the **Assign_DefaultNotRequiresApproval** activity in the **Scope_CheckApprovalLimit** scope.

   The Business Rule dialog displays.

3. In the **Name** field, enter `BusinessRule_ApprovalRequired`.

4. From the **Dictionary** list, select **RequiresApprovalRule**, which is the rule you created in Section 5.11.4, "Task 4: Create the RequiresApprovalRule Business Rule."

5. Leave the default settings for the **Service** and **Operation** fields.

6. Create input to the business rule, so that the `gOrderInfoVariable` and `lOrderApproved` variables assign data to input variable `com_example_globalcompany_ns_orderbookingservice_rules_Approve_i` for the business rule.

   a. In the **Assign Input Facts** tab, click the **Create** icon.

      The Decision Fact Map dialog displays.

   b. Enter and select the following values:

Element	Value
From	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderInfoVariable** > **ns4:orderInfoVOSDO** and select **ns4:OrderTotal**. **Note:** The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
▪ **Type**	**Business Rules Facts**
▪ **Variable**	Expand **com_example_globalcompany_ns_orderbookingservice_rules_Approve_i** > **ns10:approve** and select **ns10:price**.

   c. Click **OK**.

      The copy operation displays in the **Assign Input Facts** tab of the Business Rule dialog.

   d. In the **Assign Input Facts** tab, click the **Create** icon again to create a second assignment.

      The Decision Fact Map dialog displays.

   e. Enter and select the following values:

Element	Value
From	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Scope - Scope_CheckApprovalLimit** > **Variables** and select **lOrderApproved**. **Note:** The namespace number values (for example, **ns1**, **ns2**) can vary.
To	

Element	Value
■ **Type**	**Business Rule Facts**
■ **Variable**	Expand **com_example_globalcompany_ns_orderbookingservice_rules_Approve_i** > **ns10:approve** and select **ns10:approvalRequired**.

f. Click **OK**.

The two copy operations display in the **Assign Input Facts** tab of the Business Rule dialog.

7. Create output from the business rule, so that the variable `com_example_globalcompany_ns_orderbookingservice_rules_Approve_o` for the business rule sends data to the `lOrderApproved` variable for the scope:

a. Click the **Assign Output Facts** tab.

b. In the **Assign Output Facts** tab, click the **Create** icon.

The Decision Fact Map dialog displays.

c. Enter and select the following values:

Element	Value
From	
■ **Type**	**Business Rule Facts**
■ **Variable**	Expand **com_example_globalcompany_ns_orderbookingservice_rules_Approve_o** > **ns10:approve** and select **ns10:approvalRequired**. **Note:** The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
■ **Type**	**Variable**
■ **Variable**	Expand **Scope - Scope_CheckApprovalLimit** > **Variables** and select **lOrderApproved**.

d. Click **OK**.

The copy operation displays in the **Assign Input Facts** tab of the Business Rule dialog.

8. Click **OK** in the Business Rules dialog.

9. Select **Save All** from the **File** main menu to save your work.

5.11.6 Task 6: Define a Variable in Rules Designer

You define variables in the data model. When you make changes later, you must edit the value of the variable. You create a variable named `MAX_PRICE` to define the dollar amount where orders above this amount would need manual approval from a manager and orders under this amount are approved automatically. You set the `MAX_PRICE` variable to $2000.

To create the `MAX_PRICE` variable:

1. In the Rules Designer, select the **Globals** tab.

2. Click the **Create** icon to add a new variable entry.

   The Edit Variable dialog displays.

3. In the **Name** field, enter `MAX_PRICE`.
4. In the **Description** field, enter the following string:

   ```
   Limit for Automatic Approval
   ```

5. From **Type** dropdown list, select **int**.
6. Do not select any value for **Bucketset**.
7. Click the icon next to the **Value** field.

   The Expression Builder dialog displays.

8. In the **Expression** area, enter `2000`, and then click **OK** to close the Expression Builder.
9. In the Edit Variable dialog, click **OK**.

5.11.7 Task 7: Add a New Rule for the Ruleset in Rules Designer

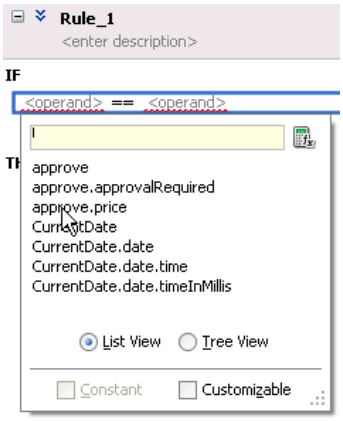
When you create the rule dictionary, an empty ruleset named `Ruleset_1` was created without any rules. In this task, you add the `CheckOrderTotalAgainstLimit` rule. This rule specifies that if the order is greater than or equal to $2,000, then the order requires manual approval.

To create the rule:

1. In Rules Designer, select **Ruleset_1** from the left menu.
2. From the **Create** dropdown list, select **Create Rule**.

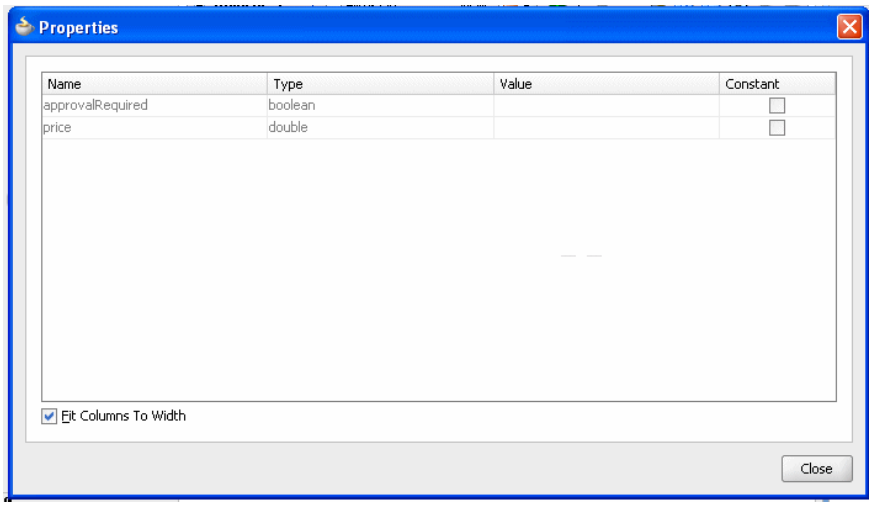
   A new rule displays:

3. Click `<insert test>` to display the statement template.
4. In the **IF** section, click the left-hand operand and select **approve.price**.



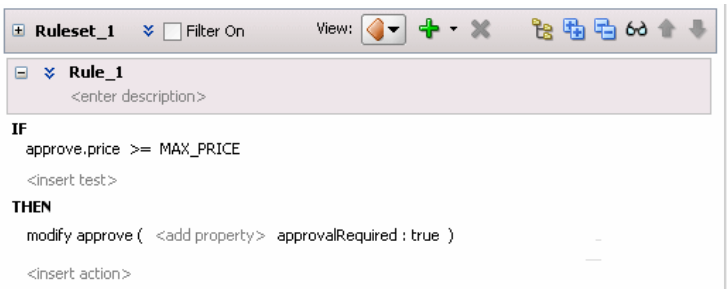
5. Click the operator and select **>=**.
6. Click the right-hand operand and select **MAX_PRICE**.
7. In the **THEN** section, click **<insert action>** and select **modify**.
8. Click **<target>** and select **approve**.
9. Click **<add property>**.

   The Properties dialog displays.



10. In the **approvalRequired** row, select **true** from the **Value** dropdown menu and click the **Constant** check box.
11. Click **Close**.

    The business rule updates and is complete.



12. Select **Save All** from the **File** main menu to save your work.
13. Click **X** in the **RequiresApprovalRule.rules** tab to close the Rules Designer.

5.11.8 Task 8: Redeploy the OrderBookingComposite Composite

To redeploy the `OrderBookingComposite` composite:

1. In the Application Navigator, right-click **OrderBookingComposite** and select **Deploy** > **OrderBookingComposite** > to **MyAppServerConnection**.

   The SOA Deployment Configuration Dialog displays.

2. Select **Overwrite any existing composite with the same revision ID** to overwrite the composite you deployed in Section 5.7.4, "Task 4: Deploy the OrderBookingComposite Composite."

3. When prompted with the Authorization Request dialog, enter `weblogic` in the `Username` field and the password in the `Password` field.

   In SOA - Log, a series of validations display, followed by:

   ```
   BUILD SUCCESSFUL
   Total time: nn seconds
   ```

5.11.9 Task 9: Initiate a Test Instance for the OrderBookingComposite Composite

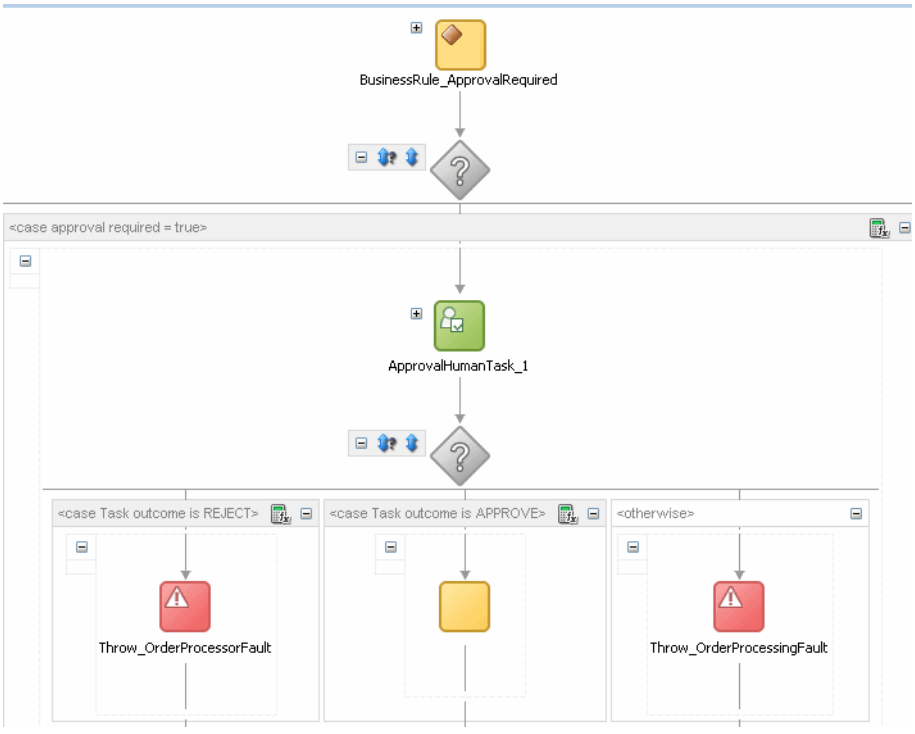
Initiate a test instance of the `OrderBookingComposite` composite, as you did in Section 5.7.6, "Task 6: Initiate a Test Instance for the OrderBookingComposite Composite." This time, in the Flow Trace window, notice how the order progresses through the `Scope_CheckApprovalLimit` scope.

5.12 Adding the Switch_ApprovalRequired Switch to the Scope_CheckApprovalLimit Scope

For an order that requires manual approval because the order total is $2,000 or more, the `SwitchApprovalRequired` switch in the `ScopeCheckApprovalLimit` scope consists of a `<case>` branch that passes control to the `ApprovalHumanTask` human task activity, which enables a manager named `jstein` to approve or reject the orders. For orders that do not require manual approval, this switch does not apply to them.

Figure 5–6 shows the `SwitchApprovalRequired` switch contains a human task activity and another switch activity to handle the manager's response.

Figure 5–6 Switch_ApprovalRequired Switch with Human Task and Switch



To create the `SwitchApprovalRequired` switch, perform the following tasks:

- Task 1: Create the Switch_ApprovalRequired Switch

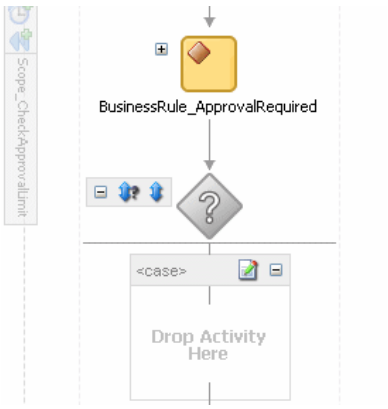
- Task 2: Set the Condition for the <case> Branch
- Task 3: Create a Human Task in the <case> Branch to Approve an Order
- Task 4: Modify TaskSwitch Activity in <case> Branch to Handle Manager's Response
- Task 5: Redeploy the OrderBookingComposite Composite
- Task 6: Initiate a Test Instance for the OrderBookingComposite Composite

5.12.1 Task 1: Create the Switch_ApprovalRequired Switch

To create the `Switch_ApprovalRequired` switch:

1. Click the **OrderProcessor.bpel** tab.
2. From the Component Palette, drag a **Switch** activity from the **Component Palette** section to below the **BusinessRule_ApprovalRequired** activity.
3. Rename this activity by double-clicking the name underneath the icon. Do not double-click the activity icon itself.
4. In the edit field, change the name to `Switch_ApprovalRequired`.
5. Click the **Expand** (+) icon to expand the **Switch_ApprovalRequired** scope.
6. Remove the unneeded **<otherwise>** branch.
   a. Right-click the **<otherwise>** branch and select **Delete** from the menu.
   b. When prompted to remove the branch, click **Yes**.

   The switch looks similar to the one in the following figure:



7. Select **Save All** from the **File** main menu to save your work.

5.12.2 Task 2: Set the Condition for the <case> Branch

To create the `<case>` branch:

1. Double-click the title bar of the **<case>** box to display the Switch Case dialog.

   The Switch Case dialog displays.
2. In the **Name** box, enter:

   ```
   approval required = true
   ```
3. Click the **XPath Expression Builder** icon above the **Expression** box to display the Expression Builder dialog.

4. In the **BPEL Variables** box, expand **Scope - Scope_CheckApprovalLimit** > **Variables** and select **lOrderApproved**.

   `lOrderApproved` is the variable you defined in Section 5.11.2, "Task 2: Add the lOrderApproved Variable."

   The **Content Preview** box should show the following:

   ```
   bpws:getVariableData('lOrderApproved')
   ```

5. Click **Insert Into Expression**. The Expression box displays the function with the one parameter.
6. Append `= 'true'` to the expression, starting with a space, in the Expression box so that the expression looks like this:

   ```
   bpws:getVariableData('lOrderApproved') = 'true'
   ```

7. Click **OK** in the Expression Builder dialog. The Switch Case dialog now contains the expression.
8. Click **OK** in the Switch Case dialog to close it.
9. Select **Save All** from the **File** main menu to save your work.

   You modify the **<case>** branch with two activities, a human task activity and a switch activity). To create these activities, you must create a sequence activity to be the container for these two activities.

5.12.3 Task 3: Create a Human Task in the <case> Branch to Approve an Order

To create a human task in the **<case>** branch:

1. Drag a **Human Task** activity into the **<case>** box.

   The Create a Human Task dialog appears.

2. From the **Task Definition** list, click the **Create** icon next to the **Task Definition** field.

   The Create Human Task dialog displays.

3. Enter and select the following values:

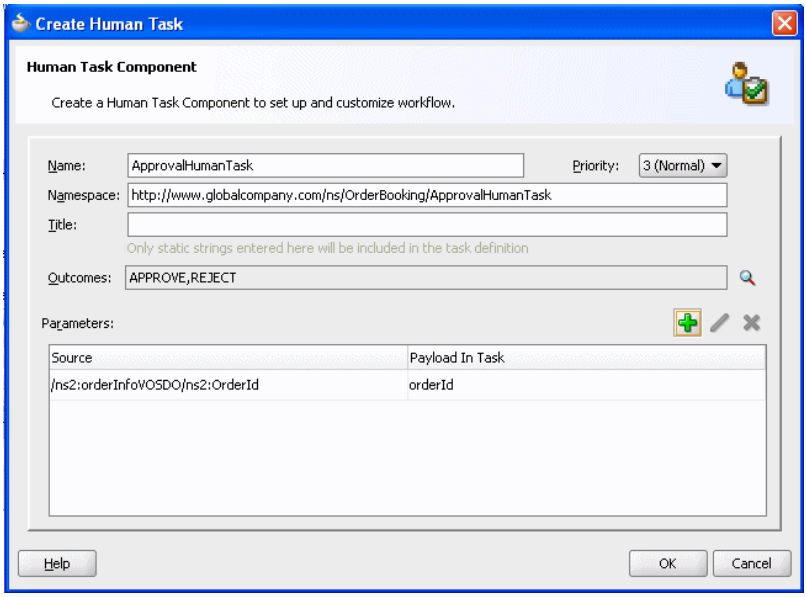
Element	Value
Name	`ApprovalHumanTask`
Priority	Leave the priority set to **3 (Normal)**.
Namespace	`http://www.globalcompany.com/ns/OrderBooking/ApprovalHumanTask`
Title	Do not enter a value for the time being.

4. In the **Parameters** section, select the **Add Task Parameter** icon.

   The Add Task Parameter dialog displays.

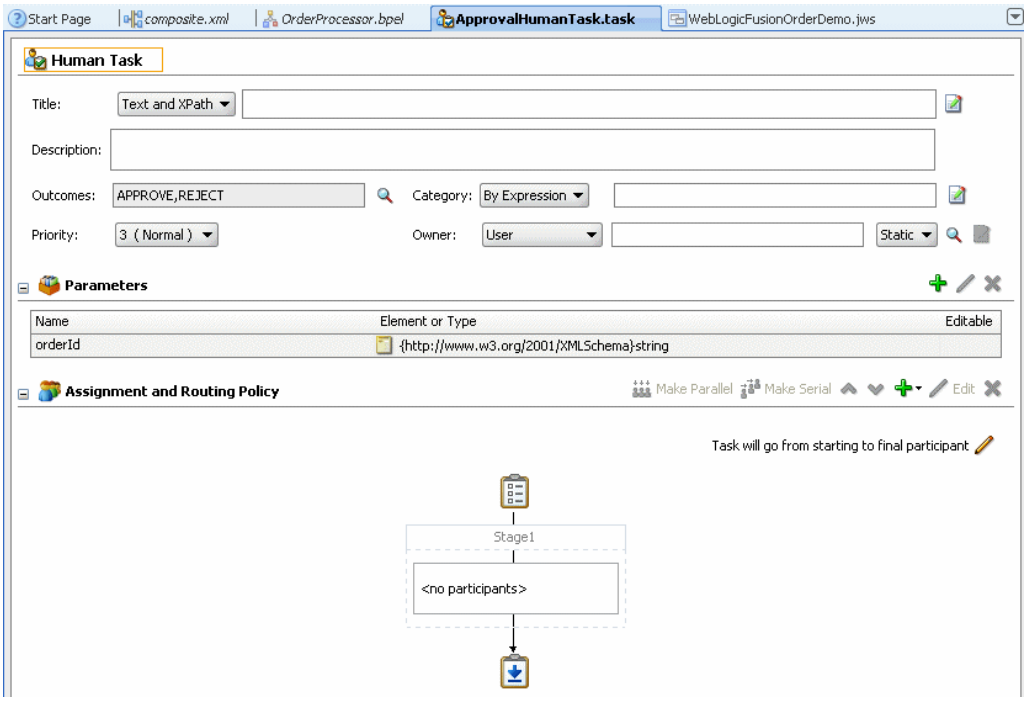
5. Click the icon next to the **Source** field to launch the Task Parameters page for selecting a parameter source.
6. Expand **Variables** > **gOrderInfoVariable** > **ns8:orderInfoVOSDO** and select the **OrderId** key.
7. Click **OK** to close the Task Parameters dialog.

8. Back in the Add Task Parameter dialog, in the **Parameter Name** field, modify the field to `orderId`.
9. Click **OK** to close the Add Task Parameter dialog and return to the Create Human Task dialog.



10. In the Create Human Task dialog, click **OK**.

    The Human Task Editor appears.



    For an overview of the Human Task Editor, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

11. Define a title for the task

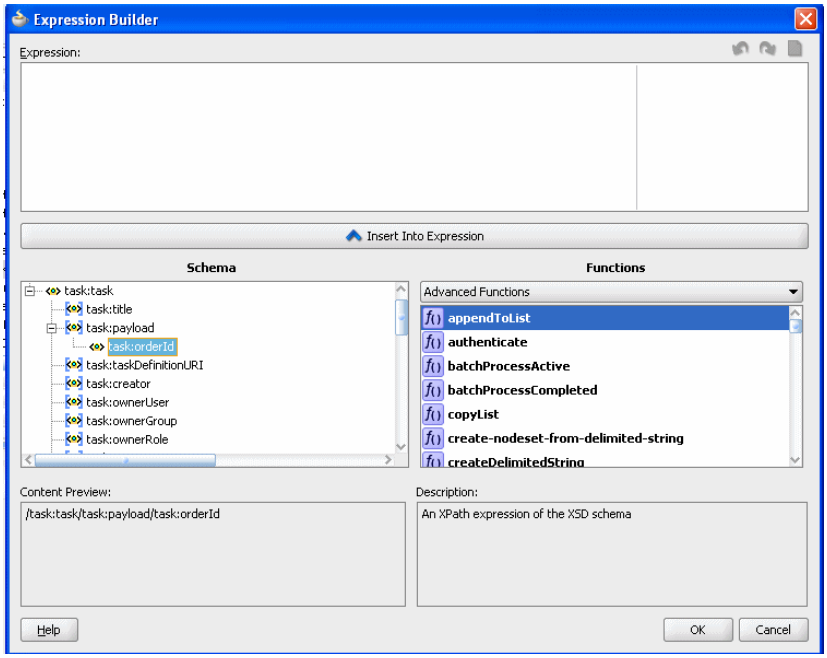
a. In the **Title** field, enter:

```
Approval Required for Order Id:
```

b. Click the icon to the right of the **Title** field to select the order ID.

The Expression Builder dialog displays.

c. From the **Schema** section, expand **task:task** > **task:payload** and select **task:orderId**.



d. Click **Insert Into Expression**.

The Expression box updates with the following expression:

```
/task:task/task:payload/task:orderId
```

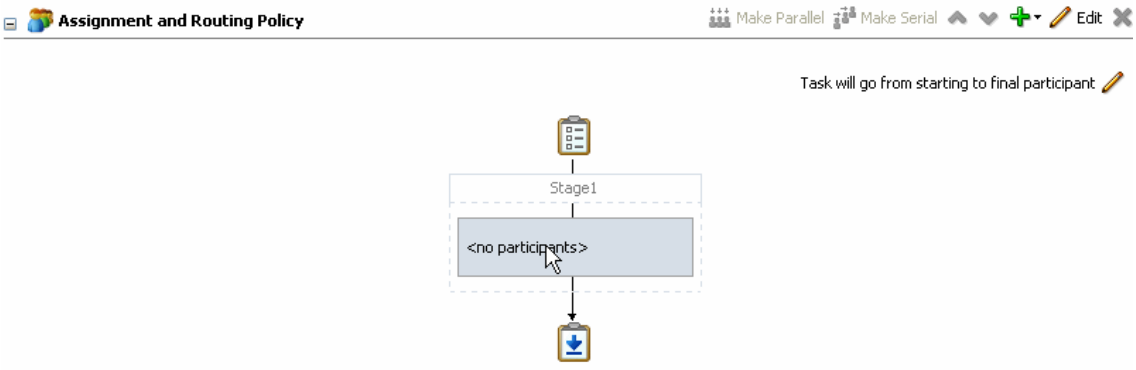
e. Click **OK** to close the Expression Builder.

The ApprovalHumanTask.task pages updates with the following for the title:

```
Approval Required for Order Id:<%/task:task/task:payload/task:orderId%>>
```

12. Specify an approver for the human task:

a. In the **Assignment and Routing Policy** section, double-click **<no participants>**.



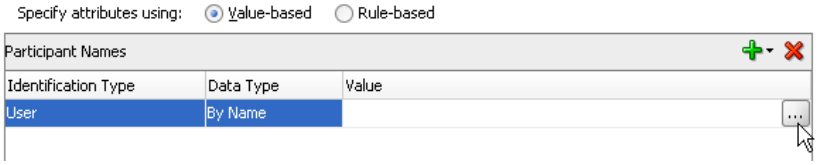
The Add Participant Type dialog displays.

b. In the **Label** field, enter `Approver`.

c. From the dropdown menu in the **Participant Names** table, select **Add User**.

A new row displays in the **Participant Names** table.

d. Click the **Browse** icon to the far right of the row.



The Identity Lookup dialog appears.

e. From the **Application Server** list, select **MyAppServerConnection**.

f. Click the **Lookup** icon. It is located to the right of the **User Name** field.

The search results display in the **Search User** section.

g. Select **jstein** and then click **Select**.

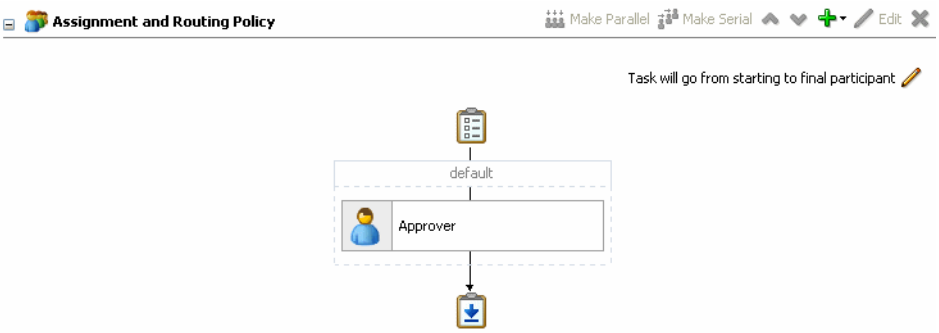
`jstein` is added to the **Selected User** section.

h. Click **OK** to close the Identity Lookup dialog.

`jstein` displays in the **Participants Names** table in the Edit Participant Type dialog.

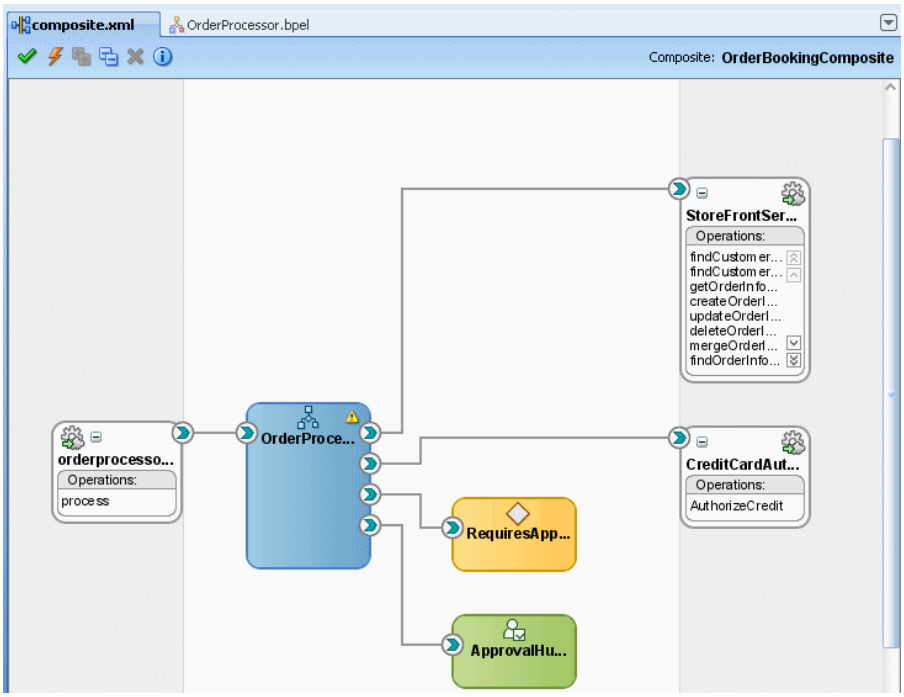
i. Click **OK** in the Add Participant Type dialog.

Approver displays in the **Assignment and Routing Policy** section of the ApprovalHumanTask.task window.



13. Select **Save All** from the **File** main menu to save your work.
14. Click **X** in the **ApprovalHumanTask.task** tab to close the human task.
15. Click the **composite.xml** tab to see the human task.

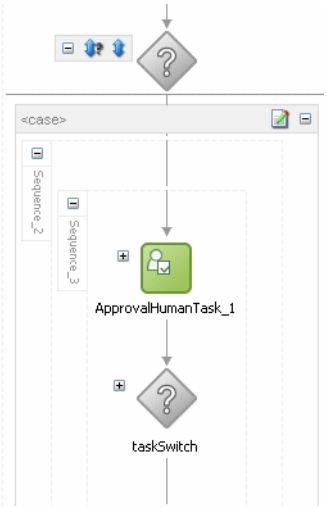
    ApprovalHumanTask displays in the SOA Composite Editor.



5.12.4 Task 4: Modify TaskSwitch Activity in <case> Branch to Handle Manager's Response

Oracle JDeveloper created a switch called `taskSwitch` for you automatically after the human task activity in the `OrderProcessor` BPEL process, as shown in Figure 5–7.

Figure 5–7 taskSwitch Activity in the <case> Branch



This switch enables you to define the actions to take depending on whether the manager approved or rejected the order, or if the order has expired.

The switch handles these cases:

- The manager rejected the order.
- The manager approved the order.
- The order has expired.

To modify the switch for these actions:

1. Click the **Expand** (+) icon to expand the **taskSwitch**.
2. In the **<case Task outcome is REJECT>** branch, remove the **CopyPayloadFromTask** activity and replace it with a throw activity.

   For those orders not approved, this activity throws a fault called **Throw_ OrderProcessorFault**. The `OrderProcessor` process terminates after executing the throw activity.

   a. Right-click the **CopyPayloadFromTask** activity and select **Delete** from the menu.

   b. When prompted to remove the branch, click **Yes**.

   c. From the Component Palette, drag a **Throw** activity into the **<case Task outcome is REJECT>** branch.

   d. Double-click the new throw activity.

      The Throw activity dialog displays.

   e. Enter and select the following values:

Element	Value
Name	`Throw_OrderProcessorFault`
Namespace	`http://www.globalcompany.example.com/ns/OrderBookingService`
Local Part	`OrderProcessorFault`
Fault Variable	1. Click the **Browse** icon. 2. In the Variable Chooser dialog, select **gOrderProcessorFaultVariable**. 3. Click **OK**.

   f. Click **OK**.

3. In the **<case Task outcome is APPROVE>** branch, remove the **CopyPayloadFromTask** activity and replace it with an empty assign activity. the empty assign passed the output from the business to the next scope in the process.

   a. Right-click the **CopyPayloadFromTask** activity and select **Delete** from the menu.

   b. When prompted to remove the branch, click **Yes**.

   c. From the Component Palette, drag an **Empty** activity into the **<case Task outcome is APPROVE>** branch.

   d. Rename this activity by double-clicking the name underneath the icon.

   e. In the edit field, remove the name.

4. In the Assign dialog, click **OK**.
5. In the **<otherwise>** branch, remove the **CopyPayloadFromTask** activity and replace it with a throw activity.

   For those orders not approved, this activity throw a fault called **ThrowRejected**. The `OrderProcessor` process terminates after executing the throw activity.

   a. Right-click the **CopyPayloadFromTask** activity and select **Delete** from the menu.

   b. When prompted to remove the branch, click **Yes**.

   c. From the Component Palette, drag a **Throw** activity into the **<otherwise Task>** branch.

   d. Double-click the new throw activity.

      The Throw activity dialog displays.

   e. Enter and select the following values:

Element	Value
Name	`Throw_OrderProcessingFault`
Namespace	`http://www.globalcompany.example.com/ns/OrderBookingService`
Local Part	`OrderProcessorFault`
Fault Variable	1. Click the **Browse** icon. 2. In the Variable Chooser dialog, select **gOrderProcessorFaultVariable**. 3. Click **OK**.

   f. Click **OK**.
6. Click the **Collapse** (**-**) icon to minimize **taskSwitch** switch.
7. Click the **Collapse** (**-**) icon to minimize the **Scope_CheckApprovalLimit** scope.
8. Select **Save All** from the **File** main menu to save your work.

5.12.5 Task 5: Redeploy the OrderBookingComposite Composite

To redeploy the `OrderBookingComposite` composite:

1. In the Application Navigator, right-click **OrderBookingComposite** and select **Deploy** > **OrderBookingComposite** > to **MyAppServerConnection**.

   The SOA Deployment Configuration Dialog displays.
2. Select **Overwrite any existing composite with the same revision ID** to overwrite the composite you previously deployed.
3. When prompted with the Authorization Request dialog, enter `weblogic` in the `Username` field and the password in the `Password` field.

   In SOA - Log, a series of validations display, followed by:

```
BUILD SUCCESSFUL
Total time: nn seconds
```

5.12.6 Task 6: Initiate a Test Instance for the OrderBookingComposite Composite

Initiate a test instance of the `OrderBookingComposite` composite, as you have done previously. See Section 5.7.6, "Task 6: Initiate a Test Instance for the OrderBookingComposite Composite" for further information on creating a test instance. For this test instance, make the following adjustments:

- In the **Inputs Arguments** section, in the **orderID** field, enter an ID over `1000` to submit an order for over $2000.
- In the Flow trace window, scroll toward the bottom of the **Scope_CheckApprovalLimit** scope to see the `ApprovalHumanTask` human task was initiated after the business rule.

Proceed with Chapter 6, "Creating the Second Half of the OrderProcessor BPEL Process," to complete the creation of the `OrderProcessor` BPEL process. After the process is complete, you can create a form for the manager to approve orders in Chapter 9, "Creating the Task Display Form for the ApprovalHumanTask Human Task."

6

Creating the Second Half of the OrderProcessor BPEL Process

This chapter describes how to create the second half of the `OrderProcessor` BPEL process for composite `OrderBookingComposite`. This chapter assumes you have performed all the tasks from Chapter 3 to Chapter 5.

This chapter contains the following sections:

6.1 Overview of Tasks for Creating the Second Half of OrderProcessor

Table 6–1 lists and describes the tasks for creating the second half of the `OrderProcessor` BPEL process for the `OrderBookingComposite` composite.

Table 6–1 Tasks for Creating the Second Half of the OrderProcessor BPEL Process for OrderBookingComposite

Task	Description	See
Create the `Scope_RetrieveQuotes` Flow	Create the `Scope_RetrieveQuotes` flow to send the order information to two suppliers, an internal warehouse and an external partner warehouse, and have the warehouses return their bids for the orders.	Section 6.2
Create the `Scope_SelectPreferredSupplier` Scope	Create the `Scope_SelectPreferredSupplier` scope to use the `EvaluatePreferredSupplierRule` business rule to select the warehouse with the lowest order total.	Section 6.3
Create the Services and Routing Required for the `Scope_FulfillOrder` Scope	Create adapters for USPS and a JMS queue. Also, create a mediator to send orders for fulfillment to these adapters.	Section 6.4
Create the `Scope_FulfillOrder` Scope	Create the `Scope_FulfillOrder` scope to submit orders to the `FulfillOrder` mediator, which sends the order to both the USPS and JMS adapters.	Section 6.5
Create the `Scope_UpdateStatusToComplete` Scope for Completed Orders	Create the `Scope_UpdateStatusToComplete` scope to assign a status of `complete` to the order entity variable, which updates the order in the database. If you did not use an entity variable, you would have to create a database adapter.	Section 6.6
Create the `Scope_NotifyCustomerofCompletion` Scope	Create the `Scope_NotifyCustomerofCompletion` scope to use the Oracle User Messaging Service to send an email to the customer when the order is fulfilled.	Section 6.7
Add a Catch Branch for Incomplete Orders for the Entire Process	Add a catch branch to the process as a whole so that you can update the order status to be canceled if an error occurs anywhere in the process.	Section 6.8

6.2 Creating the Scope_RetrieveQuotes Flow

The `Scope_RetrieveQuotes` flow sends the order information to two suppliers, an internal warehouse and an external partner warehouse, and the warehouses return their bids for the orders. The `Scope_SelectPreferredSupplier` scope then chooses the warehouse based on the lowest bid.

Figure 6–1 shows the activities in the `Scope_RetrieveQuotes` scope. The scope uses a flow activity to send the order information to the two warehouses in parallel.

Figure 6–1 Activities for the Scope_RetrieveQuotes Scope

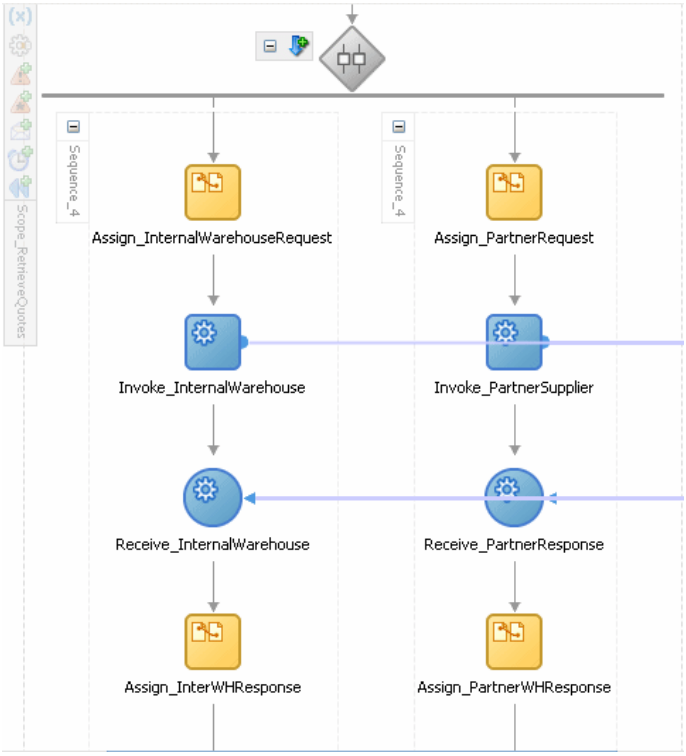


Figure 6–2 shows the `OrderProcessor` BPEL process invokes the `InternalWarehouse` service and receives a quote from it. This service references a WSDL file from a BPEL process also named `InternalWarehouseService`, which resides within the `OrderBookingComposite` composite. Figure 6–3 shows how it appears in the SOA Composite Editor. This supplier statically returns a value of $1,000 for all orders regardless of their order total.

Figure 6–2 Activities for Receiving a Bid from an Internal Warehouse

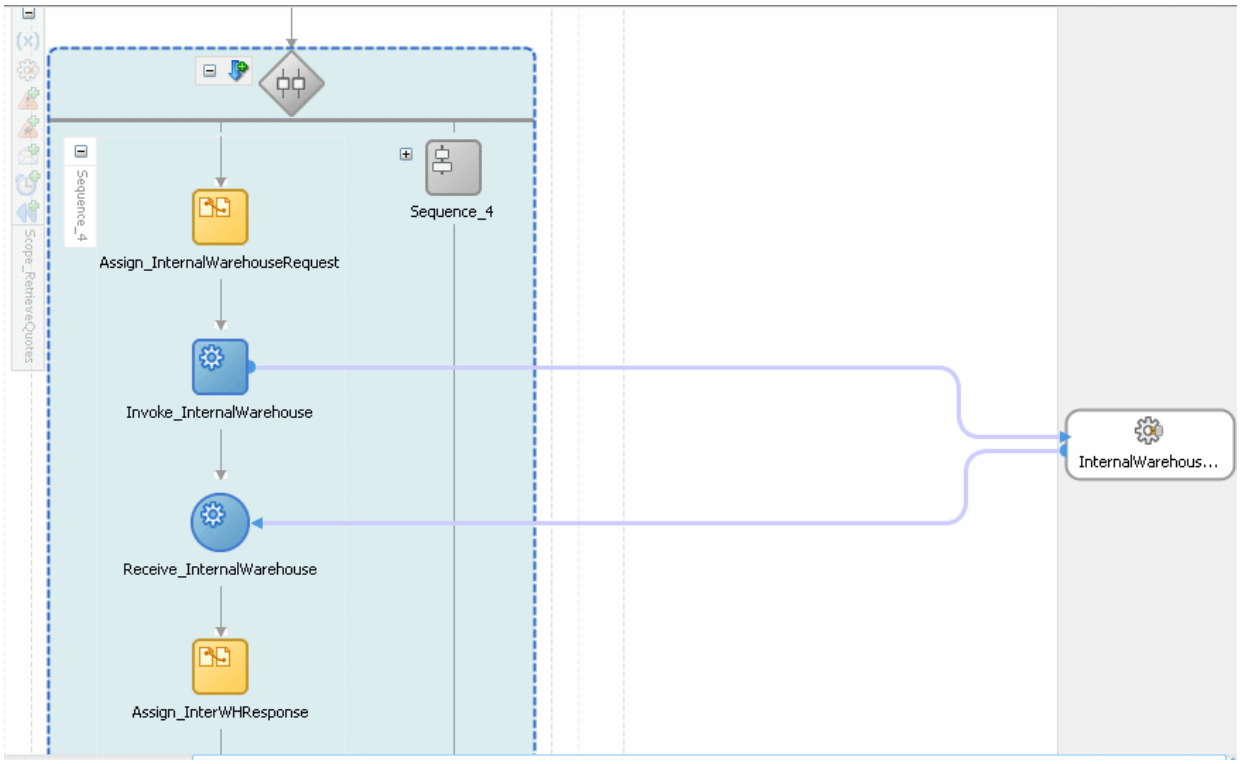


Figure 6–3 InternalWarehouseService in OrderBookingComposite

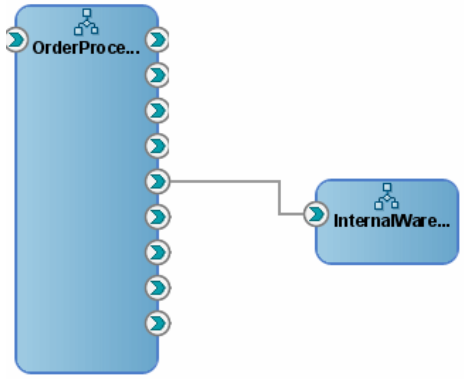


Figure 6–4 show the `OrderProcessor` BPEL process invokes the `PartnerSupplierMediator` mediator and receives a quote from it. This mediator initiates the `ExternalPartnerSupplier` BPEL process in the `PartnerSupplierComposite`, which you created in Chapter 1, "Introduction to the SOA Sample Application." Figure 6–5 shows how the mediator and service appear in the SOA Composite Editor.

Figure 6–4 Activities for Receiving a Bid from a Partner Warehouse

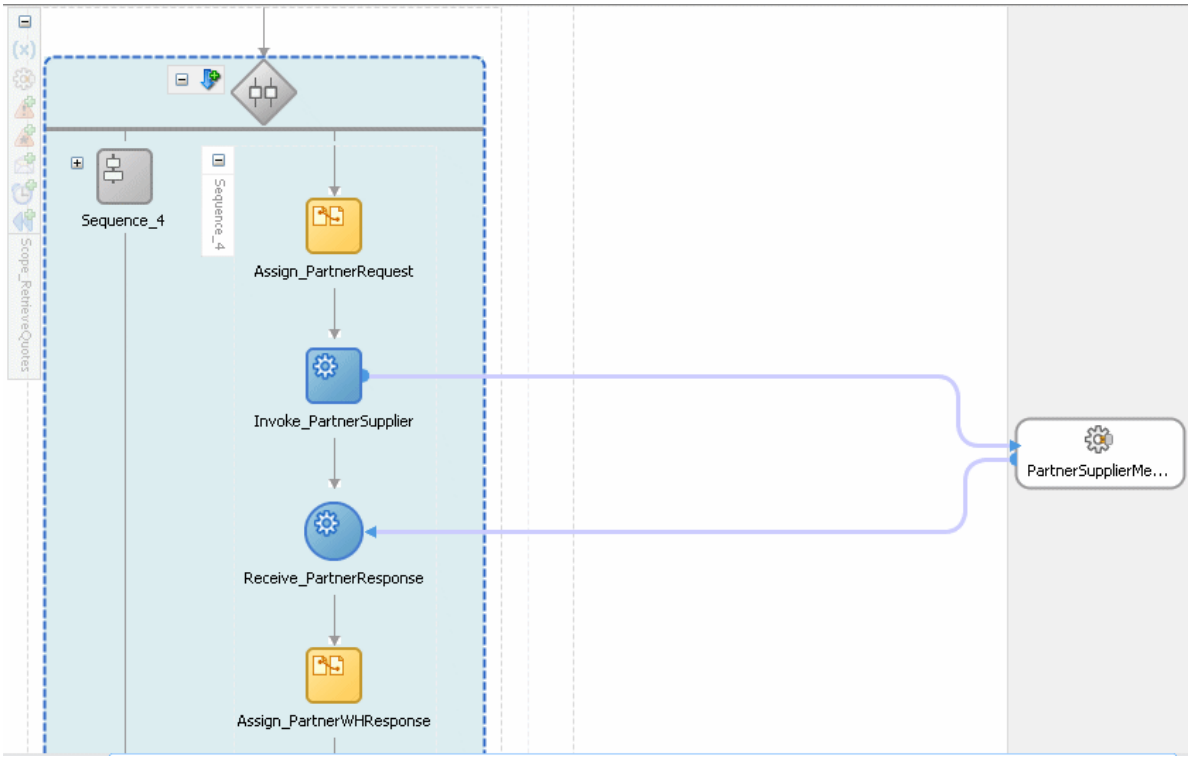
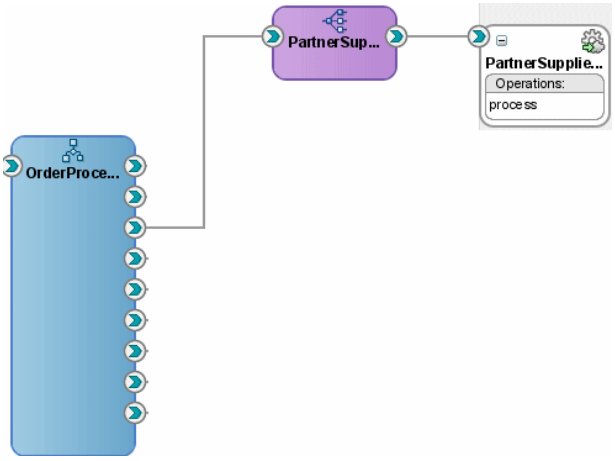


Figure 6–5 PartnerSupplierService in OrderBookingComposite



To create the `Scope_RetrieveQuotes` scope and related services, perform the following tasks:

- Task 1: Add the Scope_RetrieveQuotes Scope
- Task 2: Create the InternalWarehouseService BPEL Process
- Task 3: Modify the InternalWarehouseService Process
- Task 4: Wire OrderProcessor to the InternalWarehouseService Process
- Task 5: Create the PartnerSupplierService Service

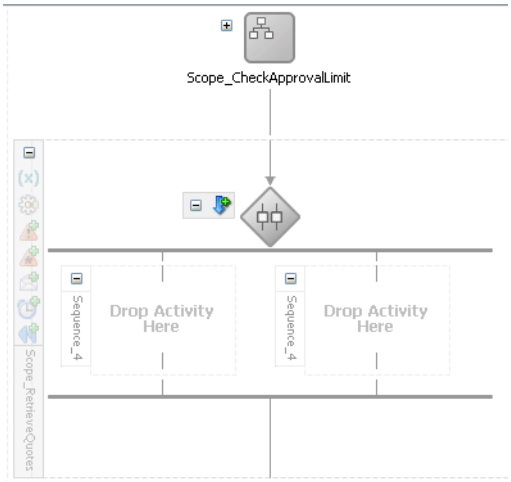
- Task 6: Create a PartnerSupplier Mediator Service for the PartnerSupplierService Service
- Task 7: Create Routing Rules Between the PartnerSupplierMediator Mediator to the ExternalPartnerSupplier Service
- Task 8: Wire OrderProcessor to the PartnerSupplierMediator Mediator
- Task 9: Add the gWarehouseQuotes Variable
- Task 10: Add Activities to Obtain a Quote from the InternalWarehouse Process
- Task 11: Add Activities to Obtain a Quote from the PartnerSupplierMediator Mediator

6.2.1 Task 1: Add the Scope_RetrieveQuotes Scope

To add the `Scope_RetrieveQuotes` scope:

1. From the Component Palette, drag a **Scope** activity below the **Scope_CheckApprovalLimit** scope.
2. Rename this activity by double-clicking the name underneath the icon. Do not double-click the activity icon itself.
3. In the edit field, change the name to `Scope_RetrieveQuotes`.
4. Click the **Expand** (+) icon to expand the **Scope_RetrieveQuotes** scope.
5. Drag and drop a **Flow** activity into the scope.
6. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.
7. In the edit field, enter `RetrieveQuotesFromSuppliers`.
8. Click the **Expand** (+) icon to expand the **Scope_RetrieveQuotes** scope.

   The flow should now contains two empty sequences.



6.2.2 Task 2: Create the InternalWarehouseService BPEL Process

To create the `InternalWarehouseService` BPEL process:

1. Click the **composite.xml** tab.
2. Select **SOA** from the **Component Palette**.

3. Drag a **BPEL Process** from the **Service Components** list into the canvas workspace.

   The Create BPEL Process dialog appears.

4. Enter and select the following values:

Element	Value
Name	`InternalWarehouseService`
Namespace	`http://www.globalcompany.example.com/ns/InternalWarehouse`
Template	**Asynchronous BPEL Process**
Expose as a SOAP service	Deselect this check box.

5. In the **Input** field, import the complete schema located in the *DEMO_DOWNLOAD_HOME* directory.
   a. In the **Input** field, click the **Browse Input Elements** icon.

      The Type Chooser dialog displays.

   b. Expand **Project Schema Files** > **InternalWarehouse.xsd** and select **WarehouseRequest** and then click **OK**.

   c. Click **OK**.

6. In the **Output** field, import the complete schema located in the *DEMO_DOWNLOAD_HOME* directory.
   a. In the **Input** field, click the **Browse Input Elements** icon.

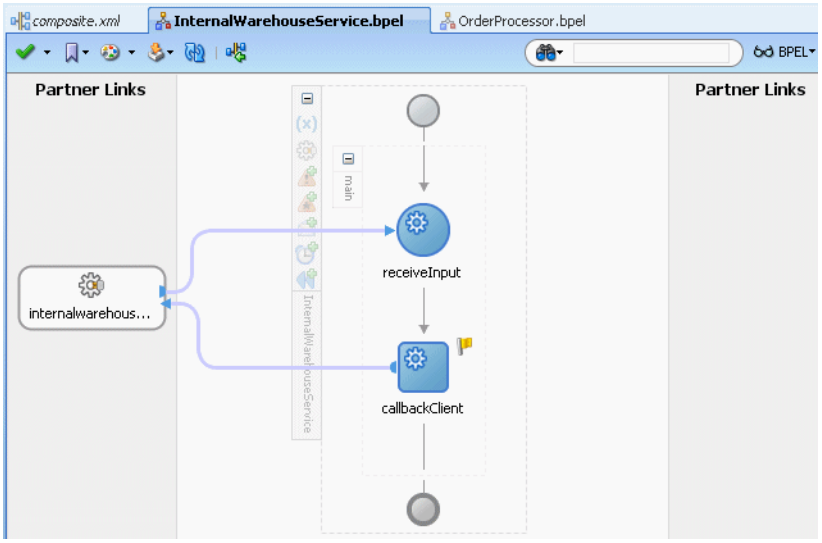
      The Type Chooser dialog displays.

   b. Expand **Project Schema Files** > **InternalWarehouse.xsd** and select **WarehouseResponse** and then click **OK**.

7. Click **OK**.

   The BPEL process displays in the SOA Composite Editor.

8. Double-click `InternalWarehouseService` BPEL process to display the BPEL Designer.



6.2.3 Task 3: Modify the InternalWarehouseService Process

Next, you create an assign activity to copy input data to the `InternalWarehouseService` service:

1. Create the assign activity:
   a. From the Component Palette, drag an **Assign** activity to below the **receiveInput** receive activity.
   b. Rename this activity by double-clicking the name underneath the icon. Do not double-click the activity icon itself.
   c. In the edit field, change the name to `Assign_Defaults`.
   d. Double-click the assign activity.

      The Assign dialog displays.
2. Copy string `'InternalWarehouse'` to the output variable for the `InternalWarehouseService` service:
   a. From the dropdown list, select **Copy Operation**:

      The Create Copy Operation dialog appears.
   b. Enter and select the following values:

Element	Value
From	
▪ **Type**	**Expression**
▪ **Expression**	`string('InternalWarehouse')`
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **outputVariable** > **payload** > **client:WarehouseResponse** and select **client:warehouse**.

c. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

The Copy Operation tab in the Assign dialog updates to show the rule.

3. Assign the current date to the output variable for the `InternalWarehouseService` service:

a. From the dropdown list, select **Copy Operation**:

The Create Copy Operation dialog appears.

b. Enter and select the following values:

Element	Value
From	
▪ **Type**	**Expression**
▪ **Expression**	`xp20:current-date()`
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **outputVariable** > **payload** > **ns3:WarehouseResponse** and select **ns3:deliveryDate**. The namespace number values (for example, **ns1**, **ns2**) can vary.

c. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

The Copy Operation tab in the Assign dialog updates to show the rule.

4. Assign `1000` to the output variable for the `InternalWarehouseService` service. This value ensures this warehouse statically returns a value of $1,000 for all orders.

a. From the dropdown list, select **Copy Operation**:

The Create Copy Operation dialog appears.

b. Enter and select the following values:

Element	Value
From	
▪ **Type**	**Expression**
▪ **Expression**	`1000`
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **outputVariable** > **payload** > **ns3:WarehouseResponse** and select **ns3:orderTotal**. The namespace number values (for example, **ns1**, **ns2**) can vary.

c. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

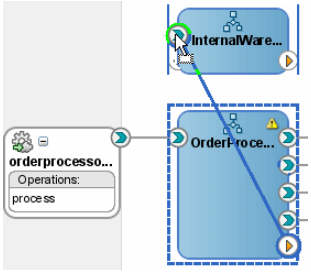
The Copy Operation tab in the Assign dialog updates to show the rule.

5. In the Assign dialog, click **OK**.
6. Select **Save All** from the **File** main menu to save your work.
7. Click **X** in the **InternalWarehouseService.bpel** tab to close the process.

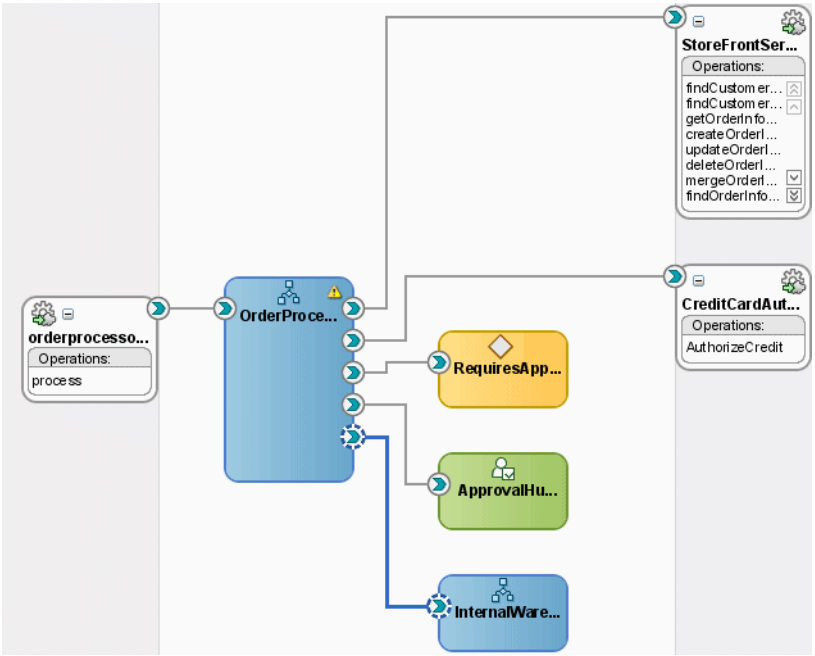
6.2.4 Task 4: Wire OrderProcessor to the InternalWarehouseService Process

To wire the `OrderProcessor` BPEL process to the `InternalWarehouseService` service:

1. Drag a wire from **OrderProcessor** to the **InternalWarehouseService** reference handle.



You should see a wire going from the **OrderProcessor** BPEL process to the **InternalWarehouseService** process in the SOA Composite Editor.



2. Click the **OrderProcessor.bpel** tab to see the **InternalWarehouseService** in the **Partner Links** lane of the BPEL Designer.

3. Select **Save All** from the **File** main menu to save your work.

6.2.5 Task 5: Create the PartnerSupplierService Service

The `PartnerSupplierMediator` mediator obtains a quote from a partner warehouse service named `PartnerSupplierService`, which calls the `PartnerSupplierComposite` you created in Chapter 3. Before you create the `PartnerSupplierMediator` mediator, you must create the `PartnerSupplierService` service. This service references the WSDL created when you created the `ExternalPartnerSupplier` BPEL process in Chapter 3.

To create a Web service for the `PartnerSupplierService` service:

1. If the `PartnerSupplierComposite` composite was not deployed when you created the composite, deploy it now:

   a. In the Application Navigator, right-click **PartnerSupplierComposite** and select **Deploy** > **PartnerSupplierComposite** > **to MyAppServerConnection**.

      The SOA Deployment Configuration Dialog displays.

   b. Accept the default settings and click **OK**.

   c. When prompted with the Authorization Request dialog, enter `weblogic` in the `Username` field and the password in the `Password` field.

      In SOA - Log, a series of validations display, followed by:

      ```
      BUILD SUCCESSFUL
      Total time: nn seconds
      ```

2. In the **composite.xml** tab, from the Component Palette, drag a **Web Service** from the **Service Adapters** list into the right swim lane of the SOA Composite Editor.

   The Web Service window appears.

3. In the **Name** field, enter `PartnerSupplierService`.

4. From the **Type** list, select **Reference**.

5. Click the **Find existing WSDLs** icon next to the **WSDL URL** field.

   The SOA Resource Lookup dialog displays.

6. Select **Resource Palette**.

7. Expand **Application Server** > **MyApplicationServerConnection** > **SOA** > **PartnerSupplierComposite** and select **externalpartnersupplier_client_ep**.

8. Click **OK** in the SOA Resource Lookup dialog.

9. In the Web Service dialog, from the **Port Type** list, select **ExternalPartnerSupplier** and from the **Callback Port Type** list, select **ExternalPartnerSupplierCallback**.
10. Click **OK** in the Web Service dialog.

    The **PartnerSupplierService** service displays in the SOA Composite Editor.

6.2.6 Task 6: Create a PartnerSupplier Mediator Service for the PartnerSupplierService Service

The `PartnerSupplierMediator` mediator service obtains a quote from the `PartnerSupplierService` service:

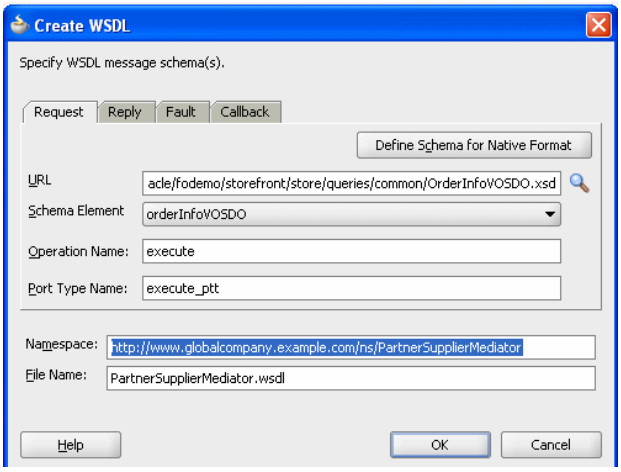
To create the mediator:

1. From the Component Palette, drag a **Mediator** service into the middle lane of the SOA Composite Editor.

   The Create Mediator window appears.
2. In the **Name** field, enter `PartnerSupplierMediator`.
3. From the **Template** list, select **Interface Definition from WSDL**
4. Deselect the **Create Composite Service with SOAP Bindings**.
5. From the **WSDL URL** field, generate a WSDL file:
   a. Click the **Generate WSDL from schema(s)** icon.

      The Create WSDL dialog displays.
   b. In the **URL** field, click the **browse for schema file** icon.

      The Type Chooser dialog displays.
   c. Expand **Project Schema Files** > **OrderInfoVOSDO.xsd** and select **orderInfoVOSDO**.
   d. Click **OK** to close the Type Chooser and return to the Create WSDL dialog.
   e. In the **Namespace** field, enter `http://www.globalcompany.example.com/ns/PartnerSupplierMediator`.



f. Click the **Callback** tab.

g. In the **URL** field, click the **browse for schema file** icon.

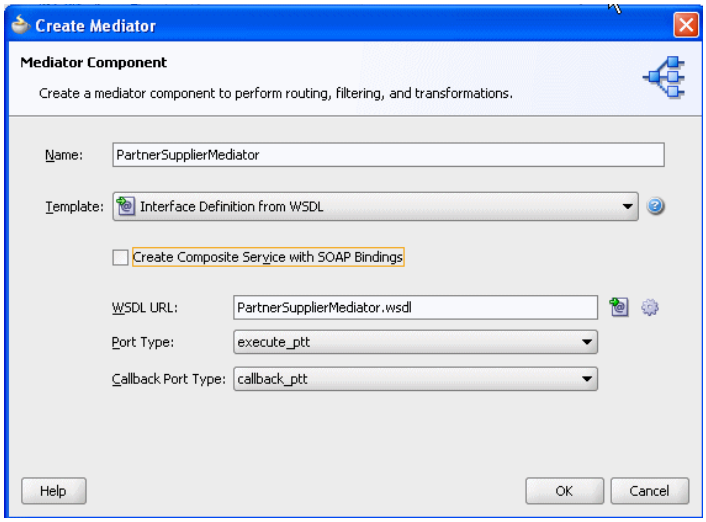
The Type Chooser dialog displays.

h. Expand **Project Schema Files** > **InternalWarehouseService.xsd** and select **WarehouseResponse**.

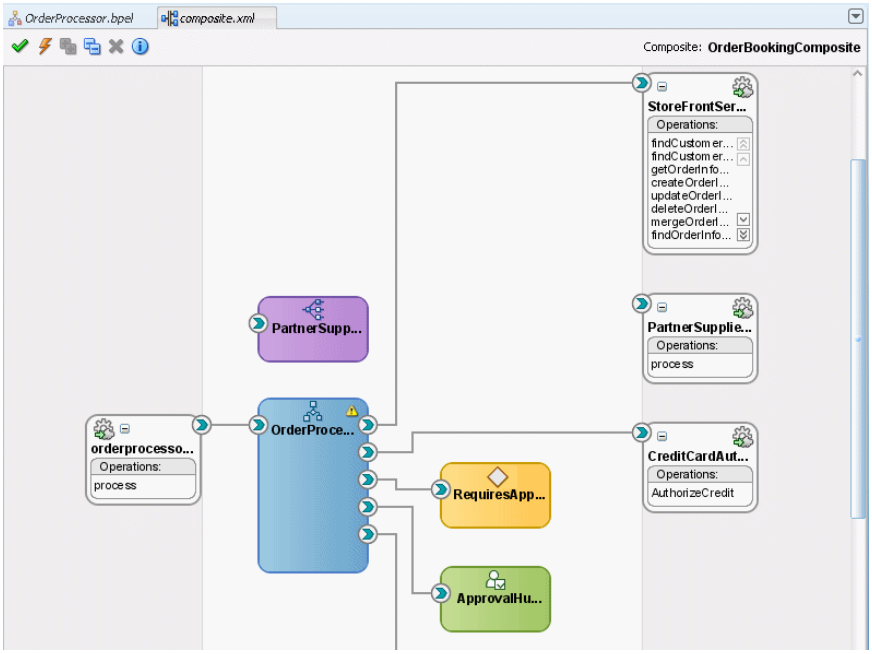
i. Click **OK** in the Type Chooser dialog.

j. Click **OK** in the Create WSDL dialog and return to the Create Mediator dialog.

6. In the Create Mediator dialog, deselect the **Create Composite Services with SOAP Bindings** option, and then click **OK** to create the mediator with the specified settings.



The `PartnerSupplierMediator` mediator displays in the SOA Composite Editor.



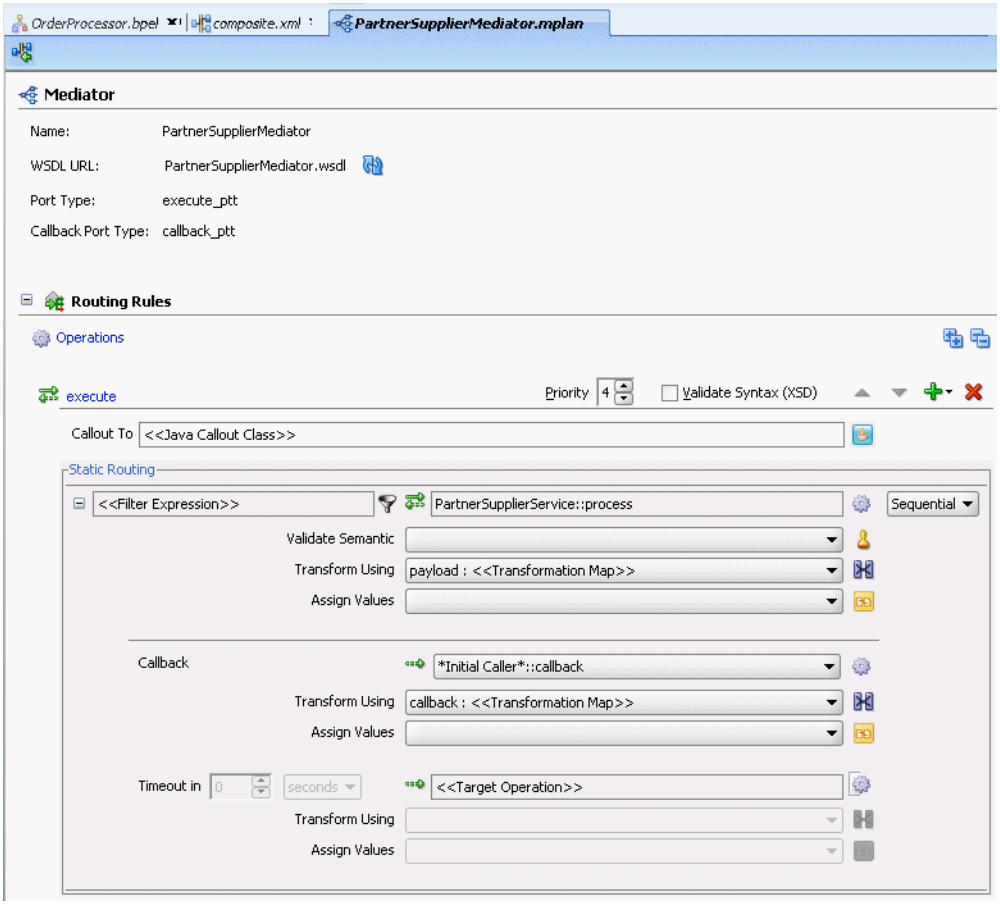
6.2.7 Task 7: Create Routing Rules Between the PartnerSupplierMediator Mediator to the ExternalPartnerSupplier Service

To route order information from a mediator to a service, you set up routing rules.

To create a routing rule from the `PartnerSupplierMediator` mediator to the `PartnerSupplier` service:

1. Drag a wire from **PartnerSupplierMediator** to the **PartnerSupplierService** reference handle.

2. Double-click **PartnerSupplierMediator** to view the Mediator Editor.



For an overview of the Mediator Editor, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

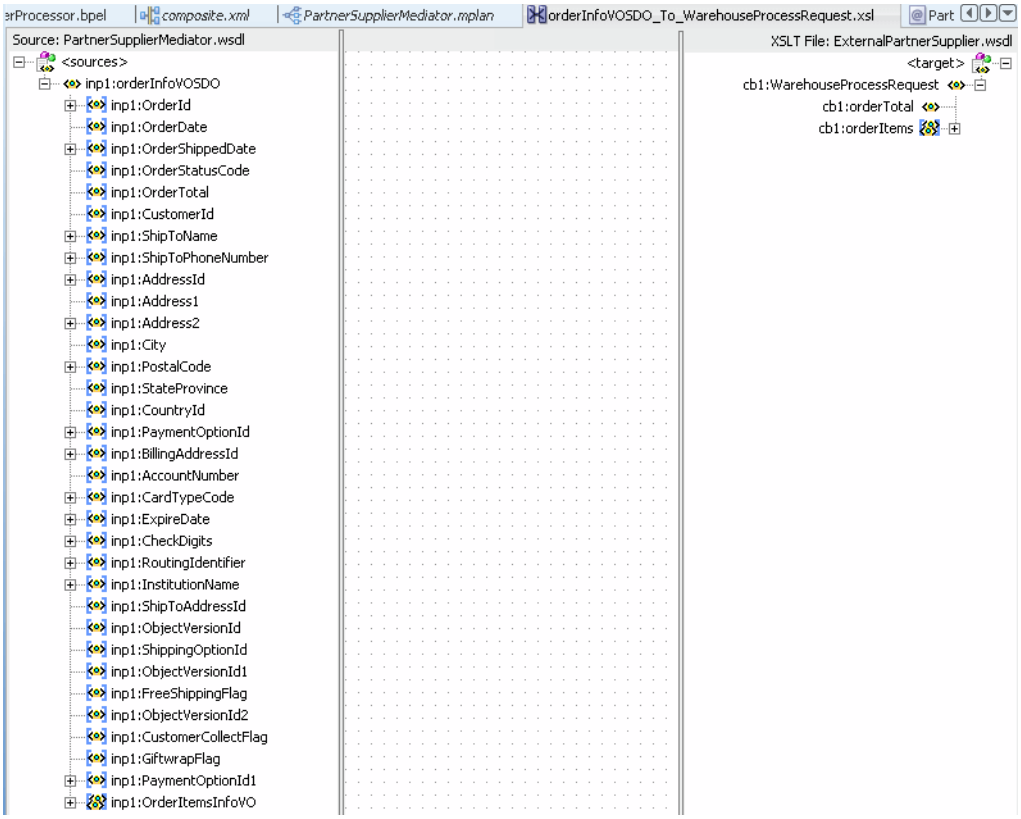
3. Modify the **payload** transformation so that the `PartnerSupplierService` service receives the proper information from the mediator.-

   a. Click the transformation icon next to the **Transform Using** field.

   The Request Transformation Map dialog displays.

   b. Select **Create New Mapper File** and leave the default file entry as `orderItemsInfoVOSDO_To_WarehouseProcessRequest.xsl`, and then click **OK**.

   The Data Mapper displays.



c. On the **Source:PartnerSupplierMediator.wsdl** (left) side, click and drag **OrderTotal** to **orderTotal** on the **XSLT File:ExternalPartnerSupplier.wsdl** (right) side.

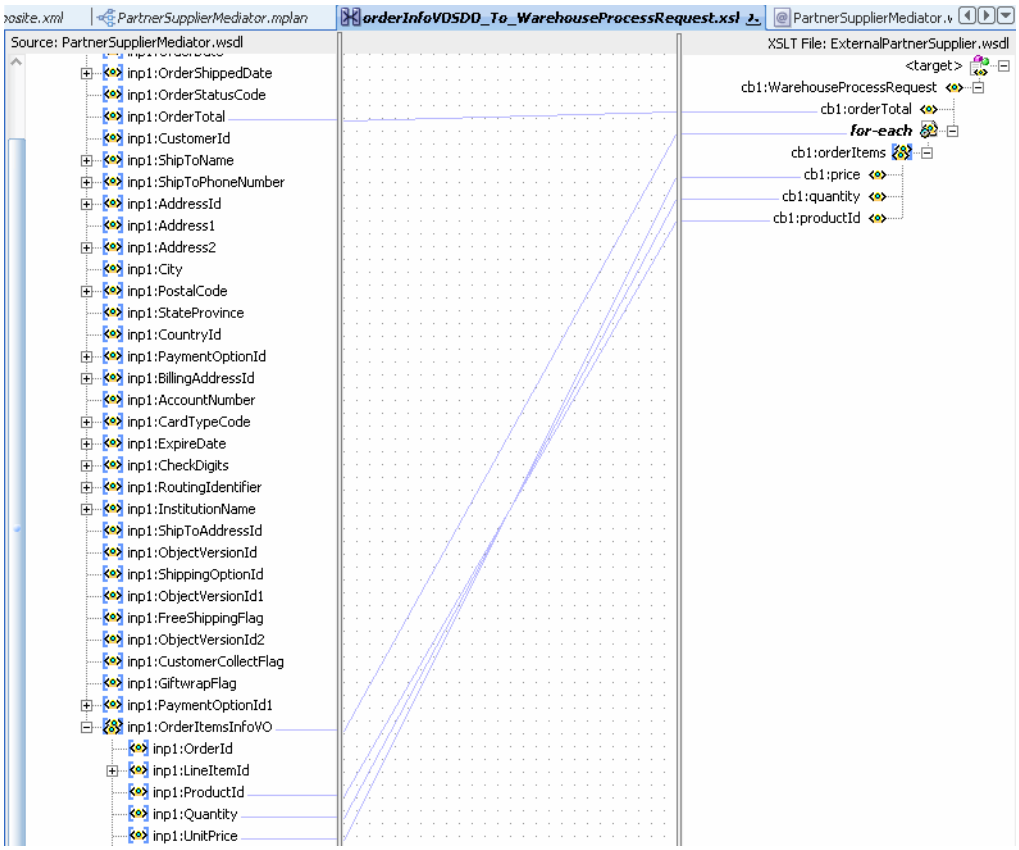
d. On the **Source:PartnerSupplierMediator.wsdl** (left) side, expand **OrderItemsInfoVO**.

e. On the **Source:PartnerSupplierMediator.wsdl** (left) side, click and drag **OrderItemsInfoVO** to **orderItems** on the **XSLT File: ExternalPartnerSupplier.wsdl** (right) side.

The Auto Map Preferences dialog prompts to perform automatic mapping of the node.

f. Leave the default settings and click **OK**.

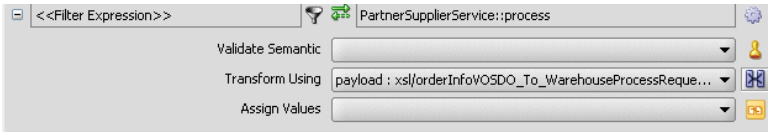
g. In the Data Mapper expand **for-each** > **orderItems** to see the mappings from **OrderItemsInfoVO** to **orderItems**.



h. Select **Save All** from the **File** main menu to save your work.

i. Click **X** in the **IorderInfoVOSDO_To_WarehouseProcessRequest.xsl** tab to close the Data Mapper.

j. With the **PartnerSupplier.mplan** tab back in focus, in the **Routing Rules** section, you should see file **orderInfoVO_To_WarehouseProcessRequest.xsl** in the **Transform Using** field.



4. Modify the **callback** transformation so that the `PartnerSupplierMediator` mediator receives the proper information from the `PartnerSupplierService` service:

a. Click the transformation icon next to the **Transform Using** field.

The Request Transformation Map dialog displays.

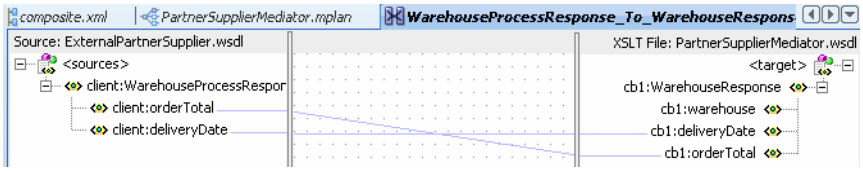
b. Select **Create New Mapper File** and leave the default file entry as `WarehouseProcessResponse_To_WarehouseProcessResponse.xsl`, and then click **OK**.

The Data Mapper displays.

c. On the **Source:ExternalPartnerSupplier.wsdl** (left) side, click and drag **OrderTotal** to **orderTotal** on the **XSLT File:PartnerSupplierMediator.wsdl** (right) side.

d. On the **Source:ExternalPartnerSupplier.wsdl** (left) side, click and drag **client:deliveryDate** to **deliveryDate** on the **XSLT File:PartnerSupplierMediator.wsdl** (right) side.

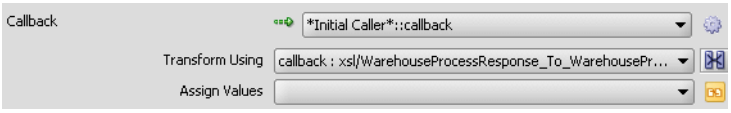
The mappings in the Data Mapper should look like the following:



e. Select **Save All** from the **File** main menu to save your work.

f. Click **X** in the **WarehouseProcessResponse_To_ WarehouseProcessResponse.xsl** tab to close the Data Mapper.

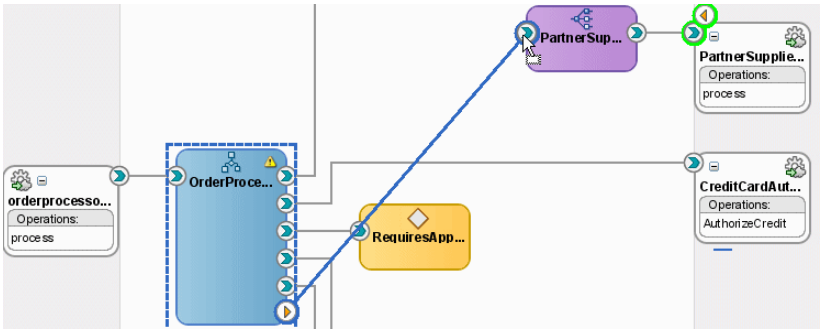
g. With the **PartnerSupplierMediator.mplan** tab back in focus, in the **Routing Rules** section, you should see file **WarehouseProcessResponse_To_ WarehouseResponse.xsl** in the **Transform Using** field.



5. Click **X** in the **PartnerSupplier.mplan** tab to close Mediator Editor.

6.2.8 Task 8: Wire OrderProcessor to the PartnerSupplierMediator Mediator

1. Click the **composite.xml** tab.
2. Drag a wire from **OrderProcessor** to the **PartnerSupplierMediator** reference handle.



3. Click the **OrderProcessor.bpel** tab to see **PartnerSupplierMediator** added to the **Partner Links** lane as a service.

4. Select **Save All** from the **File** main menu to save your work.

6.2.9 Task 9: Add the gWarehouseQuotes Variable

In this task, you create the `gWarehouseQuotes` variable, which provides output from the `Scope_RetrieveQuotes` scope and input to the `Scope_SelectPreferredSupplier` scope. This variable provides the response for the warehouses, including the warehouse name, delivery date, and order total.

To create this variable:

1. In the canvas workspace for the **OrderProcessor** BPEL process, click the **Variables** icon.

   The Variables dialog displays.

2. Click the **Add** icon to add a variable.

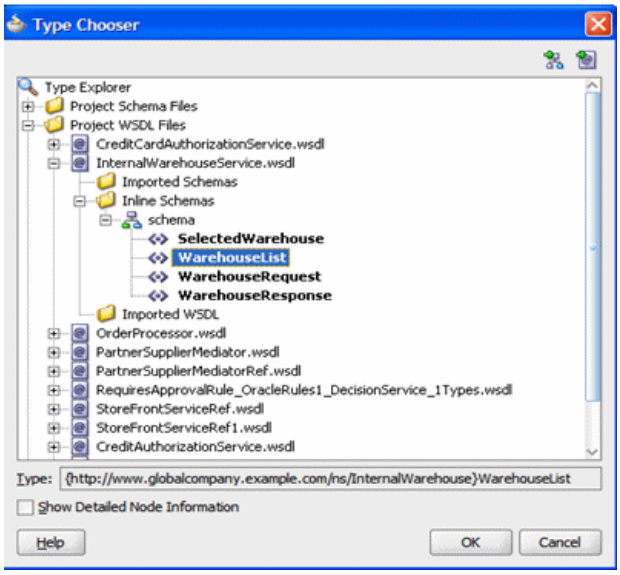
   The Create Variable dialog displays.

3. In the **Name** field, enter `gWarehouseQuotes`.

4. In the **Type** section, select **Element** and then select the **Browse** icon to the right of the **Element** field.

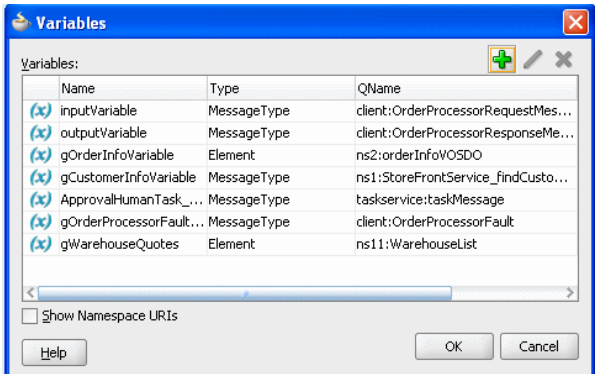
   The Type Chooser dialog appears with a list of available services.

5. Expand **Project WSDL Files** > **InternalWarehouseService.wsdl** > **Inline Schemas** > **Schema** and select **WarehouseList**.



6. Click **OK** in the Type Chooser dialog.
7. Click **OK** in the Create Variable dialog.

   The Variables dialog updates with the `gWarehouseQuotes` variable.

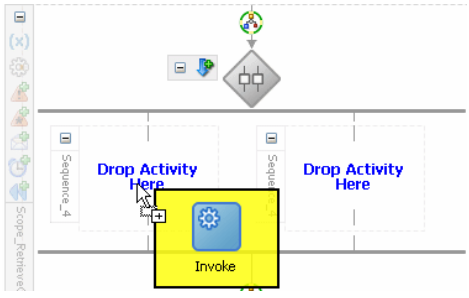


8. Click **OK** in the Variables dialog.

6.2.10 Task 10: Add Activities to Obtain a Quote from the InternalWarehouse Process

To add activities to obtain a quote:

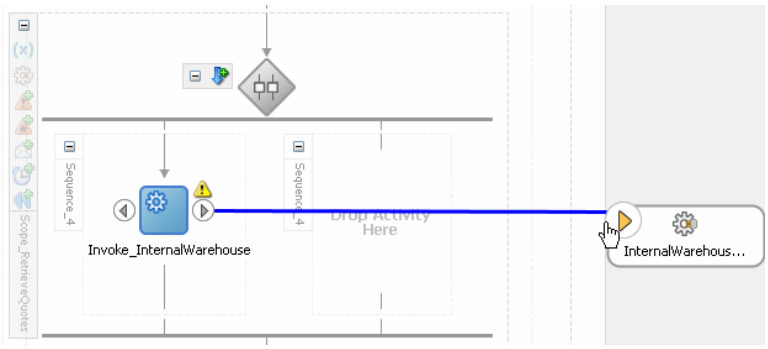
1. Create an invoke activity to invoke the `InternalWarehouse` BPEL process.
   a. From the Component Palette, drag an **Invoke** activity into left-side sequence of the switch in the `Scope_RetrieveQuotes` scope.



b. Rename this activity by double-clicking name underneath the icon. Do not double-click the invoke icon itself.

c. In the edit field, change the name to `Invoke_InternalWarehouse`.

d. Drag the mouse from the right side of **Invoke_InternalWarehouse** to the **InternalWarehouse** BPEL process.



The Edit Invoke dialog appears and is automatically filled in with the following information:

Element	Value
Name	`InvokeInternalWarehouse`
Partner Link	`InternalWarehouseService.internalwarehouseservice_client`
Operation	`WarehouseRequest`

e. Click the **Automatically Create Input Variable** icon. It is the first icon to the right of the **Input** field.

The Create Variable dialog appears for the input variable.

f. Enter and select the following values:

Element	Value
Name	`lInternalWarehouseInputVariable`
Global Variable/Local Variable	**Local Variable**, because this variable is not needed for other scopes in the process

g. Click **OK** to close the Create Variable dialog

The Edit Invoke dialog populates with the variable in the **Input** field.

h. In the Edit Invoke dialog, click **OK** to save the variable setting.

2. Assign data to the input variable for the `InternalWarehouse` process:

a. Drag an **Assign** activity from the **Component Palette** section to above the **InvokeInternalWarehouse** invoke activity.

b. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.

c. In the edit field, enter `Assign_InternalWarehouseRequest`.

d. Double-click the **Assign_InternalWarehouseRequest** activity.

The Assign dialog displays.

e. From the dropdown list, select **Copy Operation**.

The Create Copy Operation dialog appears.

f. Select the following values:

Element	Value
From	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderInfoVariable** > **ns4:orderInfoVOSDO** and select the **ns4:OrderId** node.The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Scope - RetrieveQuote** > **Variables** > **lInternalWarehouseInputVariable** > **payload** > **WarehouseRequest** and select **ns1:orderId**.

g. Click **OK** to close the Create Copy Operation dialog.

The Copy Operation tab in the Assign dialog updates to show the rule.

h. In the Assign dialog, click **OK**.

3. Create a receive activity to receive the delivery date from the internal warehouse:

a. From the Component Palette, drag and drop a **Receive** activity below the **InvokeInternalWarehouse** activity.

b. Rename this activity by double-clicking name underneath the icon. Do not double-click the receive icon itself.

c. In the edit field, change the name to `Receive_InternalWarehouse`.

d. Drag the mouse from the right side of **ReceiveInternalWarehouse** to the **InternalWarehouse** BPEL process.

The Edit Receive dialog appears and is automatically filled in with the following information:

Element	Value
Name	`Receive_InternalWarehouse`
Partner Link	`InternalWarehouseService.internalwarehouseservice_client`
Operation	`WarehouseResponse`

e. Click the **Auto-Create Request** icon. It is the first icon to the right of the **Variable** field.

The Create Variable dialog appears for the input variable.

f. Enter and select the following values:

Element	Value
Name	`linternalWarehouseResponseVariable`.
Global Variable/Local Variable	**Local Variable**, because this variable is not needed for other scopes in the process

g. Click **OK** to close the Create Variable dialog.

The Edit Receive dialog populates with the variable in the **Variable** field.

h. In the Edit Receive dialog, click **OK** to save the variable settings.

4. Assign data from the `lInternalWarehouseResponseVariable` variable to the `gWarehouseQuotes` variable:

a. Drag an **Assign** activity from the **Component Palette** section to below the **Receive_InternalWarehouse** receive activity.

b. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.

c. In the edit field, enter `Assign_InterWHResponse`.

d. Double-click the **Assign_InterWHResponse** activity.

The Assign dialog displays.

e. From the dropdown list, select **Append Operation**.

The Create Append Operation dialog appears.

f. Select the following values:

Element	Value
From	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Scope - Scope_RetrieveQuotes** > **Variables** > **lInternalWarehouseResponseVariable** > **payload** and select **ns1:WarehouseResponse**. The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gWarehouseQuotes** > **WarehouseList** and select **ns1:WarehouseList**.

g. Click **OK** to close the Create Append Operation dialog.

The Copy Operation tab in the Create Append Operation dialog updates to show the operation.

h. In the Assign dialog, click **OK**.

5. Click the **Collapse** (**-**) icon to minimize the left-side flow sequence.

6. Select **Save All** from the **File** main menu to save your work.

6.2.11 Task 11: Add Activities to Obtain a Quote from the PartnerSupplierMediator Mediator

To add activities to obtain a quote:

1. Create an invoke activity to invoke the `PartnerSupplierMediator` mediator:
   a. From the Component Palette, drag an **Invoke** activity into right-side sequence.
   b. Rename this activity by double-clicking name underneath the icon. Do not double-click the invoke icon itself.
   c. In the edit field, change the name to `Invoke_PartnerSupplier`.
   d. Drag the mouse from the right side of **Invoke_PartnerSupplier** to the **PartnerSupplierMediator** service.

      The Edit Invoke dialog appears and is automatically filled in with the following information:

Element	Value
Name	`Invoke_PartnerSupplier`
Partner Link	`PartnerSupplierMediator.PartnerSupplierMediator`
Operation	`excecute`

   e. Click the **Automatically Create Input Variable** icon. It is the first icon to the right of the **Input** field.

      The Create Variable dialog appears for the input variable.

   f. Enter and select the following values:

Element	Value
Name	`lPartnerSupplierInputVariable`
Global Variable/Local Variable	**Local Variable**, because this variable is not needed for other scopes in the process

   g. Click **OK** to close the Create Variable dialog.

      The Edit Invoke dialog populates with the variable in the **Input Variable** field.

   h. In the Edit Invoke dialog, click **OK** to save the variable setting.

2. Assign data to the input variable the `PartnerSupplierService` service:
   a. Drag and drop an **Assign** activity from the **Component Palette** section to above the **Invoke_PartnerSupplier** invoke activity.
   b. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.
   c. In the edit field, enter `Assign_PartnerRequest`.
   d. Double-click the **Assign_PartnerRequest** activity.

      The Assign dialog displays.

   e. From the dropdown list, select **Copy Operation**.

      The Create Copy Operation dialog appears.

f. Select the following values:

Element	Value
From	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderInfoVariable** and select **ns4:orderInfoVOSDO**. The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Scope - RetrieveQuotes** > **Variables** > **lPartnerSupplierInputVariable** > **request** and select **ns4:orderInfoVOSDO**.

g. Click **OK** to close the Create Copy Operation dialog.

The Copy Operation tab in the Assign dialog updates to show the rule.

h. In the Assign dialog, click **OK**.

3. Create a receive activity to receive the delivery date from the external partner warehouse:

a. From the Component Palette, drag a receive activity below the **Invoke_ PartnerSupplier** activity.

b. Rename this activity by double-clicking name underneath the icon. Do not double-click the invoke icon itself.

c. In the edit field, change the name to `Receive_PartnerResponse`.

d. Drag the mouse from the right side of **Receive_PartnerResponse** to the **PartnerSupplierService** service.

The Edit Receive dialog appears and is automatically filled in with the following information:

Element	Value
Name	`Receive_PartnerResponse`
Partner Link	`PartnerSupplierMediator.PartnerSupplierMediator`
Operation	`callback`

e. Click the **Add** icon. It is the first icon to the right of the **Variable** field.

The Create Variable dialog appears for the input variable.

f. Enter and select the following values:

Element	Value
Name	`lPartnerResponseVariable`
Global Variable/Local Variable	**Local Variable**

g. Click **OK** to close the Create Variable dialog.

   The Edit Receive dialog populates with the variable in the **Variable** field.

h. In the Edit Receive dialog, click **OK** to save the variable settings.

4. Assign data from `lPartnerResponseVariable` variable to the `gWarehouseQuotes` variable:

   a. Drag an **Assign** activity from the **Component Palette** section to below the **Receive_PartnerResponse** receive activity.

   b. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.

   c. In the edit field, enter `Assign_PartnerWHResponse`.

   d. Double-click the **Assign_PartnerWHResponse** activity.

      The Assign dialog displays.

   e. From the dropdown list, select **Append Operation**.

      The Create Append Operation dialog appears.

   f. Select the following values:

Element	Value
From	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Scope - Scope_RetrieveQuotes** > **Variables** > **lPartnerResponseVariable** > **callback** and select **ns1:WarehouseResponse**. The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gWarehouseQuotes** and select **ns1:WarehouseList**.

   g. Click **OK** to close the Create Append Operation dialog.

      The Copy Operation tab in the Create Append Operation dialog updates to show the rule.

   h. In the Assign dialog, click **OK**.

5. Click the **Collapse** (**-**) icon to minimize the right-side flow sequence.

6. Click the **Collapse** (**-**) icon to minimize the **Scope_RetrieveQuotes** scope.

7. Select **Save All** from the **File** main menu to save your work.

6.3 Creating the Scope_SelectPreferredSupplier Scope

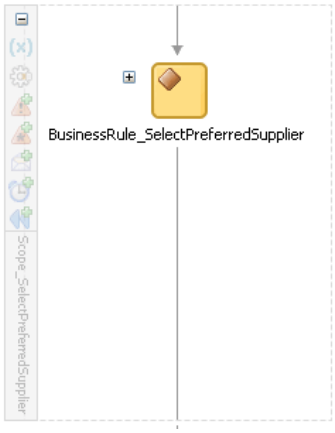
The `Scope_SelectPreferredSupplier` scope uses the `EvaluatePreferredSupplierRule` to select the warehouse with the lowest order total.

To create the `Scope_SelectPreferredSupplier` scope, perform the following tasks:

6.3.1 Task 1: Create the Scope_SelectPreferredSupplier Scope

The `Scope_SelectSupplier` scope invokes the `RequiresApprovalRule` business rule, as shown in Figure 6–6.

Figure 6–6 Scope_SelectSupplier Scope



To add the scope:

1. From the Component Palette, drag a **Scope** activity below the **Scope_RetrieveQuotes** scope.
2. Rename this activity by double-clicking the name underneath the icon. Do not double-click the activity icon itself.
3. In the edit field, change the name to `Scope_SelectPreferredSupplier`.
4. Click the **Expand** (+) icon to expand the **Scope_SelectPreferredSupplier** scope.
5. Select **Save All** from the **File** main menu to save your work.

6.3.2 Task 2: Add the gPreferredSupplier Variable

In this task, you create the `gPreferredSupplier` variable, which provides output from the business rule variable `com_example_globalcompany_ns_internalwarehouse_WarehouseResponse_o`.

To create this variable:

1. In the workspace for the **OrderProcessor** BPEL process, click the **Variables** icon.

   The Variables dialog displays.
2. Click the **Create** icon to add a variable.

   The Create Variable dialog displays.
3. In the **Name** field, enter `gPreferredSupplier`.

4. In the **Type** section, select **Element** and then select the **Browse Elements** icon to the right of the **Element** field.

   The Type Chooser dialog appears with a list of available services.

5. Expand **Project Schema Files** > **InternalWarehouse.xsd** and select **WarehouseResponse**. You previously imported this schema file when you created input and output variables for the `OrderProcessor` BPEL process.

6. Click **OK** to close the Type Chooser dialog.

7. In the Create Variable dialog, click **OK**.

   The Variables dialog updates with the `gPreferredSupplier` variable.

8. Click **OK** in the Variables dialog.

6.3.3 Task 3: Create the EvaluatePreferredSupplierRule Business Rule

To create the business rule:

1. Click the **composite.xml** tab to view the SOA Composite Editor.

2. Drag a **Business Rule** service component into the SOA Composite Editor.

   The Create Business Rule dialog displays.

3. In the **Name** field, enter `EvaluatePreferredSupplierRule` to be the name of the Oracle Business Rules dictionary.

4. Leave the default for the **Package** field.

5. In the **Inputs/Outputs** section, from the **Add** menu, select **Input** to select the input for the business rule:

   The Type Chooser dialog displays.

6. In the **Inputs/Outputs** section, select the input for the business rule:

   a. From the **Add** menu, select **Input**.

      The Type Chooser dialog displays.

   b. Expand **InternalWarehouse.xsd** and select **WarehouseList**.

   c. Click **OK** to return to the Create Business Rules dialog.

7. In the **Inputs/Outputs** section, select the output for the business rule:

   a. From the **Add** menu, select **Output**.

      The Type Chooser dialog displays.

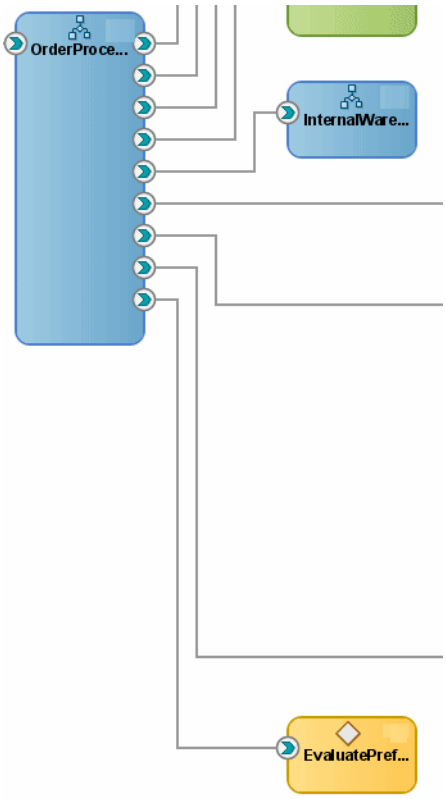
   b. Expand **Warehouse.xsd** and select **WarehouseProcessResponse**. You previously imported this schema file when you created input and output variables for the `ExternalPartnerSupplier` BPEL process.

   c. Click **OK** to return to the Create Business Rules dialog.

8. Click the **Advanced** tab and modify the name in the **Service Name** field to `EvaluatePreferredSupplierRule_DecisionService_1`. Oracle JDeveloper creates a WSDL for the business rule based on this name.

9. Click **OK** to create the business rule.

   The **EvaluatePreferredSupplierRule** business rule displays in the composite.



10. Select **Save All** from the **File** main menu to save your work.

6.3.4 Task 4: Reference the RequiresApprovalRule Dictionary in the BPEL Designer

To reference the `EvaluatePreferredSupplierRule` in the `Scope_SelectSupplier` scope:

1. Click the **OrderProcessor.bpel** tab.
2. From the Component Palette, drag a **Business Rule** activity into the **Scope_SelectSupplier** scope.

   The Business Rule dialog displays.
3. In the **Name** field, enter `BusinessRule_SelectPreferredSupplier`.
4. From the **Dictionary** list, select **EvaluatePreferredSupplierRule**, which is the rule you created in Section 6.3.3, "Task 3: Create the EvaluatePreferredSupplierRule Business Rule."
5. Leave the default settings for the **Service** and **Operation** fields.
6. Create input to the business rule, so that the `gWarehouseQuotes` variable assigns data to input variable `com_example_globalcompany_ns_internalwarehouse_WarehouseList_i` for the business rule.
   a. In the **Assign Input Facts** tab, click the **Create** icon.

      The Decision Fact Map dialog displays.
   b. Select the following values:

Element	Value
From	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gWarehouseQuotes** and select **ns3:WarehouseList**. **Note:** The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
▪ **Type**	**Business Rules Facts**
▪ **Variable**	Expand **com_example_globalcompany_ns_internalwarehouse_WarehouseList_i** and select **ns10:WarehouseList**.

c. Click **OK**.

The copy operation displays in the **Assign Input Facts** tab of the Business Rule dialog.

7. Create output from the business rule, so that the variable `com_example_globalcompany_ns_internalwarehouse_WarehouseResponse_o` sends data to the `gPreferredSupplier` variable:

a. Click the **Assign Output Facts** tab.

b. In the **Assign Output Facts** tab, click the **Create** icon.

The Decision Fact Map dialog displays.

c. Select the following values:

Element	Value
From	
▪ **Type**	**Business Rule Facts**
▪ **Variable**	Expand **com_example_globalcompany_ns_internalwarehouse_WarehouseResponse_o** and select **ns1:WarehouseResponse**. **Note:** The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gPreferredSupplier** and select **ns1:WarehouseResponse**.

d. Click **OK**.

The copy operation displays in the **Assign Output Facts** tab of the Business Rule dialog.

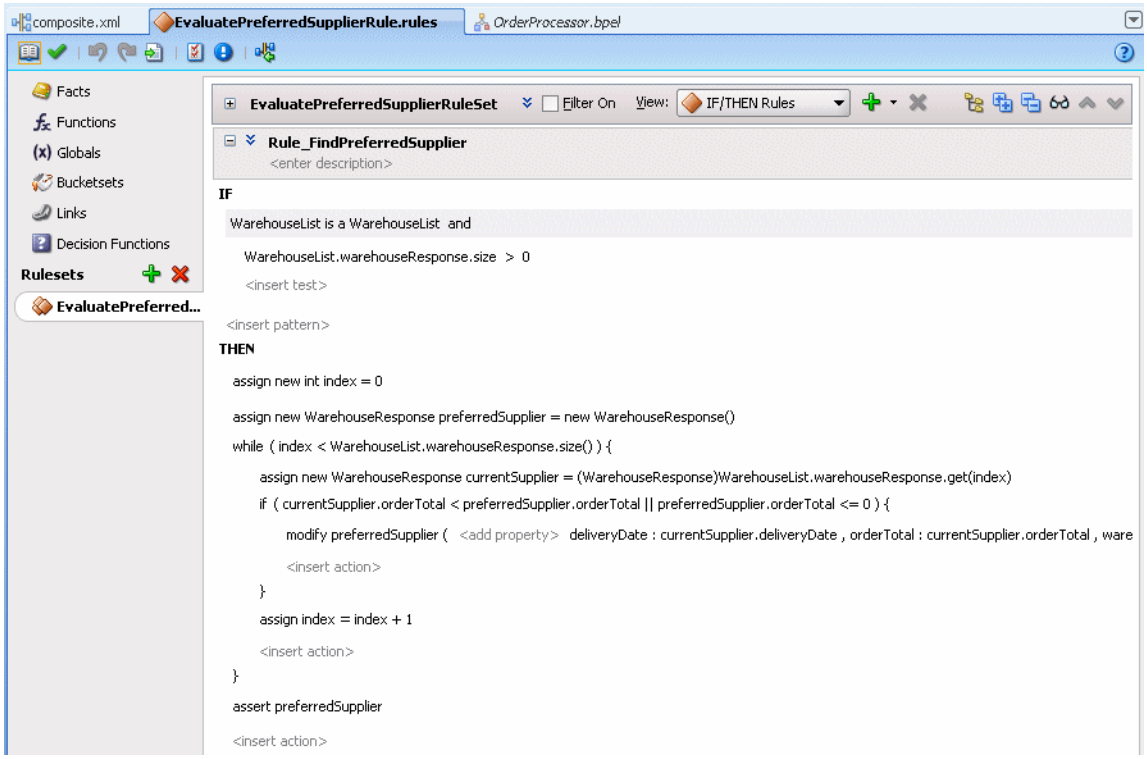
8. Click **OK** in the Business Rules dialog.

9. Select **Save All** from the **File** main menu to save your work.

6.3.5 Task 5: Add a New Rule for Ruleset in Rules Designer

In this task, you add the `Rule_FindPreferredSupplier` rule. This rule uses the `gWarehouseQuotes` variable as input, which provides the order total for the warehouses. The logic for the rule selects the warehouse as the current supplier with the lowest order total, as shown in Figure 6–7.

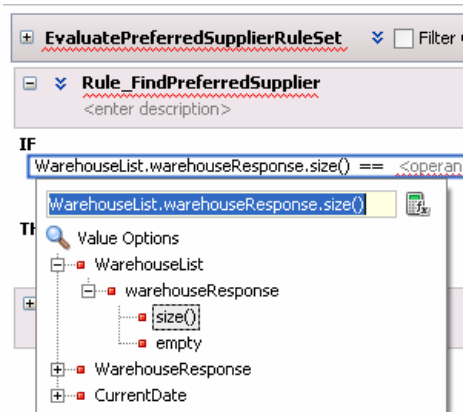
Figure 6–7 Rule_FindPreferredSupplier Rule



To create the rule:

1. In Rules Designer, select **Ruleset_1** from the left menu.
2. From the **Create** dropdown list, select **Create Rule**.

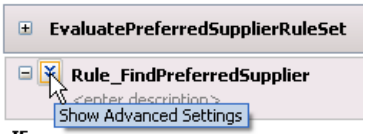
   A new rule named **Rule_1** displays.
3. Select **Rule_1** and modify the name to `Rule_FindPreferredSupplier`.
4. Click `<insert test>` to display the statement template.
5. For the **IF** condition, click the left-hand operand and expand **WarehouseList** > **warehouseResponse** and select **size()**.



a. Click the operator and select **>**.

b. Click the right-hand operand and enter `0`.

6. Click the **Show Advanced Settings** icon:



7. Click the **Advanced Mode** option, which enables you to select advanced actions for the `THEN` true clause.

8. For the **THEN** true clause, perform the following steps to complete the first statement:

a. Click **<insert action>** and select **assign new**.

b. Click **<type>** and select **int**.

c. Click **var** and enter `index`.

d. Click **<expression>** and enter `0`.

9. Create the second statement as:

```
assign new WarehouseResponse preferredSupplier = new WarehouseResponse()
```

10. Perform the following steps to complete the third statement:

a. Click **<insert action>** and select **while**.

b. Click **<boolean expression>** and enter:

```
index < WarehouseList.warehouseResponse.size()
```

c. Under the **while** statement, create the following `assign new` activity:

```
assign new WarehouseResponse
currentSupplier=(WarehouseResponse)WarehouseList.wareshouseResponse.get(ind
ex)
```

d. Under the **while** statement, click **<insert action>** and select **if**.

e. Click **<boolean expression>** and click the **Expression Builder** icon.

f. In the Expression Builder, enter the following:

```
currentSupplier.orderTotal < preferredSupplier.orderTotal ||
```

```
preferredSupplier.orderTotal <= 0
```

You can select **currentSupplier.orderTotal** and **preferredSupplier.orderTotal** from the **Options** and click **Insert into Expression**. Click **OK** in the Expression Builder.

g. Under the **if** statement, click **<insert action>** and select **modify**.

h. Click **<target>** and select **preferredSupplier**.

i. Click **<add property>**. The Properties dialog displays.

j. From the **Value** dropdown menu for **deliveryDate**, **orderTotal**, and **warehouse**, select **currentSupplier.deliveryDate**, **currentSupplier.orderTotal**, and **currentSupplier.warehouse**, respectively.

k. Click **Close** in the Properties dialog.

l. Under the **while** statement, create the following assign statement:

```
assign index = index + 1
```

11. Create the fourth statement as:

```
assert preferredSupplier
```

12. Select **Save All** from the **File** main menu to save your work.

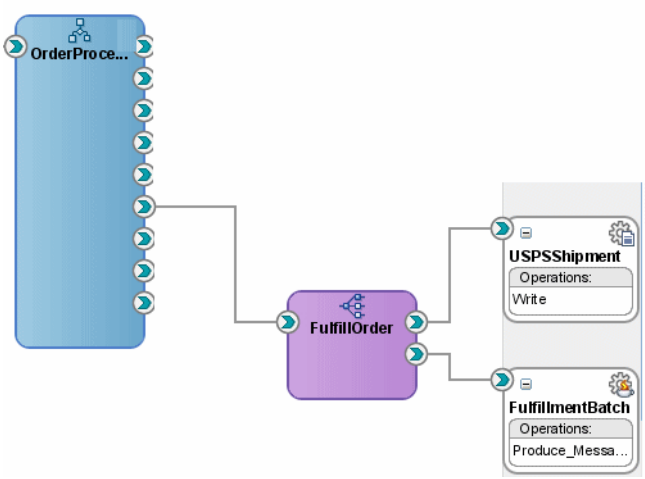
13. Click **X** in the **EvaluatePreferredSupplierRule.rules** tab to close the Rules Designer.

6.4 Creating the Services and Routing Required for the Scope_ FulfillOrder Scope

After a warehouse is selected for an order, the `OrderProcessor` BPEL process invokes the `Scope_FulfillOrder` scope, which uses the `FulfillOrder` mediator service to determine where orders are forwarded for fulfillment. It sends the order to a a file adapter named `USPSShipment` and a JMS adapter named `FulfillmentBatch`. For this tutorial, the order is just sent to a JMS queue. There is no consumer of the order data from the queue. This tutorial has you create the JMS adapter, so you can learn how to send messages to a JMS adapter.

Figure 6–8 shows the flow of the `FulfillOrder` mediator service in the SOA Composite Editor.

Figure 6–8 FulfillOrder Flow



Prior to creating the `Scope_FulfillOrder` scope in the `OrderProcessor` BPEL process, you create the following:

- `FulfillOrder` mediator service
- `USPSShipment` file adapter
- `FulfillmentBatch` JMS adapter

The tasks to create these elements are as follows:

- Section 6.4.1, "Task 1: Create USPSShipment File Adapter"
- Section 6.4.2, "Task 2: Create FulfillmentBatch JMS Service"
- Section 6.4.3, "Task 3: Create FulfillOrder Mediator Service Component"
- Section 6.4.4, "Task 4: Create Routing Rules"
- Section 6.4.5, "Task 5: Wire OrderProcessor to FulfillOrder Mediator Service"

6.4.1 Task 1: Create USPSShipment File Adapter

The `USPSShipment` adapter writes order information to a flat file in the `C:\tmp` directory.

To create this adapter:

1. Copy `LegacyOrderBookingPO.xsd` from *`DEMO_DOWNLOAD_HOME`*`\CompositeServices\OrderBookingComposite\xsd` to directory *`MY_FOD_HOME`*`\OrderBookingComposite\xsd`, so you can reference it when you create the adapter.
2. In the Application Navigator, click the **Refresh** icon.
3. From the Component Palette, drag and drop the **File Adapter** into the right swim lane of the SOA Composite Editor.

   The Adapter Configuration Wizard displays.
4. Click **Next**.

   The Service Name page displays.
5. In the **Service Name** field, enter `USPSShipment`, and then click **Next**.

   The Operation page displays.

6. In the Adapter Interface page, select **Define from operation and schema**, and then click **Next**.

   The Operation page displays.

7. In **Operation Type** section, click **Write File**, and then click **Next**.

   When you select **Write File**, the **Operation Name** is automatically set to **Write**.

   The File Configuration page displays.

8. Enter and select the following values:

Element	Value
Directory for Outgoing Files	Click **Browse** to find the directory where you want the adapter to write the files. For example, you can select `/tmp`.
File Naming Convention	Specify how you want to name the files. Enter `po_%SEQ%.txt`. The `%SEQ%` indicates that the file names are to be numbered sequentially.
Number of Messages Equals	You can leave it at 1, which means that each order writes to a separate file.

9. Accept the other default settings, and then click **Next**.

   The Messages page displays.

10. Click the **Browse** icon to the right of the URL field.

    The Type Chooser dialog displays.

11. Expand **Project Schema Files** > **LegacyOrderBookingPO.xsd** and select **PurchaseOrder**.

12. Click **OK** to return to the Message page.

    The **URL** field fills in with value **xsd/LegacyOrderBooking.xsd** and the **Schema Element** field fills in with value **PurchaseOrder**.

13. Click **Next**.

    The Finish page displays.

14. Click **Finish**.

    The SOA Composite Editor updates with **USPSShipment** adapter. In addition, the OrderBookingComposite directory updates with files `USPShipment_file.jca` and `USPSShipment.wsdl` for the adapter, which you can also see in the Application Navigator.

15. Select **Save All** from the **File** main menu to save your work.

6.4.2 Task 2: Create FulfillmentBatch JMS Service

The `FulfillmentBatch` JMS adapter sends the order information to a JMS server.

To create this adapter:

1. From the Component Palette, drag a **JMS Adapter** from the **Service Adapters** list into the right swim lane of the SOA Composite Editor.

   The Adapter Configuration Wizard displays.

2. In the Welcome page, click **Next**.

The Service Name page displays.

3. In the **Service Name** field, enter `FulfillmentBatch`, and then click **Next**.

   The JMS Provider page displays.

4. From the **Oracle Enterprise Messaging Service (OEMS)** list, select **Oracle WebLogic JMS**, and then click **Next**.

   The Service Connection page displays.

5. From the **Connection** list, select the **MyAppServerConnection** running Oracle SOA Suite, and then click **Next**.

   The Adapter Interface page displays.

6. Select **Define from operation and schema**, and then click **Next**.

   The Operation page displays.

7. Select **Produce Message**, and then click **Next**.

   The Produce Operation Parameters page displays.

8. Click the **Browse** icon next to the **Destination Name** field.

   The Select Destination dialog displays.

9. In the **Destination** section, expand **SOAJMSModule** and select **DemoSupplierTopic**, and then click **OK**.

   The Produce Operation Parameters page displays.

   If you ran the `seedFodJmsResource` script in Section 2.1.3, "Task 3: Deploy the WebLogic Fusion Order Demo Application," to run the sample application, this topic exists. If topic **DemoSupplierTopic** is not available, create it through the Oracle WebLogic Server Administration Console, following these procedures:

   - Section A.1, "Task 1: Create the JMS Topic"
   - Section A.2, "Task 2: Create the JMS Topic Connection Factory"
   - Section A.3, "Task 3: Add the Connection Pool"

10. In the **JNDI Name** field, enter `eis/Jms/TopicConnectionFactory`.

    The Messages page displays.

11. Accept the other defaults in the page, and click **Next**.

12. In the Messages page, click option **Native format translation is not required (Schema is Opaque)**, and then click **Next**.

    The Finish page displays.

13. Click **Finish**.

    The SOA Composite Editor updates with **FulfillmentBatch** adapter. In addition, the `OrderBookingComposite` directory updates with files `FulfillmentBatch_jms.jca` and `FulfillmentBatch.wsdl` for the adapter, which you can also see in the Application Navigator.

14. Select **Save All** from the **File** main menu to save your work.

6.4.3 Task 3: Create FulfillOrder Mediator Service Component

To create the `FulfillOrder` mediator service component:

1. From the Component Palette, drag a **Mediator** service into the designer of the SOA Composite Editor.

   The Create Mediator window appears.

2. In the **Name** field, enter `FulfillOrder`.
3. From **Template**, select **Interface Definition from WSDL**.
4. Deselect the **Create Composite Service with SOAP Bindings**.
5. From the **WSDL URL** field, generate a WSDL file:
   a. Click the **Generate WSDL from schema(s)** icon.

      The Create WSDL dialog displays.

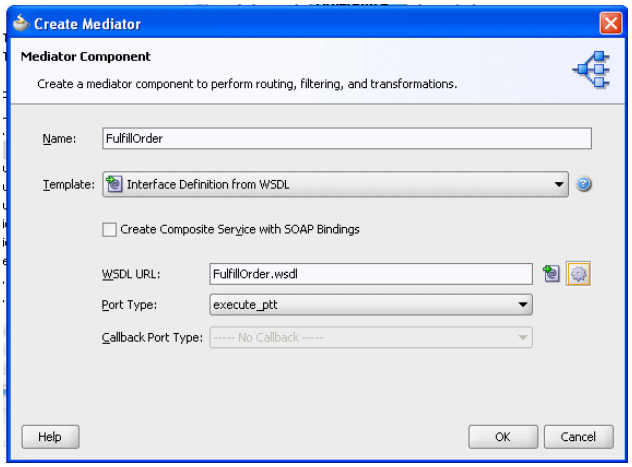
   b. In the **URL** field, click the **browse for schema file** icon.

      The Type Chooser dialog displays.

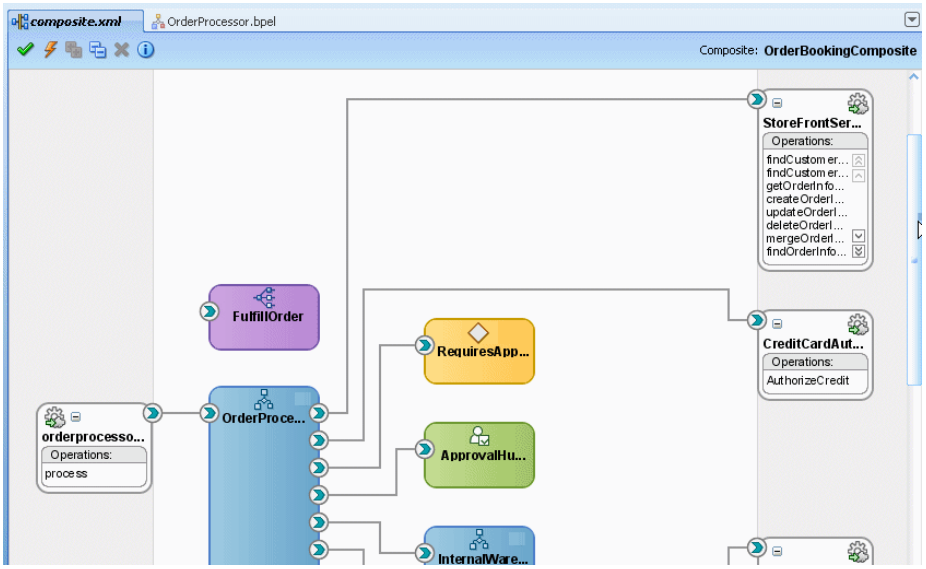
   c. Expand **Project Schema Files** > **OrderInfoVOSDO.xsd** and select **orderInfoVOSDO**.

   d. Click **OK**.

   e. In the Create WSDL dialog, accept the default values for the remaining fields, and click **OK**.
6. In the Create Mediator dialog, click **OK** to create the mediator with the settings.



The **FulfillOrder** mediator displays in the SOA Composite Editor.



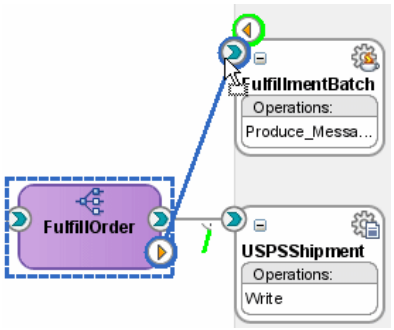
7. Select **Save All** from the **File** main menu to save your work.

6.4.4 Task 4: Create Routing Rules

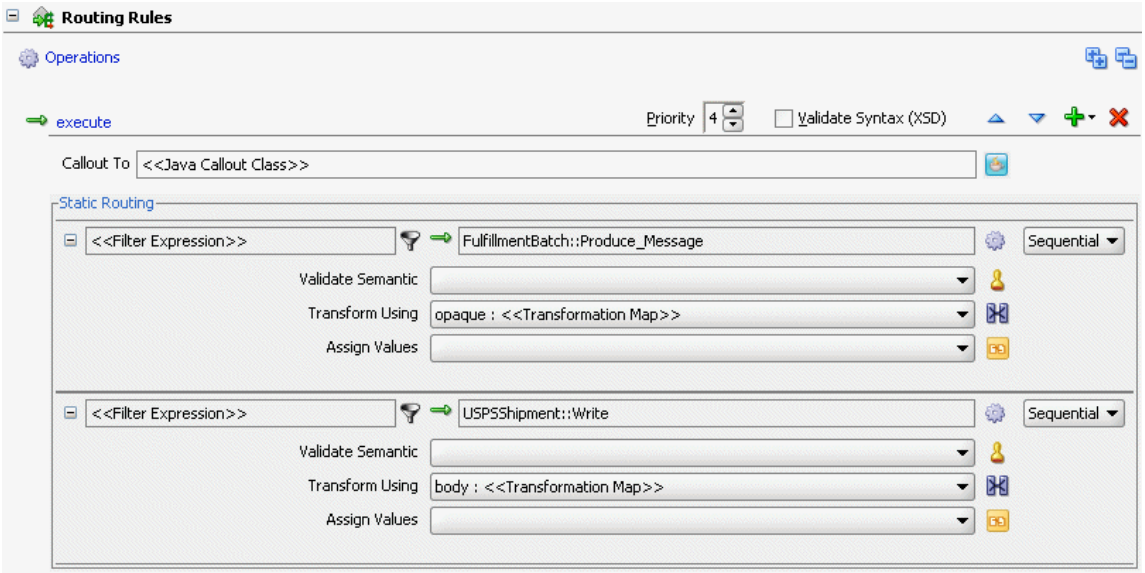
For the WebLogic Fusion Order Demo application, you create routing rules from the `FulfillOrder` mediator to the `USPSShipment` and `FulfillmentBatch` adapters:

To create a routing rule from the `FulfillOrder` mediator service to the `FullmentBatch` JMS adapter:

1. Drag a wire from the **FulfillOrder** mediator to the **USPSShipment** reference handle.
2. Drag a wire from the **FulfillOrder** mediator to the **FulfillmentBatch** reference handle.



3. Double-click **FulfillOrder** to view the Mediator Editor.



4. Modify the transformation for `FulfillmentBatch` JMS service:

   a. Click the transformation icon next to the **Transform Using** field.

      The Request Transformation Map dialog displays.

   b. Select **Create New Mapper File** and leave the default file entry as `orderInfoVOSD_To_opaqueElement.xsl` as the file name, and then click **OK**.

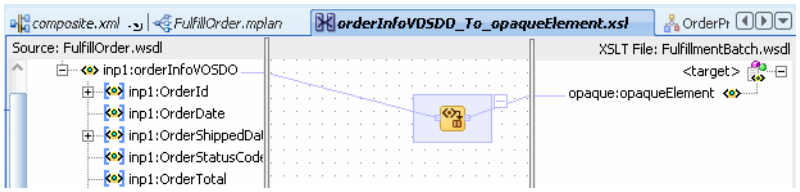
      The Data Mapper displays.

   c. On the **Source:FulfillOrderRef.wsdl** (left) side, click and drag **inp1:orderInfoVOSDO** to **opaque:opaqueElement** on the **XSLT File:FulfillmentBatch.wsdl** (right) side.

   d. From the Component Palette, expand the **String Functions** list.

   e. Drag the **get-content-as-string** function on the top of the mapping and connect the source and target to it.

      This function returns the XML representation of the **orderInfoVOSDO** input. The Data Mapper dialog should look like the following now.



   f. Click **X** in the **orderInfoVODO_To_opaqueElement.xsl** tab to close the Data Mapper.

5. Modify the transformation for the `USPSShipment` adapter:

   a. Click the transformation icon next to the **Transform Using** field.

      The Request Transformation Map dialog displays.

b. Select **Create New Mapper File** and leave the default file entry as `orderInfoVOSDO_To_PurchaseOrder.xsl` as the file name, and then click **OK**.

The Data Mapper displays.

c. On the **Source:FulfillOrder.wsdl** (left) side, click and drag the following from **orderInfoVOSDO** to **PurchaseOrder** on the **XSLT File:USPSShipment.wsdl** (right) side:

- **OrderId** to **ID**
- **OrderDate** to **OrderInf**o > **OrderDate**
- **OrderStatusCode** to **OrderInfo** > **OrderStatus**
- **OrderTotal** to **OrderInfo** > **OrderPrice**
- **CustomerId** to **CustID**
- **ShipToName** to **ShipTo** > **Name** > **Last**
- **ShipToPhoneNumber** to **UserContact** >**PhoneNumber**
- **Address1** to **ShipTo** > **Street**
- **City** to **ShipTo** > **City**
- **Postalcode** to **ShipTo** > **Zip**
- **StateProvince** to **ShipTo** > **State**
- **CountryId** to **ShipTo** > **Country**
- **OrderItemsInfoVO** to **Item**

For the **OrderItemsInvoVO** to **OrderItems**, the Auto Map Preferences dialog displays. Leave the default settings and click **OK**.

d. Click **X** in the **orderInfoVOSDO_To_PurchaseOrder.xsl** tab to close the Data Mapper.

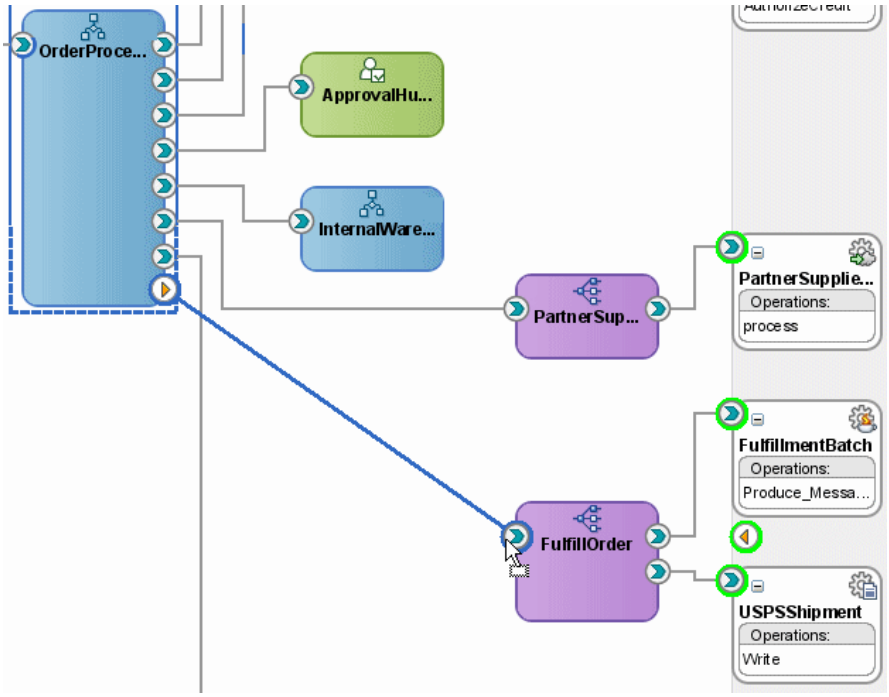
e. Click **X** in the **FulfillOrder.mplan**.

f. Select **Save All** from the **File** main menu to save your work.

6.4.5 Task 5: Wire OrderProcessor to FulfillOrder Mediator Service

To wire the `OrderProcessor` BPEL process to the `FulfillOrder` mediator:

1. Drag a wire from **OrderProcessor** to the **FulfillOrder** reference handle.



2. Select **Save All** from the **File** main menu to save your work.
3. Click the **OrderProcessor.bpel** tab to see the FulfillOrder mediator service added to the main process.

6.5 Creating the Scope_FulfillOrder Scope

To create the `Scope_FulfillOrder` scope in the `OrderProcessor` process, perform the following tasks:

- Task 1: Add the Scope_FulfillOrder Scope
- Task 2: Create the InvokeFulfillOrder Activity
- Task 3: Create the AssignFulfillRequest Activity

6.5.1 Task 1: Add the Scope_FulfillOrder Scope

To create the `Scope_FulfillOrder` scope:

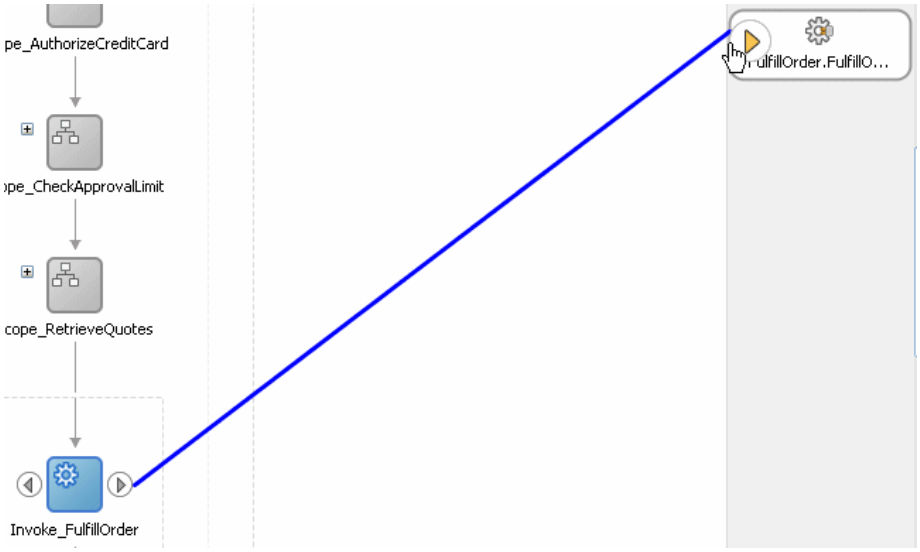
1. From the Component Palette, drag a **Scope** activity below the **Scope_SelectPreferredSupplier** activity.
2. Rename this activity by double-clicking the name underneath the icon. Do not double-click the activity icon itself.
3. In the edit field, change the name to `Scope_FulfillOrder`.
4. Click the **Expand** (+) icon to expand the **Scope_FulfillOrder** scope.

6.5.2 Task 2: Create the InvokeFulfillOrder Activity

To create an invoke activity to call the `FulfillOrder` mediator service:

1. From the Component Palette, drag and drop an **Invoke** activity into the **Scope_FulfillOrder** scope.

2. Rename this activity by double-clicking name underneath the icon. Do not double-click the invoke icon itself.
3. In the edit field, change the name to `Invoke_FulfillOrder`.
4. Drag the mouse from the right side of **Invoke_FulfillOrder** activity to the **FulfillOrder** service.



The Edit Invoke dialog appears and is automatically filled in with the following information:

Element	Value
Name	`Invoke_Fulfillorder`
Partner Link	`FulfillOrder.FulfillOrder`
Operation	`execute`

5. Click the **Automatically Create Input Variable** icon. It is the first icon to the right of the **Input Variable** field.

   The Create Variable dialog appears for the input variable.
6. Enter and select the following values:

Element	Value
Name	Modify the name of the input variable to `lFulfillOrder_InputVariable`.
Global Variable/Local Variable	Select **Local Variable**.

7. Click **OK** to close the Create Variable dialog.

   The Edit Invoke dialog populates with the variable in the **Input Variable** field.
8. In the Edit Invoke dialog, click **OK** to save the variable setting.

6.5.3 Task 3: Create the AssignFulfillRequest Activity

To assign data to the input variable for `FulfillOrder` mediator service:

1. Drag and drop an **Assign** activity from the **Component Palette** section to above the **Invoke_FulfillOrder** invoke activity.
2. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.
3. In the edit field, enter `Assign_OrderData`.
4. Double-click the **Assign_OrderData** activity.

   The Assign dialog displays.
5. From the dropdown menu, select **Copy Operation**.

   The Create Copy Operation dialog appears.
6. Select the following values:

Element	Value
From	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderInfoVariable** and select **ns4:orderInfoVOSDO**. The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Scope - Scope_FulfillOrder** > **Variables** > **lFulfillOrder_InputVariable** > **request** and select **ns4:orderInfoVOSDO**.

7. Click **OK** to close the Create Copy Operation dialog.

   The Copy Operation tab in the Assign dialog updates to show the rule.
8. In the Assign dialog, click **OK**.
9. Click the **Collapse** (**-**) icon to minimize the **Scope_FulfillOrder** scope.
10. Select **Save All** from the **File** main menu to save your work.

6.6 Creating the Scope_UpdateStatusToComplete Scope for Completed Orders

The `Scope_UpdateStatusToComplete` scope assigns a status of `complete` to the `order` entity variable, which updates the order in the database. If you did not use an entity variable, you would have to create a database adapter.

To create the `Scope_UpdateStatusToComplete` scope:

1. Add the `Scope_UpdateStatusToComplete` scope:
   a. From the Component Palette, drag a **Scope** activity below the **Scope_FulfillOrder** activity.
   b. Rename this activity by double-clicking the name underneath the icon. Do not double-click the activity icon itself.

c. In the edit field, change the name to `Scope_UpdateStatusToComplete`.

d. Click the **Expand** (+) icon to expand the **Scope_UpdateStatusToComplete** scope.

2. Create an assign activity to complete the order:

a. From the Component Palette, drag an **Assign** activity into the `Scope_UpdateStatusToComplete` scope.

b. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.

c. In the edit field, enter `UpdateOrderStatus`.

d. Double-click the **UpdateOrderStatus** activity.

The Assign dialog displays.

3. Assign a status of `complete` for the order:

a. From the dropdown list, select **Copy Operation**.

The Create Copy Operation dialog appears.

b. Select the following values:

Element	Value
From	
▪ **Type**	**Expression**
▪ **Expression**	1. Select the **XPath Expression Builder** icon to display the Expression Builder dialog. 2. In the **Expression** box, enter the following: `string('complete')` 3. Click **OK** to return to the Create Copy Operation dialog.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderInfoVariable** > **ns4:orderInfoVOSDO** and select **ns4:OrderStatusCode**. **Note:** The namespace number values (for example, **ns1**, **ns2**) can vary.

c. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

The Copy Operation tab in the Assign dialog updates to show the rule.

4. Assign the order ID to the output variable for the `OrderProcessor` BPEL process:

a. From the dropdown list, select **Copy Operation**.

The Create Copy Operation dialog appears.

b. Select the following values:

Element	Value
From	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **inputVariable** > **payload** > **ns4:WarehouseRequest** and select **ns4:ordeId**. **Note:** The namespace number values (for example, **ns1**, **ns2**) can vary.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **outputVariable** > **payload** > **ns3:WarehouseResponse** and select **Total**.

   c. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

      The Copy Operation tab in the Assign dialog updates to show the rule.

5. In the Assign dialog, click **OK**.
6. Click the **Collapse** (**-**) icon to minimize the **Scope_UpdateStatusToComplete** scope.
7. Select **Save All** from the **File** main menu to save your work.

6.7 Creating the Scope_NotifyCustomerofCompletion Scope

The `Scope_NotifyCustomerofCompletion` scope uses the Oracle User Messaging Service to send an email to the customer when the order is fulfilled.

To create the `Scope_NotifyCustomerofCompletion` scope:

1. From the Component Palette, drag a **Scope** activity below the **Scope_ UpdateStatusToComplete** activity.
2. Rename this activity by double-clicking the name underneath the icon. Do not double-click the activity icon itself.
3. In the edit field, change the name to `Scope_NotifyCustomerofCompletion`.
4. Click the **Expand** (**+**) icon to expand the **Scope_NotifyCustomerofCompletion** scope.
5. From the Component Palette, drag an **Email** activity into the empty scope.

   The Email dialog displays.
6. In the **From Account** field, leave the default value as `Default`.
7. For the **To** field, specify the customer's email address from the `ConfirmedEmail` parameter from the `gCustomerInfoVariable` variable:

   a. Click the **XPath Expression Builder** icon next to the **To** field to display the Expression Builder dialog

   b. In the **BPEL Variables** box, expand **gCustomerInfoVariable** > **parameters** > **findCustomerInfoVO1CustomerInfoVOCriteriaResponse** > **result** and select **ConfirmedEmail**.

      The Content Preview box shows:

```
bpws:getVariableData('gCustomerInfoVariable','parameters','/ns3:findCustome
rInfoVO1CustomerInfoVOCriteriaResponse/ns3:result/ns2:ConfirmedEmail')
```

c. Click **Insert Into Expression**.

The Expression box updates.

d. Click **OK** to close the Expression Builder.

8. For the **Subject** field, specify `Order with id` *`OrderID`* `shipped`. To perform the steps:

a. In the **Subject** field box, enter `Order with id`, followed by a space.

```
Order with id
```

b. Click the **XPath Expression Builder** icon next to the **Subject** field to display the Expression Builder dialog.

c. In the Expression Builder dialog, in the **BPEL Variables** box, expand **gOrderInfoVariable** > **orderInfoVOSDO** and select the **OrderID** node.

The Content Preview box shows:

```
bpws:getVariableData('gOrderInfoVariable','/ns2:orderInfoVOSDO/ns2:OrderId'
)
```

d. Click **Insert Into Expression**.

The Expression box updates with the **OrderId** variable.

e. Click **OK** to close the Expression Builder.

f. Append the end of the **Subject** field with `shipped!`. The entire string

```
Order with id
<%bpws:getVariableData('gOrderInfoVariable','/ns2:orderInfoVOSDO/ns2:OrderI
d')%> shipped!
```

9. For the **Body** field, specify `Dear` *`FirstName`*`, your order has been shipped`. To perform the steps:

a. In the **Subject** field box, enter `Dear`, followed by a space.

```
Dear
```

b. Click the **XPath Expression Builder** icon next to the **Subject** field to display the Expression Builder dialog.

c. In the Expression Builder dialog, in the **BPEL Variables** box, expand **gCustomerInfoVariable** > **parameter**s > **findCustomerInfoVO1CustomerInfoVOCriteriaResponse** > **result** and select **FirstName**.

The Content Preview box shows:

```
bpws:getVariableData('gCustomerInfoVariable','parameters','/ns3:findCustome
rInfoVO1CustomerInfoVOCriteriaResponse')
```

d. Click **Insert Into Expression**.

The Expression box updates with the **OrderId** variable.

e. Click **OK** to close the Expression Builder.

f. Append the end of the **Body** field with the following string:

```
, your order has been shipped.
```

The entire string is as follows:

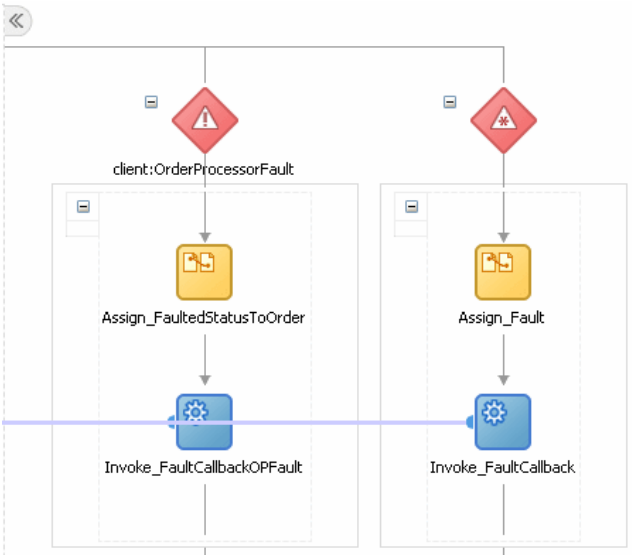
```
Dear
<%bpws:getVariableData('gCustomerInfoVariable','parameters','/ns6:findCusto
merInfoVO1CustomerInfoVOCriteriaResponse/ns6:result/ns4:FirstName')%>,
your order has been shipped.
```

10. Click **OK** in the Email dialog.
11. Click the **Collapse** (**-**) icon to minimize the **Scope_NotifyCustomerofCompletion** scope.
12. Select **Save All** from the **File** main menu to save your work.

6.8 Adding a Catch Branch for Incomplete Orders for the Entire Process

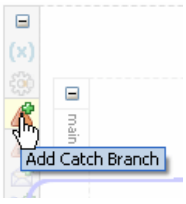
Add a catch branch to the process as a whole so that you can update the order status to be canceled in case an error occurs anywhere in the process. Figure 6–9 shows the catches for the `OrderProcessor` process. The branch on the left is a catch branch, which assigns a status of `'FAULTED'` to an order when there is an error. The branch on the right is a catchAll branch, which catches any fault not handled by the catch branch.

Figure 6–9 Catches in OrderProcessor



To create the catches for the process, perform the following tasks:

1. Click the **Add Catch Branch** icon for the process, as shown in the following figure:



2. Double-click the catch to display the Catch dialog.
3. Enter the following values:

Element	Value
Namespace	`http://www.globalcompany.example.com/ns/OrderBookingService`
Local Part	`OrderProcessorFault`

4. Click **OK** in the Catch dialog.
5. Click the **Expand** (+) icon to expand the **client:OrderProcessorFault** catch.
6. Create an invoke activity to invoke the **orderprocessor_client** service:
   a. From the Component Palette, drag an **Invoke** activity into right-side sequence.
   b. Rename this activity by double-clicking name underneath the icon. Do not double-click the invoke icon itself.
   c. In the edit field, change the name to `Invoke_FaultCallbackOPFault`.
   d. Drag the mouse from the left side of **Invoke_FaultCallbackOPFault** to **orderprocessor_client**.

      The Edit Invoke dialog appears and is automatically filled in with the following information:

Element	Value
Name	`Invoke_FaultCallbackOPFault`
Partner Link	`orderprocessor_client_ep`
Operation	`processFault`

   e. Click the **Browse Variables** icon. It is the first icon to the right of the **Input** field.

      The Variable Chooser dialog appears.
   f. Select the **gOrderProcessorFaultVariable** and then click **OK**.

      You created this variable in Section 5.10, "Creating Catch Branches for the Scope_AuthorizeCreditCard."
   g. In the Edit Invoke dialog, click **OK** to save the variable setting.
7. In the **client:OrderProcessorFault** catch, create an assign activity to assign expression `'FAULTED'` as input to global variable `gOrderInfoVariable`.
   a. From the Component Palette, drag an **Assign** activity into the branch, above the **Invoke_FaultCallbackOPFault**.
   b. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.
   c. In the edit field, enter `Assign_FaultedStatusToOrder`.
   d. Double-click **Assign_FaultedStatusToOrder**.

      The Assign dialog displays.
   e. From the dropdown list, select **Copy Operation**.

      The Create Copy Operation dialog appears.
   f. Enter and select the following values:

Element	Value
From	
▪ **Type**	**Expression**
▪ **Expression**	`string('FAULTED')`
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderInfoVariable** > **orderInfoVOSDO** and select **OrderStatusCode**, which is the variable containing the order information.

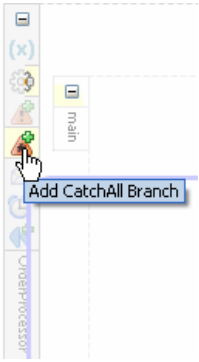
g. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

The Copy Operation tab in the Assign dialog updates to show the rule.

h. In the Assign dialog, click **OK**.

8. Click the **Collapse** (**-**) icon to minimize the **client:OrderProcessorFault** catch.

9. Click the **Add CatchAll Branch** icon for the process to catch any faults that are not handled by **client:OrderProcessorFault** catch.



10. Expand the **CatchAll** catch.

11. Create an invoke activity to invoke the **orderprocessor_client** service:

a. From the Component Palette, drag an **Invoke** activity into right-side sequence.

b. Rename this activity by double-clicking name underneath the icon. Do not double-click the invoke icon itself.

c. In the edit field, change the name to `Invoke_FaultCallback`.

d. Drag the mouse from the left side of **Invoke_FaultCallback** to **orderprocessor_client**.

The Edit Invoke dialog appears and is automatically filled in with the following information:

Element	Value
Name	`Invoke_FaultCallback`
Partner Link	`orderprocessor_client`

Element	Value
Operation	`processFault`

e. Click the **Browse Variables** icon. It is the first icon to the right of the **Input** field.

The Variable Chooser dialog appears.

f. Select the **gOrderProcessorFaultVariable** and then click **OK**.

You created this variable in Section 5.10, "Creating Catch Branches for the Scope_AuthorizeCreditCard."

g. In the Edit Invoke dialog, click **OK** to save the variable setting.

12. Assign expression `ora:getFaultAsString()` to global variable `gOrderProcessorFaultVariable`.

a. From the Component Palette, drag an **Assign** activity into the branch, above the **Invoke_FaultCallback**.

b. Rename this activity by double-clicking name underneath the icon. Do not double-click the assign icon itself.

c. In the edit field, enter `Assign_Fault`.

d. Double-click **Assign_Fault**.

The Assign dialog displays.

e. From the dropdown list, select **Copy Operation**.

The Create Copy Operation dialog appears.

f. Select the following values:

Element	Value
From	
▪ **Type**	**Expression**
▪ **Expression**	1. Select the **XPath Expression Builder** icon. 2. In the **Functions** section in the lower right, from the menu, select **Advanced Functions** and then select **getFaultAsString** from the menu options. 3. Click **Insert Into Expression**, and then click **OK** to return to the Create Copy Operation dialog.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderProcessorFaultVariable** and select **summary**.

g. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

The Copy Operation tab in the Assign dialog updates to show the rule.

13. Assign expression `ora:getFaultName()` to global variable `gOrderProcessorFaultVariable`.

a. From the dropdown list, select **Copy Operation**.

The Create Copy Operation dialog appears.

b. Select the following values:

Element	Value
From	
▪ **Type**	**Expression**
▪ **Expression**	1. Select the **XPath Expression Builder** icon. 2. In the **Functions** section in the lower right, from the menu, select **Advanced Functions** and then select **getFaultName** from the menu options. 3. Click **Insert Into Expression**, and then click **OK** to return to the Create Copy Operation dialog.
To	
▪ **Type**	**Variable**
▪ **Variable**	Expand **Variables** > **gOrderProcessorFaultVariable** and select **code**.

c. Click **OK** to close the Create Copy Operation dialog and return to the Assign dialog.

The Copy Operation tab in the Assign dialog updates to show the rule.

d. In the Assign dialog, click **OK**.

14. Click the **Collapse** (**-**) icon to minimize the catch.

15. Select **Save All** from the **File** main menu to save your work.

7

Adding the OrderPendingEvent Mediator Service Component

Business events consist of message data sent as the result of an occurrence in a business environment. When a business event is published, other service components can subscribe to it.

In this chapter, you learn how to subscribe to a business event using Oracle Mediator. At a high-level, you perform the following tasks:

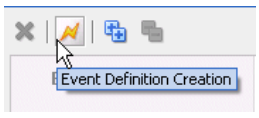
- Create a business named `NewOrderSubmitted`.
- Create `OrderPendingEvent` mediator service component to subscribe to the `NewOrderSubmitted` business event and initiate the `OrderProcessor` BPEL process through a routing rule to process the order through a routing rule.

This chapter contains the following sections:

7.1 Task 1: Create the NewOrderSubmitted Business Event

To create the `NewOrderSubmitted` business event:

1. Click the **composite.xml** tab to view the SOA Composite Editor.
2. Launch the Event Definition Creation wizard in either of two ways:
   a. In the SOA Composite Editor, click the **Event Definition Creation** icon above the designer:



   b. From the **File** main menu, select **New** > **SOA Tier** > **Service Components** > **Event Definition**.

   The Event Definition Creation dialog appears.
3. In the **Event Definition Name** field, enter `OrderEO`. Oracle JDeveloper saves the `NewOrderSubmitted` event to the `orderEO.edl` file.

4. Leave the default settings for the **Namespace** field.
5. Click the **Add an Event** icon to add an event.

   The Add an Event dialog appears.
6. Enter the following values.

Element	Value
Element	1. Click the **Browse** icon to select the payload. The Type Chooser dialog displays. 2. Expand **Project Schema Files** > **OrderEO.xsd** and select **NewOrderSubmittedInfo**. You imported this schema file when you copied the services in Section 5.2, as you were creating the `OrderProcessor` BPEL process. 3. Click **OK**.
Name	`NewOrderSubmitted`

7. Click **OK**.
8. In the Event Definition Creation dialog, click **OK**.

   The Business Events Editor displays with the `NewOrderSubmitted` event.
9. Select **Save All** from the **File** main menu to save your work.
10. Click **X** in the **OrderEO.edl** tab to close the definition file.

    The business event is published to MDS and you are returned to the SOA Composite Editor.

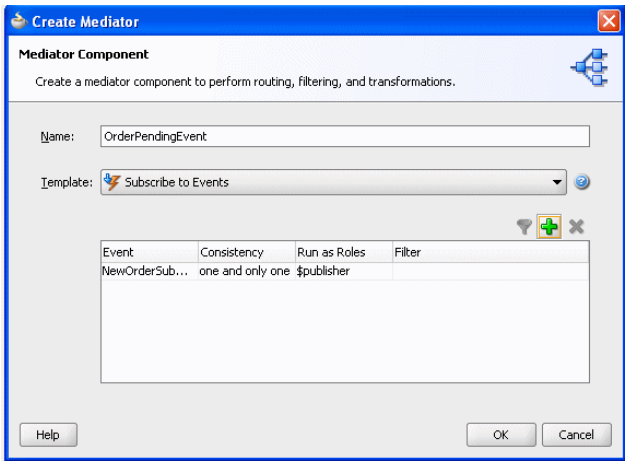
7.2 Task 2: Create Mediator Service Component to Subscribe to NewOrderSubmitted Business Event

To subscribe to the `NewOrderSubmitted` business event and initiate the `OrderProcessor` BPEL process:

1. Drag a **Mediator** service component into the SOA Composite Editor. This service component enables you to subscribe to the business event.
2. In the **Name** field, enter `OrderPendingEvent`.
3. From the **Templates** list, select **Subscribe to Events**.

   The window refreshes to display an events table.
4. Click the **Subscribe to a new event** icon to display the Event Chooser dialog.
5. With the **NewOrderSubmitted** event selected, click **OK**.

   You are returned to the Create Mediator dialog.



one and only one specifies that events are delivered to the subscriber in its own global (that is, JTA) transaction. Any changes made by the subscriber within the context of that transaction are committed when the event processing is complete. If the subscriber fails, the transaction is rolled back. Failed events are retried a configured number of times before being delivered to the hospital queue.

$publisher specifies the event requires a security role.

6. In the Create Mediator dialog, click **OK**.

   The `OrderPendingEvent` mediator displays in the SOA Composite Editor. The icon on the left side that indicates that mediator is configured for an event subscription.

7. Click **Source**.

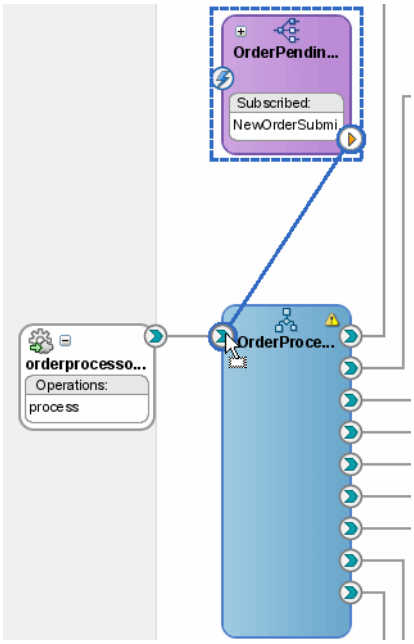
   The following source code provides details about the subscribed event of the mediator service component.

```
<component name="OrderPendingEvent">
  <implementation.mediator src="OrderPendingEvent.mplan"/>
  <business-events>
    <subscribe xmlns:sub1="http://schemas.oracle.com/events/edl/OrderEO"
               name="sub1:NewOrderSubmitted" consistency="oneAndOnlyOne"
               runAsRoles="$publisher"/>
  </business-events>
</component>
```

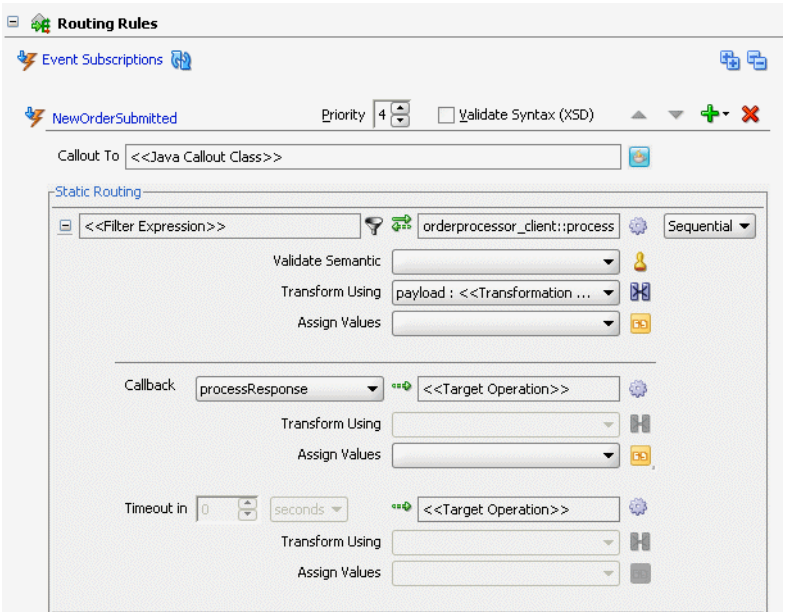
7.3 Task 3: Route OrderPendingEvent Mediator Service Component to OrderProcessor BPEL Process

To create a routing rule from the `OrderPendingEvent` mediator service component to the `OrderProcessor` BPEL process:

1. Back in the Design tab, drag a wire from **OrderPendingEvent** to the **OrderProcessor** reference handle.



2. Double-click **OrderPendingEvent** tab to see the rule in the Mediator Editor:



3. Modify the transformation used for the `OrderPendingEvent` mediator service component so that the `OrderProcessor` BPEL process receives input from the `NewOrderSubmitted` business event:

   a. Click the transformation icon next to the **Transform Using** field.

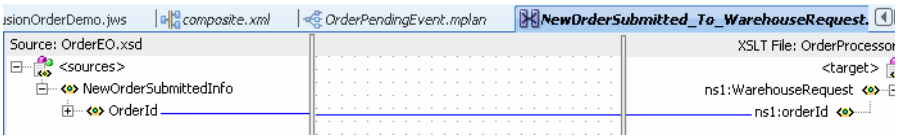
      The Event Transformation Map dialog displays.

   b. Select **Create New Mapper File**, use the default name `NewOrderSubmitted_To_WarehouseRequest.xsl` in the accompanying field, and then click **OK**.

      The Data Mapper displays.

c. On the **Source:OrderEO.xsd** (left) side, click and drag **OrderID** to **ns1:WarehousreRequest** > **ns1:orderId** on the **XSLT File: OrderProcessor.wsdl** (right) side. The namespace number values (for example, **ns1**, **ns2**) can vary.

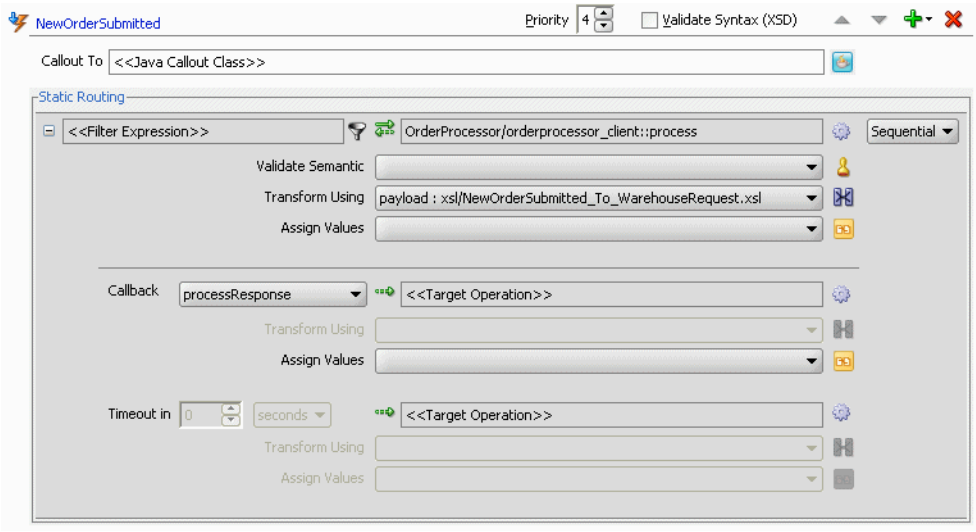
The Data Mapper dialog should look like the following now.



d. Select **Save All** from the **File** main menu to save your work.

e. Click **X** in the **NewOrderSubmitted_To_WarehouseRequest.xsl** tab to close the Data Mapper.

With the **OrderPendingEvent.mplan** tab back in focus, in the **Routing Rules** section, you should see the transformation updated as follows:



8

Adding a Flow to Update Orders

In this chapter, you provide functionality for updated orders. You create a mediator service component to publish business event `OrderUpdateEvent` and send the order ID for the order to the `OrderProcessor` BPEL process. You create a second mediator service component to subscribe to the business event, send the order ID to the `StoreFrontService` service, and wait for the `StoreFrontService` service to respond with updated order information.

This chapter contains the following sections:

8.1 Task 1: Copy Schema File Needed for Business Event

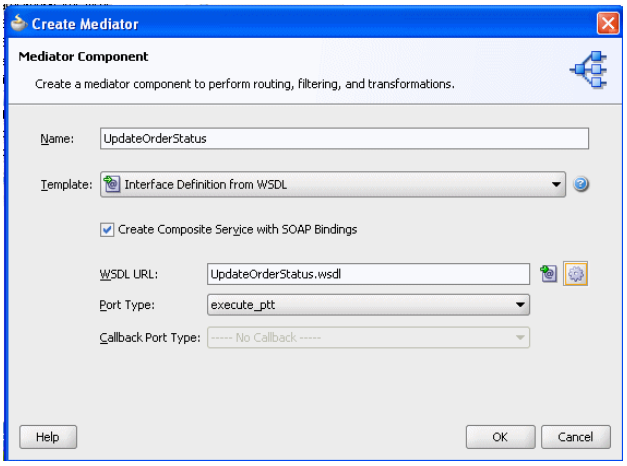
To obtain the schema:

1. Copy `OrderProcessor.xsd` from directory *`DEMO_DOWNLOAD_HOME`*`\CompositeServices\OrderBookingComposite\xsd` to *`MY_FOD_HOME`*`\CompositeServices\OrderBookingComposite\xsd`. This schema file contains the additional `updateOrderStatus` schema element to create the business event.
2. In the Application Navigator, click the **Refresh** icon.

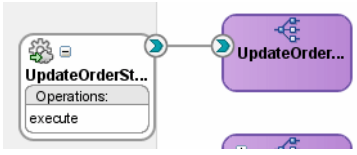
8.2 Task 2: Create the UpdateOrderStatus Mediator Service Component to Publish the OrderUpdateEvent Business Event

To create business event `OrderUpdateEvent` and create a mediator to publish the business event:

1. Drag a **Mediator** service component into the SOA Composite Editor. This service component enables you to subscribe to the business event.
2. In the **Name** field, enter `UpdateOrderStatus`.
3. From **Template**, select **Interface Definition from WSDL**.
4. Select the **Create Composite Service with SOAP Bindings**.
5. From the **WSDL URL** field, generate a WSDL file:
   a. Click the **Generate WSDL from schema(s)** icon.
   b. From the Create WSDL dialog, in the **URL** field, click the **browse for schema file** icon.
   c. In the Type Chooser dialog, expand **Project Schema Files** > **OrderProcessor.xsd** and select **updateOrderStatus**.
   d. Click **OK**.
   e. Back in the Create WSDL dialog, in the **Namespace** field, enter `http://www.globalcompany.example.com/ns/OrderBookingService`.
   f. Click **OK** and return to the Create Mediator dialog.
6. Back in the Create Mediator dialog, click **OK** to create the mediator with the settings.



The `UpdateOrderStatus_ep` SOAP service and the `UpdateOrderStatus` mediator display in the SOA Composite Editor composite.



8.3 Task 3: Create a Routing Rule to Initiate the Business Event

To create a routing rule to initiate the business event:

1. Double-click the **UpdateOrderStatus** mediator.
2. In the **Routing Rules** section of the Mediator Editor, from the **Create** dropdown list, select **static routing rule** to create a routing rule to initiate the business event.

3. In the Target Type message dialog, click **Event**.
4. In the Event Chooser dialog, click the **Create new event definition file (edl)** icon. It is the second icon to the right of the field.
5. In the **Event Definition name** field, enter `OrderEventsDefinition`.
6. In the **Namespace** field, enter `http://www.globalcompany.example.com/ns/OrderBookingService`.
7. Create business event `OrderUpdateEvent`:
   a. From the **Events** table, click the **Add an Event** icon to add an event.

      The Add an Event dialog appears.

   b. Enter and select the following values:

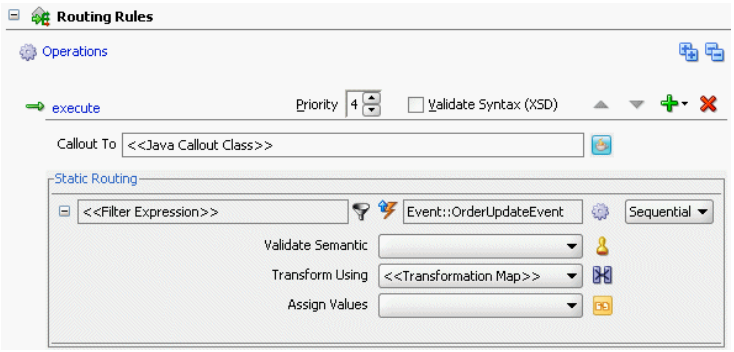
Element	Value
Element	1. Click the **Browse** icon to select the payload. The Type Chooser dialog displays. 2. Expand **Project Schema Files** > **OrderProcessor.xsd** and select **updateOrderStatus**. 3. Click **OK**.
Name	`OrderUpdateEvent`

   c. Click **OK** to display the Event Definition dialog.
   d. Click **OK** to save settings.

      The Event Chooser dialog displays with the `OrderUpdateEvent` event.

   e. Click **OK** in the Event Chooser dialog.

      The Routing Rules updates with a routing rule to initiate business event `OrderUpdateEvent`.



8. Modify the transformation used for the `UpdateOrderStatus` mediator service components, so that any service subscribing to this event receives input from the `OrderUpdateEvent` business event:
   a. Click the transformation icon next to the **Transform Using** field.

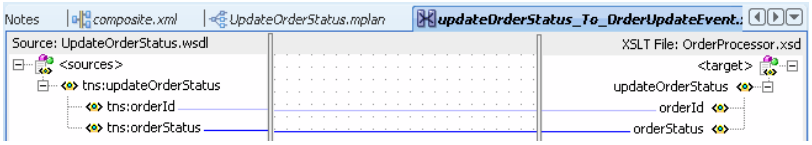
b. In the Request Transformation Map dialog, select **Create New Mapper File** and leave the default file entry as `updateOrderStatus_To_OrderUpdateEvent.xsl`, and then click **OK**.

   The Data Mapper displays.

c. On the **Source:UpdateOrderStatus.wsdl** (left) side, click and drag **tns:orderId** to **orderId** on the **XSLT File: OrderProcessor.xsd** (right) side.

d. On the **Source:UpdateOrderStatus.wsdl** (left) side, click and drag **tns:orderStatus** to **orderStatus** on the **XSLT File: OrderProcessor.xsd** (right) side. The namepace in your environment may vary.

   The Data Mapper dialog should look like the following now.



e. Select **Save All** from the **File** main menu to save your work.

f. Click **X** in the **updateOrderStatus_To_OrderUpdateEvent.xsl** tab to close the Data Mapper.

g. With the **UpdateOrderStatus.mplan** tab back in focus, in the **Routing Rules** section, you should see file **updateOrderStatus_To_OrderUpdateEvent.xsl** in the **Transform Using** field.

9. Click **X** in the **UpdateOrderStatus.mplan** tab to close Mediator Editor.

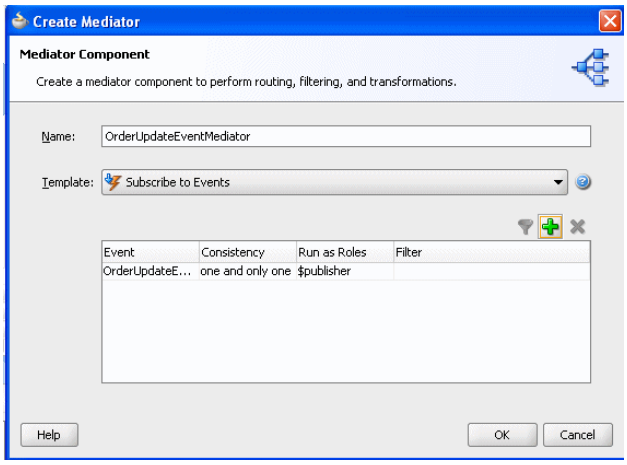
8.4 Task 4: Create the OrderUpdateEventMediator Mediator Service Component to Subscribe to the OrderUpdateEvent Business Event

To create a mediator to subscribe to the `OrderUpdateEvent` business event and initiate the `StoreFrontService` service:

1. Drag a **Mediator** service component into the SOA Composite Editor. This service component enables you to subscribe to the business event.
2. In the **Name** field, enter `OrderUpdateEventMediator`.
3. From the **Templates** list, select **Subscribe to Events**.

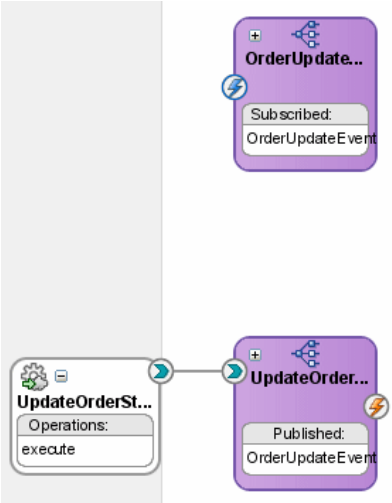
   The window refreshes to display an events table.
4. Click the **Subscribe to a new event** icon to display the Event Chooser dialog.
5. With the **OrderUpdateEvent** event selected, click **OK**.

   You are returned to the Create Mediator dialog.



6. In the Create Mediator dialog, click **OK**.

   The `OrderUpdateEventMediator` mediator displays in the SOA Composite Editor. The icon on the left side that indicates that mediator is configured for an event subscription.



8.5 Task 5: Create a Routing Rule to Send Order Updates to the StoreFrontService service

To create routing rules to send the order ID to the `StoreFrontService` service, and wait for the `StoreFrontService` service to respond with updated order information.

1. Double-click the **OrderUpdateEventMediator** mediator.
2. In the **Routing Rules** section of the Mediator Editor, from the **Create** dropdown list, select **static routing rule** to create a routing rule to initiate the business event.
3. In the Target Type message dialog, click **Service**.
4. In the Target Services dialog, expand **References** > **StoreFrontService** and select **getOrderInfoVOSDO** and then click **OK**.
5. Modify the parameter transformation so that the `StoreFrontService` service receives the order ID information from the mediator:

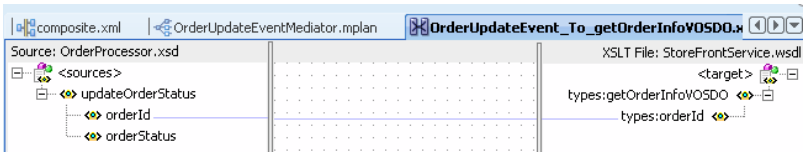
a. Click the transformation icon next to the **Transform Using** field.

b. In the Request Transformation Map dialog, select **Create New Mapper File** and leave the default file entry as `OrderUpdateEvent_To_getOrderInfoVOSDO.xsl`, and then click **OK**.

   The Data Mapper displays.

c. On the **Source:OrderProcessor.xsd** (left) side, click and drag **orderId** to **types:orderId** on the **StoreFrontService.wsdl** (right) side.

   The Data Mapper dialog should look like the following now.

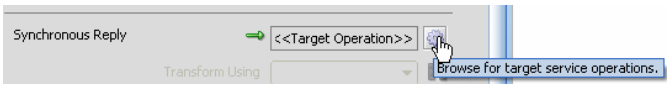


d. Select **Save All** from the **File** main menu to save your work.

e. Click **X** in the **OrderUpdateEvent_To_getOrderInfoVOSDO.xsl** tab to close the Data Mapper.

f. With the **OrderUpdateEventMediator.mplan** tab back in focus, in the **Routing Rules** section, you should see file **OrderUpdateEvent_To_getOrderInfoVOSDO.xsl** in the **Transform Using** field.

6. In the **Synchronous Reply** section of the Mediator Editor, click the **Browse for target service operations** icon:



7. In the Target Type message dialog, click **Service**.

8. In the Target Services dialog, expand **References** > **StoreFrontService** and select **updateOrderInfoVOSDO** and then click **OK**.

9. Modify the parameter transformation so that the `StoreFrontService` service receives the proper information from the mediator:

   a. Click the transformation icon next to the **Transform Using** field.

   b. In the Request Transformation Map dialog, select **Create New Mapper File** and leave the default file entry as `getOrderInfoVOSDOResponse_To_updateOrderInfoVOSDO.xsl`, and then click **OK**.

      The Data Mapper displays.

   c. On the **Source** (left) side, click and drag **types:getOrderInfoVOSDOResponse** > **types:result** to **types:updateOrderInfoVOSDO** > **types:orderInfoVO1** on the **XSLT File** right side.

      The Auto Map Preferences dialog prompts to perform automatic mapping of the node.

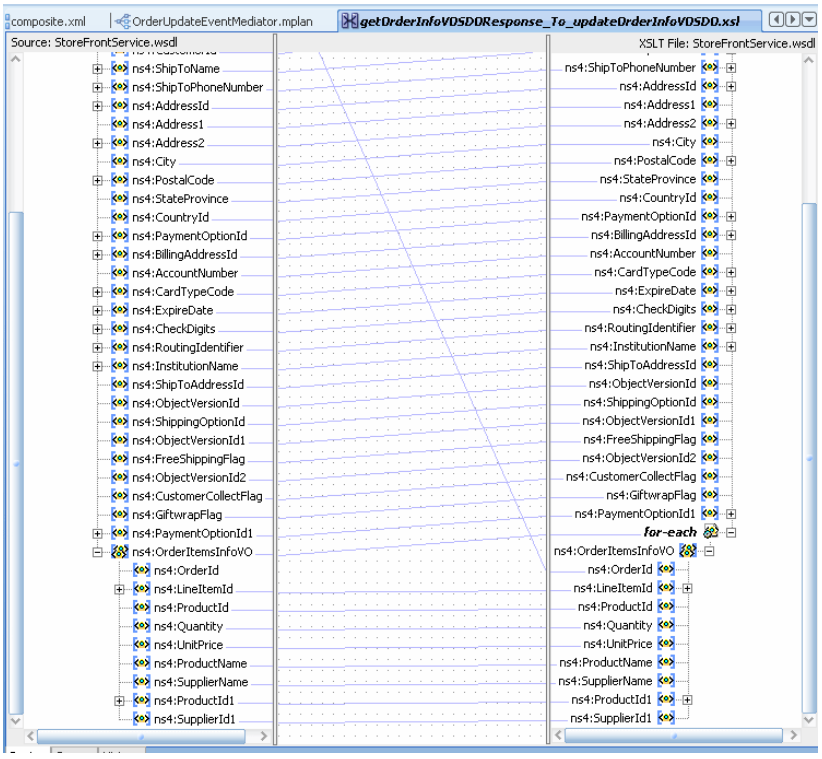
   d. Deselect option **Match Elements Considering their Ancestor names**.

   e. Leave the default settings for the other options, and then click **OK**.

   f. On the **Source:StoreFrontService.wsdl** side, expand **types:results** > **ns4:OrderItemsInfoVO**.

g. On the **XSLT File:StoreFrontService.wsdl** side, expand **types:orderInfoVO1** > **for-each** > **ns4:OrderItemsInfoVO**. The namespace number values (for example, **ns1**, **ns2**) can vary.

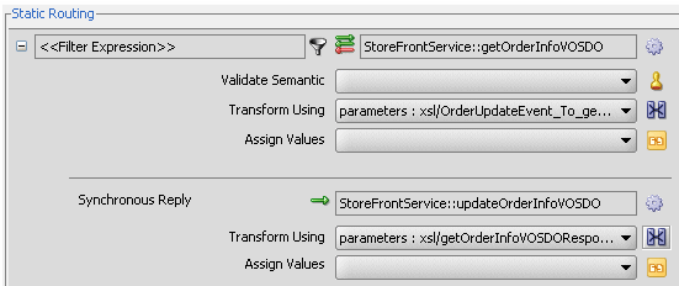
In the Data Mapper, you can now see how the data is transformed for an updated order.



h. Select **Save All** from the **File** main menu to save your work.

i. Click **X** in the **getOrderInfoVOSDOResponse.xsl** tab to close the Data Mapper.

j. With the **OrderUpdateEventMediator.mplan** tab back in focus, in the **Routing Rules** section, you should see file **getOrderInfoVOSDOResponse_To_updateOrderInfoVOSDO.xsl** in the **Transform Using** field.



10. Click **X** in the **OrderUpdateEventMediator.mplan** tab to close Mediator Editor.

8.6 Task 6: Redeploy the OrderBookingComposite Composite

To redeploy the `OrderBookingComposite` composite:

1. In the Application Navigator, right-click **OrderBookingComposite** and select **Deploy** > **OrderBookingComposite** > to **MyAppServerConnection**.

   The SOA Deployment Configuration Dialog displays.

2. Select **Overwrite any existing composite with the same revision ID** to overwrite the composite you previously deployed.

3. When prompted with the Authorization Request dialog, enter `weblogic` in the `Username` field and the password in the `Password` field.

   In SOA - Log, a series of validations display, followed by:

   ```
   BUILD SUCCESSFUL
   Total time: nn seconds
   ```

8.7 Task 7: Initiate a Test Instance for the OrderBookingComposite Composite

Initiate a test instance of the `OrderBookingComposite` composite, as you have done previously. See Section 5.7.6, "Task 6: Initiate a Test Instance for the OrderBookingComposite Composite" for further information on creating a test instance. For this test instance, make the following adjustments:

- From the **Test** dropdown list, select **UpdateOrderStatus_ep** as the test service.
- In the **Inputs Arguments** section, enter the following values:
  - In the **orderID** field, enter an ID under `1000`.
  - In the **orderStatus** field, enter any value.

9

Creating the Task Display Form for the ApprovalHumanTask Human Task

In Chapter 5, "Creating the First Half of the OrderProcessor BPEL Process," you created the `OrderProcessor` BPEL process. The `CheckIfRequiresApproval` switch of that process uses a human task to pass control to the `ApprovalHumanTask` human task activity. This human task activity enables a manager named `jstein` to approve or reject orders totalling more than $2,000. In this chapter, you create the task form for `jstein`.

This chapter contains the following sections:

- Section 9.1, "About the Task Form"
- Section 9.2, "Task 1: Create a New Task Form for the ApprovalHumanTask Human Task"
- Section 9.3, "Task 2: Add the ADF Business Components Service Runtime Library to the Project"
- Section 9.4, "Task 3: Create the Contents for the Task Form"
- Section 9.5, "Task 4: Deploy the OrderApprovalHumanTask Task Form"

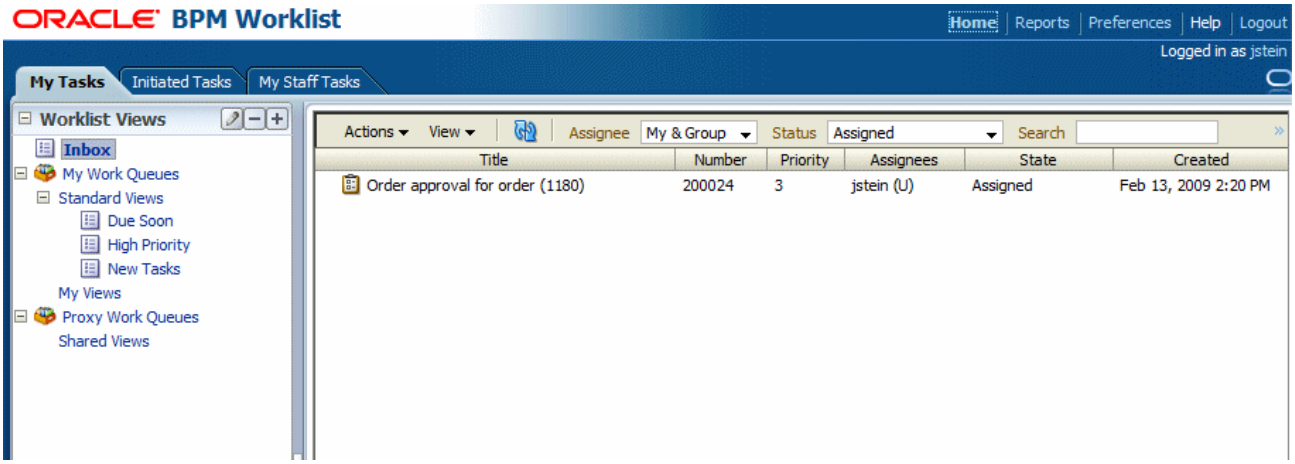
9.1 About the Task Form

The task form is a way for `jstein` to interact with the `ApprovalHumanTask` human task. The task form displays the contents of the task to a user's worklist. Earlier, when you deployed and ran Fusion Order Demo in Chapter 2, you can use the Oracle BPM Worklist to display all the worklist tasks and approve or deny orders totalling more than $2,000.

You create the task form using Oracle Application Development Framework (Oracle ADF) in Oracle JDeveloper. With Oracle ADF, you can design a task display form that depicts the human task in the SOA composite.

The task form is a Java Server Page XML (`.jspx`) file that you create in a new project of the `WebLogicFusionOrderDemo` application. Figure 9–1 shows a sample worklist.

Figure 9–1 Task Form in Oracle BPM Worklist



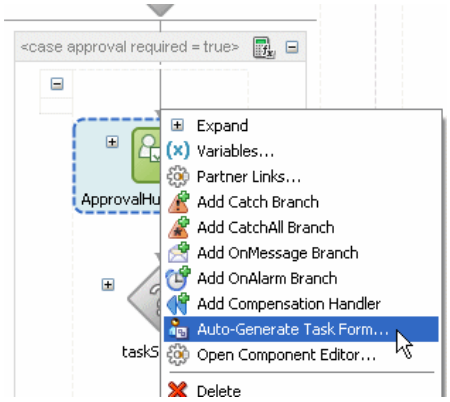
9.2 Task 1: Create a New Task Form for the ApprovalHumanTask Human Task

When you create a task form based on a human task, Oracle JDeveloper performs the following during task-flow creation:

- Creates data controls based on the task parameters and outcomes
- Creates the initial task form, including the payload

To create a task form based on the `ApprovalHumanTask` human task:

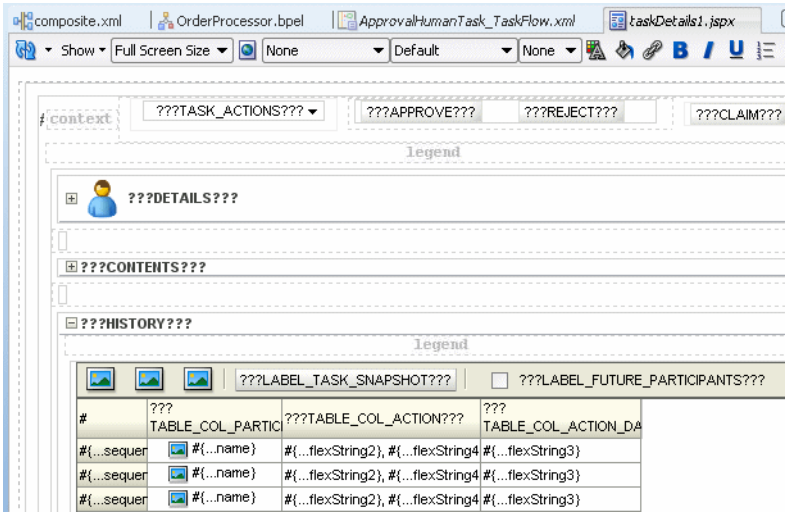
1. Open the `OrderProcessor` BPEL process within the SOA composite application.
2. Scroll to the **Scope_CheckApprovalLimit** scope and expand it.
3. Expand the sequence.
4. Right-click the **ApprovalHumanTask_1** human task activity and select **Auto-Generate Task Form**, as shown in the following figure.



   The Create Project dialog displays.

5. Enter `OrderApprovalHumanTask` for the project name and click **OK**.

   The **ApprovalHumanTask_TaskFlow.xml** tab displays with the task flow definition and the **taskDetails1.jspx** tab displays the JSP page with the payload.



9.3 Task 2: Add the ADF Business Components Service Runtime Library to the Project

To add the ADF Business Components service run-time library:

1. In the Application Navigator, right-click **OrderApprovalHumanTask** and select **Project Properties**.
2. Select **Libraries and Classpath**, and from the Libraries and Classpath page, and click **Add Library**.
3. In the Add Library dialog, select **BC4J Service Runtime**, and then click **OK**.
4. In the Libraries and Classpath page, click **OK**.

9.4 Task 3: Create the Contents for the Task Form

To provide input from the `StoreFrontService` service in the **Contents** showDetailHeader for the task form.

1. Add a data control for the `StoreFrontService` service.
   a. In the Application Navigator, right-click the **OrderApprovalHumanTask** project and select **New**.
   b. In the New Gallery dialog, click the **All Technologies** tab.
   c. In the **Categories** tree, select **Business Tier**, and then **Data Controls**.
   d. Select **Web Service Data Control** and click **OK**.

      The Create Web Service Data Control - Step 1 of 5 page displays.
   e. In the **Name** field, enter `StoreFrontService`.
   f. In the **URL** field, click **Browse** and select `StoreFrontService.wsdl` in *`MY_FOD_HOME`*`\CompositeServices\OrderBookingComposite\services\oracle\fodemo\storefront\store\service\common\serviceinterface`.

      In many ways, this process is similar to creating a references to a service in the SOA Composite Editor.

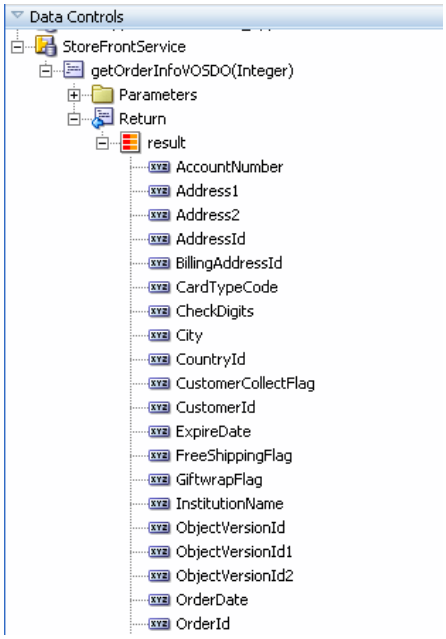
g. In the Create Web Service Data Control - Step 1 of 5 page, click **Next**.

h. In the Create Web Service Data Control - Step 2 of 5 page, select the **getOrderInfoVOSDO** operation from the **Available** list and click the **Add** button. Click **Next** to proceed to the next page in the wizard.

i. In the Create Web Service Data Control - Step 3 of 5 page, accept the default, and click **Finish**.

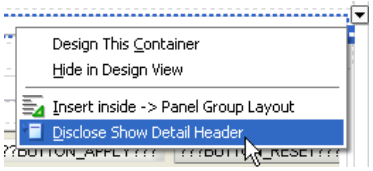
The **StoreFrontService** data control displays in the **Data Controls** panel of the Application Navigator.

j. In the **Data Controls** panel of the Application Navigator, expand the **StoreFrontService** > **getOrderInfoVOSDO** > **Return** > **result** to see the data controls you can include in the form.

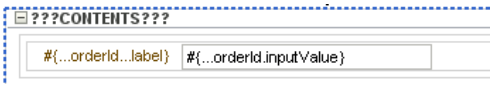


2. In the taskDetails1.jpsx page, select the **CONTENTS** showDetailHeader and from the menu, select **Design this Container**.

3. With the **CONTENTS** showDetailHeader still selected, from the menu, select **Disclose Show Detail Header**.

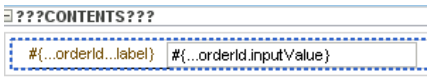


The **CONTENTS** header shows the order ID is included.

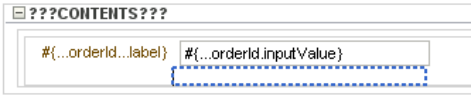


4. Select the panelFormLayout containing the **orderID** input label and click Enter.

The following image shows the panelgroupLayout being selected.



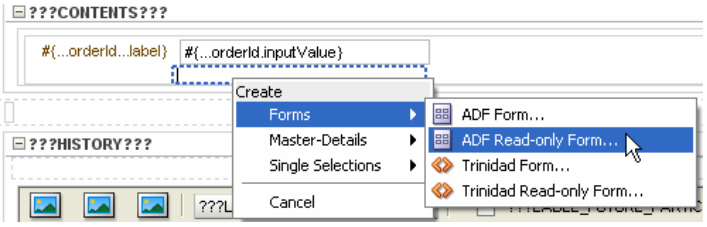
After you click Enter, a new label displays.



5. Add parameters from the `StoreFrontService` service into the task form:

   a. In the **Data Controls** panel of the Application Navigator, drag the **result** icon into the empty input field.

   b. From the **Create** menu, select **Forms**, and then **ADF Read-only Form**, as shown in the following figure.

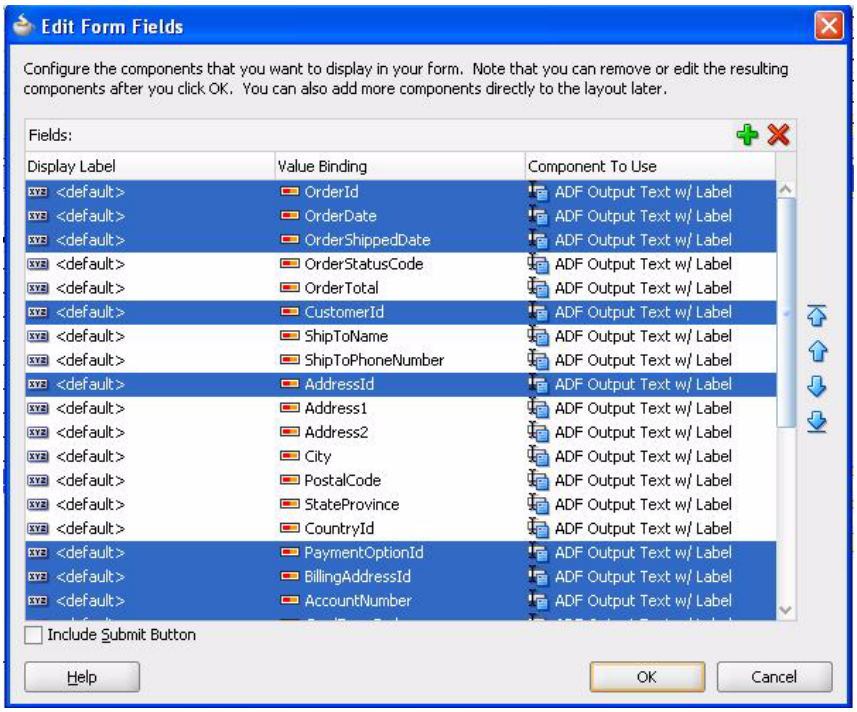


   The Edit Action dialog displays with the **ApprovalHumanTask_ ApprovalHumanTask** data control selected.

   c. In the Edit Form Fields dialog, select all but the following fields and click the **Delete** icon:

   - **OrderStatusCode**
   - **OrderTotal**
   - **ShipToName**
   - **ShipToPhoneNumber**
   - **Address1**
   - **Address2**
   - **City**
   - **PostalCode**
   - **StateProvince**
   - **CountyId**

   The Edit Form Fields dialog should look like the following image:



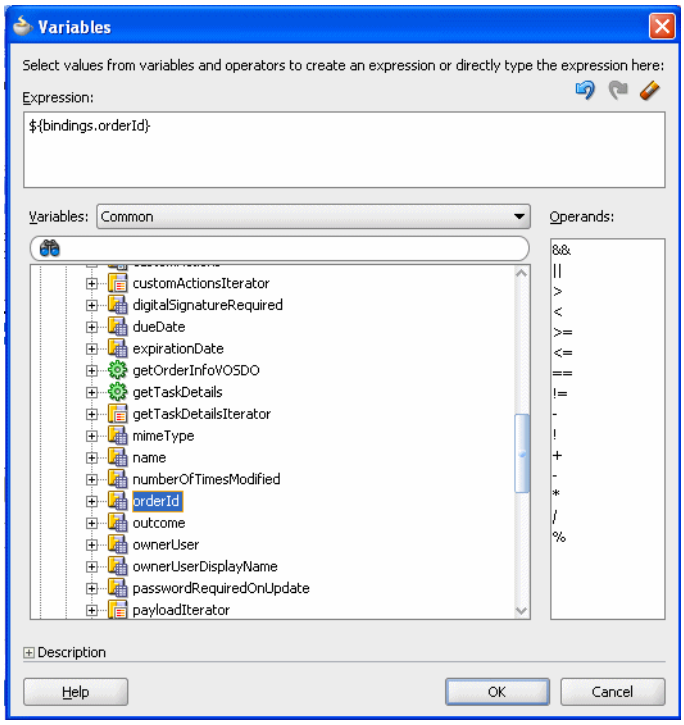
d. Click **OK**.

The Edit Action dialog displays with the **StoreFrontService** data collection selected.

e. In the **Parameters** section, in the **Value** field, select **Show El Expression Builder**.

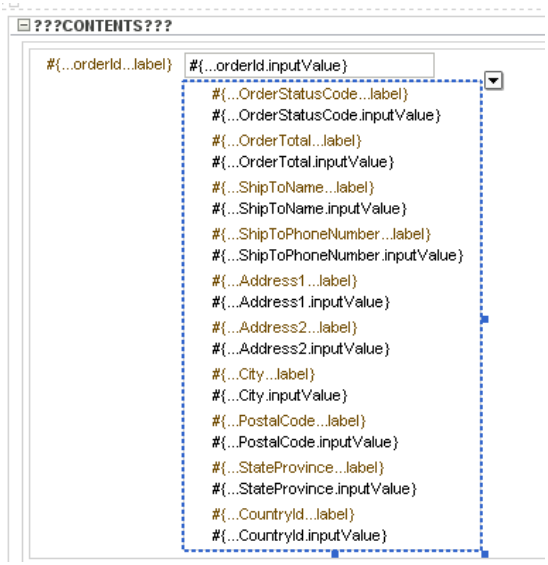
The Variables dialog displays.

f. Expand **ADF Bindings** > **bindings** and select **orderId** and then select **OK**.



g. In the Edit Action dialog, click **OK**.

The **CONTENTS** header shows the selected input parameters:



6. Select **Save All** from the **File** main menu to save your work.

9.5 Task 4: Deploy the OrderApprovalHumanTask Task Form

To deploy the `OrderApprovalHumanTask` form:

1. In the Application Navigator, right-click **OrderApprovalHumanTask** and select **Deploy** > **OrderApprovalHumanTask** > to **MyAppServerConnection**.

The SOA Deployment Configuration Dialog displays.

2. Accept the default settings and click **OK**.
3. When prompted with the Authorization Request dialog, enter `weblogic` in the `Username` field and the password in the `Password` field.

   In SOA - Log, a series of validations display, followed by:

   ```
   BUILD SUCCESSFUL
   Total time: nn seconds
   ```

10

Conclusion

Congratulations! You created an SOA composite application using the following components:

- Oracle Mediator
- Oracle BPEL Process Manager
- Human Oracle Human Workflow (using a human task)
- Oracle Business Rules
- Oracle Messaging Service

You should now have a working knowledge of the advantages provided by Oracle SOA Suite. To learn more, refer to the following resources:

- *Oracle Fusion Middleware Getting Started with Oracle SOA Suite* provides an overview of Oracle SOA Suite and other Oracle products that complement your SOA environment.
- *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite* describes how to create and deploy applications using Oracle SOA Suite.
- *Oracle Fusion Middleware Administrator's Guide for Oracle SOA Suite* describes how to administer the run-time environment for Oracle SOA Suite, with a focus on Fusion Middleware Control.
- *Oracle Fusion Middleware User's Guide for Oracle Business Rules* provides additional details for creating Oracle Business Rules programs.
- Oracle SOA Suite on Oracle Technology Network provides access to various use-case samples for Oracle SOA Suite and its components.:

  `http://www.oracle.com/technology/sample_code/products/soa`

A

Create the JMS Topic for the FulfillmentBatch Adapter

This appendix complements Section 6.4, "Creating the Services and Routing Required for the Scope_FulfillOrder Scope." It contains the following tasks:

- Section A.1, "Task 1: Create the JMS Topic"
- Section A.2, "Task 2: Create the JMS Topic Connection Factory"
- Section A.3, "Task 3: Add the Connection Pool"

A.1 Task 1: Create the JMS Topic

The `DemoSupplierTopic` topic defines a publish and subscribe destination type, which is used for asynchronous peer communications.

To create it through the Oracle WebLogic Server Administration Console.

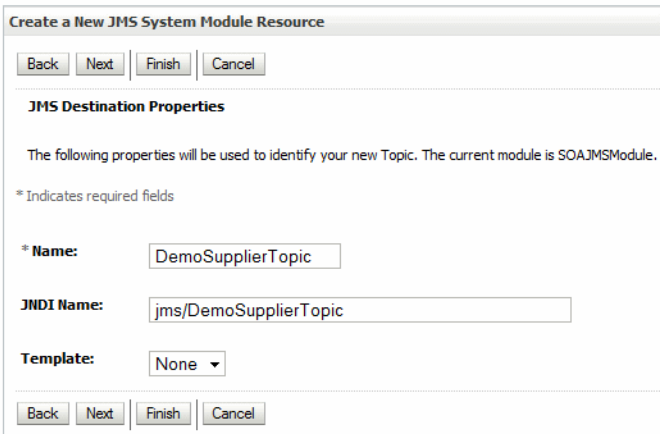
1. Access the Oracle WebLogic Server Console from the following URL:

   `http://hostname:port/console`

   where is the *`hostname`* is the DNS name or IP address of the Administration Server for Oracle SOA Suite and *`port`* is the DNS name or IP address of the Administration Server and port is the address of the port on which the Administration Server is listening for requests (7001 by default).

2. When the login page appears, enter the user name and the password you used to start the Administration Server (you may have specified this user name and password during the installation process), or enter a user name that is granted a default global security role.
3. Click **Log In**.
4. In the Administration Console, from the navigation pane, expand **Services** > **Messaging** and select **JMS Modules**.
5. On the JMS Modules page, select **SOAJMSModule**.
6. On the Settings for SOAJMSModule page, in the **Summary of Resources** table, select **New**.
7. On the Create a New JMS System Module Resource page, select **Topic** and then **Next**.
8. In the **JMS Destination Properties** section, enter the following details:

Element	Value
Name	`DemoSupplierTopic`
JNDI Name	`jms/DemoSupplierTopic`



9. Click **Next**.
10. From the **Subdeployments** list, select **SOASubDeployment**.
11. From the **JMS Servers** table, select **SOAJMSServer**, and then click **Finish**.

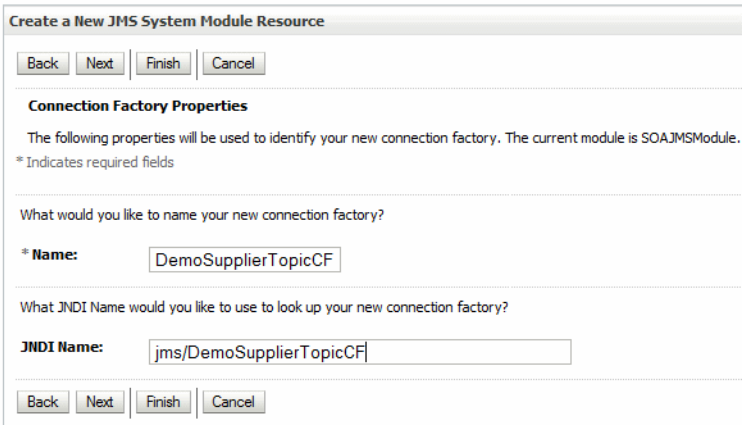
    The **Summary of Resources** table now displays the topic **DemoSupplierTopic**.

A.2 Task 2: Create the JMS Topic Connection Factory

To add the connection factory, which defines a set of connection configuration parameters to create connections for JMS clients:

1. On the Settings for SOAJMSModule page, in the **Summary of Resources** table, select **New** again.
2. On the Create a New JMS System Module Resource page, select **Connection Factory** and then **Next**.
3. In the **Connection Factory Properties** section, enter the following details:

Element	Value
Name	`DemoSupplierTopicCF`
JNDI Name	`jms/DemoSupplierTopicCF`



4. Click **Next**.
5. Click **Finish**.

   On the Settings for SOAJMSModule page, the **Summary of Resources** table now displays both the **DemoSupplierTopic** topic and the connection factory **DemoSupplierTopicCF**.

☐	DemoSupplierTopic	Topic	jms/DemoSupplierTopic	SOASubDeployment	SOAJMSServer
☐	DemoSupplierTopicCF	Connection Factory	jms/DemoSupplierTopicCF	Default Targetting	soa_server1

A.3 Task 3: Add the Connection Pool

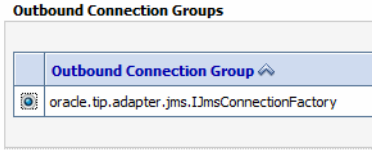
A connection pool is configured in the `JMSAdapter` application.

To add a connection pool:

1. The `JMSAdapter` application uses a deployment plan. Create a directory for deployment plan in the following directory:

   `(UNIX)` *`MW_HOME`*`/soa/JSMPlan`
   `(Windows)` *`MW_HOME`*`\soa\JSMPlan`

2. In the Administration Console, from the navigation pane, select **Deployments**.
3. On the Summary of Deployments page, from the **Deployments** table, select the **JmsAdapter** link.
4. On the Settings for JmsAdapter page, select the **Configuration** tab and then the **Outbound Connection Pools** sub-tab.
5. From the **Outbound Connection Pool Configuration** table, click **New**.
6. From the **Outbound Connection Groups** table, select **oracle.tip.adapter.jms.IJmsConnectionFactory**, and then click **Next**.



7. In the **JNDI Name** field, enter `eis/Jms/TopicConnectionFactory`.
8. Click **Finish**.

9. When prompted to select a deployment plan, perform the following steps:
   a. In the **Path** field, select the path to the directory you created in Step 1 and enter `Plan.xml` after the path.

      If there is a plan file selected with the option at the top of the page, the one you enter takes precedence.
   b. Click **OK**.
   c. Verify the plan name is set to `Plan.xml` in the `JMSPlan` directory.
10. Select the **Configuration** tab.
11. Expand the select **oracle.tip.adapter.jms.IJmsConnectionFactory**, and select **eis/Jms/TopicConnectionFactory**
12. For the following rows, select the **Property Value** cell on the far right, modify the value as specified, and then press Enter.

Row	Property Value
ConnectionFactoryLocation	`jms/DemoSupplierTopicCF`
IsTopic	`true`
Username	The Oracle WebLogic Server administrator. For example: `weblogic`
Password	The password of the Oracle WebLogic Server `weblogic` user. For example: `welcome1`

13. Click **Save**.
14. Redeploy the adapter:
    a. From the navigation pane, select **Deployments**.

       The Summary of Deployments page displays with the **Deployments** table.
    b. Select the check box next to the **JmsAdapter**, and then click **Update**.
    c. In the Update Application Assistant page, click **Redeploy this application using the following deployment file**.
    d. Click **Next**.
    e. Click **Finish**.

B

ant Scripts

This appendix contains the following sections:

B.1 About ant Scripts

`ant` is a Java-based build tool used by Oracle SOA Suite for managing SOA composite applications. The WebLogic Fusion Order Demo application provides an example of using `ant` scripts to compile, package, and deploy the application.

The following files control the `ant` scripts:

- `build.properties` in *`DEMO_DOWNLOAD_HOME`*`/CompositeServices/bin`

  A file that you edit to reflect your environment (for example, specifying Oracle home and Java home directories, setting server properties such as host name and port number to use for deployment, specifying the application to deploy, and so on).

- `build.xml` in *`DEMO_DOWNLOAD_HOME`*`/CompositeServices/bin`

  Used by `ant` to compile, build, and deploy composite applications to the server specified in the `build.properties` file.

To use `ant` scripts for specified `ant` targets:

1. Modify the `build.properties` file to reflect your environment.
2. In the Application Navigator, under the **Resources** node, right-click **build.xml** and choose **Run Ant Target** and select appropriate `ant` target.

   This command builds the targets defined in the `build.xml` file.

B.2 ant Targets for WebLogicFusionOrderDemo

Table B–1 describes the targets available in the `build.xml` file. It shows which other targets are dependent or called from a target. If a called target exists in another file, the table references the file and location as *`directory`*`>` *`file_name`*`>` *`target`*).

Table B–1 ant Targets for WebLogicFusionOrderDemo

ant Target	Description	Dependent Targets and Targets Called From Other Targets. Targets from another file display as *directory* > *file_name* > *target*.
`build.src.zip`	This script creates the source distribution.	Depends on `clean`
`clean`	This script removes existing sources.	Depends on `init` and runs the following: **1.** `orderbooking.composite.home/bin` > `build-sca-composite.xml` > `clean` **2.** `orderbooking.bam.home/bin` > `build-sca-composite.xml` > `clean` **3.** `partnersupplier.composite.home/bin` > `build-sca-composite.xml` > `clean` **4.** `b2b.composite.home/bin` > `build-sca-composite.xml` > `clean`. **5.** `orderbookingsdo.composite.home/bin` > `build-sca-composite.xml` > `clean` **6.** `creditauthorization.home/bin` > `build-sca-composite.xml` > `clean` **7.** `creditauthorization.home/bin` > `build-sca-composite.xml` > `clean` **8.** `orderapproval.home/bin/bin` > `build-sca-composite.xml` > `clean`

`compile-build-all`	This script compiles and builds all applicable composites and applications.	Depends on `init` and runs the following:
		1. `orderbooking.composite.home/bin` > `build-sca-composite.xml` > `create-deployable-composite`
		-*ORACLE_HOME*`/bin` > `ant-sca-package.xml` > `package`
		`-orderbooking.composite.home/bin` > `build-sca-composite.xml` > `setupDeploymentEnvironment`
		2. `orderbooking.bam.home/bin` > `build-sca-composite.xml` > `create-deployable-composite`
		-*ORACLE_HOME*`/bin` > `ant-sca-package.xml` > `package`
		`-orderbooking.bam.home/bin` > `build-sca-composite.xml` > `setupDeploymentEnvironment`
		3. `partnersupplier.composite.home/bin` > `build-sca-composite.xml` > `create-deployable-composite`
		-*ORACLE_HOME*`/bin` > `ant-sca-package.xml` > `package`
		4. `b2b.composite.home/bin` > `build-sca-composite.xml` > `create-deployable-composite`
		-*ORACLE_HOME*`/bin` > `ant-sca-package.xml` > `package`
		`-b2b.composite.home/bin` > `build-sca-composite.xml` > `setupDeploymentEnvironment`
		5. `orderbookingsdo.composite.home` > `build-sca-composite.xml` > `create-deployable-composite`
		-*ORACLE_HOME*`/bin` > `ant-sca-package.xml` > `package`
		6. `creditauthorization.home/bin` > `build.xml` > `create-war`
		7. `orderapproval.home/bin` > `build.xml` > `create-ear`

Table B–1 (Cont.) ant Targets for WebLogicFusionOrderDemo

ant Target	Description	Dependent Targets and Targets Called From Other Targets. Targets from another file display as *directory* > *file_name* > *target*.
`compile-deploy-all`	This script compiles, builds, and deploys all applicable composites and applications.	Depends on `compile-build-all` and runs the following: **1.** `orderbooking.composite.home/bin` > `build-sca-composite.xml` > `deploy-composite` -*ORACLE_HOME*`/bin` > `ant-sca-compile.xml` > `attachplan` -*ORACLE_HOME*`/bin` > `ant-sca-deploy.xml` > `deploy` **2.** `orderbooking.bam.home/bin` > `build-sca-composite.xml` > `deploy-composite` -*ORACLE_HOME*`/bin` > `ant-sca-compile.xml` > `attachplan` -*ORACLE_HOME*`/bin` > `ant-sca-deploy.xml` > `deploy` **3.** `partnersupplier.composite.home/bin` > `build-sca-composite.xml` > `deploy-composite` -*ORACLE_HOME*`/bin` > `ant-sca-compile.xml` > `attachplan` **4.** `b2b.composite.home/bin` > `build-sca-composite.xml` > `deploy-composite` -*ORACLE_HOME*`/bin` > `ant-sca-compile.xml` > `attachplan` -*ORACLE_HOME*`/bin` > `ant-sca-deploy.xml` > `deploy` **5.** `orderbookingsdo.composite.home/bin` > `build-sca-composite.xml` > `deploy-composite` -*ORACLE_HOME*`/bin` > `ant-sca-deploy.xml` > `attachplan` **6.** `creditauthorization.home/bin` > `build.xml` > `deploy-application` **7.** `orderapproval.home/bin` > `build.xml` > `deploy-application`
`createMDSConnections`	This script seeds Oracle Metadata Repository connection information.	Runs the following: **1.** `createMDSConnectionsForDB` **2.** `createMDSConnectionsForFileStore` **3.** `createMDSConnectionsForServerFileStore`
`createMDSConnectionsForDB`	This script seeds the connections for a database-based Oracle Metadata Repository.	`build.properties` > `foreign.mds.type=db`
`createMDSConnectionsForFileStore`	This script seeds the connections for a file-based Oracle Metadata Repository.	`build.properties` > `foreign.mds.type=jdev`
`createMDSConnectionsForServerFileStore`	This script seeds the connections for a database-based Oracle Metadata Repository.	`build.properties` > `foreign.mds.type=server.file`
`init`	This script displays build information.	Not applicable

Table B–1 (Cont.) ant Targets for WebLogicFusionOrderDemo

ant Target	Description	Dependent Targets and Targets Called From Other Targets. Targets from another file display as *directory* > *file_name* > *target*.
`jdeveloper-setup-seed`	This script complete client-side setup.	Depends on `init` and runs the following: **1.** `createMDSConnections` **2.** `seedFodJmsResources` **3.** `setupWorkspaceForJdeveloerUse`
`removeDemoUsers`	This script removes the demo community	Runs `deploy SOATestDemoApp -action REMOVE_COMMUNITY`
`removeFodJmsResources`	This script removes the JMS resources.	Not applicable
`seedB2BAgreements`	This script seeds Trading Partner agreements.	`b2b.composite.home/bin` > `build-sca-composite.xml` > `importAndDeployB2BtradingAgreements`
`seedDemoUsers`	This script seeds the demo community. For this tutorial, it adds `jstein` as the user to approve orders for over $2,000. When you run the demo, you place an order for $2,000 and log in to the Oracle BPM Worklist as `jstein` and approve the order.	Runs `deploy SOATestDemoApp -action SEED_COMMUNITY` `SOATestDemoApp` is a server-side application to seed the users.
`seedFodJmsResources`	This script creates the needed JMS resources.	Not applicable

Table B–1 (Cont.) ant Targets for WebLogicFusionOrderDemo

ant Target	Description	Dependent Targets and Targets Called From Other Targets. Targets from another file display as *directory* > *file_name* > *target*.
`setupWorkspaceForJDeveloperUse`	This script sets up the application workspace in Oracle JDeveloper.	Runs the following: **1.** `orderbooking.composite.home/bin` > `build-sca-composite.xml` > `setupDeploymentEnvironment` **2.** `orderbooking.bam.home/bin` > `build-sca-composite.xml` > `setupDeploymentEnvironment` **3.** `b2b.composite.home/bin` > `build-sca-composite.xml` > `deploy-composite` **4.** `createMDSConnection`
`server-cleanup-all`	This script removes existing sources and undeploys applications.	Depends on `init` and runs the following: **1.** `orderbooking.composite.home/bin` > `build-sca-composite.xml` > `undeploy-composite` -*ORACLE_HOME*`/bin` > `ant-sca-test.xml` > `undeploy` **2.** `orderbooking.bam.home/bin` > `build-sca-composite.xml` > `undeploy-composite` -*ORACLE_HOME*`/bin` > `ant-sca-test.xml` > `undeploy` **3.** `partnersupplier.composite.home/bin` > `build-sca-composite.xml` > `undeploy-composite` -*ORACLE_HOME*`/bin` > `ant-sca-test.xml` > `undeploy` **4.** `b2b.composite.home/bin` > `build-sca-composite.xml` > `undeploy-composite` -*ORACLE_HOME*`/bin` > `ant-sca-test.xml` > `undeploy` **5.** `orderbookingsdo.composite.home/bin` > `build-sca-composite.xml` > `undeploy-composite` -*ORACLE_HOME*`/bin` > `ant-sca-test.xml` > `undeploy` **6.** `creditauthorization.home/bin` > `build.xml` > `undeploy-application` **7.** `orderapproval.home/bin/bin` > `build.xml` > `undeploy-application` -`b2b.composite.home/bin` > `build-sca-composite.xml` > `purgeB2BTradingAgreements` **8.** `removeFodJmsResources` **9.** `removeDemoUsers`

Table B–1 (Cont.) ant Targets for WebLogicFusionOrderDemo

ant Target	Description	Dependent Targets and Targets Called From Other Targets. Targets from another file display as *directory* > *file_name* > *target*.
`server-setup-seed-deploy-test`	This script runs all the other targets.	Runs the following: **1.** `createMDSConnections` **2.** `compile-deploy-all` **3.** `seedFodJmsResources` **4.** `seedB2BAgreements` **5.** `seedDemoUsers` **6.** `orderbooking.bam.home/bin` > `build-sca-composite.xml` > `seedBAMServerObjects` Depends on `createBAMConfig` **7.** `orderbooking.bam.home/bin` > `build-sca-composite.xml` > `seedBAMAdapterResources` **8.** `orderbooking.composite.home` > `build-sca-composite.xml` > `test-composite` -*ORACLE_HOME*`/bin` > `ant-sca-test.xml` > `test` **9.** `orderbooking.bam.home` > `build-sca-composite.xml` > `test-composite` -*ORACLE_HOME*`/bin` > `ant-sca-test.xml` > `test`

Index

P

R

S

T

U

V

W