# Oracle® SOA Suite

Tutorial

Release 3 (10.1.3.1.0)

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Oracle SOA Suite Tutorial, Release 3 (10.1.3.1.0)

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# Contents

# Preface

This document describes how to build the SOA Order Booking demo application.

This preface contains the following topics:

- Audience
- Documentation Accessibility
- Related Documents
- Conventions

## Audience

This document is intended for developers who are interested in developing applications based on service-oriented architecture (SOA).

## Documentation Accessibility

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## Related Documents

For more information related to the demo application, see the following documents in the Oracle Application Server Release 3 (10.1.3.1.0) documentation set:

- *Oracle SOA Suite Quick Start Guide*
- *Oracle SOA Suite Developer's Guide*

## 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 Order Booking Application and the Tutorial

This chapter describes the components of the SOA Order Booking application, and the requirements for creating and running it.

This chapter contains the following sections:

## 1.1 What Does the SOA Order Booking Application Do?

Run by a fictitious company called "Global Company", the SOA Order Booking application processes orders placed by customers. The application routes each order to two suppliers, Select Manufacturer and Rapid Service, to get quotes. The application chooses the supplier that provided the lower quote to fulfill the order.

To invoke the SOA Order Booking application, Global Company provides customers with a web front-end application called the SOADemo-Client application. The SOADemo-Client application enables customers to browse products and place their orders. This web front-end application is built using Application Development Framework (ADF) technology.

When the customer places an order using the SOADemo-Client application, the client application invokes the SOA Order Booking application. The SOA Order Booking application consists of different projects, each of which performs a specific function.

The entry point to the SOA Order Booking application is the OrderBookingESB project. This project invokes the SOAOrderBooking project, which is a Business Process Execution Language (BPEL) project that orchestrates all the services needed by the SOA Order Booking application.

For more information on projects in the application, see Section 1.6, "Technologies and Techniques Used in Each Project".

The SOA Order Booking application contains two types of projects:

- Projects that provide services. These projects include CustomerService, CreditService, SelectManufacturer, and RapidService. The services offered by these projects are implemented as web services so that they can be invoked by different types of clients. For example, the CustomerService project is invoked by the SOADemo-Client application and also by the SOAOrderBooking BPEL project.

- Projects that define the flow of action in the application. These projects use the ESB (Enterprise Service Bus) or the BPEL technologies. These projects include OrderBookingESB, FulfillmentESB, and SOAOrderBooking, and they invoke the projects that provide services. They can also invoke other BPEL and ESB project. For example, the OrderBookingESB project invokes the SOAOrderBooking project (which is a BPEL project), and the SOAOrderBooking project invokes the FulfillmentESB project.

Table 1–1 provides a short description of the projects in the SOA Order Booking application.

***Table 1–1 Projects in the SOA Order Booking Application***

| Project | Description |
|---|---|
| OrderBookingESB | Provides the starting point for the SOA Order Booking application. The SOADemo-Client application invokes OrderBookingESB, which invokes SOAOrderBooking, which invokes everything else. |
| SOAOrderBooking | Defines the main flow of the application. It invokes all the web services and performs the appropriate actions based on the results. |
| CustomerService | Provides web services for looking up existing customers in the database, and for adding new customers. |
| CreditService | Provides web services for checking whether or not a customer's credit card is valid. |
| SelectManufacturer | Provides price quote for orders. This is one of the suppliers. |
| RapidService | Provides price quote for orders. This is another supplier. |
| FulfillmentESB | Determines how an order is to be shipped based on the dollar amount of the order. |

In addition to the SOA Order Booking application and its projects, this tutorial also describes the SOADemo-Client application, which is the web front-end to the SOA Order Booking application.

## 1.2 Flow of the Application

This section describes the order in which the projects are invoked.

1. When a customer places an order using the SOADemo-Client application, this action invokes the OrderBookingESB project.
2. The OrderBookingESB project invokes the SOAOrderBooking project, which defines the main flow of the SOA Order Booking application.
3. The SOAOrderBooking project inserts the order information in the database.
4. The SOAOrderBooking project retrieves customer information from the database. It does this by invoking the CustomerService project.
5. The SOAOrderBooking project checks the customer's credit. It does this by invoking the CreditService project.

6. The SOAOrderBooking project then determines if the order requires manual approval. It does this by using the rules defined in a rules repository. The application uses these rules:
   - If the customer's status is platinum, then the order is approved automatically, regardless of the dollar amount of the order.
   - For non-platinum customers, if the dollar amount of the order is greater than or equal to $1000, then the order requires manual approval. If the order is under $1000, then the order is approved automatically.
7. For orders that require manual approval, a manager needs to log into the Worklist application and approve (or reject) the order.
8. For approved orders, the SOAOrderBooking project requests quotes from the suppliers: SelectManufacturer and RapidService.
9. After getting responses from the suppliers, the SOAOrderBooking project selects the supplier that responded with the lower quote.
10. The SOAOrderBooking project selects a shipping method (USPS or Fedex) for the order. It does this by invoking the FulfillmentESB project.
11. The FulfillmentESB project checks the dollar amount of the order. If the amount is under $500, then it selects the USPS as the shipper. Otherwise, Fedex is the shipper.
12. The SOAOrderBooking project sets the order status in the database.
13. The SOAOrderBooking project sends an email to the customer. It does this through the Email service, which is available in BPEL.

## 1.3 Software Required for Creating and Running the Application

To create the SOA Order Booking and SOADemo-Client applications, and to run them, you need the following software:

***Table 1–2 Required Software***

| Software | Description |
|---|---|
| Oracle JDeveloper | Oracle JDeveloper is the development tool that you use to develop the applications. You need Oracle JDeveloper version 10.1.3.1.0. |
| Oracle Application Server | Oracle Application Server is the runtime platform on which you deploy and run the applications. You need Oracle Application Server Release 3 (10.1.3.1.0). |
| Oracle Database | Oracle Database is used to store data such as customer, order, and product information. To run the SOA Order Booking application, you create a schema called SOADEMO in the database and install tables with sample data in the schema.<br>Projects in the SOA Order Booking application read from and write to tables in the SOADEMO schema.<br>You need release 10g (10.2.x) of the Oracle Database. You cannot use the Oracle Lite database that is shipped with the Windows version of Oracle Application Server. |

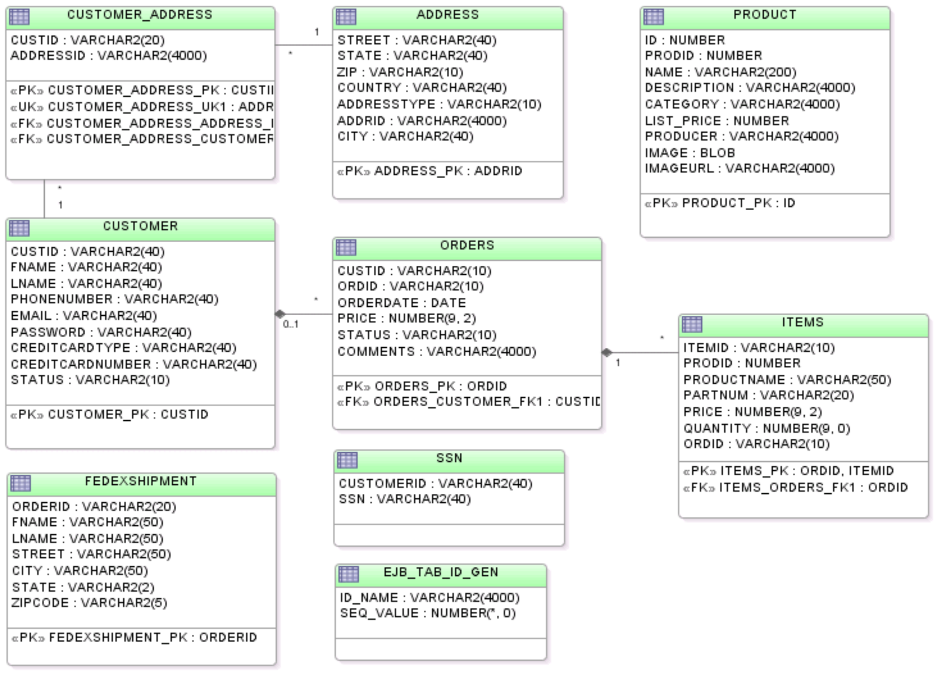
## 1.4 Contents of the SOADEMO Schema

The SOADEMO schema consists of the following tables:

*Table 1–3 Tables in the SOADEMO Schema*

| Table | Description |
|---|---|
| ADDRESS | Stores the addresses of the customers. |
| CUSTOMER | Stores customer data. |
| CUSTOMER_ADDRESS | Is a mapping table between customers and addresses. A customer can have more than one address. |
| ORDERS | Stores order information. |
| ITEMS | Stores the items in orders. |
| PRODUCT | Stores items available for purchase. |
| FEDEXSHIPMENT | Stores order information for orders that are shipped by Fedex. |
| SSN | Stores customer ID and social security number. This table is used only to show how to add a feature to the SOA Order Booking application. See the *Oracle SOA Suite Quick Start Guide* for details. |
| EJB_TAB_ID_GEN | Is used internally by Enterprise JavaBeans. |

*Figure 1–1 Contents of the SOADEMO Database Schema*



The database sequences in the SOADEMO schema are:

*Table 1–4 Sequences in the SOADEMO Schema*

| Sequence | Description |
|---|---|
| ADDRESS_EJB_SEQ_ID_GEN | Generates the address IDs. |
| EJB_SEQ_ID_GEN | Generates the customer IDs. |
| ORDER_SEQ_ID_GEN | Generates the order IDs. |

**Running in a Multi-Lingual or Multibyte Environment**

If you are running the Oracle BPEL Process Manager in a multi-lingual environment or need multibyte support, it is recommended that your database character set encoding be Unicode. This means that the database character set encoding should be AL32UTF8. If the character set encoding is not Unicode, there may be possible loss or misinterpretation of data.

## 1.5 How This Tutorial Is Organized

The steps of the tutorial begin in Chapter 2, "Setting Up Your Environment", where you begin by downloading and installing the required software and configuring the required connections in JDeveloper and Oracle Application Server.

Chapter 3 to Chapter 9 describe the projects in the SOA Order Booking application. Each chapter covers one project. You start by creating the projects that provide web services. After you have these services in place, you can create the SOAOrderBooking project, which, because it defines the main flow in the application, invokes almost all the web services.

Chapter 10, "Interfacing the Client Application with the SOA Order Booking Application", covers how the SOADemo-Client application invokes services in the SOA Order Booking application.

## 1.6 Technologies and Techniques Used in Each Project

The SOA Order Booking application integrates SOA Suite technologies such as BPEL and ESB, and uses them to invoke web services in a defined flow sequence. The web services are independent of each other and are generated in different ways.

Table 1–5 lists the technologies and techniques used in the projects in the SOA Order Booking application.

***Table 1–5 Technology and Techniques Used in the Projects***

| Project | Technology and Techniques Used |
|---|---|
| CustomerService | ■ Uses EJB 3.0 entity objects that are generated from database tables. JDeveloper is used to generate the entity objects.<br>■ Uses JSR-181 Web Services Metadata annotations.<br>■ Uses a stateless session bean as the session facade. The session bean is generated by JDeveloper. |
| CreditService | ■ Shows "top-down" implementation of web services: starting with a WSDL file, you use JDeveloper to generate Java classes from the WSDL file. |
| RapidService | ■ Shows "bottom-up" implementation of web services: starting with Java classes, you use JDeveloper to generate a WSDL file.<br>■ Uses JSR-181 Web Services Metadata annotations in the Java files. |
| SelectManufacturer | ■ Shows a simple asynchronous BPEL process with Receive and Invoke activities. |

***Table 1–5 (Cont.) Technology and Techniques Used in the Projects***

| Project | Technology and Techniques Used |
|---|---|
| FulfillmentESB | ■ Shows routing services that use filters to check input data. The filters then direct the requests to the appropriate targets.<br>■ Uses transformation rules to transform data appropriately for writing to databases and files. Database adapters and file adapters perform the writes.<br>■ Shows a routing service that routes to a JMS adapter. |
| SOAOrderBooking | ■ Shows how to use BPEL to orchestrate a flow sequence.<br>■ Invokes the services provided by all the projects (except for OrderBookingESB).<br>■ Invokes other BPEL flows (the SelectManufacturer BPEL project).<br>■ Invokes ESB project (the FulfillmentESB project).<br>■ Shows how to integrate Oracle Business Rules with BPEL.<br>■ Shows Decision Service.<br>■ Sends email through the Email service.<br>■ Uses the flow activity to send requests to RapidService and SelectManufacturer.<br>■ Uses the human task to set up a step that requires manual approval. |
| OrderBookingESB | ■ Invokes a BPEL project (the SOAOrderBooking project) by using a SOAP service. |
| SOADemo-Client application | ■ Shows how to invoke an ESB project from an ADF application (the "place order" button invokes the OrderBookingESB project).<br>■ Shows how to call the CustomerService project from the "login" button. |

# 2 Setting Up Your Environment

This chapter describes how to set up the required software for creating and running the SOA Order Booking application.

This chapter contains the following sections:

- Section 2.1, "Download the Files for the Tutorial"
- Section 2.2, "Install Oracle Application Server"
- Section 2.3, "Install Oracle JDeveloper"
- Section 2.4, "Unzip the Files for the SOA Order Booking Application"
- Section 2.5, "Install the SOADEMO Schema"
- Section 2.6, "Define Data Source and Connection Pool in Oracle Application Server"
- Section 2.7, "Set Up Connections in Oracle JDeveloper"
- Section 2.8, "Create the SOADEMO Application in JDeveloper"

## 2.1 Download the Files for the Tutorial

To use this tutorial, you need to download files for:

- Oracle Application Server. This is your runtime environment.
- JDeveloper. This is your development environment.
- SOA Order Booking demo application. This is the application that this tutorial describes. The zip file that contains the files for the application is `soademo_101310_prod.zip`.

You can download the files from the Service-Oriented Architecture page on the Oracle Technology Network site (`http://www.oracle.com/technology/soa`).

## 2.2 Install Oracle Application Server

Install Oracle Application Server Release 3 (10.1.3.1.0) from the zip file you downloaded. You can perform either the Basic installation or the Advanced installation. If you choose the Advanced installation, ensure that you install the SOA Suite, which is installed automatically in the Basic installation.

The tutorial assumes that your Oracle Application Server installation uses the default port of 8888. The installer configures Oracle HTTP Server or OC4J to listen on this port if the port is not in use. If the port is in use, the installer will try the next number on the list. See the *Oracle Application Server Installation Guide* for your platform for details.

If your installation uses a different port number, you need to change the port number in some files. These files will be pointed out as you develop the application.

Remember the password that you set for the `oc4jadmin` user. You will need this password for managing Oracle Application Server.

For details on installing Oracle Application Server, see the *Oracle Application Server Installation Guide* for your platform.

## 2.3 Install Oracle JDeveloper

Install JDeveloper Version 10.1.3.1.0 from the zip file you downloaded. You can install JDeveloper and Oracle Application Server on the same machine or on different machines.

The tutorial assumes that JDeveloper and Oracle Application Server are installed on the same machine. If you installed them on different machines, you will need to update the hostname in certain files. These files will be pointed out as you develop the application.

## 2.4 Unzip the Files for the SOA Order Booking Application

Unzip the `soademo_101310_prod.zip` file that you downloaded for the SOA Order Booking application. You can unzip the files into a temporary directory. When you create the application, you will create the files for the application in a different directory. You will copy some files from the temporary directory to the application directory when you develop the SOA Order Booking application.

For example, you can unzip the files into `C:\temp`, and you can build your application in `C:\soademo`.

## 2.5 Install the SOADEMO Schema

You need to have DBA privileges for the database where you want to install the SOADEMO schema.

**Note:** You must install the SOADEMO schema on Oracle Database 9*i*, 10*g*, or XE. If you want to install the schema on an Oracle Lite database, you need to modify the SQL scripts that install the SOADEMO schema and its objects.

To install the SOADEMO schema:

1. Change directory to where you unzipped the `soademo_101310_prod.zip` file for the SOA Order Booking application.
2. Check that the directory contains the following files:
   - `build.sql`
   - `createSchema.sql`
   - `createSchemaObjects.sql`
   - `populateSchemaTables.sql`
3. Check that the ORACLE_HOME and ORACLE_SID environment variables are set.
4. Run `build.sql` as DBA using SQL*Plus:

```
> sqlplus "sys/password as sysdba"
SQL> @build.sql
```

The script creates a schema called SOADEMO with "ORACLE" as its password, and populates it with the tables described in Section 1.4, "Contents of the SOADEMO Schema".

## 2.6 Define Data Source and Connection Pool in Oracle Application Server

You need to define data sources and connection pools in Oracle Application Server so that the SOA Order Booking application will be able to access the database during runtime.

### 2.6.1 Start Up Application Server Control

Application Server Control is the web-based tool that you use to manage Oracle Application Server. To access Application Server Control, enter the following URL in a browser:

`http://`*`hostname`*`:`*`port`*`/em`

*`hostname`* specifies the machine running Oracle Application Server.

*`port`* specifies the HTTP listening port. The installer configures Oracle HTTP Server or OC4J to listen on port 8888 if the port is not in use. If the port is in use, the installer will try the next number on the list. See the *Oracle Application Server Installation Guide* for your platform for details.

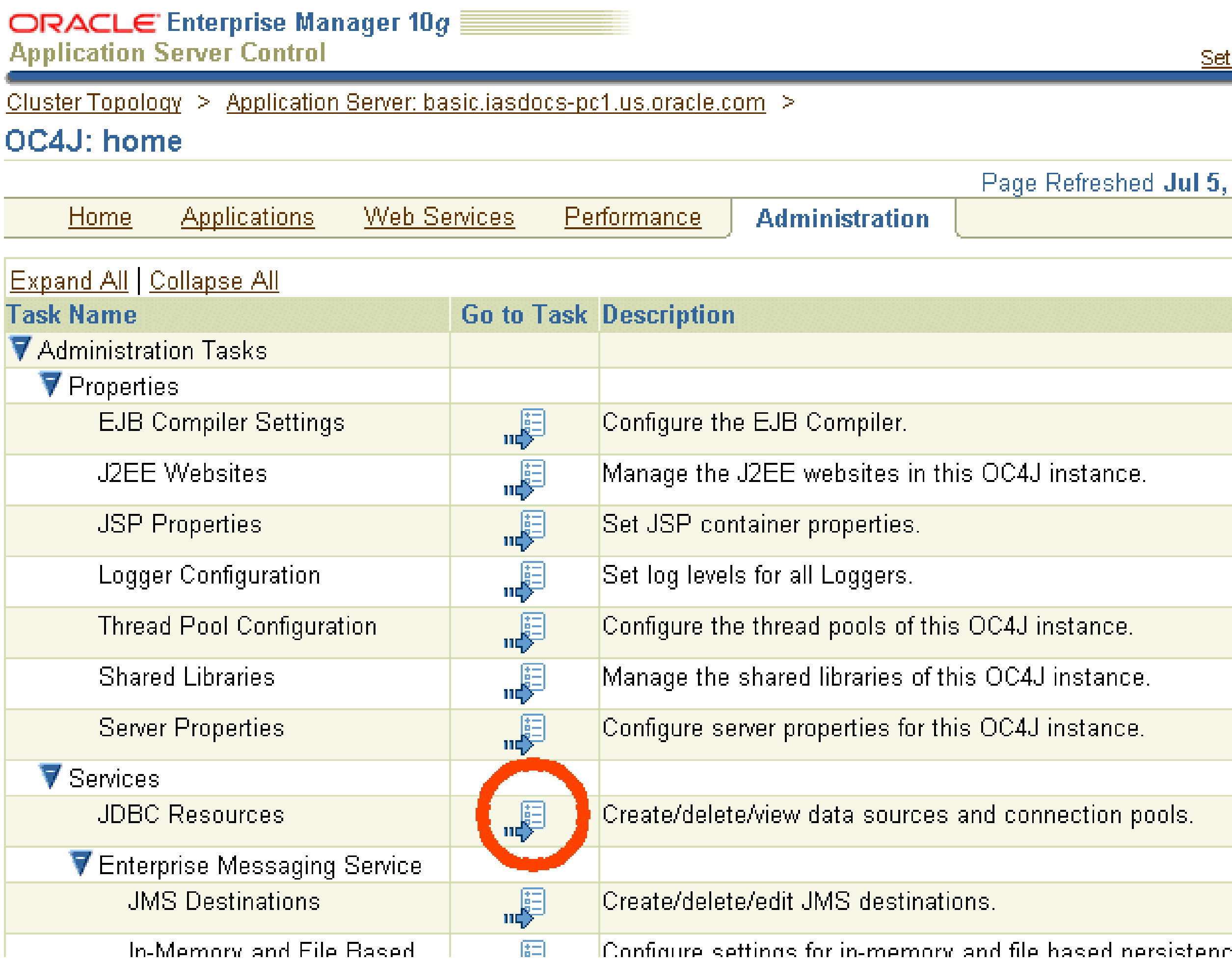
When Application Server Control prompts you to log in, enter `oc4jadmin` as the username. The password for `oc4jadmin` is the password that you set during installation.

### 2.6.2 Create a Connection Pool

Connection pools maintain connections to your database. For the SOA Order Booking application, you need to create a connection pool called `soademo_pool`.

1. Log into Application Server Control.
2. Click the **home** link to display the OC4J:home page.
3. On the OC4J:home page, click the **Administration** tab.
4. Click the icon in the Go To Task column for **Services** > **JDBC Resources**. See Figure 2–1 below. This displays the JDBC Resources page.

***Figure 2–1 Click the Icon for JDBC Resources***


ORACLE Enterprise Manager 10*g* Application Server Control

Cluster Topology > Application Server: basic.iasdocs-pc1.us.oracle.com >

**OC4J: home**

Page Refreshed **Jul 5,**

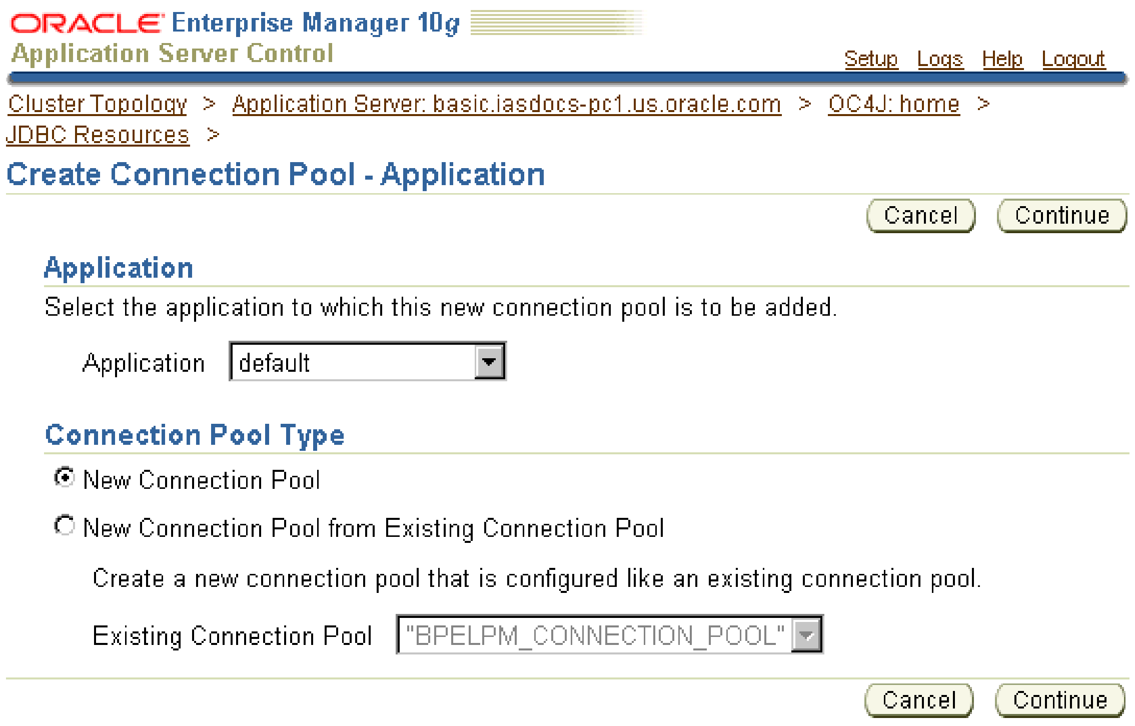
Home | Applications | Web Services | Performance | **Administration**

Expand All | Collapse All

| Task Name | Go to Task | Description |
|---|---|---|
| Administration Tasks | | |
| Properties | | |
| EJB Compiler Settings | | Configure the EJB Compiler. |
| J2EE Websites | | Manage the J2EE websites in this OC4J instance. |
| JSP Properties | | Set JSP container properties. |
| Logger Configuration | | Set log levels for all Loggers. |
| Thread Pool Configuration | | Configure the thread pools of this OC4J instance. |
| Shared Libraries | | Manage the shared libraries of this OC4J instance. |
| Server Properties | | Configure server properties for this OC4J instance. |
| Services | | |
| JDBC Resources | | Create/delete/view data sources and connection pools. |
| Enterprise Messaging Service | | |
| JMS Destinations | | Create/delete/edit JMS destinations. |
| In-Memory and File Based | | Configure settings for in-memory and file based persistenc |

5. In the JDBC Resources page, click the **Create** button *in the Connection Pools section* (*not* in the Data Sources section). This displays the Create Connection Pool - Application page (Figure 2–2).

*Figure 2–2 Create Connection Pool - Application Page*


ORACLE Enterprise Manager 10g
Application Server Control
Setup Logs Help Logout
Cluster Topology > Application Server: basic.iasdocs-pc1.us.oracle.com > OC4J: home >
JDBC Resources >
Cancel Continue

Create Connection Pool - Application

Application

Select the application to which this new connection pool is to be added.

Application: default

Connection Pool Type

[✓ New Connection Pool]

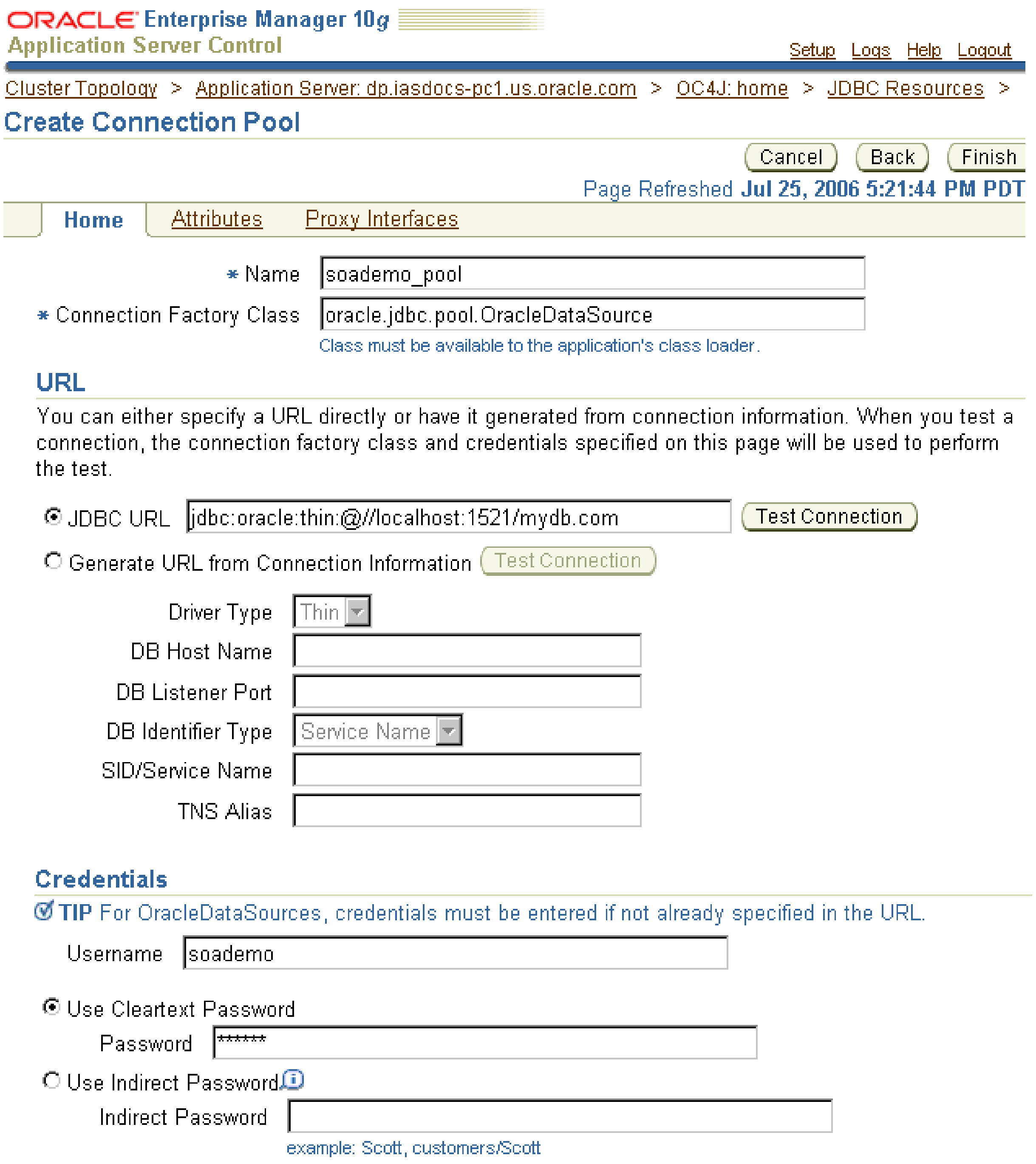
New Connection Pool from Existing Connection Pool

Create a new connection pool that is configured like an existing connection pool.

Existing Connection Pool: "BPELPM_CONNECTION_POOL"

6. Click **Continue** to accept the defaults on the Create Connection Pool - Application page. This displays the Create Connection Pool page.
7. On the Create Connection Pool page, set the following values:
   - **Name**: enter **soademo_pool**.
   - **URL section**: enter the information to connect to the database where you installed the SOADEMO schema.
   - **Credentials section**: enter the username and password to connect to the database.

***Figure 2–3 Create Connection Pool Page***


ORACLE Enterprise Manager 10g
Application Server Control
Setup Logs Help Logout
Cluster Topology > Application Server: dp.iasdocs-pc1.us.oracle.com > OC4J: home > JDBC Resources >

Create Connection Pool

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Home Attributes Proxy Interfaces

| | |
|---|---|
| * Name | soademo_pool |
| * Connection Factory Class | oracle.jdbc.pool.OracleDataSource |

Class must be available to the application's class loader.

URL

You can either specify a URL directly or have it generated from connection information. When you test a connection, the connection factory class and credentials specified on this page will be used to perform the test.

[✓ JDBC URL] jdbc:oracle:thin:@//localhost:1521/mydb.com Test Connection

Generate URL from Connection Information Test Connection

| | |
|---|---|
| Driver Type | Thin |
| DB Host Name | |
| DB Listener Port | |
| DB Identifier Type | Service Name |
| SID/Service Name | |
| TNS Alias | |

Credentials

TIP For OracleDataSources, credentials must be entered if not already specified in the URL.

Username: soademo

[✓ Use Cleartext Password]

Password: ******

Use Indirect Password

Indirect Password:

example: Scott, customers/Scott

8. Click **Test Connection**. This displays the Test Connection page. Click **Test** on that page to verify that the connection information is valid. If the test failed, verify the connection values and try again.
9. Click **Finish**.

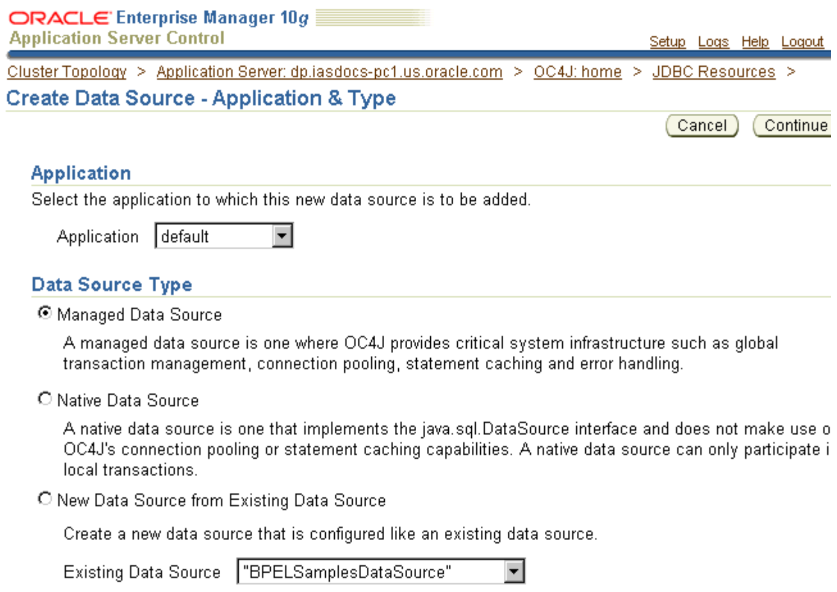
   Continue with the next section to create a data source that uses the connection pool that you just created.

### 2.6.3 Create a Data Source

Create a data source that uses the connection pool that you created in the previous section.

1. On the JDBC Resources pages, click the **Create** button in the Data Sources section. This displays the Create Data Source - Application & Type page.

***Figure 2–4 Create Data Source - Application & Type Page***


ORACLE Enterprise Manager 10g
Application Server Control
Setup Logs Help Logout
Cluster Topology > Application Server: dp.iasdocs-pc1.us.oracle.com > OC4J: home > JDBC Resources >
Cancel
Continue

Create Data Source - Application & Type

Application

Select the application to which this new data source is to be added.

Application: default

Data Source Type

(●) Managed Data Source

A managed data source is one where OC4J provides critical system infrastructure such as global transaction management, connection pooling, statement caching and error handling.

( ) Native Data Source

A native data source is one that implements the java.sql.DataSource interface and does not make use o OC4J's connection pooling or statement caching capabilities. A native data source can only participate i local transactions.

( ) New Data Source from Existing Data Source

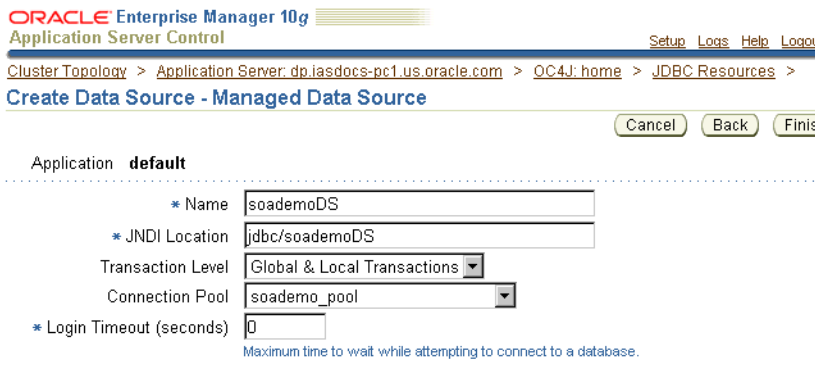
Create a new data source that is configured like an existing data source.

Existing Data Source: "BPELSamplesDataSource"

2. Click **Continue** on the Create Data Source - Application & Type page to accept the default values. This displays the Create Data Source - Managed Data Source page.
3. On the Create Data Source - Managed Data Source page, enter the following values:
   - **Name**: enter **soademoDS**.
   - **JNDI Location**: enter **jdbc/soademoDS**.
   - **Connection Pool**: select **soademo_pool**.

   You can leave the other fields at their default values.

***Figure 2–5 Create Data Source - Managed Data Source Page***


ORACLE Enterprise Manager 10g
Application Server Control
Setup Logs Help Logou
Cluster Topology > Application Server: dp.iasdocs-pc1.us.oracle.com > OC4J: home > JDBC Resources >
Cancel
Back
Finis

Create Data Source - Managed Data Source

Application **default**

| | |
|---|---|
| * Name | soademoDS |
| * JNDI Location | jdbc/soademoDS |
| Transaction Level | Global & Local Transactions |
| Connection Pool | soademo_pool |
| * Login Timeout (seconds) | 0 |

Maximum time to wait while attempting to connect to a database.

4. Click **Finish**. This takes you back to the JDBC Resources page.
5. On the JDBC Resources page, click the icon in the Test Connection column for the **soademoDS** data source. This displays the Test Connection page. Click **Test** on the Test Connection page. You should get a confirmation message that the connection was made successfully.

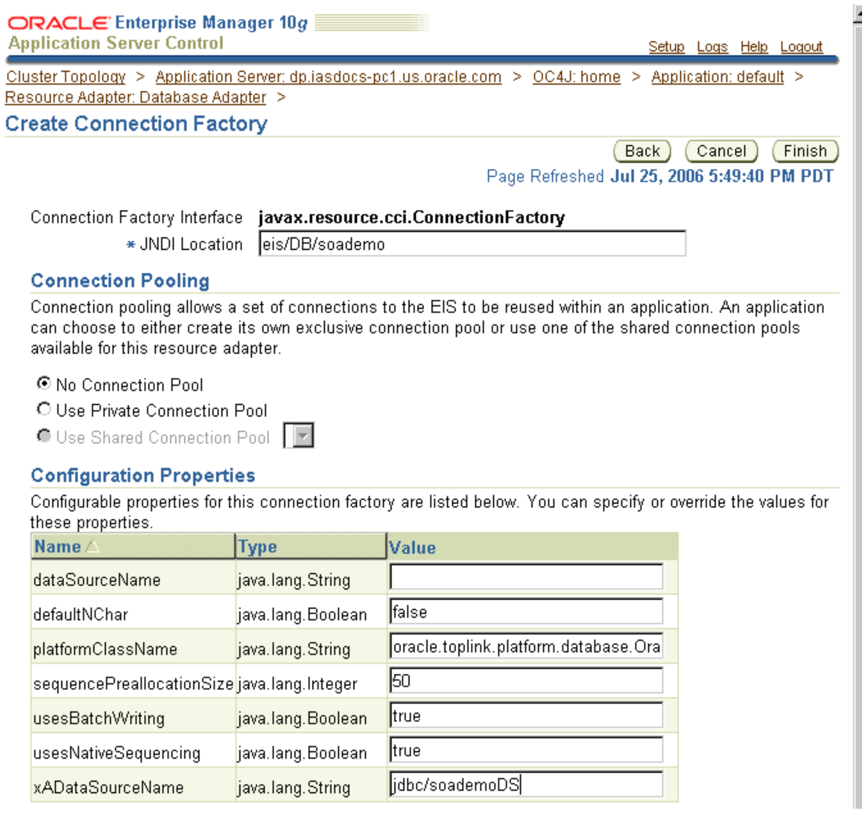
### 2.6.4 Create a Database Adapter Connection Factory

Perform the following steps to create a database adapter connection factory:

1. Click the **OC4J:home** breadcrumb link at the top of the page.
2. Click the **Applications** link.
3. Click the **default** link in the applications table.
4. Click **DbAdapter** in the Modules table.
5. Click the **Connection Factories** link.
6. In the Connection Factories section, click the **Create** button. (Note: do not click the Create button in the Shared Connection Pools section.)
7. On the Create Connection Factory: Select Interface page, click **Continue** to accept the default values.
8. On the Create Connection Factory page, enter the following values:
   - **JNDI Location**: enter **eis/DB/soademo**.
   - **xADataSourceName**: enter **jdbc/soademoDS**.

   For the other fields, accept the default values.

***Figure 2–6 Create Connection Factory Page***


ORACLE Enterprise Manager 10g
Application Server Control
Setup Logs Help Logout
Cluster Topology > Application Server: dp.iasdocs-pc1.us.oracle.com > OC4J: home > Application: default > Resource Adapter: Database Adapter >
Back Cancel Finish

Create Connection Factory

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Connection Factory Interface **javax.resource.cci.ConnectionFactory**
* JNDI Location eis/DB/soademo

Connection Pooling

Connection pooling allows a set of connections to the EIS to be reused within an application. An application can choose to either create its own exclusive connection pool or use one of the shared connection pools available for this resource adapter.

[✓ No Connection Pool]
Use Private Connection Pool
Use Shared Connection Pool

Configuration Properties

Configurable properties for this connection factory are listed below. You can specify or override the values for these properties.

| Name | Type | Value |
|---|---|---|
| dataSourceName | java.lang.String | |
| defaultNChar | java.lang.Boolean | false |
| platformClassName | java.lang.String | oracle.toplink.platform.database.Ora |
| sequencePreallocationSize | java.lang.Integer | 50 |
| usesBatchWriting | java.lang.Boolean | true |
| usesNativeSequencing | java.lang.Boolean | true |
| xADataSourceName | java.lang.String | jdbc/soademoDS |

9. Click **Finish**.

## 2.7 Set Up Connections in Oracle JDeveloper

In JDeveloper, you set up connections to the database, to Oracle Application Server, and to the Integration Server in Oracle Application Server. These connections enable you to view the data in the SOADEMO schema, and to deploy the applications to Oracle Application Server from JDeveloper.

#### Starting JDeveloper

To start Oracle JDeveloper:

1. Navigate to the directory where you installed Oracle JDeveloper and double-click the `jdeveloper.exe` executable.

   If this is the first time Oracle JDeveloper is run, a window asking "Do you wish to migrate?" appears.

2. Click **No** to continue. You will build the entire application from scratch.

### 2.7.1 Create a Database Connection to the SOADEMO Schema

In JDeveloper, create a database connection to the SOADEMO schema:

---

**Note:** In this tutorial, the database connection is named **SOADEMO**. You can use a different name if you want, but using the same naming conventions will make it easier to follow the instructions.

---

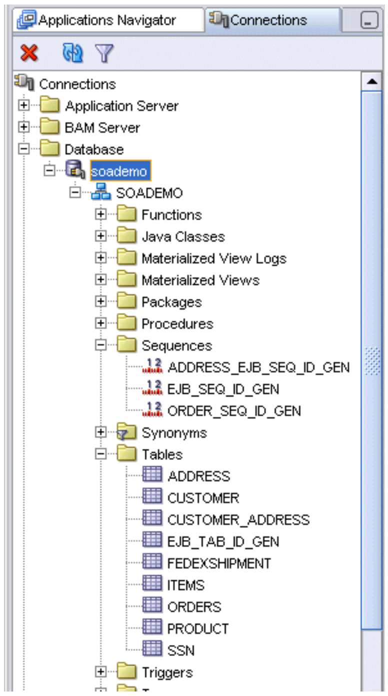
1. In Oracle JDeveloper, select **View > Connection Navigator**.
2. Right-click the **Database** node and select **New Database Connection**.
3. Click **Next** on the Welcome page.
4. In Step 1, Type, enter the following values:
   - **Connection Name**: enter **SOADEMO**.
   - **Connection Type**: select **Oracle (JDBC)**.

   Click **Next**.
5. In Step 2, Authentication, enter the following values:
   - **Username**: enter **SOADEMO**.
   - **Password**: enter **oracle**.
   - **Role**: leave blank.
   - **Deploy Password**: select the check box.

   Click **Next**.
6. In Step 3, Connection, enter the following values:
   - **Driver**: select **thin**.
   - **Host Name**: enter the name of the machine running the database where you installed the SOADEMO schema.
   - **JDBC Port**: enter the port number for the database. The default value is `1521`.
   - **SID**: enter the system identifier for the database. The default value is `ORCL`.

   If you are unsure about the database connection values, check with your database administrator.

   Click **Next**.
7. In Step 4, Test, click **Test Connection**. If the test is not successful, check that the database is available and that the connection values are correct. You can click the **Back** button to return to the previous page to edit the connection values.
8. Click **Finish**. The connection appears below the **Database** node in the Connection Navigator.
9. You can now examine the schema from Oracle JDeveloper. In the Connection Navigator, expand **Database > soademo > SOADEMO**. Expand the **Sequences** and **Tables** nodes and verify that the tables match those listed in Section 1.4, "Contents of the SOADEMO Schema".



### 2.7.2 Create a Connection to Oracle Application Server

In JDeveloper, create a connection to Oracle Application Server.

1. In Oracle JDeveloper, select **View > Connection Navigator**.
2. Right-click the **Application Server** node and select **New Application Server Connection**.
3. Click **Next** on the Welcome page.
4. In Step 1, Type, enter the following values:
   - **Connection Name**: enter **SoademoApplicationServer**.
   - **Connection Type**: select **Oracle Application Server 10g 10.1.3**.

   Click **Next**.
5. In Step 2, Authentication, enter the following values:
   - **Username**: enter **oc4jadmin**. This is the name of the administration user.
   - **Password**: enter the password for `oc4jadmin`. This is the password that you set when you installed Oracle Application Server.
   - **Deploy Password**: select the check box.

   Click **Next**.
6. In Step 3, Connection, enter the following values:
   - **Connect To**: select **Single Instance**.
   - **Host Name**: enter the name of the machine where you installed Oracle Application Server.
   - **OPMN Port**: enter the OPMN port for the Oracle Application Server instance. You can determine this port by looking in the `ORACLE_`

`HOME\opmn\conf\opmn.xml` file. You want the port number specified in the **request** attribute. For example:

```
<notification-server>
    <port local="6100" remote="6202" request="6005"/>
```

- **OC4J Instance Name**: enter **home**.

Click **Next**.

7. In Step 4, Test, click **Test Connection**. If the test is not successful, check that the Oracle Application Server instance is available and that the connection values are correct. You can click the **Back** button to return to the previous page to edit the connection values.
8. Click **Finish**. The connection appears below the **Application Server** node in the Connection Navigator.

### 2.7.3 Create a Connection to the Integration Server

In JDeveloper, create a connection to the BPEL and ESB servers running on the Oracle Application Server instance.

1. In Oracle JDeveloper, select **View > Connection Navigator**.
2. Right-click the **Integration Server** node and select **New Integration Server Connection**.
3. Click **Next** on the Welcome page.
4. In Step 1, Name, enter the following value:
   - **Connection Name**: enter **SoademoIntegConnection**.

   Click **Next**.
5. In Step 2, Connection, enter the following values:
   - **Application Server**: enter **SoademoApplicationServer**, which is the Application Server connection that you just created (in Section 2.7.2, "Create a Connection to Oracle Application Server").
   - **Hostname**: The value is derived from the Application Server connection.
   - **Port Number**: enter the port number that Oracle Application Server listens at for HTTP requests from clients. This is typically the Oracle HTTP Server port. If there is no Oracle HTTP Server component, then specify the OC4J port.

     The default port is 8888.
   - **Add Hostname to the List of Proxy Exceptions**: select this option.

   Click **Next**.
6. In Step 3, Test Connection, click **Test Connection**. If the test is not successful, check that the Oracle Application Server instance is available and that the connection values are correct. You can click the **Back** button to return to the previous page to edit the connection values.
7. Click **Finish**. The connection appears below the **Integration Server** node in the Connection Navigator.

## 2.8 Create the SOADEMO Application in JDeveloper

In JDeveloper, perform these steps to create an application called "SOADEMO", which will contain the projects for the SOA Order Booking application:

1. In Oracle JDeveloper, select **View > Application Navigator**.
2. Right-click the **Applications** node and select **New Application**.
3. In the Create Application dialog, enter these values:
   - **Application Name**: enter **SOADEMO**.
   - **Directory Name**: Accept the default directory location or edit it to specify a different directory location. JDeveloper will create this directory, which will contain all the projects in the SOA Order Booking application.
   - **Application Package Prefix**: enter **oracle.soademo**.
   - **Application Template**: select **No Template [All Technologies]**.

   Click **OK**.
4. In the Create Project dialog, click **Cancel**. You will create the projects later.

This tutorial refers to the directory that you specified as *`SOADEMO`*.

3

# Creating the CustomerService Project

This chapter describes how to create the CustomerService project. It contains these sections:

## 3.1 About the CustomerService Project

The CustomerService project provides methods that enable client applications, such as the SOADemo-Client application, to retrieve customer information from the database and add customers to the database.

Highlights of the CustomerService project:

- The project is invoked directly by the SOADemo-Client application. When a customer logs in using the client application, the client application invokes the CustomerService project to validate the user.
- The project uses Java Persistence API entity objects to manage the CUSTOMER and ADDRESS tables in the SOADEMO schema in the database.
- The project uses an EJB 3.0 stateless session bean with JSR-181 Web Services annotations. This means that application servers that support JSR-181 are able to publish the bean as a web service during deployment. Methods in CustomerService that you want to make public (that is, invocable by client

applications) are defined in this bean. Client applications can then invoke the methods through Web Services.

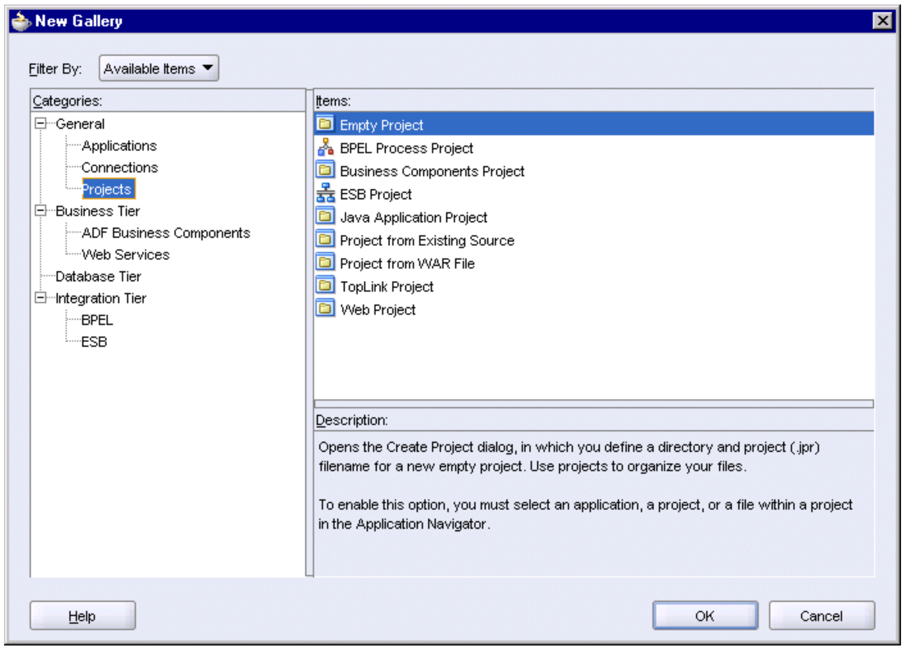
- The SOAOrderBooking project, which is a BPEL process, also invokes the CustomerService project to get details on the customer, such as the customer's status (for example, platinum or gold).

## 3.2 Create a New Project for CustomerService

Start by creating a new project for CustomerService in JDeveloper:

1. Right-click the SOADEMO application, and select **New Project**.
2. In the New Gallery, in the Categories section, expand **General** and select **Projects**. In the Items section, select **Empty Project**.

***Figure 3–1 New Gallery for the CustomerService Project***



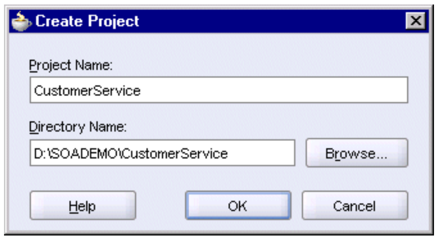
Opens the Create Project dialog, in which you define a directory and project (.jpr) filename for a new empty project. Use projects to organize your files.

To enable this option, you must select an application, a project, or a file within a project in the Application Navigator.

Click **OK**.

3. In the Create Project dialog, enter **CustomerService** in the **Project Name** field.

***Figure 3–2 Create Project Dialog for the CustomerService Project***



Project Name: CustomerService

Directory Name: D:\SOADEMO\CustomerService

Click **OK**.

In the Application Navigator, you should see an empty CustomerService project located under the SOADEMO application.

4. Select File > Save to save your work.

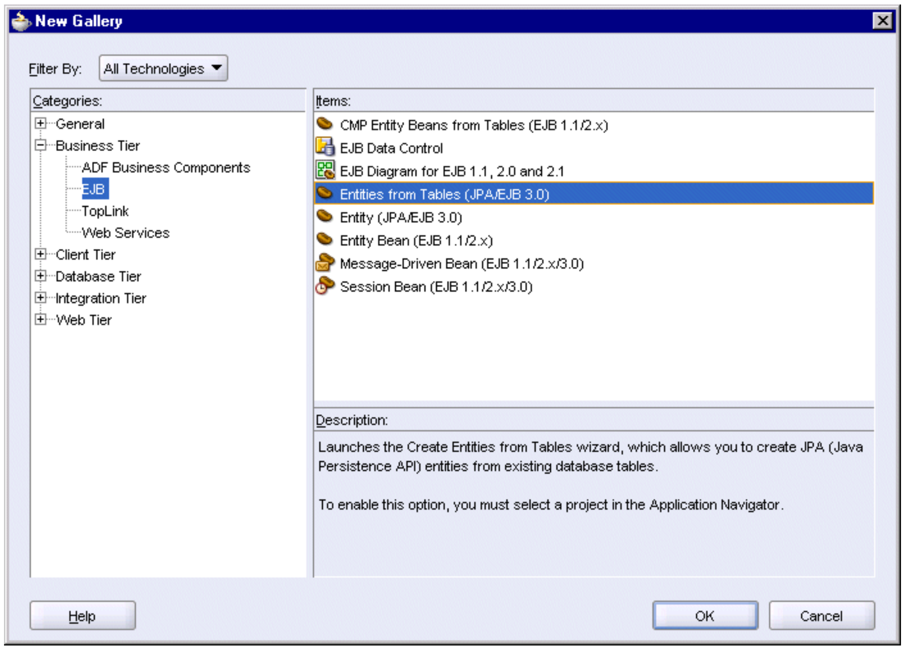
## 3.3 Create Entity Beans from Tables in the Database

You can use JDeveloper to generate entity objects for the Customer and Address tables in the SOADEMO schema. These entity objects use the Java Persistence API available in EJB 3.0.

To generate the entity beans:

1. Right-click the CustomerService project, and select **New**. In the New Gallery, in the Categories section, expand **Business Tier** and select **EJB**. In the Items section, select **Entities From Tables (JPA/EJB 3.0)**. Click **OK**.

***Figure 3–3 New Gallery for Creating Entity Objects from Database Tables***



Launches the Create Entities from Tables wizard, which allows you to create JPA (Java Persistence API) entities from existing database tables.

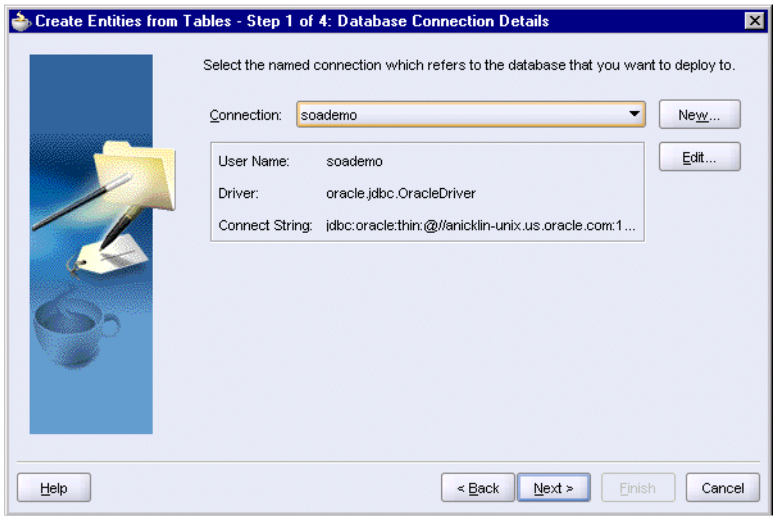
To enable this option, you must select a project in the Application Navigator.

This launches the Create Entities From Tables wizard.

2. On the Welcome page of the Create Entities From Tables wizard, click **Next**.

3. In Step 1, Database Connection Details, select the database connection and click **Next**.

***Figure 3–4 Create Entities From Tables Wizard: Step 1, Database Connection Details***


Create Entities from Tables - Step 1 of 4: Database Connection Details

Select the named connection which refers to the database that you want to deploy to.

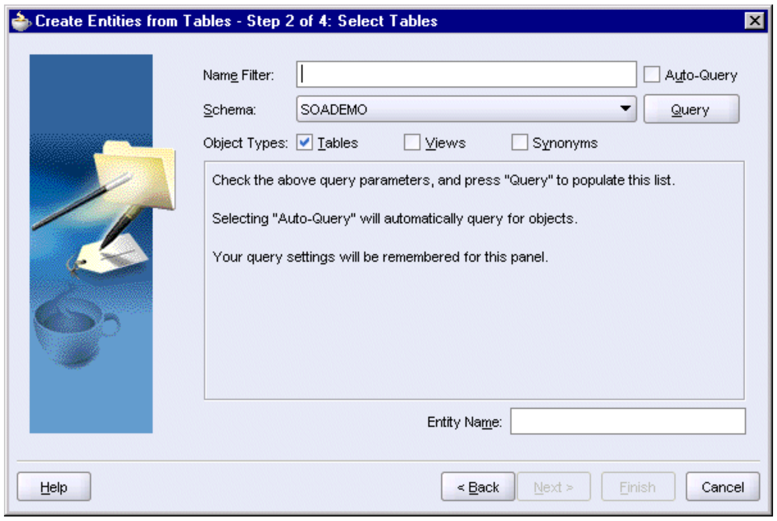
Connection: soademo

User Name: soademo
Driver: oracle.jdbc.OracleDriver
Connect String: jdbc:oracle:thin:@//anicklin-unix.us.oracle.com:1...

**4.** In Step 2, Select Tables, check that:

- **Name Filter** is blank.
- **Auto-Query** is not selected.
- **Schema** is set to SOADEMO.
- **Tables** is selected.

***Figure 3–5 Create Entities From Tables Wizard: Step 2, Select Tables***


Create Entities from Tables - Step 2 of 4: Select Tables

Name Filter:
Auto-Query [ ]
Schema: SOADEMO
Object Types: Tables [✓] Views [ ] Synonyms [ ]

Check the above query parameters, and press "Query" to populate this list.

Selecting "Auto-Query" will automatically query for objects.

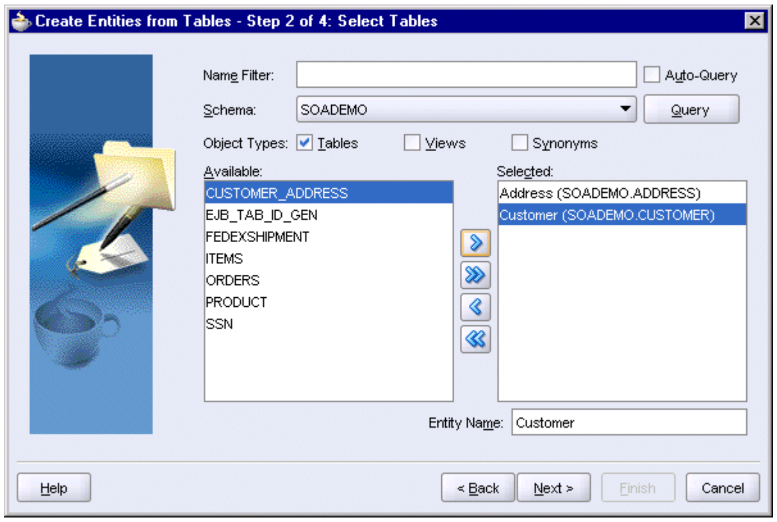
Your query settings will be remembered for this panel.

Entity Name:

Click **Query**. You should see a list of tables in the SOADEMO schema.

**5.** Select **Address** and **Customer** and click the single blue arrow to move them to the Selected box.

*Figure 3–6   Create Entities From Tables Wizard: Step 2, Select Tables*


Create Entities from Tables - Step 2 of 4: Select Tables

Name Filter: [ ] Auto-Query

Schema: SOADEMO

Object Types: [✓] Tables [ ] Views [ ] Synonyms

Available:
CUSTOMER_ADDRESS
EJB_TAB_ID_GEN
FEDEXSHIPMENT
ITEMS
ORDERS
PRODUCT
SSN

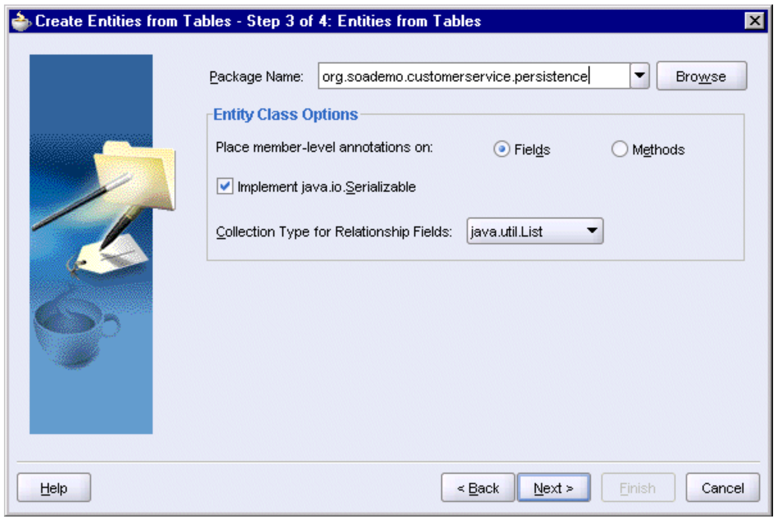
Selected:
Address (SOADEMO.ADDRESS)
Customer (SOADEMO.CUSTOMER)

Entity Name: Customer

Click **Next**.

6. In Step 3, Entities From Tables:
   - **Package Name**: set it to **org.soademo.customerservice.persistence**.
   - **Place member-level annotations on**: **Fields**.
   - **Implement java.io.Serializable**: select this option.
   - **Collection type for relationship fields**: select **java.util.List**.

*Figure 3–7   Create Entities From Tables Wizard: Step 3, Entities From Tables*


Create Entities from Tables - Step 3 of 4: Entities from Tables

Package Name: org.soademo.customerservice.persistence

Entity Class Options

Place member-level annotations on: [✓ Fields] Methods

[✓] Implement java.io.Serializable

Collection Type for Relationship Fields: java.util.List

Click **Next**.

7. In Step 4, Specify Entity Details:

   In **Table Name**, select **SOADEMO.ADDRESS**:
   - **Entity Name**: **Address**.
   - **Bean Class: org.soademo.customerservice.persistence.Address**.

*Figure 3–8 Create Entities From Tables Wizard: Step 4, Specify Entity Details, Showing Values for Address Table*

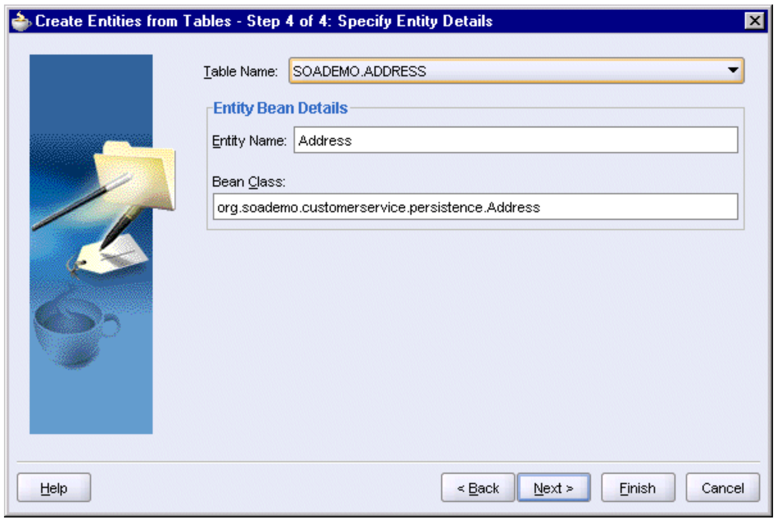

Create Entities from Tables - Step 4 of 4: Specify Entity Details
Help
< Back
Next >
Finish
Cancel

Table Name: SOADEMO.ADDRESS

Entity Bean Details

Entity Name: Address

Bean Class: org.soademo.customerservice.persistence.Address

In **Table Name**, select **SOADEMO.CUSTOMER**:

- **Entity Name**: **Customer**.
- **Bean Class**: **org.soademo.customerservice.persistence.Customer**.

*Figure 3–9 Create Entities From Tables Wizard: Step 4, Specify Entity Details, Showing Values for Customer Table*

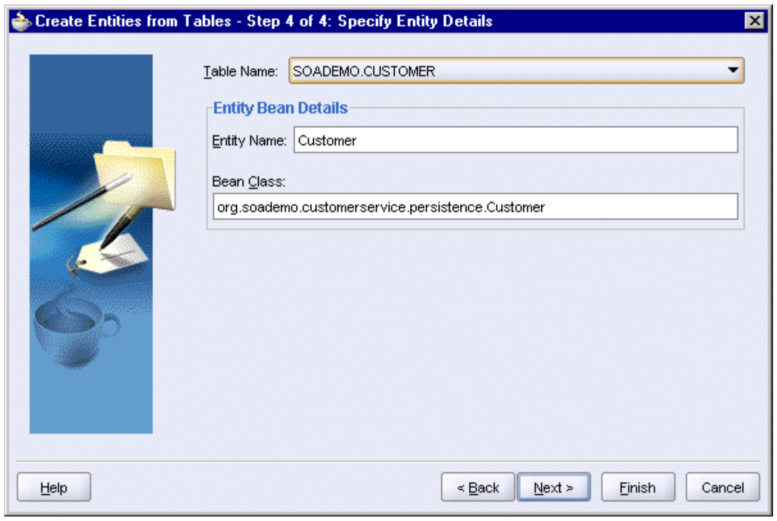

Create Entities from Tables - Step 4 of 4: Specify Entity Details
Help
< Back
Next >
Finish
Cancel

Table Name: SOADEMO.CUSTOMER

Entity Bean Details

Entity Name: Customer

Bean Class: org.soademo.customerservice.persistence.Customer

Click **Next**.

8. In the Summary screen, click **Finish**.
9. Select File > Save to save your work.

You should see these files:

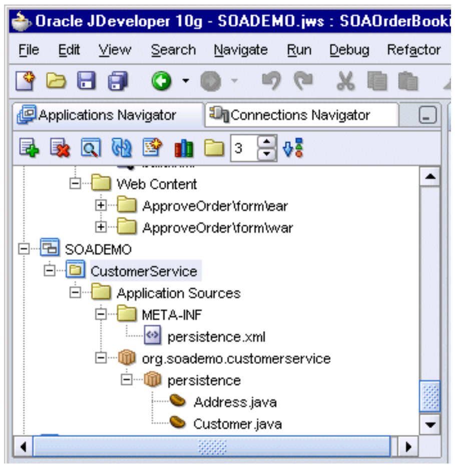
- `Address.java` and `Customer.java` in the *`SOADEMO`*`\CustomerService\src\org\soademo\customerservice\persistence` directory

- `persistence.xml` in the *`SOADEMO`*`\CustomerService\src\META-INF` directory

*`SOADEMO`* refers to the directory where you created the SOADEMO application.

The Application Navigator looks something like this:

***Figure 3–10 Application Navigator Showing the Created Files***



## 3.4 Edit persistence.xml

In `CustomerService\src\META-INF\persistence.xml`:

- Change the name of the `persistence-unit` from "`CustomerService`" to "`customerServiceUnit`".

  This name is used in the `CustomerServiceBean.java` session bean that you will create in Section 3.5, "Create a Session Bean in the business Directory".

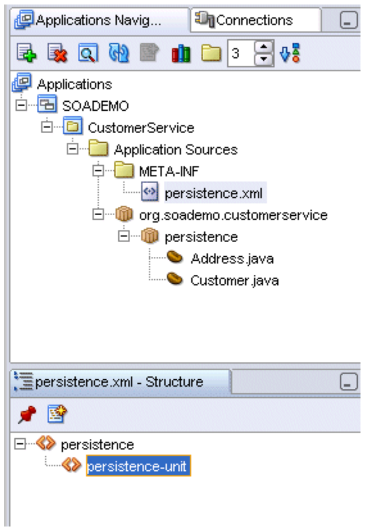
- Add a line to define the `jta-data-source`:
  `<jta-data-source>jdbc/soademoDS</jta-data-source>`

  `jdbc/soademoDS` is the data source that you created in Oracle Application Server in Section 2.6.3, "Create a Data Source".

You can make the changes using property dialogs in JDeveloper:

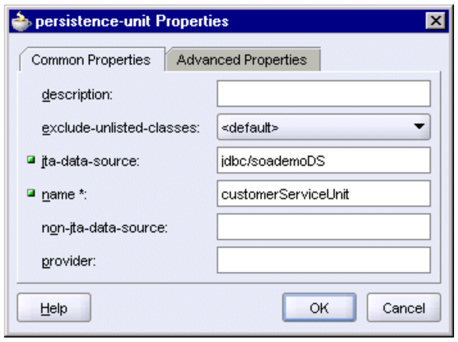
1. Check that you do not have any unsaved changes in the CustomerService project. In the Application Navigator, if you see any items that appear in italics, select the item and select File > Save.
2. Select View > Structure to display the Structure window.
3. Select **persistence.xml** in the Application Navigator. You should see the structure of the file in the Structure window.

***Figure 3–11 Structure Window (below the Application Navigator) Showing the Structure of persistence.xml***



4. Double-click **persistence-unit** in the Structure window. This displays the persistence-unit Properties dialog.
5. In the persistence-unit Properties dialog:
   - **jta-data-sources**: enter **jdbc/soademoDS**.
   - **name**: change it to **customerServiceUnit**.

***Figure 3–12 persistence-unit Properties Dialog***



| | |
|---|---|
| description: | |
| exclude-unlisted-classes: | <default> |
| jta-data-source: | jdbc/soademoDS |
| name *: | customerServiceUnit |
| non-jta-data-source: | |
| provider: | |

6. Click **OK**. The **persistence.xml** file in the Application Navigator should appear in italics, which indicates that it has unsaved changes.
7. Double-click the **persistence.xml** file in the Application Navigator. This displays the contents of the file in the editor.

   The file should look like this:

***Example 3–1 persistence.xml***

```
<?xml version="1.0" encoding="windows-1252" ?>
<persistence xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
     xsi:schemaLocation="http://java.sun.com/xml/ns/persistence
     http://java.sun.com/xml/ns/persistence/persistence_1_0.xsd"
     xmlns="http://java.sun.com/xml/ns/persistence">
  <persistence-unit name="customerServiceUnit">
```

```
    <jta-data-source>jdbc/soademoDS</jta-data-source>
  </persistence-unit>
</persistence>
```

8. Select File > Save to save the file.
9. Close the file in the editor.

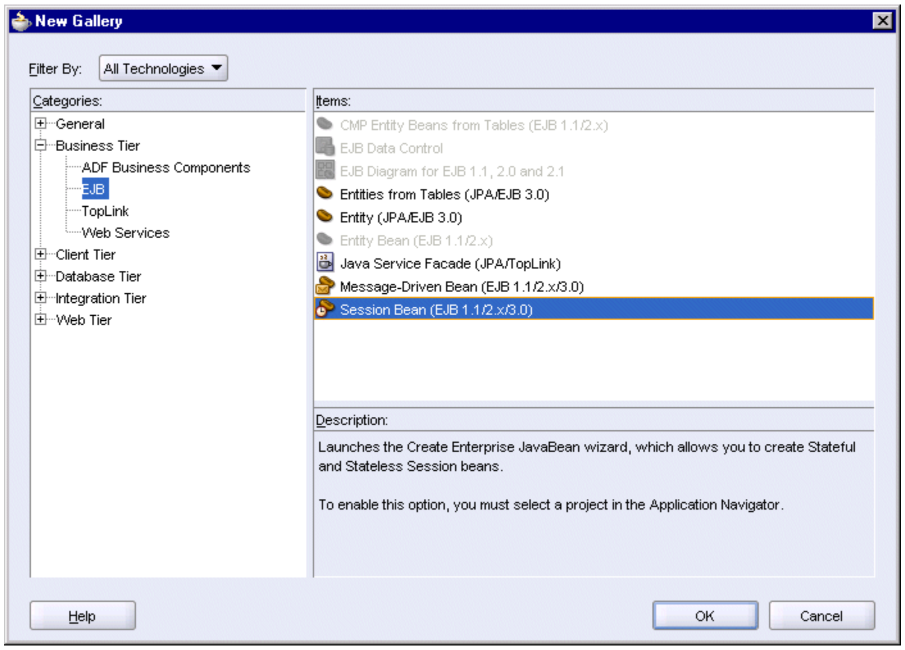
## 3.5 Create a Session Bean in the business Directory

In the business directory, you create a session bean to define the methods available to clients.

To create the session bean:

1. Right-click the CustomerService project, and select **New**. In the New Gallery, in the Categories section, expand **Business Tier** and select **EJB**. In the Items section, select "**Session Bean (EJB 1.1/2.x/3.0)**". Click **OK**.

***Figure 3–13 New Gallery for Creating Session Bean***


New Gallery
Filter By:
All Technologies
Categories:
General
Business Tier
ADF Business Components
EJB
TopLink
Web Services
Client Tier
Database Tier
Integration Tier
Web Tier
Items:
CMP Entity Beans from Tables (EJB 1.1/2.x)
EJB Data Control
EJB Diagram for EJB 1.1, 2.0 and 2.1
Entities from Tables (JPA/EJB 3.0)
Entity (JPA/EJB 3.0)
Entity Bean (EJB 1.1/2.x)
Java Service Facade (JPA/TopLink)
Message-Driven Bean (EJB 1.1/2.x/3.0)
Session Bean (EJB 1.1/2.x/3.0)
Description:
Help
OK
Cancel

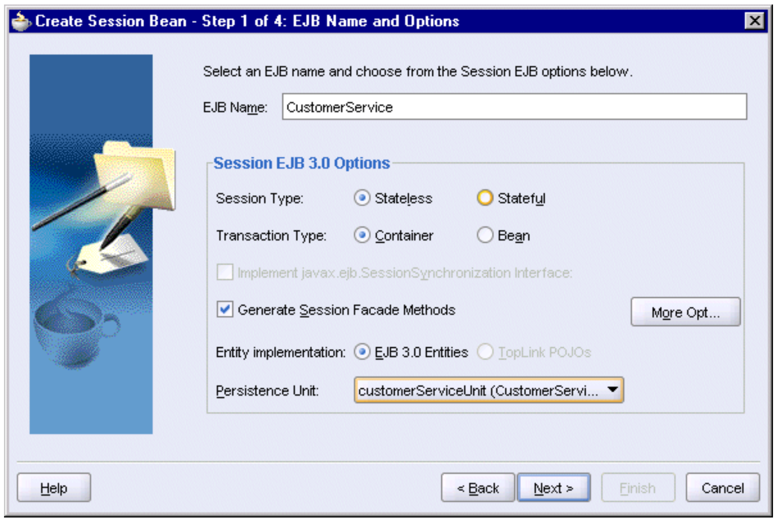
Launches the Create Enterprise JavaBean wizard, which allows you to create Stateful and Stateless Session beans.

To enable this option, you must select a project in the Application Navigator.

This launches the Create Session Bean wizard.

2. On the Welcome page of the Create Session Bean wizard, click **Next**.
3. In Step 1, EJB Name and Options:
   - **EJB Name**: enter **CustomerService**.
   - **Session Type**: select **Stateless**.
   - **Transaction Type**: select **Container**.
   - **Generate Session Facade Methods**: select this option.
   - **Entity Implementation**: select **EJB 3.0 Entities**.
   - **Persistence Unit**: select **customerServiceUnit (CustomerService.jpr)**.

***Figure 3–14 Create Session Bean Wizard: Step 1, EJB Name and Options***



Select an EJB name and choose from the Session EJB options below.

EJB Name: CustomerService

Session EJB 3.0 Options

Session Type: [✓ Stateless] Stateful

Transaction Type: [✓ Container] Bean

☐ Implement javax.ejb.SessionSynchronization Interface:

☑ Generate Session Facade Methods

Entity implementation: [✓ EJB 3.0 Entities] TopLink POJOs

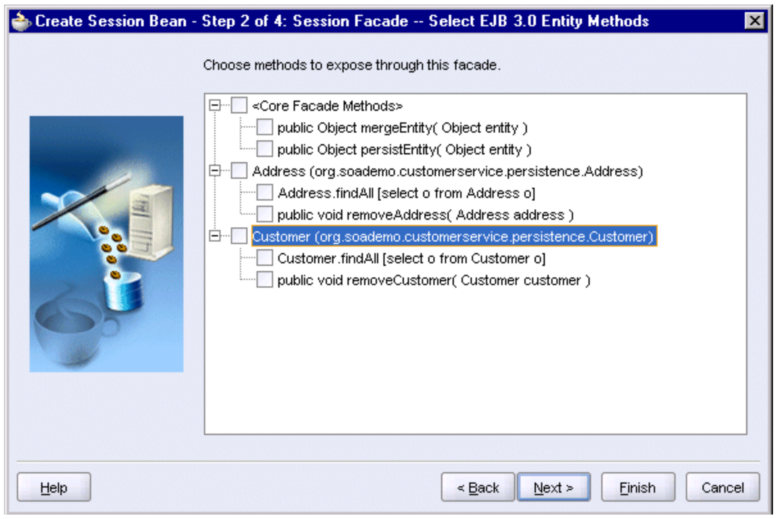
Persistence Unit: customerServiceUnit (CustomerServi...

Click **Next**.

4. In Step 2, Session Facade - Select EJB 3.0 Entity Methods, *deselect everything*.

   You will generate methods for the Customer entity later.

***Figure 3–15 Create Session Bean Wizard: Step 2, Session Facade - Select EJB 3.0 Entity Methods***


Create Session Bean - Step 2 of 4: Session Facade -- Select EJB 3.0 Entity Methods

Choose methods to expose through this facade.

☐ <Core Facade Methods>
- ☐ public Object mergeEntity( Object entity )
- ☐ public Object persistEntity( Object entity )

☐ Address (org.soademo.customerservice.persistence.Address)
- ☐ Address.findAll [select o from Address o]
- ☐ public void removeAddress( Address address )

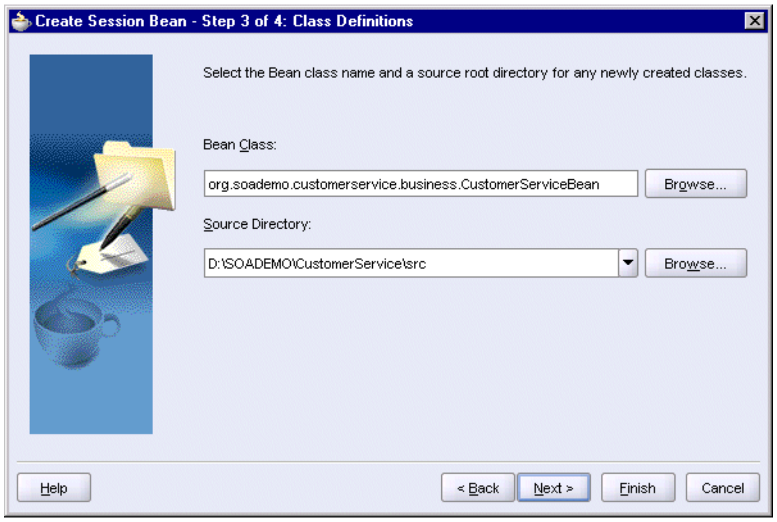
☐ Customer (org.soademo.customerservice.persistence.Customer)
- ☐ Customer.findAll [select o from Customer o]
- ☐ public void removeCustomer( Customer customer )

Click **Next**.

5. In Step 3, Class Definitions:

   - **Bean Class**: enter **org.soademo.customerservice.business.CustomerServiceBean**.
   - **Source directory**: accept the default (`CustomerService\src` directory).

***Figure 3–16 Create Session Bean Wizard: Step 3, Class Definitions***



Select the Bean class name and a source root directory for any newly created classes.

Bean Class: org.soademo.customerservice.business.CustomerServiceBean

Source Directory: D:\SOADEMO\CustomerService\src

Click **Next**.

6. In Step 4, EJB Component Interfaces:
   - **Implement a Remote Interface**: select this option.
   - **Remote Interface**: **org.soademo.customerservice.business.CustomerServiceRemote**.

   **Note:** The name of the remote interface is different from the default value.

   - **Implement a Local Interface**: select this option.
   - **Local Interface**: **org.soademo.customerservice.business.CustomerServiceLocal**.
   - **Include Web Service Endpoint Interface**: select this option.
   - **Web Service Endpoint Interface**: **org.soademo.customerservice.business.CustomerService**.

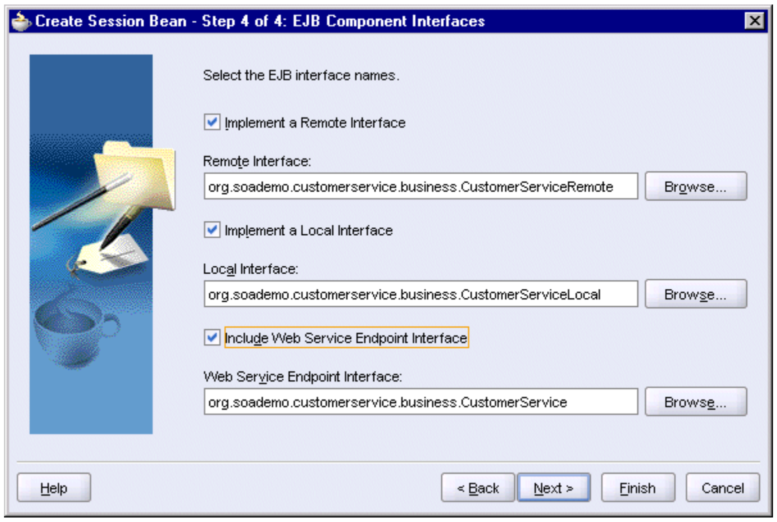
   **Note:** The name of the web service endpoint interface is different from the default value.

   Note that selecting the **Include Web Service Endpoint Interface** option adds the JSR-181 library to the project. This library is needed for the project to compile. You can also add this library to the project later, if it is not already added.

   In the generated WSDL, the name of the web service endpoint interface ("CustomerService") is used as a prefix for message names. It is also used as the name for the port type. You need to consider this because this affects the SOAOrderBooking project. The `CustomerSvc.wsdl` file in the `SOAOrderBooking\bpel` directory specifies "CustomerService" as the name of the port type. The port type names in the `CustomerSvc.wsdl` file and in the generated CustomerService WSDL must match. After you deploy the

CustomerService project, you can view the generated WSDL as described in Section 3.13, "View the WSDL for CustomerService".

*Figure 3–17 Create Session Bean Wizard: Step 4, EJB Component Interfaces*



Select the EJB interface names.

☑ Implement a Remote Interface

Remote Interface: org.soademo.customerservice.business.CustomerServiceRemote

☑ Implement a Local Interface

Local Interface: org.soademo.customerservice.business.CustomerServiceLocal

☑ Include Web Service Endpoint Interface

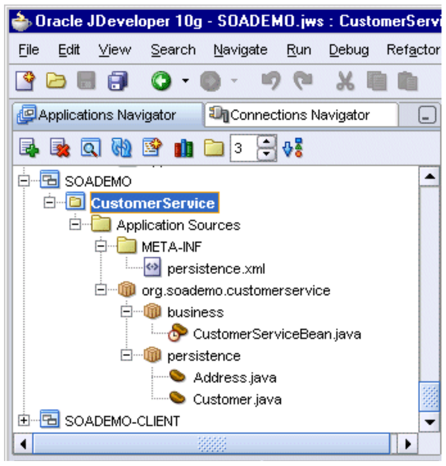
Web Service Endpoint Interface: org.soademo.customerservice.business.CustomerService

Click **Next**.

7. In the Summary page, click **Finish**.
8. Select CustomerService in the Application Navigator and select File > Save to save your work.
9. JDeveloper displays the `CustomerServiceBean.java` file in the editor. You can close it.

In the Application Navigator, you should see the CustomerService session bean in the `business` directory.

*Figure 3–18 Application Navigator Showing the CustomerService Session Bean in the business Directory*



```
SOADEMO
  CustomerService
    Application Sources
      META-INF
        persistence.xml
      org.soademo.customerservice
        business
          CustomerServiceBean.java
        persistence
          Address.java
          Customer.java
SOADEMO-CLIENT
```

## 3.6 Define Additional Queries in Customer.java

Edit the `Customer.java` file, located in the `CustomerService\src\org\soademo\customerservice\persistence` directory, to define additional queries and table information.

When you deploy the CustomerService project, Oracle Application Server uses the annotations that define the queries to generate a WSDL for the project and enable clients to access the project as a Web Service. This WSDL is generated by Oracle Application Server; you can view it after you have deployed the CustomerService project. See Section 3.13, "View the WSDL for CustomerService".

Edit the `Customer.java` file so that it looks like the following:

***Example 3–2 Customer.java***

```
package org.soademo.customerservice.persistence;

import java.io.Serializable;

import java.util.ArrayList;
import java.util.List;

import javax.persistence.CascadeType;
import javax.persistence.Column;
import javax.persistence.Entity;
import javax.persistence.FetchType;
import javax.persistence.GeneratedValue;
import javax.persistence.GenerationType;
import javax.persistence.Id;
import javax.persistence.JoinColumn;
import javax.persistence.JoinTable;
import javax.persistence.NamedQueries;
import javax.persistence.NamedQuery;
import javax.persistence.OneToMany;
import javax.persistence.SequenceGenerator;
import javax.persistence.Table;
import javax.persistence.TableGenerator;


// Note that the query statements between the double quotes must be on one line.

@Entity
@NamedQueries( { @NamedQuery(name = "Customer.findAllCustomer",
                 query = "select object(o) from Customer o")
        ,
        @NamedQuery(name = "Customer.findCustomerById",
     query = "select object(cust) from Customer cust where cust.custid = :custid")
        ,
        @NamedQuery(name = "Customer.findCustomerByEmail",
 query = "select object(cust) from Customer cust where cust.email = :email and
 cust.password = :password")
        } )

@Table(name = "CUSTOMER")
@SequenceGenerator(name = "SEQ_ID_GENERATOR", sequenceName = "EJB_SEQ_ID_GEN")
@TableGenerator(name = "TABLE_ID_GENERATOR", table = "EJB_TAB_ID_GEN",
                pkColumnName = "ID_NAME", valueColumnName = "SEQ_VALUE",
                pkColumnValue = "SEQ_GEN")
public class Customer implements Serializable {
    private String creditcardnumber;
private String creditcardtype;
@Id
@GeneratedValue(strategy = GenerationType.TABLE,
                generator = "TABLE_ID_GENERATOR")
@Column(nullable = false)
private String custid;
private String email;
private String fname;
private String lname;
private String phonenumber;
private String status;
private String password;

@OneToMany(fetch = FetchType.LAZY, cascade = { CascadeType.ALL } )
@JoinTable(name = "CUSTOMER_ADDRESS",
           joinColumns = { @JoinColumn(name = "CUSTID")
            } , inverseJoinColumns = { @JoinColumn(name = "ADDRESSID")
            } )
private List<Address> addressList;

public Customer() {
}

public String getCreditcardnumber() {
    return creditcardnumber;
}

public void setCreditcardnumber(String creditcardnumber) {
    this.creditcardnumber = creditcardnumber;
}

public String getCreditcardtype() {
    return creditcardtype;
}

public void setCreditcardtype(String creditcardtype) {
    this.creditcardtype = creditcardtype;
}

public String getCustid() {
    return custid;
}

public void setCustid(String custid) {
    this.custid = custid;
}

public String getEmail() {
    return email;
}

public void setEmail(String email) {
    this.email = email;
}

public String getFname() {
    return fname;
}

public void setFname(String fname) {
```

```
            this.fname = fname;
        }

        public String getLname() {
            return lname;
        }

        public void setLname(String lname) {
            this.lname = lname;
        }

        public String getPhonenumber() {
            return phonenumber;
        }

        public void setPhonenumber(String phonenumber) {
            this.phonenumber = phonenumber;
        }

        public String getStatus() {
            return status;
        }

        public void setStatus(String status) {
            this.status = status;
        }

        public List<Address> getAddressList() {
            if (addressList == null) {
                addressList = new ArrayList();
            }
            return addressList;
        }

        public void setAddressList(List<Address> addressList) {
            this.addressList = addressList;
        }

        public Address addAddress(Address address) {
            getAddressList().add(address);
            return address;
        }

        public Address removeAddress(Address address) {
            getAddressList().remove(address);
            return address;
        }

        public void setPassword(String password) {
            this.password = password;
        }

        public String getPassword() {
            return password;
        }
    }
```

## 3.7 Use a Database Sequence to Generate Address IDs in Address.java

Edit `Address.java` so that it uses the database sequence called ADDRESS_EJB_SEQ_ID_GEN to generate address IDs.

The lines in bold mark the changes that you have to make. The rest of the file remains the same.

```
package org.soademo.customerservice.persistence;

import java.io.Serializable;

import javax.persistence.Column;
import javax.persistence.Entity;
import javax.persistence.Id;
import javax.persistence.NamedQuery;

// add these import lines
import javax.persistence.GeneratedValue;
import javax.persistence.GenerationType;
import javax.persistence.SequenceGenerator;
import javax.persistence.Table;

@Entity
@NamedQuery(name = "Address.findAllAddress",
            query = "select object(o) from Address o")
@Table(name = "ADDRESS")
public class Address implements Serializable {
    private String addresstype;
    @Id
    @SequenceGenerator(name = "ADDRESS_ID_GEN",
                       sequenceName = "ADDRESS_EJB_SEQ_ID_GEN")
    @GeneratedValue(strategy = GenerationType.SEQUENCE,
                    generator = "ADDRESS_ID_GEN")
    @Column(nullable = false)
    private String addrid;
    private String city;
    private String country;
    private String state;
    private String street;
    private String zip;
...
```

## 3.8 Edit Session Facade for the Session Bean (CustomerServiceBean.java)

Edit `CustomerServiceBean.java`, located in the `CustomerService\src\org\soademo\customerservice\business` directory, so that it adds the methods that you defined through the queries in the `Customer.java` file in the previous section (Section 3.6, "Define Additional Queries in Customer.java").

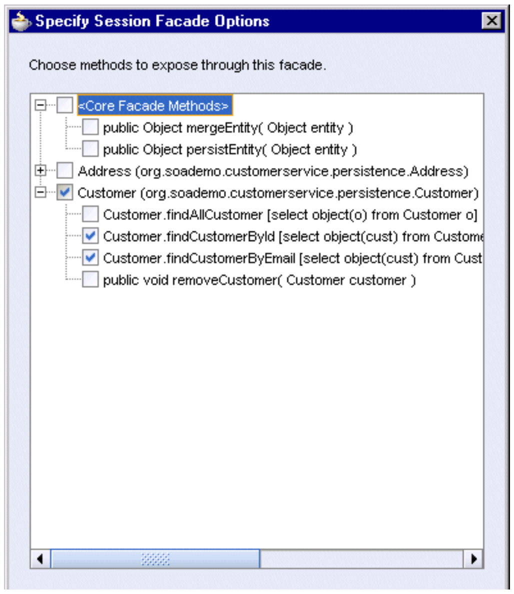
To add the new methods to `CustomerServiceBean.java`:

1. Right-click **CustomerServiceBean.java** and select **Edit Session Facade**. This displays the Specify Session Facade Options dialog.
2. In the dialog, expand **Customer** and select:
   - **findCustomerById**

- **findCustomerByEmail**

  You do not need to select the other methods because they are not used by the SOA Order Booking application.

***Figure 3–19 Specify Session Facade Options Dialog***



Choose methods to expose through this facade.

- [ ] <Core Facade Methods>
  - [ ] public Object mergeEntity( Object entity )
  - [ ] public Object persistEntity( Object entity )
- [ ] Address (org.soademo.customerservice.persistence.Address)
- [✓] Customer (org.soademo.customerservice.persistence.Customer)
  - [ ] Customer.findAllCustomer [select object(o) from Customer o]
  - [✓] Customer.findCustomerById [select object(cust) from Custome
  - [✓] Customer.findCustomerByEmail [select object(cust) from Cust
  - [ ] public void removeCustomer( Customer customer )

3. Click **OK**. JDeveloper modifies `CustomerServiceBean.java` to include the selected methods.

4. JDeveloper displays `CustomerServiceBean.java` in the editor. Select File > Save to save it, but do not close it yet, for you will be editing it.

## 3.9 Add and Modify Methods in the Session Bean (CustomerServiceBean.java)

Make the following changes to `CustomerServiceBean.java`:

- Section 3.9.1, "Modify queryCustomerFindCustomerById"
- Section 3.9.2, "Modify queryCustomerFindCustomerByEmail"
- Section 3.9.3, "Add getCustomerStatus and addNewCustomer Methods"

### 3.9.1 Modify queryCustomerFindCustomerById

Modify the `queryCustomerFindCustomerById` method:

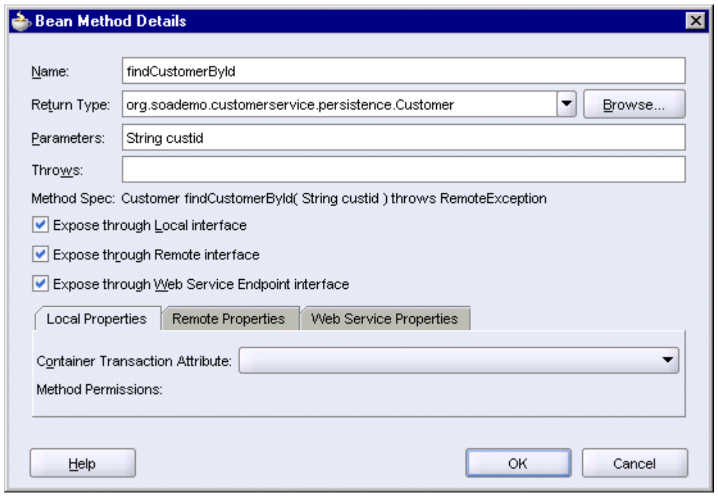
- Change it so that it returns a single value instead of a list.
- Modify its name to `findCustomerById`.

Although you can edit the file directly, it is better to make the changes using the property dialog in JDeveloper because it will synchronize the changes in other files, such as the interface files (`CustomerServiceRemote.java`, `CustomerServiceLocal.java`, and `CustomerService.java`) that this class implements.

1. If `CustomerServiceBean.java` is not showing in the editor, double-click it in the Application Navigator.
2. Select View > Structure to display the Structure window.
3. Select **CustomerServiceBean.java** in the Application Navigator.
4. In the Structure window, right-click the **queryCustomerFindCustomerById** method and select **Properties**. This displays the Bean Method Details dialog.
5. In the Bean Method Details dialog:
   - **Name**: change to **findCustomerById**.
   - **Return Type**: remove **java.util.List** and the angle brackets so that it returns only Customer, specified in its full package name (org.soademo.customerservice.persistence.Customer).
   - **Parameters**: change **Object** to **String**.

   The dialog should look like this:

***Figure 3–20 Bean Method Details Dialog for findCustomerById***



Name: findCustomerById
Return Type: org.soademo.customerservice.persistence.Customer
Parameters: String custid
Throws:
Method Spec: Customer findCustomerById( String custid ) throws RemoteException
[✓] Expose through Local interface
[✓] Expose through Remote interface
[✓] Expose through Web Service Endpoint interface
Container Transaction Attribute:
Method Permissions:

6. Click **OK**. You can see the changes in the editor.
7. Make these additional changes to the `findCustomerById` method in the editor:
   - Cast the return value to `Customer`.
   - Change the last method to `getSingleResult` (instead of `getResultList`).

   Example 3–3 shows what the updated method should look like.

***Example 3–3 The Updated findCustomerById***

```
public Customer findCustomerById(String custid) {
   return (Customer)em.createNamedQuery("Customer.findCustomerById").
                              setParameter("custid", custid).getSingleResult();
}
```

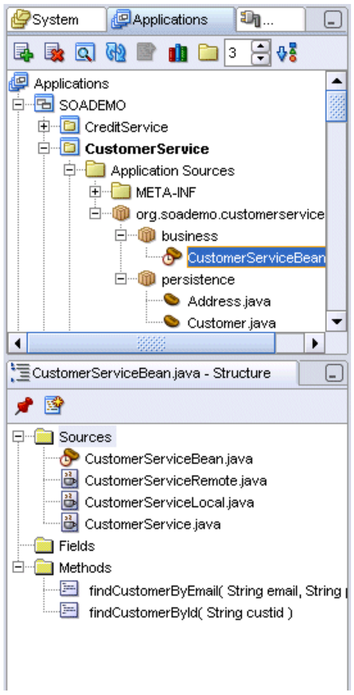
8. Select File > Save to save your changes.
9. In the Structure window, expand **Sources**. You should see the interface files listed under **Sources**.

10. Double-click the interface files (`CustomerServiceRemote.java`, `CustomerServiceLocal.java`, and `CustomerService.java`) to display them in the editor. The interface files are listed under **Sources** in the Structure window.

    After you double-click an interface file, you need to re-select **CustomerServiceBean.java** in the Application Navigator. The interface files are listed as the sources for **CustomerServiceBean.java**.

    Notice that JDeveloper has updated the methods in these interface files to synchronize with your updates.

***Figure 3–21 Application Navigator and Structure Window Showing the Structure for CustomerServiceBean.java***



11. Save the interface files.

## 3.9.2 Modify queryCustomerFindCustomerByEmail

Make similar changes to the `queryCustomerFindCustomerByEmail` method like you did for the `queryCustomerFindCustomerById` method:

- Change it so that it returns a single value instead of a list.
- Modify its name to `findCustomerByEmail`.

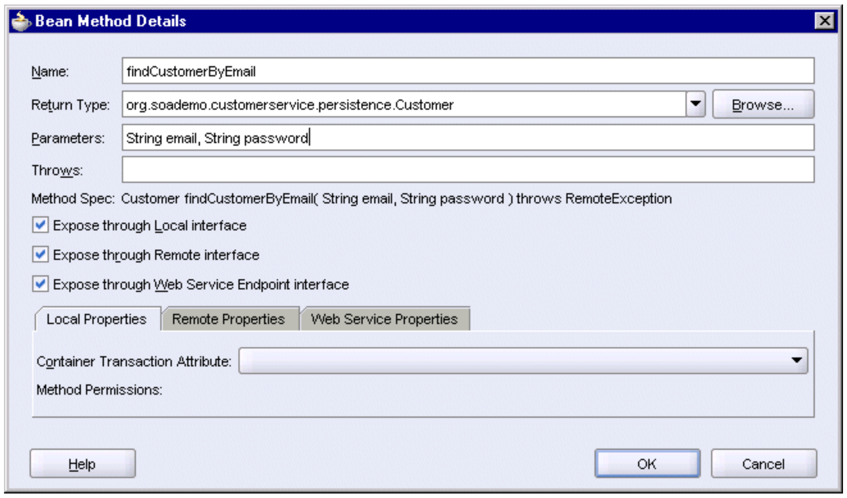
Although you can edit the file directly, it is better to make the changes using the property dialog in JDeveloper because it will synchronize the changes in other files, such as the interface files (`CustomerServiceRemote.java`, `CustomerServiceLocal.java`, and `CustomerService.java`) that this class implements.

1. Select **CustomerServiceBean.java** in the Application Navigator.
2. In the Structure window, right-click the **queryCustomerFindCustomerByEmail** method and select **Properties**. This displays the Bean Method Details dialog.

3. In the Bean Method Details dialog:
   - **Name**: change to **findCustomerByEmail**.
   - **Return Type**: remove **java.util.List** and the angle brackets so that it returns only Customer, specified in its full package name (org.soademo.customerservice.persistence.Customer).
   - **Parameters**: for both parameters, change **Object** to **String**.

   The dialog should look like this:

***Figure 3–22 Bean Method Details Dialog for findCustomerByEmail***



Name: findCustomerByEmail
Return Type: org.soademo.customerservice.persistence.Customer
Parameters: String email, String password
Throws:
Method Spec: Customer findCustomerByEmail( String email, String password ) throws RemoteException
☑ Expose through Local interface
☑ Expose through Remote interface
☑ Expose through Web Service Endpoint interface
Container Transaction Attribute:
Method Permissions:

4. Click **OK**. You can see the changes in the editor.
5. Make these additional changes to the `findCustomerByEmail` method in the editor:
   - Cast the return value to `Customer`.
   - Change the last method to `getSingleResult` (instead of `getResultList`).

   Example 3–4 shows what the updated method should look like.

***Example 3–4 The Updated findCustomerByEmail***

```
public Customer findCustomerByEmail(String email, String password) {
   return (Customer)em.createNamedQuery("Customer.findCustomerByEmail").
                 setParameter("email", email).setParameter("password",password).
                 getSingleResult();
}
```

6. Select File > Save to save your changes.
7. In the Structure window, expand **Source** and double-click the interface files (`CustomerServiceRemote.java`, `CustomerServiceLocal.java`, and `CustomerService.java`) to display them in the editor. Notice that JDeveloper has updated the methods in these files to synchronize with your updates.
8. Save the interface files.

### 3.9.3 Add getCustomerStatus and addNewCustomer Methods

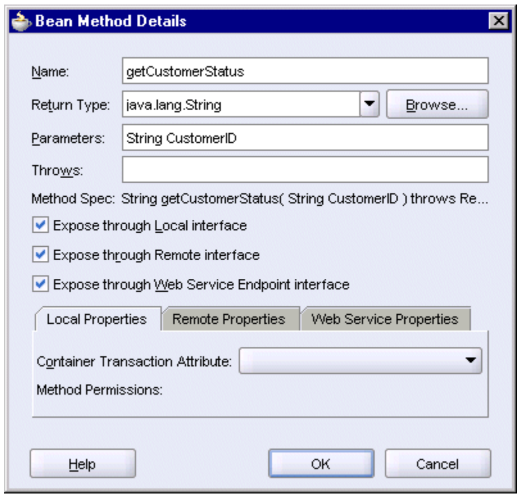
Add the `getCustomerStatus` and `addNewCustomer` methods to `CustomerServiceBean.java`. Although you can simply add these methods using the editor, it is better to enter them using the Bean Method Details dialog because JDeveloper can also update the interface files with these new methods.

To create a new method:

1. Display `CustomerServiceBean.java` in the editor.
2. Select View > Structure to display the Structure window, if it is not already showing.
3. In the Structure window, right-click **Methods** and select **New Method**. This displays the Bean Method Details dialog.
4. In the Bean Method Details dialog:
   - **Name**: enter **getCustomerStatus**.
   - **Return Type**: select **java.lang.String**.
   - **Parameters**: enter **String CustomerID**.

   The dialog should look like this:

***Figure 3–23 Bean Method Details Dialog for getCustomerStatus***


Bean Method Details

Name: getCustomerStatus

Return Type: java.lang.String

Parameters: String CustomerID

Throws:

Method Spec: String getCustomerStatus( String CustomerID ) throws Re...

[✓] Expose through Local interface

[✓] Expose through Remote interface

[✓] Expose through Web Service Endpoint interface

5. Click **OK**.
6. In the editor for `CustomerServiceBean.java`, enter the body of the method. See Example 3–5:

***Example 3–5 getCustomerStatus***

```
public String getCustomerStatus(String CustomerID) {
   return findCustomerById(CustomerID).getStatus();
}
```

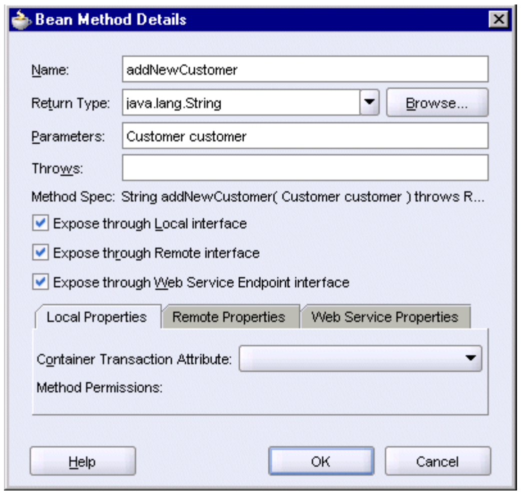
7. Save the file.

   Notice that JDeveloper updates the interface files with this new method.
8. Repeat the same procedure to create the `addNewCustomer` method. In the Bean Method Details dialog, enter these values:

- **Name**: enter **addNewCustomer**.
- **Return Type**: select **java.lang.String**.
- **Parameters**: enter **Customer customer**.

The dialog should look like this:

***Figure 3–24 Bean Method Details for addNewCustomer***


Bean Method Details

Name: addNewCustomer

Return Type: java.lang.String

Parameters: Customer customer

Throws:

Method Spec: String addNewCustomer( Customer customer ) throws R...

[✓] Expose through Local interface

[✓] Expose through Remote interface

[✓] Expose through Web Service Endpoint interface

Local Properties | Remote Properties | Web Service Properties

Container Transaction Attribute:

Method Permissions:

9. Click **OK** in the dialog.
10. In the editor for `CustomerServiceBean.java`, add the body for the method.

***Example 3–6 addNewCustomer***

```
public String addNewCustomer(Customer customer) {
   em.persist(customer);
   return "New customer added sucessfully to customer database";
}
```

11. Save the `CustomerServiceBean.java` file.
12. Save the interface files.

## 3.10 Add JSR-181 Annotations to the Web Service Endpoint Interface (CustomerService.java)

The `CustomerService.java` file was generated as the web service endpoint interface for the CustomerService session bean. You add JSR-181 annotations to this file to refine the names of methods and parameters.

Edit the file so that it looks like the following. You can edit the file in the editor.

***Example 3–7 CustomerService.java***

```
package org.soademo.customerservice.business;

import java.rmi.RemoteException;

import javax.ejb.Remote;

import javax.jws.WebMethod;
import javax.jws.WebParam;
import javax.jws.WebService;

import org.soademo.customerservice.persistence.Customer;

@WebService(serviceName = "CustomerSvc",
            targetNamespace = "http://www.globalcompany.com/ns/customer")
public interface CustomerService {

    @WebMethod
    Customer findCustomerById(
           @WebParam(name = "custid",
                     targetNamespace = "http://www.globalcompany.com/ns/customer")
                String custid) throws RemoteException;

    @WebMethod
    String getCustomerStatus(
           @WebParam(name = "CustomerID",
                     targetNamespace = "http://www.globalcompany.com/ns/customer")
                String CustomerID);

    @WebMethod
    String addNewCustomer(
           @WebParam(name = "customer",
                     targetNamespace = "http://www.globalcompany.com/ns/customer")
                Customer customer);

    @WebMethod
    Customer findCustomerByEmail(
           @WebParam(name = "email",
                     targetNamespace = "http://www.globalcompany.com/ns/customer")
                String email,
           @WebParam(name = "password",
                     targetNamespace = "http://www.globalcompany.com/ns/customer")
                String password);
}
```

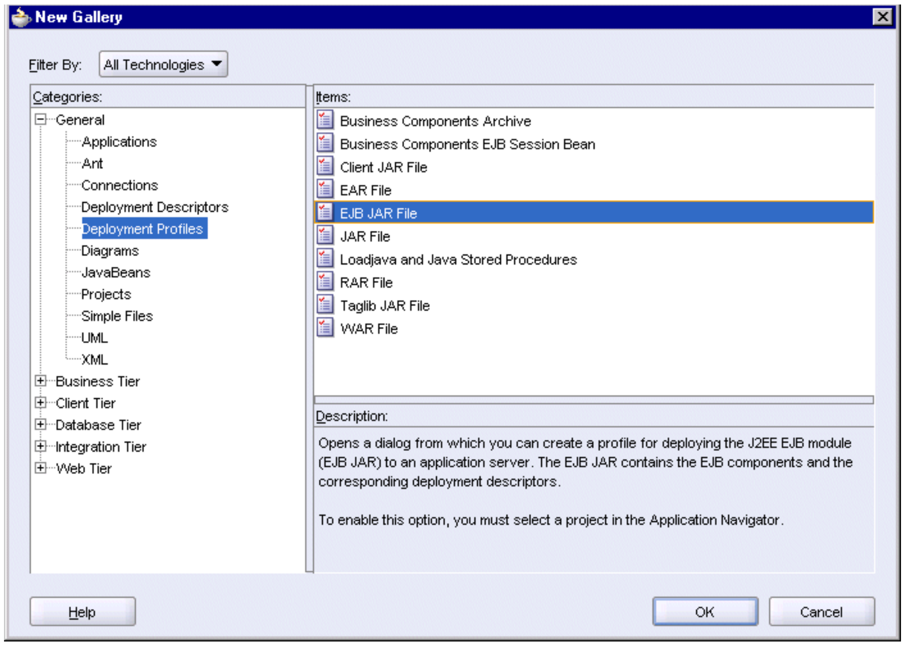
## 3.11 Create EJB JAR Deployment Profile for the CustomerService Project

Create a deployment profile so that you can easily deploy the CustomerService project to Oracle Application Server from JDeveloper.

To create a deployment profile:

1. Right-click the CustomerService project and select **New**. In Categories, expand **General** and select **Deployment Profiles**. In Items, select **EJB JAR File**.

***Figure 3–25 New Gallery for Creating a Deployment Profile for EJB JAR File***



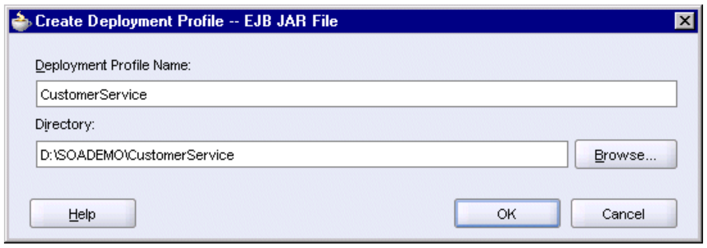
Opens a dialog from which you can create a profile for deploying the J2EE EJB module (EJB JAR) to an application server. The EJB JAR contains the EJB components and the corresponding deployment descriptors.

To enable this option, you must select a project in the Application Navigator.

Click **OK**.

2. In the Create Deployment Profile -- EJB JAR File dialog:
   - **Deployment Profile Name**: enter **CustomerService**.
   - **Directory**: use the default (`CustomerService` directory).

***Figure 3–26 Create Deployment Profile - EJB JAR File Dialog***



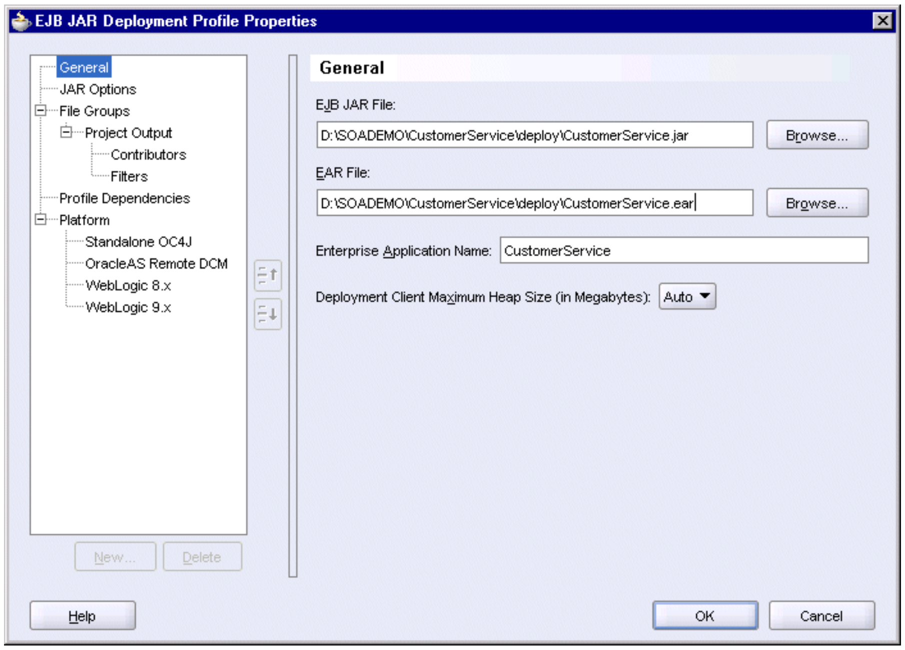
Deployment Profile Name: CustomerService

Directory: D:\SOADEMO\CustomerService

Click **OK**.

3. In the EJB JAR Deployment Profile Properties dialog, accept the defaults.

***Figure 3–27 EJB JAR Deployment Profile Properties Dialog***



General

EJB JAR File: D:\SOADEMO\CustomerService\deploy\CustomerService.jar

EAR File: D:\SOADEMO\CustomerService\deploy\CustomerService.ear

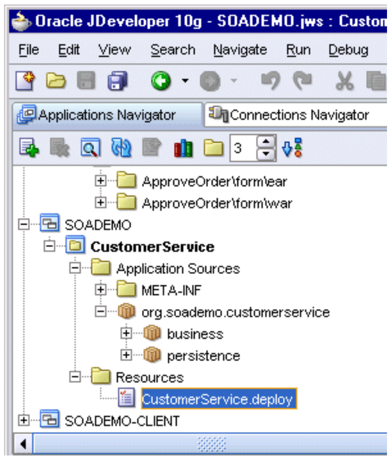
Enterprise Application Name: CustomerService

Deployment Client Maximum Heap Size (in Megabytes): Auto

4. Click **OK**.

You should see **CustomerService.deploy** under **Resources** in the Application Navigator.

***Figure 3–28 Application Navigator Showing the CustomerService.deploy Deployment Profile***

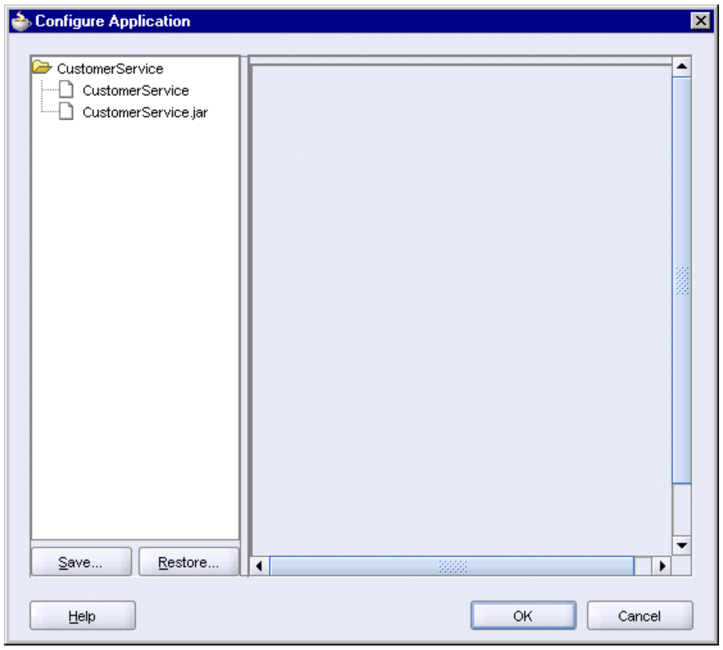


## 3.12 Deploy CustomerService

1. To deploy the CustomerService project, right-click **CustomerService.deploy** in the Application Navigator and select **Deploy To** > **SoademoApplicationServer**, where **SoademoApplicationServer** specifies the connection to Oracle Application Server.

   JDeveloper compiles the application and creates JAR and EAR files in the `CustomerService\deploy` directory. If there are no errors, it displays the Configure Application dialog.

***Figure 3–29 Configure Application Dialog***



2. Click **OK**.

Watch the messages in the JDeveloper log area for any errors.

## 3.13 View the WSDL for CustomerService

You can view the WSDL for CustomerService by entering the following URL in a browser:

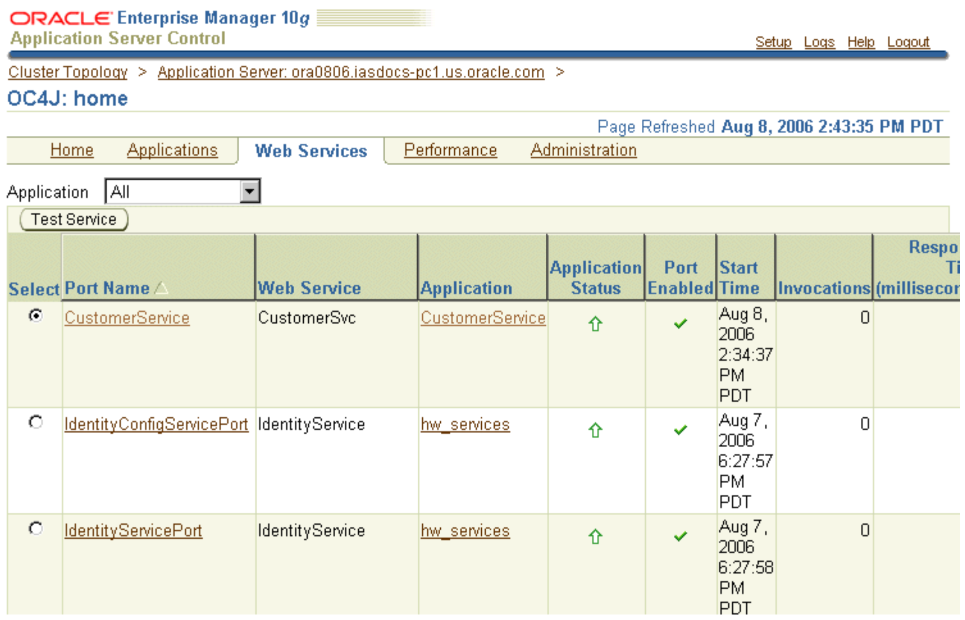
```
http://hostname:port/CustomerService/CustomerService?WSDL
```

For *hostname*, enter the name of the machine running Oracle Application Server.

For *port*, enter the HTTP port at which Oracle HTTP Server or OC4J is listening. The default port is 8888.

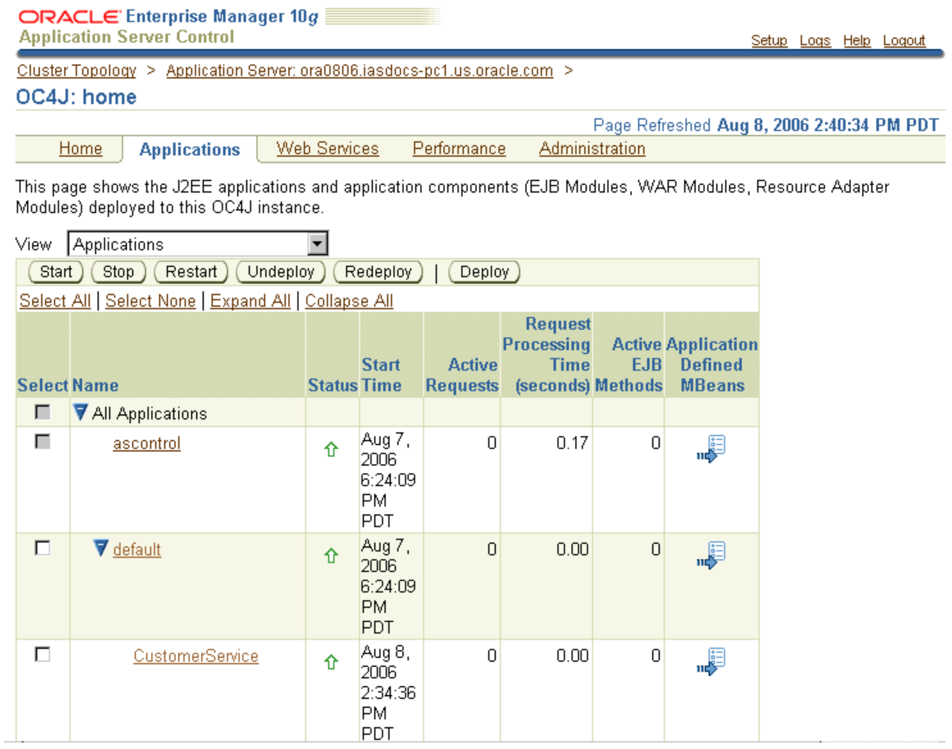
After deploying CustomerService, you should see it in two places in the Application Server Control: in the Web Services tab (Figure 3–30) and the Applications tab (Figure 3–31) of the OC4J:home page.

***Figure 3–30   Web Services Tab of OC4J:home Page Showing the CustomerService Web Service***


ORACLE Enterprise Manager 10g
Application Server Control
Setup Logs Help Logout
Cluster Topology > Application Server: ora0806.iasdocs-pc1.us.oracle.com >
OC4J: home
Page Refreshed Aug 8, 2006 2:43:35 PM PDT
Home Applications Web Services Performance Administration
Application All
Test Service

| Select | Port Name | Web Service | Application | Application Status | Port Enabled | Start Time | Invocations | Respo Ti (millisecor |
|---|---|---|---|---|---|---|---|---|
| ● | CustomerService | CustomerSvc | CustomerService | ⇧ | ✓ | Aug 8, 2006 2:34:37 PM PDT | 0 | |
| ○ | IdentityConfigServicePort | IdentityService | hw_services | ⇧ | ✓ | Aug 7, 2006 6:27:57 PM PDT | 0 | |
| ○ | IdentityServicePort | IdentityService | hw_services | ⇧ | ✓ | Aug 7, 2006 6:27:58 PM PDT | 0 | |

***Figure 3–31   Applications Tab of OC4J:home Page Showing the CustomerService Application***


ORACLE Enterprise Manager 10g
Application Server Control
Setup Logs Help Logout
Cluster Topology > Application Server: ora0806.iasdocs-pc1.us.oracle.com >
OC4J: home
Page Refreshed Aug 8, 2006 2:40:34 PM PDT
Home Applications Web Services Performance Administration

This page shows the J2EE applications and application components (EJB Modules, WAR Modules, Resource Adapter Modules) deployed to this OC4J instance.

View Applications

Start Stop Restart Undeploy Redeploy | Deploy
Select All | Select None | Expand All | Collapse All

| Select | Name | Status | Start Time | Active Requests | Request Processing Time (seconds) | Active EJB Methods | Application Defined MBeans |
|---|---|---|---|---|---|---|---|
| ☐ | ▼ All Applications | | | | | | |
| ☐ | ascontrol | ⇧ | Aug 7, 2006 6:24:09 PM PDT | 0 | 0.17 | 0 | |
| ☐ | ▼ default | ⇧ | Aug 7, 2006 6:24:09 PM PDT | 0 | 0.00 | 0 | |
| ☐ | CustomerService | ⇧ | Aug 8, 2006 2:34:36 PM PDT | 0 | 0.00 | 0 | |

4

# Creating the FulfillmentESB Project

This chapter describes how to create the FulfillmentESB project. It contains these sections:

## 4.1 About the FulfillmentESB Project

After an order has been approved, the SOAOrderBooking project invokes the FulfillmentESB project to determine the shipping method for the order. Currently there are two possible shipping methods: USPS and Fedex. The FulfillmentESB project sends orders under $500 to USPS, and orders $500 and over to Fedex.

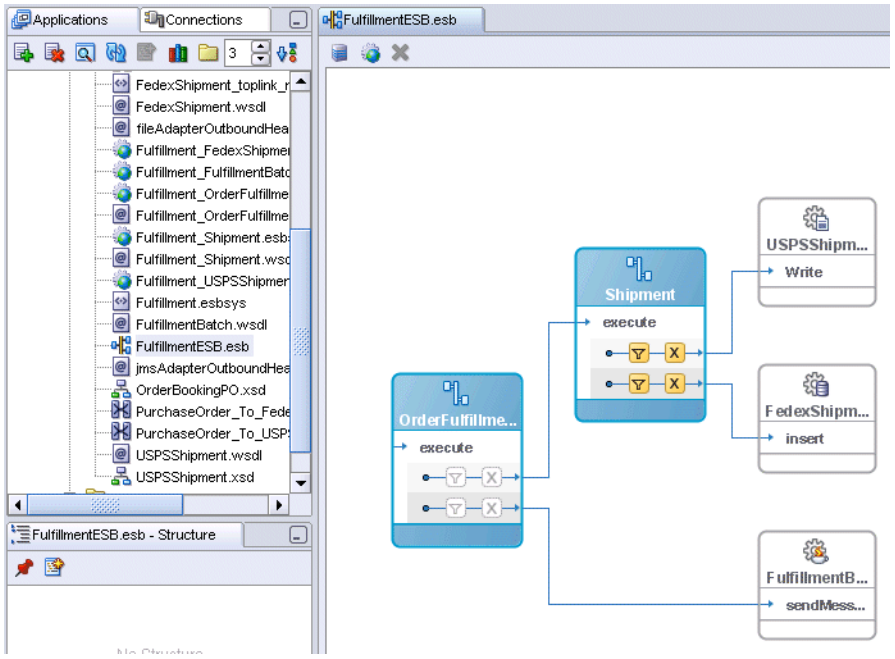
Orders are sent to the USPS through a file adapter. The order information is written to a file.

For Fedex, orders are sent through a database adapter. The order information is written to a database.

The FulfillmentESB project also sends orders to a JMS adapter. For this tutorial, the order is just sent to a JMS queue. There is no consumer of the order data from the queue. This is just to show you how to send messages to a JMS adapter, if you are planning on using one.

The FulfillmentESB project is an ESB project. In JDeveloper, the completed project looks like the following:

***Figure 4–1 FulfillmentESB Project***



The FulfillmentESB project consists of:

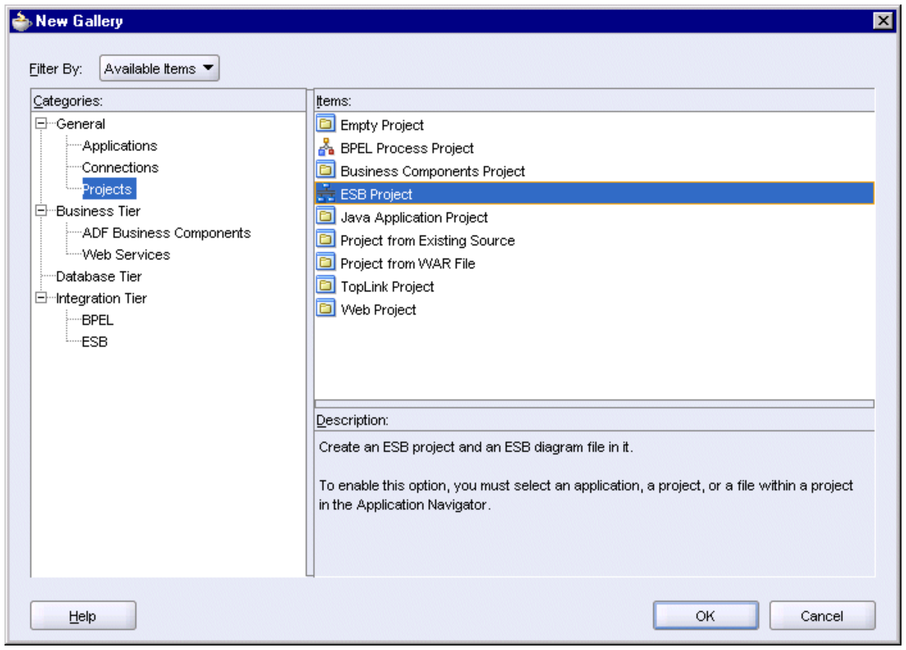
- OrderFulfillment routing service
- Shipment routing service
- USPSShipment file adapter
- FedexShipment database adapter
- FulfillmentBatch JMS adapter

## 4.2 Create a New Project for FulfillmentESB

Start by creating a new ESB project in JDeveloper:

1. Right-click the SOADEMO application, and select **New Project**.
2. In the New Gallery, in the Categories section, expand **General** and select **Projects**. In the Items section, select **ESB Project**.

***Figure 4–2 New Gallery: Select "ESB Project" for the FulfillmentESB Project***



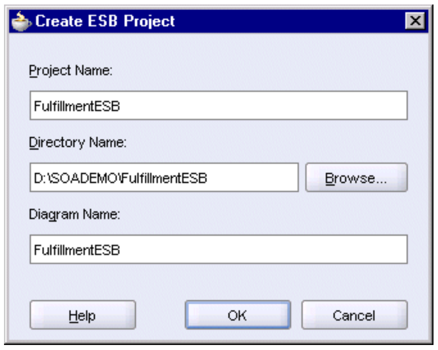
Create an ESB project and an ESB diagram file in it.

To enable this option, you must select an application, a project, or a file within a project in the Application Navigator.

Click **OK**.

3. In the Create ESB Project dialog, enter **FulfillmentESB** in the **Project Name** field. Accept the defaults for the other fields.

***Figure 4–3 Create ESB Project Dialog for FulfillmentESB Project***



Project Name: FulfillmentESB

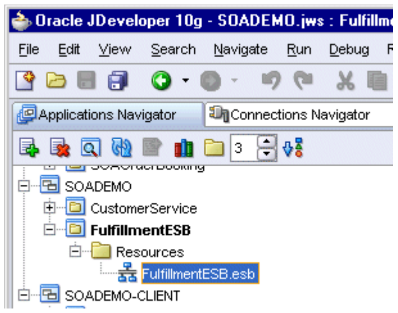
Directory Name: D:\SOADEMO\FulfillmentESB

Diagram Name: FulfillmentESB

Click **OK**.

JDeveloper displays a blank page for the `FulfillmentESB.esb` file. In the Application Navigator, this file is located under **FulfillmentESB** > **Resources**:

***Figure 4–4 Application Navigator Showing the FulfillmentESB File***



## 4.3 Create a System Called "Fulfillment"

For an ESB project, all ESB activities belong to a system. By default, JDeveloper places the activities in a system called "DefaultSystem".

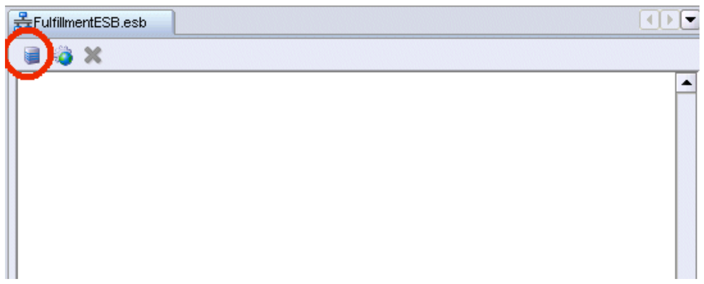
To make your ESB projects easier to maintain, you can create a new system and set the ESB activities in a project to belong to that system. During runtime, when you manage the project in the ESB Console, you can configure properties for the activities in a system.

If you do not create a system, then in the ESB Console, you will find all your activities under "DefaultSystem".

For the FulfillmentESB project, you create a system called "Fulfillment" and set all the activities in the FulfillmentESB project to belong to this system. The OrderBookingESB project, covered in Chapter 9, also has its own system.

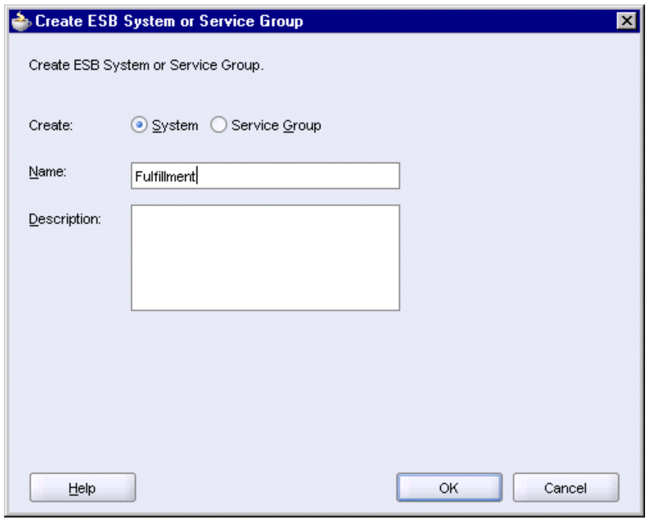
1. In the empty `FulfillmentESB.esb` page, click the **Create System/Group** icon, located at the top of the page.

***Figure 4–5 Create System/Group Icon at the Top of the FulfillmentESB.esb Page***



2. In the Create ESB System or Service Group dialog:
   - **System**: select this option.
   - **Name**: enter **Fulfillment**.
   - **Description**: leave blank or enter a brief description.

*Figure 4–6 Create ESB System or Service Group Dialog for the "Fulfillment" System*



Create ESB System or Service Group.

Create: [✓ System] Service Group

Name: Fulfillment

Description:

3. Click **OK**. In the Application Navigator, you should see a **Fulfillment.esbsys** file under **FulfillmentESB** > **Resources**.

## 4.4 Create the "OrderFulfillment" Routing Service

The OrderFulfillment routing service routes requests to two places:

- Shipment, which is another routing service
- FulfillmentBatch, which sends messages to a Java Messaging Service (JMS)

To create the OrderFulfillment routing service:

1. Copy the following file from the `soademo_101310_prod.zip` file to the *`SOADEMO`*`\FulfillmentESB` directory:

   - `OrderBookingPO.xsd`

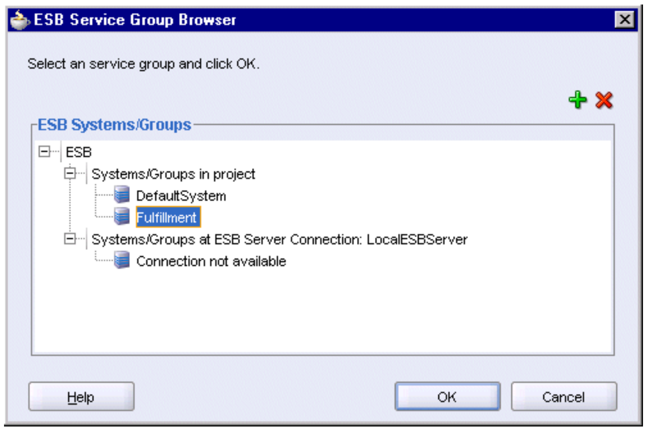
   In the zip file, this file is located in the `FulfillmentESB` directory.

   This file is needed by the OrderFulfillment routing service.

2. If the Component Palette is not showing in JDeveloper, select View > Component Palette to display it.
3. Select **ESB Services** from the dropdown in the Component Palette.
4. Drag the Routing Service icon from the Component Palette and drop it anywhere on the FulfillmentESB page.
5. In the Create Routing Service dialog:

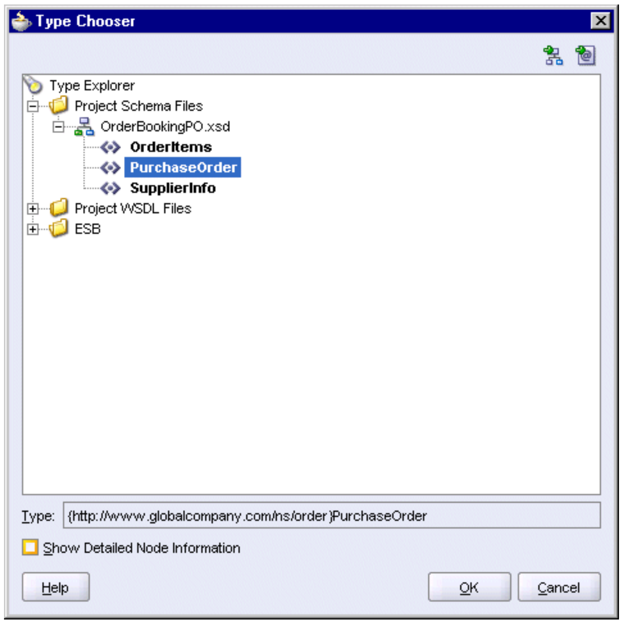
   - **Name**: enter **OrderFulfillment**.
   - **System/Group**: set to **Fulfillment**. If it is not set to **Fulfillment**, click the flashlight, which displays the ESB Service Group Browser dialog. Select **Fulfillment** in the dialog and click **OK**.

***Figure 4–7 ESB Service Group Browser***


ESB Service Group Browser
Select an service group and click OK.
ESB Systems/Groups
ESB
Systems/Groups in project
DefaultSystem
Fulfillment
Systems/Groups at ESB Server Connection: LocalESBServer
Connection not available
Help
OK
Cancel

- **Generate WSDL From Schemas**: select this option.
- **Schema Location**: click **Browse**, which displays the Type Chooser dialog. In the dialog, select **Project Schema Files** > **OrderBookingPO.xsd** > **PurchaseOrder**.

***Figure 4–8 Type Chooser Dialog for OrderFulfillment Routing Service***



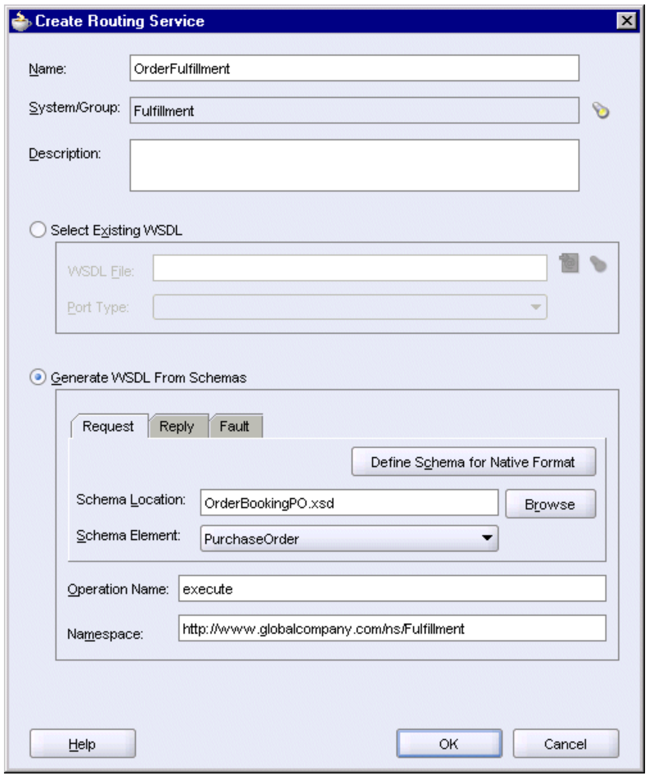
Type: {http://www.globalcompany.com/ns/order}PurchaseOrder

Click **OK** in the Type Chooser dialog.

- **Schema Element**: select **PurchaseOrder**.
- **Operation Name**: enter **execute**.
- **Namespace**: enter **http://www.globalcompany.com/ns/Fulfillment**.

The Create Routing Service dialog should now look like this.

*Figure 4–9 Create Routing Service Dialog for the OrderFulfillment Routing Service*


Create Routing Service

Name: OrderFulfillment

System/Group: Fulfillment

Description:

( ) Select Existing WSDL

WSDL File:

Port Type:

(•) Generate WSDL From Schemas

Schema Location: OrderBookingPO.xsd

Schema Element: PurchaseOrder

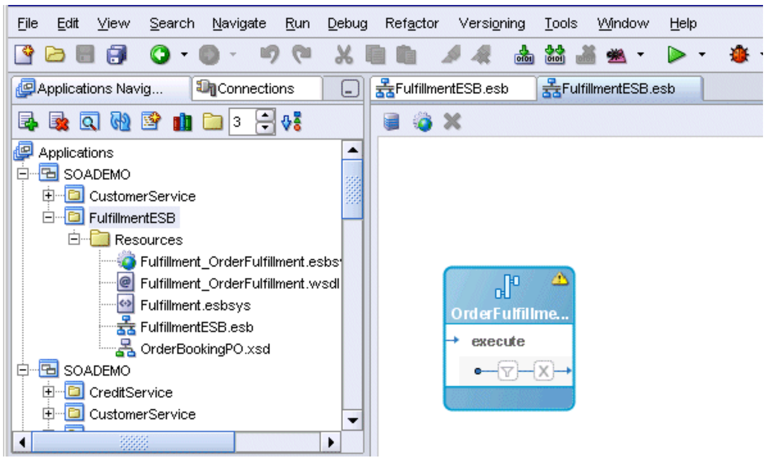
Operation Name: execute

Namespace: http://www.globalcompany.com/ns/Fulfillment

6. Click **OK** in the Create Routing Service dialog.

In JDeveloper, you should see this routing service instance:

*Figure 4–10 OrderFulfillment Routing Service in JDeveloper*



JDeveloper created the following files in the `FulfillmentESB` directory.

- `Fulfillment_OrderFulfillment.esbsvc` - this file defines the "OrderFulfillment" routing service. JDeveloper prefixes the system name to the filename.
- `Fulfillment_OrderFulfillment.wsdl` - this WSDL file is for the "OrderFulfillment" routing service.

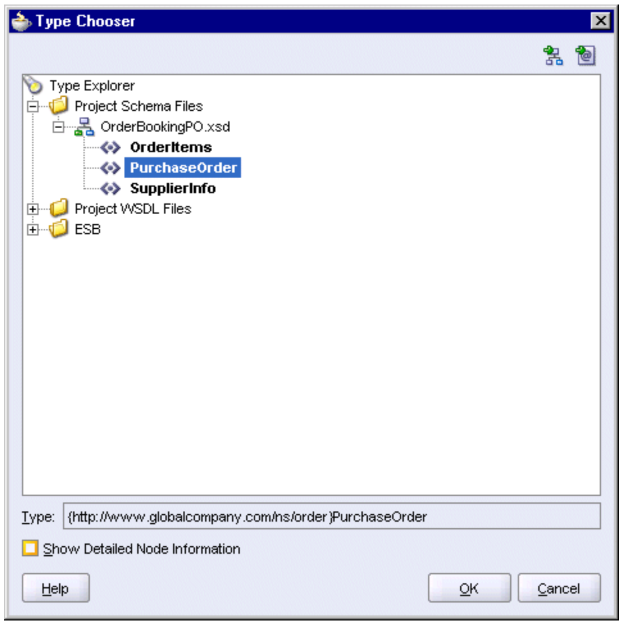
## 4.5 Create the "Shipment" Routing Service

The Shipment routing service routes requests either to the FedexShipment database adapter or to the USPSshipment file adapter. You will define a filter rule in the Shipment routing service to route orders greater than or equal to $500 to the FedexShipment, while orders less than $500 are routed to the USPSshipment.

To create the Shipment routing service:

1. Drag the Routing Service icon from the Component Palette and drop it anywhere on the FulfillmentESB page.
2. In the Create Routing Service dialog:
   - **Name**: enter **Shipment**.
   - **System/Group**: should be set to **Fulfillment**. If not, click the flashlight icon to change it.
   - **Generate WSDL From Schemas**: select this option.
   - **Schema Location**: click **Browse**, which displays the Type Chooser dialog. In the dialog, select **Project Schema Files** > **OrderBookingPO.xsd** > **PurchaseOrder**.

*Figure 4–11 Type Chooser Dialog for Shipment Routing Service*

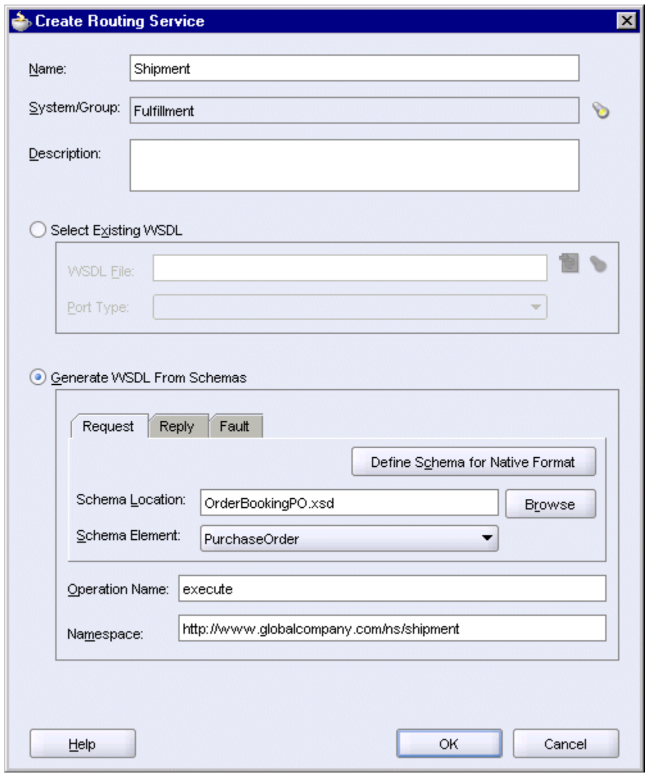


Type: {http://www.globalcompany.com/ns/order}PurchaseOrder

   Click **OK** in the Type Chooser dialog.
   - **Schema Element**: select **PurchaseOrder**.
   - **Operation Name**: enter **execute**.
   - **Namespace**: enter **http://www.globalcompany.com/ns/shipment**.

   The Create Routing Service dialog should now look like this:

***Figure 4–12 Create Routing Service Dialog for the Shipment Routing Service***


Create Routing Service

Name: Shipment

System/Group: Fulfillment

Description:

Select Existing WSDL

WSDL File:

Port Type:

Generate WSDL From Schemas

Request | Reply | Fault

Define Schema for Native Format

Schema Location: OrderBookingPO.xsd [Browse]

Schema Element: PurchaseOrder

Operation Name: execute

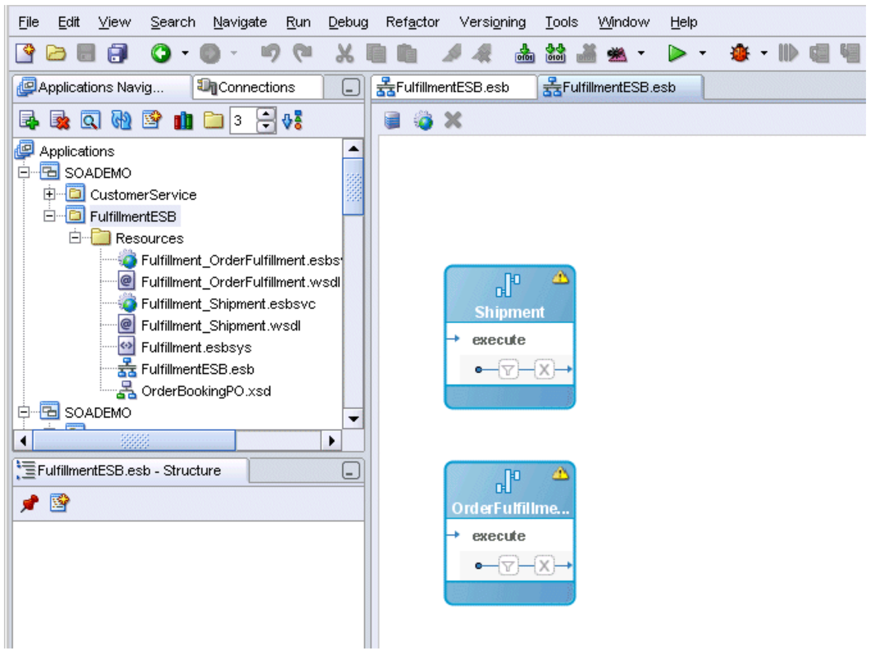
Namespace: http://www.globalcompany.com/ns/shipment

Help | OK | Cancel

**3.** Click **OK** in the Create Routing Service dialog.

In JDeveloper, you should see two routing services:

***Figure 4–13 JDeveloper Showing the OrderFulfillment and Shipment Routing Services***



JDeveloper created the following files in the `FulfillmentESB` directory.

- `Fulfillment_Shipment.esbsvc` - this file defines the "Shipment" routing service. JDeveloper prefixes the system name to the filename.
- `Fulfillment_Shipment.wsdl` - this WSDL file is for the "Shipment" routing service.

## 4.6 Create the "USPSShipment" Adapter (File Adapter)

The "USPSShipment" service is one of the targets for the "Shipment" routing service. When the "Shipment" routing service sends an order to the "USPSShipment" service, the "USPSShipment" service writes the order information to a flat file in the `C:\temp` directory.

To create the "USPSShipment" service:

1. Copy the following file from the `soademo_101310_prod.zip` file to the `FulfillmentESB` directory:

   - `USPSShipment.xsd`

   In the zip file, this file is located in the `FulfillmentESB` directory.

2. In the Component Palette, select **Adapter Services** from the dropdown.

3. Drag the File Adapter icon from the Component Palette and drop it anywhere on the FulfillmentESB page.

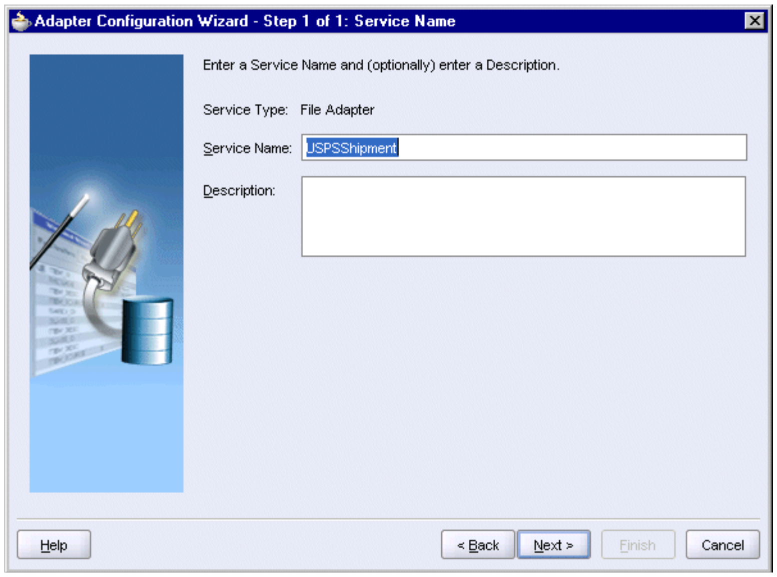
4. In the Create File Adapter Service dialog:

   - **Name**: enter **USPSShipment**.
   - **System/Group**: should be set to **Fulfillment**. If not, click the flashlight icon to change it.
   - **WSDL File**: click the Configure Adapter Service WSDL icon (the one on the left), which launches the Adapter Configuration wizard.

     Click **Next** on the Welcome page of the wizard.

     Step 1, Service Name:

***Figure 4–14   Adapter Configuration Wizard, Step 1, Service Name***



Enter a Service Name and (optionally) enter a Description.

Service Type: File Adapter

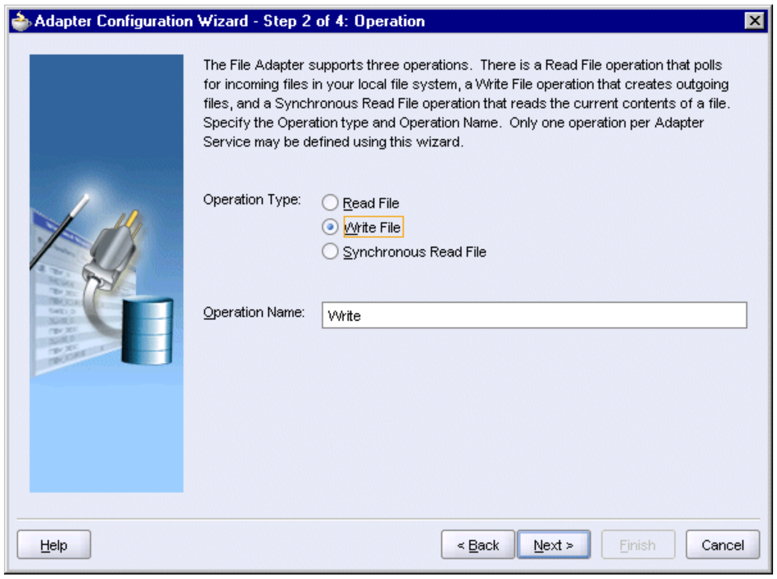
Service Name: USPSShipment

Description:

– **Service Name**: enter **USPSShipment**.
– Click **Next**.

Step 2, Operation:

***Figure 4–15 Adapter Configuration Wizard, Step 2, Operation***



The File Adapter supports three operations. There is a Read File operation that polls for incoming files in your local file system, a Write File operation that creates outgoing files, and a Synchronous Read File operation that reads the current contents of a file. Specify the Operation type and Operation Name. Only one operation per Adapter Service may be defined using this wizard.

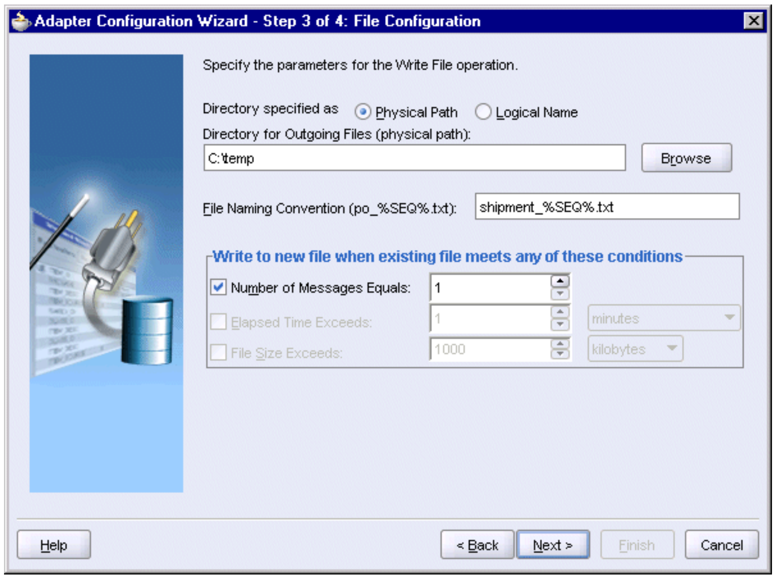
Operation Type: Read File [✓ Write File] Synchronous Read File

Operation Name: Write

– **Operation Type**: select **Write File**.
– **Operation Name**: should be filled in with **Write**.
– Click **Next**.

Step 3, File Configuration:

***Figure 4–16 Adapter Configuration Wizard, Step 3, File Configuration***


Adapter Configuration Wizard - Step 3 of 4: File Configuration
Browse
Help
< Back
Next >
Finish
Cancel

Specify the parameters for the Write File operation.

Directory specified as [✓ Physical Path] Logical Name

Directory for Outgoing Files (physical path): C:\temp

File Naming Convention (po_%SEQ%.txt): shipment_%SEQ%.txt

Write to new file when existing file meets any of these conditions

[✓ Number of Messages Equals:] 1
Elapsed Time Exceeds: 1 minutes
File Size Exceeds: 1000 kilobytes

– **Directory for Outgoing Files**: enter the directory where you want the adapter to write the files. For example, you can enter **C:\temp**.

---

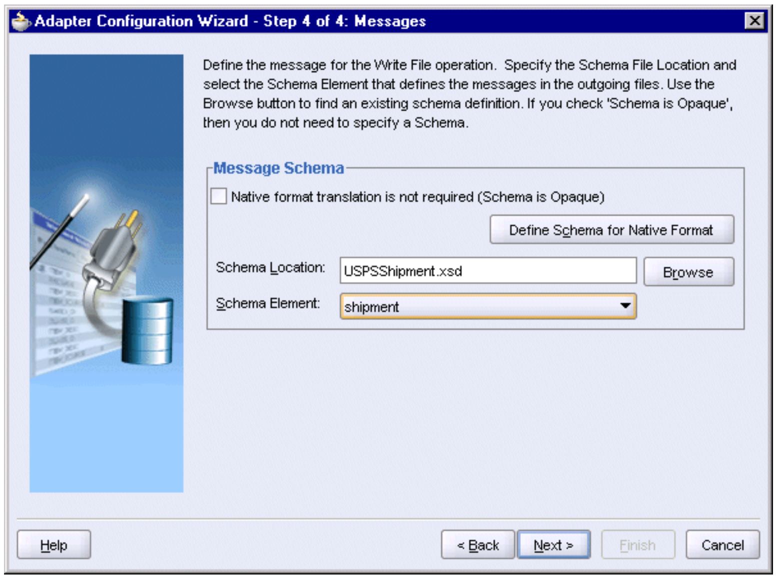
**Note:** This directory is located on the machine where you are running Oracle Application Server, not the machine where you are running JDeveloper.

---

- **File Naming Convention**: specify how you want to name the files. Enter **shipment_%SEQ%.txt**. The `%SEQ%` indicates that the filenames will be numbered sequentially.
- **Number of Messages Equals**: You can leave it at **1**, which means that each order will be written in a separate file.
- Click **Next**.

Step 4, Messages:

***Figure 4–17 Adapter Configuration Wizard, Step 4, Messages***


Adapter Configuration Wizard - Step 4 of 4: Messages

Define the message for the Write File operation. Specify the Schema File Location and select the Schema Element that defines the messages in the outgoing files. Use the Browse button to find an existing schema definition. If you check 'Schema is Opaque', then you do not need to specify a Schema.

Message Schema

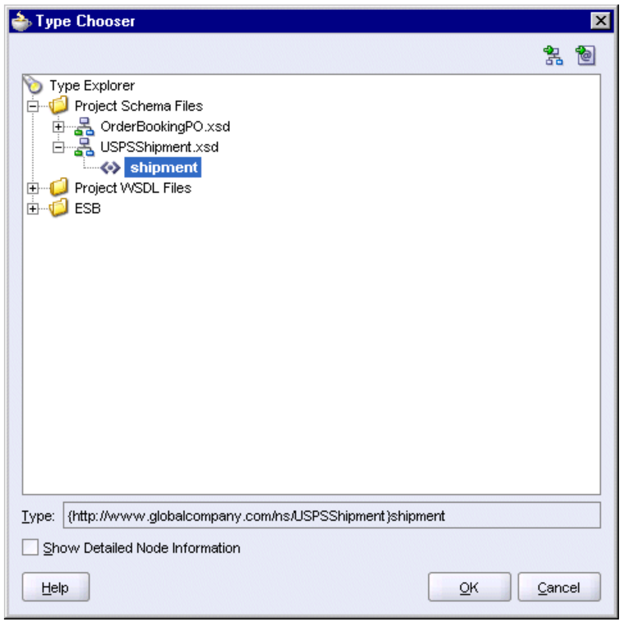
[ ] Native format translation is not required (Schema is Opaque)

Schema Location: USPSShipment.xsd

Schema Element: shipment

- **Native format translation is not required (Schema is Opaque)**: do not select this option.
- **Schema Location**. Click **Browse**. In the Type Chooser, select **Project Schema Files** > **USPSShipment.xsd** > **shipment**.

***Figure 4–18 Type Chooser for USPSShipment File Adapter***



Type: {http://www.globalcompany.com/ns/USPSShipment}shipment

Show Detailed Node Information

Click **OK** in the Type Chooser.

– **Schema Element**: should be set to **shipment**.

– Click **Next**.

On the Finish page, click **Finish**.

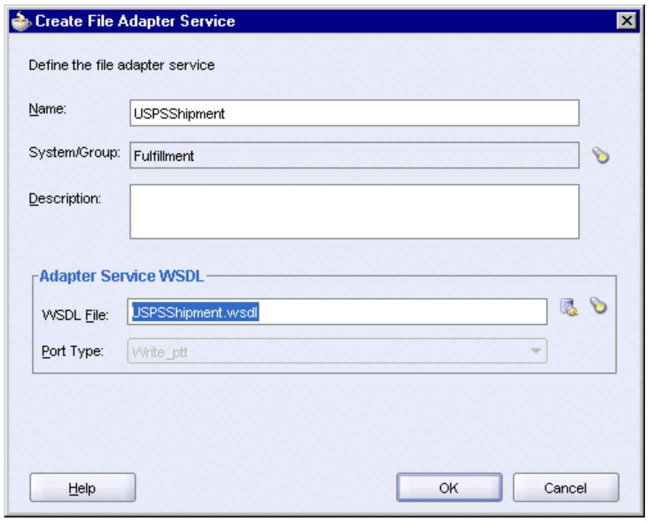
The wizard creates the following files in the `FulfillmentESB` directory:

– `USPSShipment.wsdl` - this file contains the information you specified in the wizard.

– `fileAdapterOutboundHeader.wsdl` - this file contains generic information for writing to files.

The Create File Adapter Service dialog should now look like this. JDeveloper automatically filled in **Write_ptt** for **Port Type**.

***Figure 4–19 Create File Adapter Service Dialog for the USPSShipment File Adapter Service***



Create File Adapter Service

Define the file adapter service

Name: USPSShipment

System/Group: Fulfillment

Description:

Adapter Service WSDL

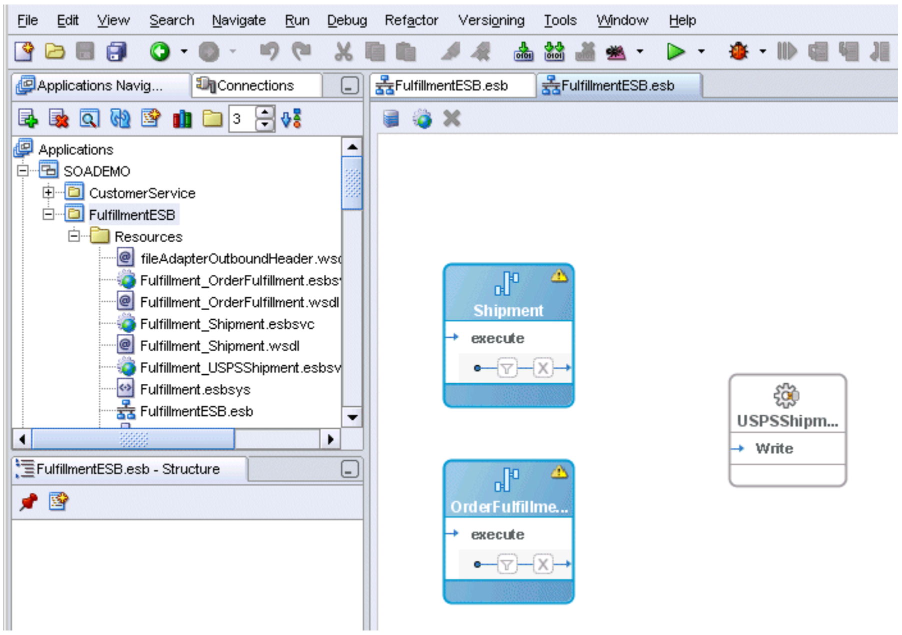
WSDL File: USPSShipment.wsdl

Port Type: Write_ptt

**5.** Click **OK** in the Create File Adapter Service dialog.

In JDeveloper, you should see two routing services and a file adapter service:

***Figure 4–20 JDeveloper Showing the OrderFulfillment and Shipment Routing Services, and the USPSShipment File Adapter Service***



## 4.7 Create the "FedexShipment" Adapter (Database Adapter)

The FedexShipment service is a database adapter. When the Shipment routing service routes an order to the FedexShipment adapter, the FedexShipment adapter writes the order information to the FEDEXSHIPMENT table in the SOADEMO schema.

To create the FedexShipment adapter:

1. Copy the following file from the `soademo_101310_prod.zip` file to the `FulfillmentESB` directory:

   - `FedexShipment_table.xsd`

   In the zip file, this file is located in the `FulfillmentESB` directory.

2. In the Component Palette, select **Adapter Services** from the dropdown.

3. Drag the Database Adapter icon from the Component Palette and drop it anywhere on the FulfillmentESB page.

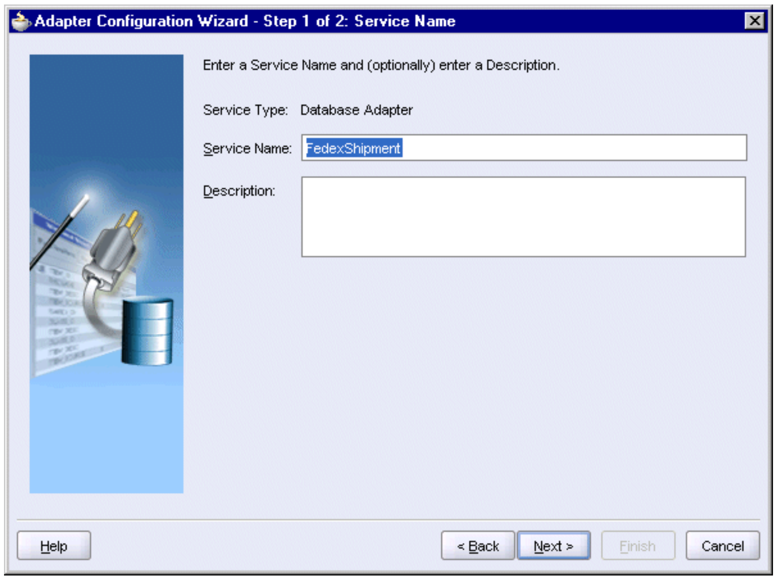
4. In the Create Database Adapter Service dialog:

   - **Name**: enter **FedexShipment**.
   - **System/Group**: should be set to **Fulfillment**. If not, click the flashlight icon to change it.
   - **WSDL File**: click the Configure Adapter Service WSDL icon (the one on the left), which launches the Adapter Configuration wizard.

     Click **Next** on the Welcome page of the wizard.

     Step 1, Service Name:

***Figure 4–21 Adapter Configuration Wizard, Step 1, Service Name***



Enter a Service Name and (optionally) enter a Description.

Service Type: Database Adapter

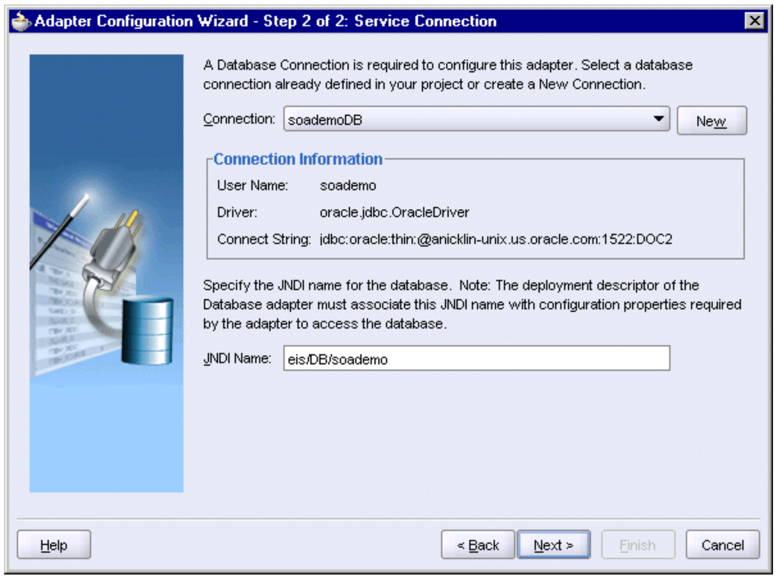
Service Name: FedexShipment

Description:

     – **Service Name**: enter **FedexShipment**.
     – Click **Next**.

     Step 2, Service Connection:

*Figure 4–22 Adapter Configuration Wizard, Step 2, Service Connection*


Adapter Configuration Wizard - Step 2 of 2: Service Connection
New
Connection Information
Help
< Back
Next >
Finish
Cancel

A Database Connection is required to configure this adapter. Select a database connection already defined in your project or create a New Connection.

Connection: soademoDB

User Name: soademo
Driver: oracle.jdbc.OracleDriver
Connect String: jdbc:oracle:thin:@anicklin-unix.us.oracle.com:1522:DOC2

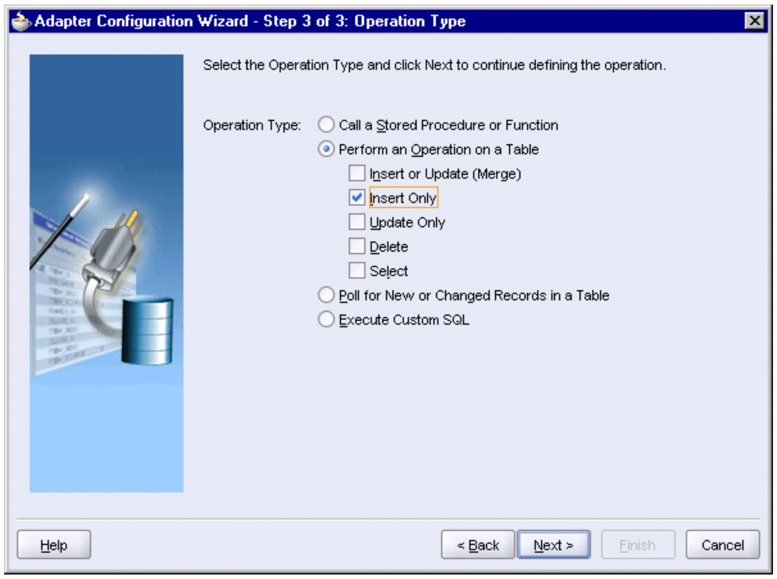
Specify the JNDI name for the database. Note: The deployment descriptor of the Database adapter must associate this JNDI name with configuration properties required by the adapter to access the database.

JNDI Name: eis/DB/soademo

- **Connection**: select the database connection for the SOADEMO schema.
- **JNDI Name**: enter **eis/DB/soademo**. This is the JNDI location you specified when you created connection factory in Oracle Application Server (see Section 2.6.4, "Create a Database Adapter Connection Factory").
- Click **Next**.

Step 3, Operation Type:

*Figure 4–23 Adapter Configuration Wizard, Step 3, Operation Type*



Select the Operation Type and click Next to continue defining the operation.

Operation Type:
- [ ] Call a Stored Procedure or Function
- [✓] Perform an Operation on a Table
  - [ ] Insert or Update (Merge)
  - [✓] Insert Only
  - [ ] Update Only
  - [ ] Delete
  - [ ] Select
- [ ] Poll for New or Changed Records in a Table
- [ ] Execute Custom SQL

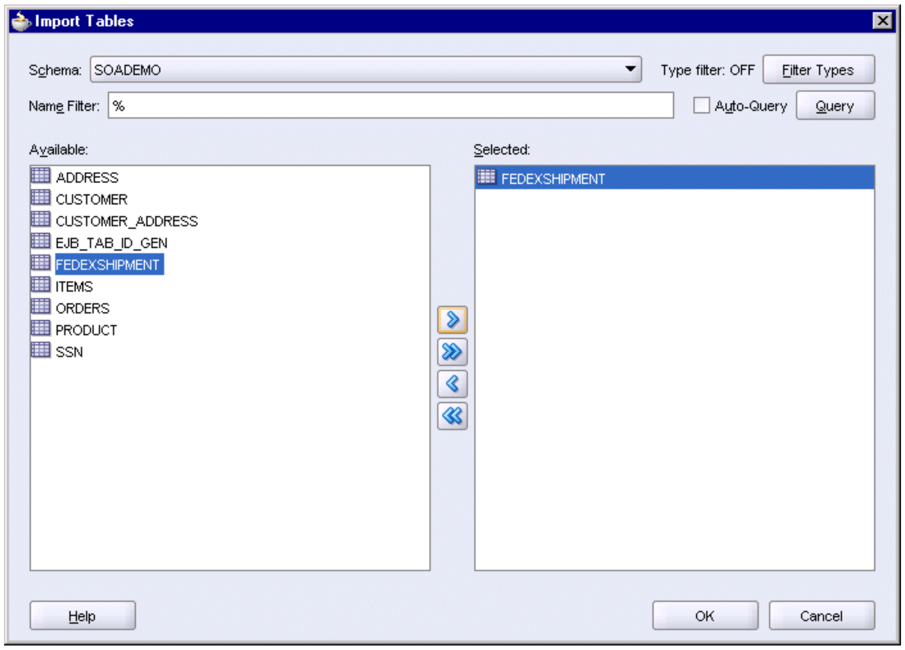
- Select **Perform an Operation on a Table**, and select **Insert Only**. The SOA Order Booking application only needs to insert rows in the table.
- Click **Next**.

Step 4, Select Table, click **Import Tables**.

In the Import Tables dialog, click **Query**.

Select **FEDEXSHIPMENT** and click the right-arrow button to move it the Selected box. The FEDEXSHIPMENT table is the table that the database adapter will write to.

***Figure 4–24 Import Tables Dialog for FedexShipment***



Schema: SOADEMO

Name Filter: %

Available:

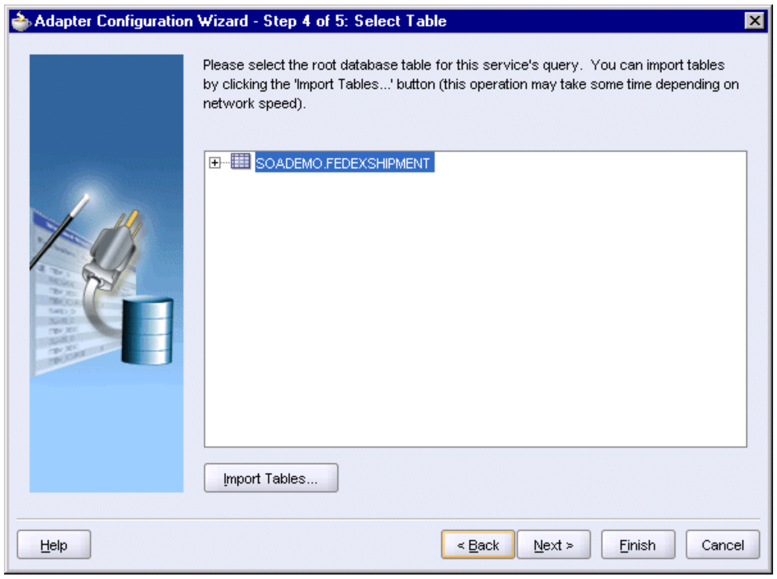
- ADDRESS
- CUSTOMER
- CUSTOMER_ADDRESS
- EJB_TAB_ID_GEN
- FEDEXSHIPMENT
- ITEMS
- ORDERS
- PRODUCT
- SSN

Selected:

- FEDEXSHIPMENT

Click **OK** in the Import Tables dialog. Step 4, Select Table, now looks like this:

***Figure 4–25 Adapter Configuration Wizard, Step 4, Select Table***



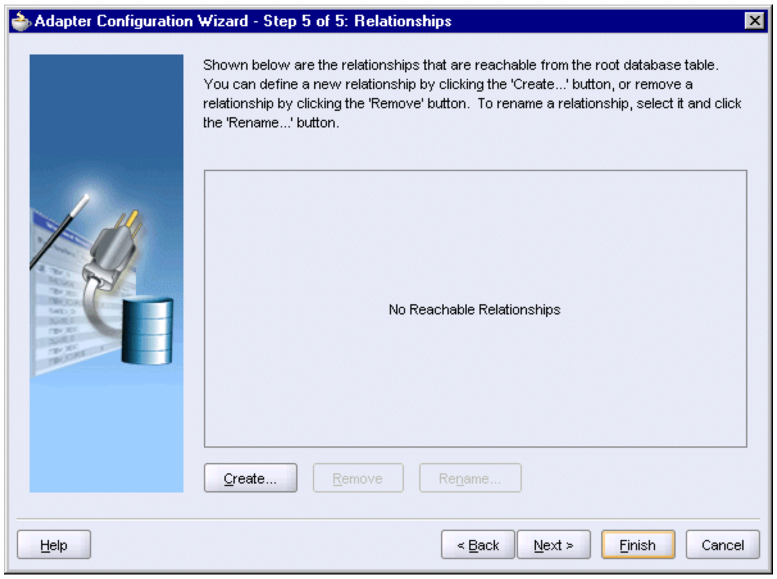
Please select the root database table for this service's query. You can import tables by clicking the 'Import Tables...' button (this operation may take some time depending on network speed).

SOADEMO.FEDEXSHIPMENT

Select the **SOADEMO.FEDEXSHIPMENT** table and click **Next**.

In Step 5, Relationships, click **Next**.

***Figure 4–26 Adapter Configuration Wizard, Step 5, Relationships***



Shown below are the relationships that are reachable from the root database table. You can define a new relationship by clicking the 'Create...' button, or remove a relationship by clicking the 'Remove' button. To rename a relationship, select it and click the 'Rename...' button.

No Reachable Relationships

On the Finish page, click **Finish**.

The wizard creates the following files in the `FulfillmentESB` directory:

– `DBAdapterOutboundHeader.wsdl` -- this file contains the generic information for connecting to a database.

– `FedexShipment.wsdl` -- this file contains the information that you specified in the wizard.

– `FedexShipment_toplink_mappings.xml` -- this file is used by TopLink

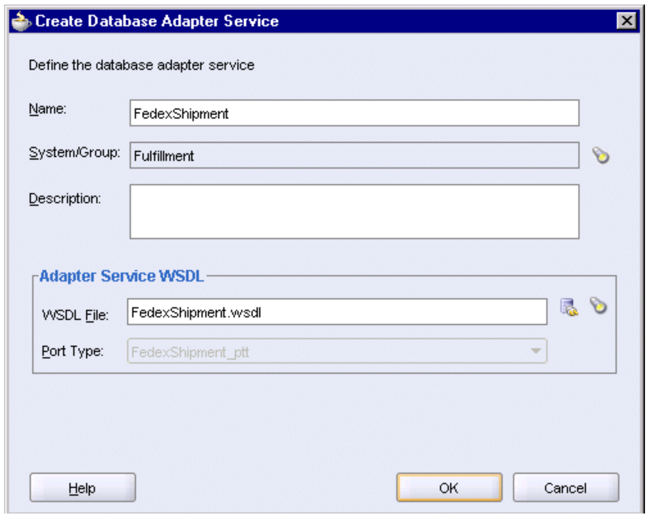
– `src\*`

– `database\*`

– `toplink\*`

The Create Database Adapter Service dialog now looks like this:

***Figure 4–27 Create Database Adapter Service Dialog for the FedexShipment Database Adapter Service***


Create Database Adapter Service

Define the database adapter service

Name: FedexShipment

System/Group: Fulfillment

Description:

Adapter Service WSDL

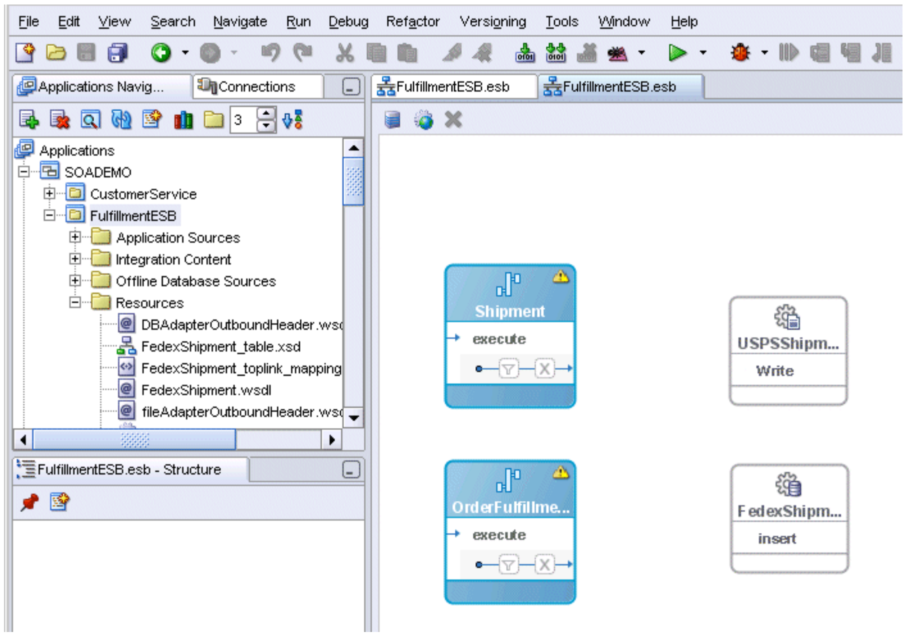
WSDL File: FedexShipment.wsdl

Port Type: FedexShipment_ptt

5. Click **OK** in the Create Database Adapter Service dialog.

In JDeveloper, you should see two routing services, a file adapter service, and a database adapter service.

***Figure 4–28 JDeveloper Showing the OrderFulfillment and Shipment Routing Services, the USPSShipment File Adapter Service, and the FedexShipment Database Adapter Service***



## 4.8 Create the "FulfillmentBatch" Adapter (JMS Adapter)

The "OrderFulfillment" routing service routes all orders to the "Shipment" routing service and to the "FulfillmentBatch" adapter. The "FulfillmentBatch" adapter sends the order information to a JMS server.

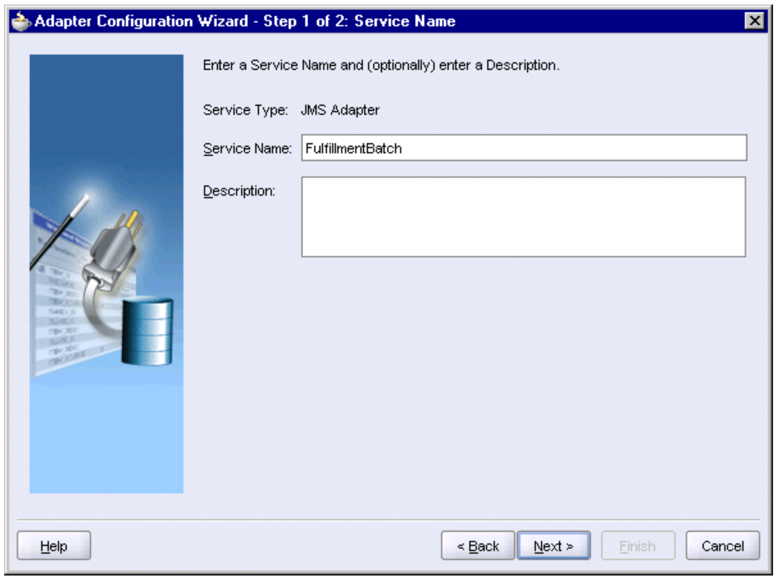
To create the FulfillmentBatch JMS adapter:

1. In the Component Palette, select **Adapter Services** from the dropdown.
2. Drag the JMS Adapter icon from the Component Palette and drop it anywhere on the FulfillmentESB page.
3. In the Create JMS Adapter Service dialog:
   - **Name**: enter **FulfillmentBatch**.
   - **System/Group**: should be set to **Fulfillment**. If not, click the flashlight icon to change it.
   - **WSDL File**: click the Configure Adapter Service WSDL icon (the one on the left), which launches the Adapter Configuration wizard.

     Click **Next** on the Welcome page of the wizard.

     Step 1, Service Name:

***Figure 4–29 Adapter Configuration Wizard, Step 1, Service Name***



Enter a Service Name and (optionally) enter a Description.

Service Type: JMS Adapter

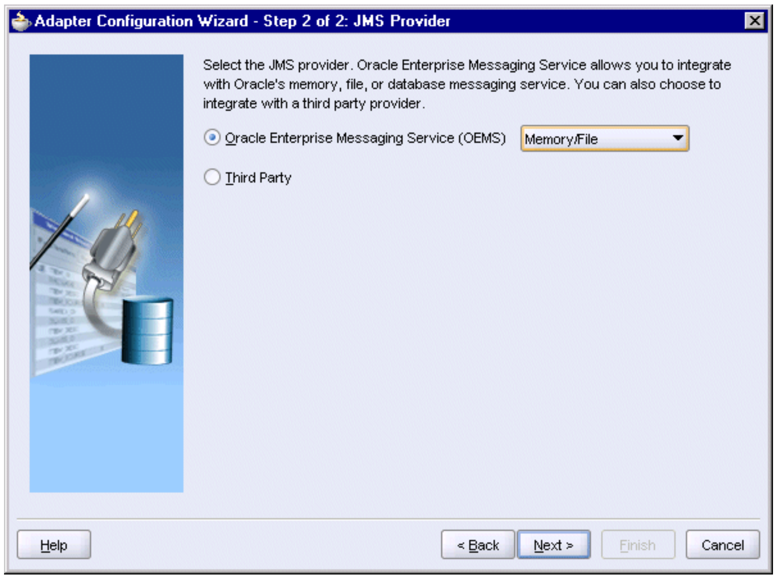
Service Name: FulfillmentBatch

Description:

     – Service Name: enter **FulfillmentBatch**.
     – Click **Next**.

     Step 2, JMS Provider:

***Figure 4–30 Adapter Configuration Wizard, Step 2, JMS Provider***


Adapter Configuration Wizard - Step 2 of 2: JMS Provider

Select the JMS provider. Oracle Enterprise Messaging Service allows you to integrate with Oracle's memory, file, or database messaging service. You can also choose to integrate with a third party provider.

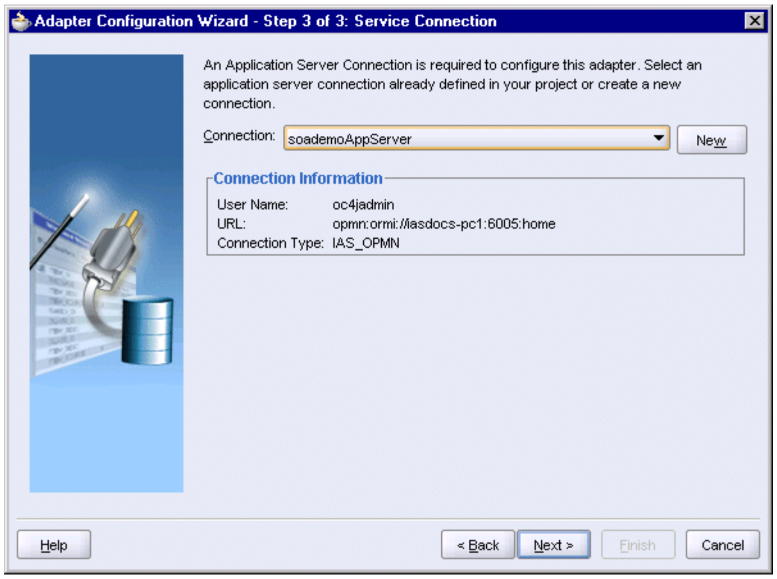
(●) Oracle Enterprise Messaging Service (OEMS) Memory/File

( ) Third Party

- Select **Oracle Enterprise Messaging Service (OEMS)** and select **Memory/File** from the dropdown.
- Click **Next**.

Step 3, Service Connection:

***Figure 4–31 Adapter Configuration Wizard, Step 3, Service Connection***


Adapter Configuration Wizard - Step 3 of 3: Service Connection

An Application Server Connection is required to configure this adapter. Select an application server connection already defined in your project or create a new connection.

Connection: soademoAppServer

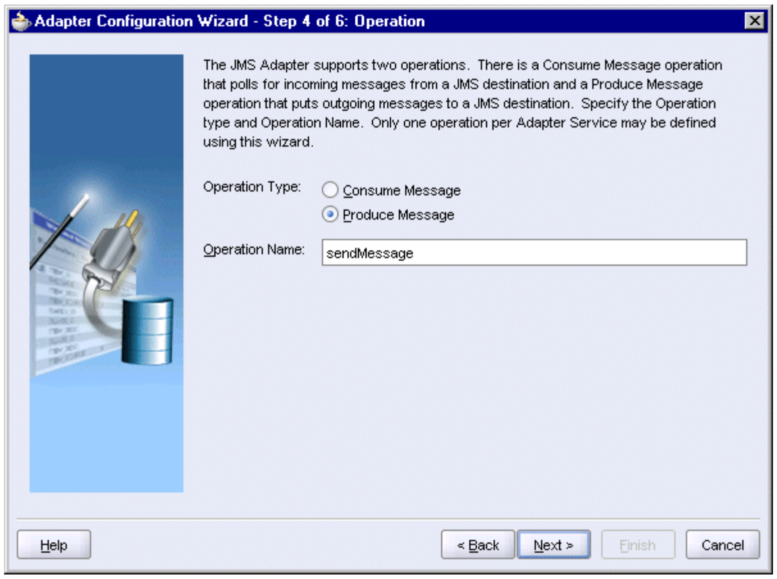
Connection Information

| | |
|---|---|
| User Name: | oc4jadmin |
| URL: | opmn:ormi://iasdocs-pc1:6005:home |
| Connection Type: | IAS_OPMN |

- In the **Connection** dropdown, select the connection to Oracle Application Server.
- Click **Next**.

Step 4, Operation:

*Figure 4–32 Adapter Configuration Wizard, Step 4, Operation*



Adapter Configuration Wizard - Step 4 of 6: Operation

The JMS Adapter supports two operations. There is a Consume Message operation that polls for incoming messages from a JMS destination and a Produce Message operation that puts outgoing messages to a JMS destination. Specify the Operation type and Operation Name. Only one operation per Adapter Service may be defined using this wizard.

Operation Type: Consume Message [✓ Produce Message]

Operation Name: sendMessage

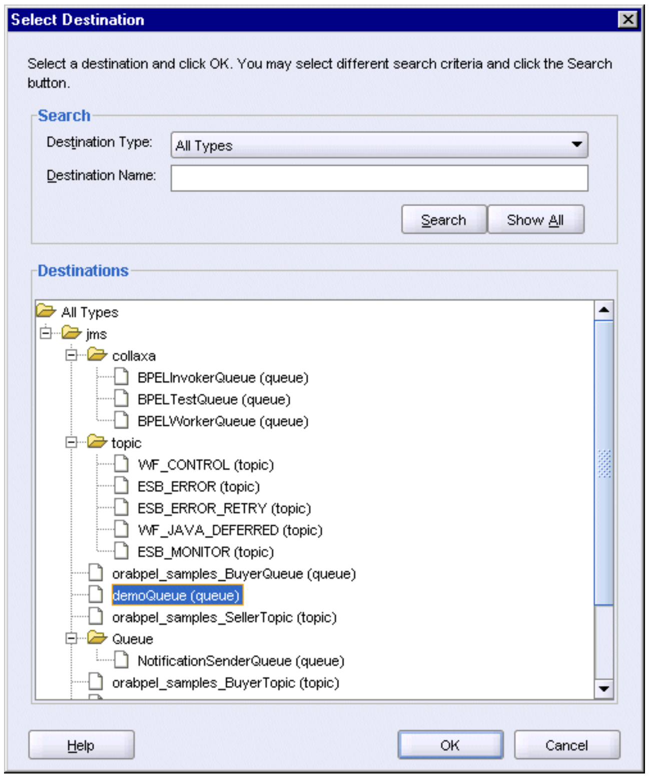
– **Operation Type**: select **Produce Message**.

– **Operation Name**: enter **sendMessage**.

– Click **Next**.

Step 5, Produce Operation Parameters, click **Browse**. This displays the Select Destination dialog. In the dialog, select **demoQueue (queue)**, and click **OK**.

*Figure 4–33 Select Destination Dialog*



Select Destination

Select a destination and click OK. You may select different search criteria and click the Search button.

Search

Destination Type: All Types

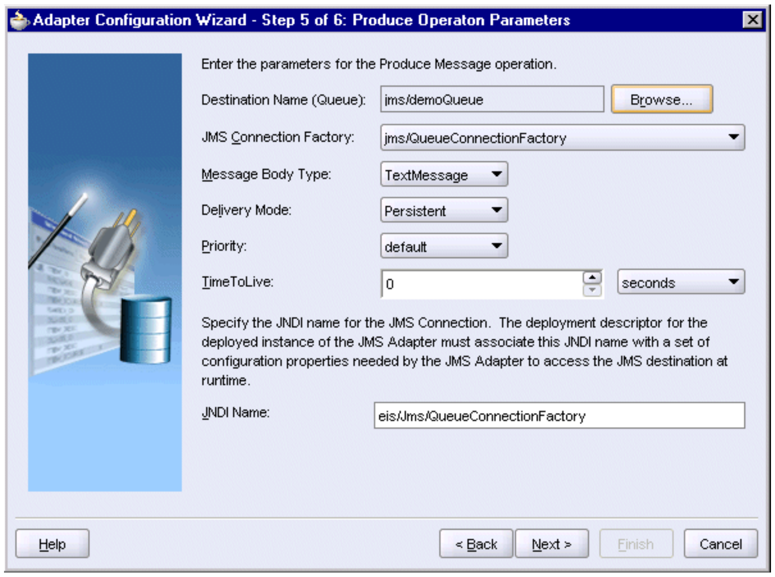
Destination Name:

Destinations

```
All Types
  jms
    collaxa
      BPELInvokerQueue (queue)
      BPELTestQueue (queue)
      BPELWorkerQueue (queue)
    topic
      WF_CONTROL (topic)
      ESB_ERROR (topic)
      ESB_ERROR_RETRY (topic)
      WF_JAVA_DEFERRED (topic)
      ESB_MONITOR (topic)
    orabpel_samples_BuyerQueue (queue)
    demoQueue (queue)
    orabpel_samples_SellerTopic (topic)
    Queue
      NotificationSenderQueue (queue)
    orabpel_samples_BuyerTopic (topic)
```

The rest of the values in Step 5 are filled in for you. You can just accept these values.

***Figure 4–34 Adapter Configuration Wizard, Step 5, Produce Operation Parameters***


Adapter Configuration Wizard - Step 5 of 6: Produce Operaton Parameters
Browse...
Help
< Back
Next >
Finish
Cancel

Enter the parameters for the Produce Message operation.

Destination Name (Queue): jms/demoQueue

JMS Connection Factory: jms/QueueConnectionFactory

Message Body Type: TextMessage

Delivery Mode: Persistent

Priority: default

TimeToLive: 0 seconds

Specify the JNDI name for the JMS Connection. The deployment descriptor for the deployed instance of the JMS Adapter must associate this JNDI name with a set of configuration properties needed by the JMS Adapter to access the JMS destination at runtime.

JNDI Name: eis/Jms/QueueConnectionFactory

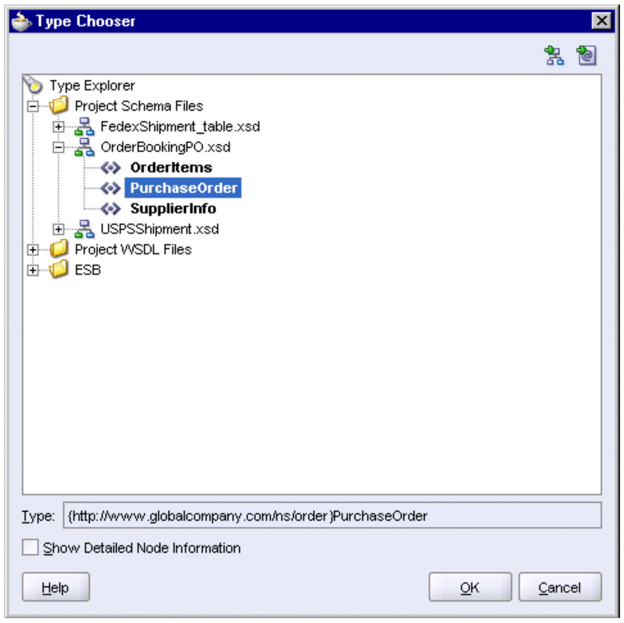
Click **Next**.

Step 6, Messages:

– **Native format translation is not required (Schema is Opaque)**: do not select this option.

– **Schema Location**: click **Browse**, which displays the Type Chooser. Select **Project Schema Files** > **OrderBookingPO.xsd** > **PurchaseOrder**.

***Figure 4–35 Type Chooser for the FulfillmentBatch JMS Adapter Service***



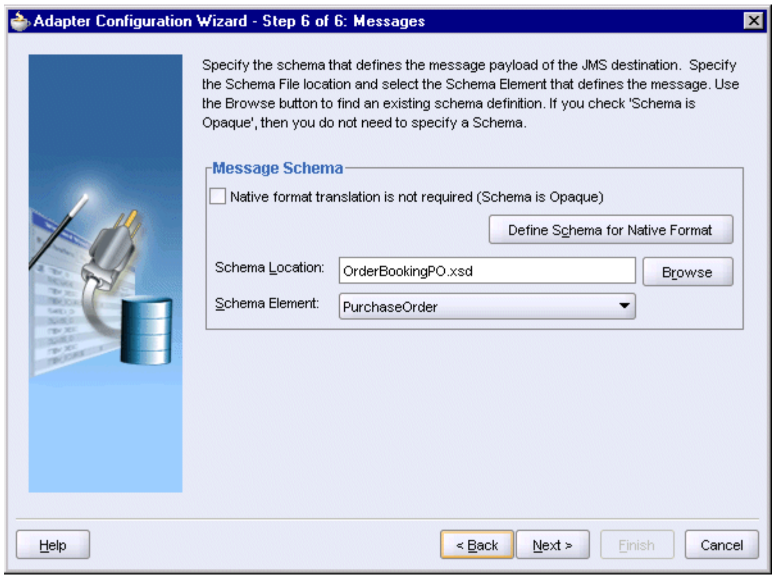
Type: {http://www.globalcompany.com/ns/order}PurchaseOrder

Show Detailed Node Information

Click **OK** in the Type Chooser.

– **Schema Element**: select **PurchaseOrder**.

*Figure 4–36 Adapter Configuration Wizard, Step 6, Messages*



Adapter Configuration Wizard - Step 6 of 6: Messages

Specify the schema that defines the message payload of the JMS destination. Specify the Schema File location and select the Schema Element that defines the message. Use the Browse button to find an existing schema definition. If you check 'Schema is Opaque', then you do not need to specify a Schema.

Message Schema

☐ Native format translation is not required (Schema is Opaque)

Schema Location: OrderBookingPO.xsd

Schema Element: PurchaseOrder

Click **Next**.

On the Finish page, click **Finish**.

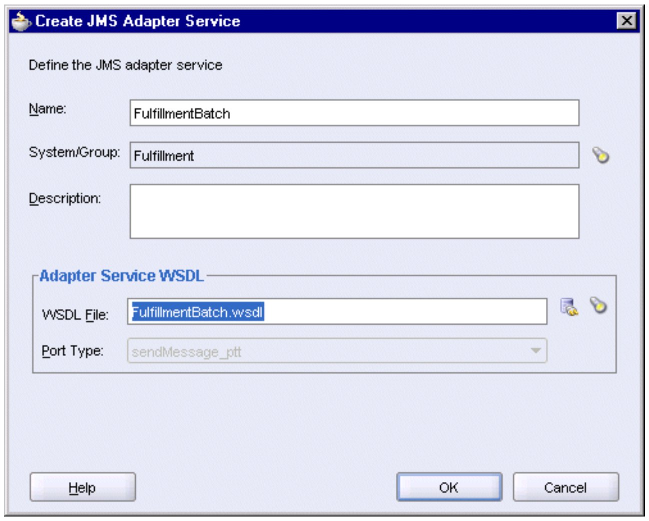
The wizard created the following files in the `FulfillmentESB` directory:

– `jmsAdapterOutboundHeader.wsdl`

– `FulfillmentBatch.wsdl`

The Create JMS Adapter Service dialog now looks like this:

*Figure 4–37 Create JMS Adapter Service Dialog for the FulfillmentBatch JMS Adapter Service*



Create JMS Adapter Service

Define the JMS adapter service

Name: FulfillmentBatch

System/Group: Fulfillment

Description:

Adapter Service WSDL

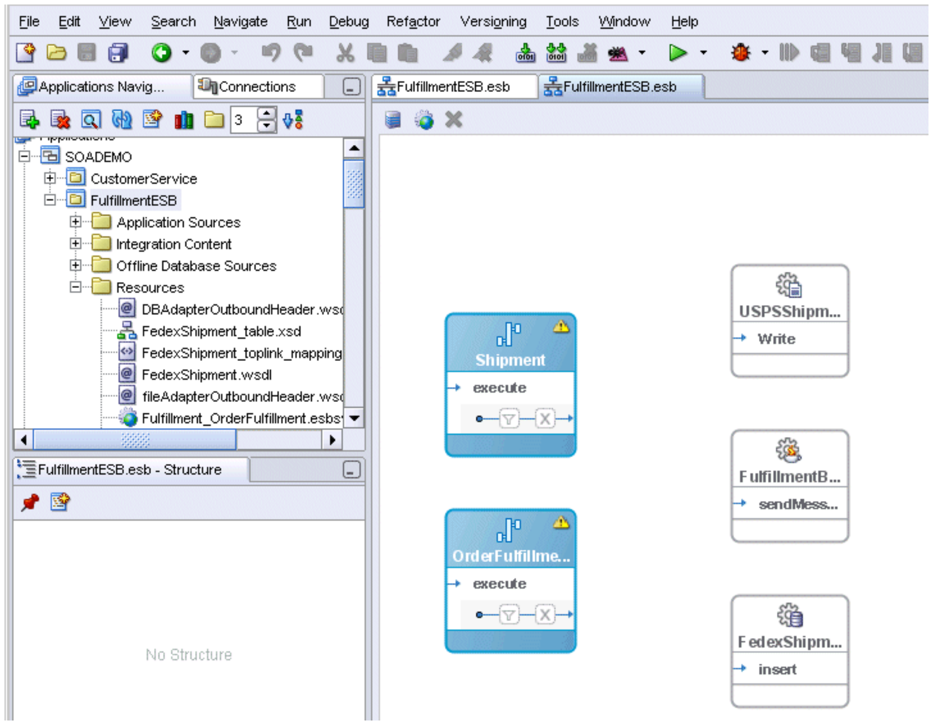
WSDL File: FulfillmentBatch.wsdl

Port Type: sendMessage_ptt

**4.** Click **OK** in the Create JMS Adapter Service dialog.

In JDeveloper, you should see two routing services, a file adapter service, a database adapter service, and a JMS adapter service.

***Figure 4–38 JDeveloper Showing All the Services for the FulfillmentESB Project***



## 4.9 Create Routing Rules

To route order information from one service to another, you set up routing rules. Routing rules enable you to define filters and transformations. Filters enable you to define conditions under which a service gets to process an order, and transformations enable you to map data so that the target service is able to process the data correctly.

For the FulfillmentESB project, you create routing rules between the following services:

- Section 4.9.1, "Between OrderFulfillment and Shipment"
- Section 4.9.2, "Between OrderFulfillment and JMS Adapter"
- Section 4.9.3, "Between Shipment and USPSShipment"
- Section 4.9.4, "Between Shipment and FedexShipment"

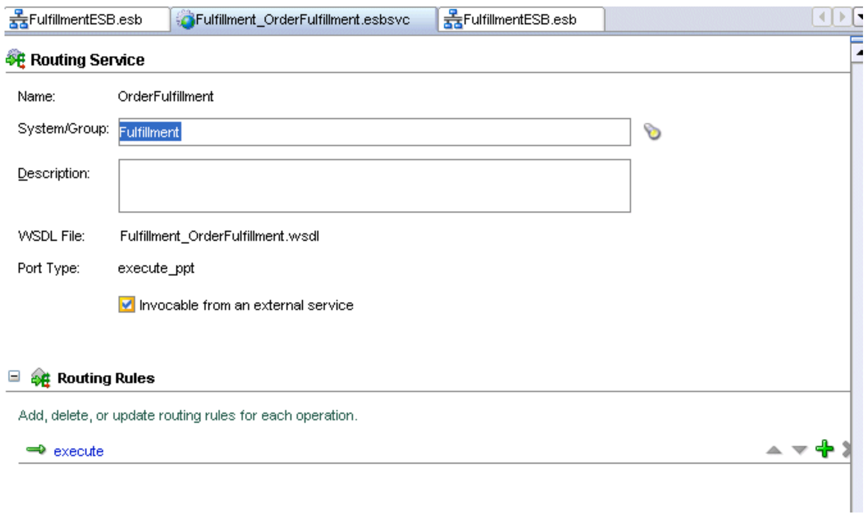
### 4.9.1 Between OrderFulfillment and Shipment

The OrderFulfillment routing service routes orders to two places: Shipment and FulfillmentBatch.

To create routing rule between OrderFulfillment and Shipment:

1. Double-click OrderFulfillment in the top section of the icon. This displays the page for the `Fulfillment_OrderFulfillment.esbsvc` file.

***Figure 4–39 Definition for the Fulfillment_OrderFulfillment Routing Service***



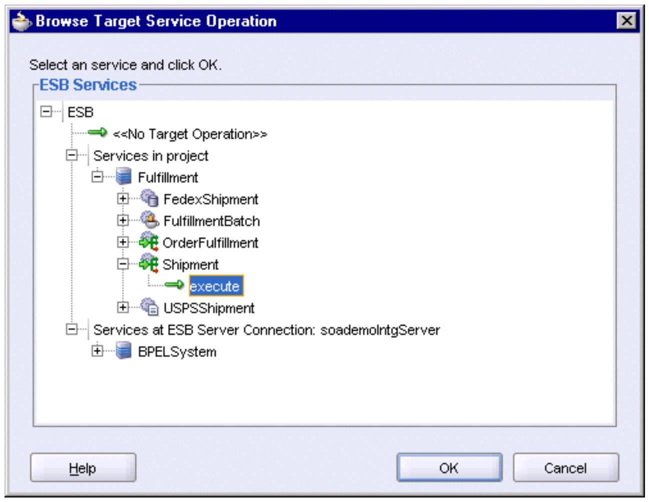
Name: OrderFulfillment
System/Group: Fulfillment
Description:
WSDL File: Fulfillment_OrderFulfillment.wsdl
Port Type: execute_ppt
☑ Invocable from an external service

Add, delete, or update routing rules for each operation.

2. In the Routing Rules section, click the [+] to expand it.
3. Click the green + icon to add a routing route. This displays the Browse Target Service Operation dialog.

   You may have to scroll to the right to see the green + icon.
4. In the Browse Target Service Operation dialog, select **Services In Project** > **Fulfillment** > **Shipment** > **execute**.

***Figure 4–40 Browse Target Service Operation Dialog***

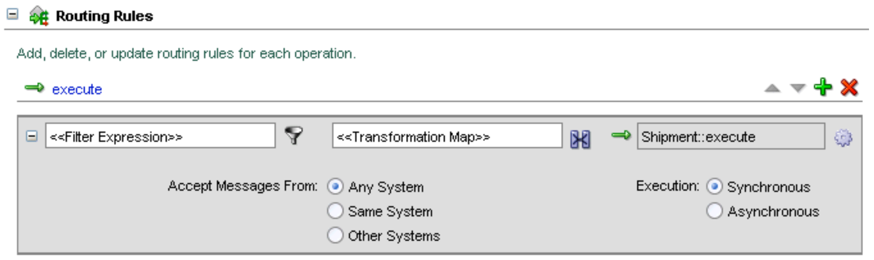


Select an service and click OK.

5. Click **OK** in the Browse Target Service Operation dialog.

   The routing rule area now looks like this:

***Figure 4–41 Routing Rule from OrderFulfillment to Shipment***



Accept Messages From: [✓ Any System] Same System Other Systems

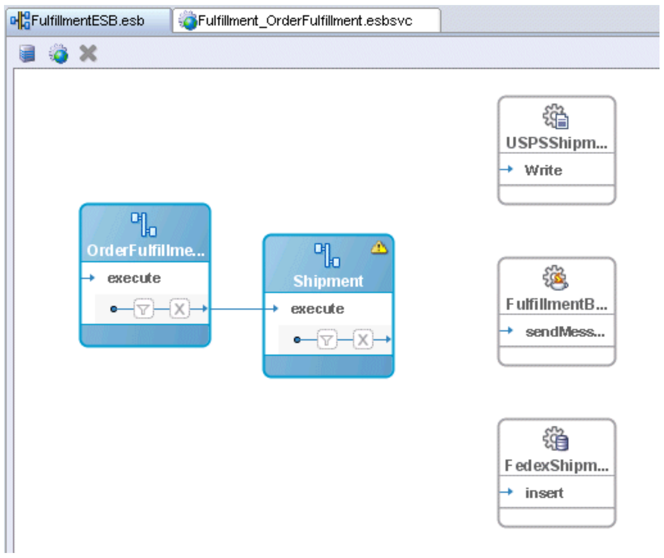
Execution: [✓ Synchronous] Asynchronous

6. Select File > Save to save your work.

For this routing rule, there are no filters and no transformations. The OrderFulfillment routing service routes all orders to the Shipment routing service. The data is not transformed in any way.

Click the FulfillmentESB.esb tab in JDeveloper. You should see an arrow going from OrderFulfillment to Shipment.

***Figure 4–42 JDeveloper Showing Routing from OrderFulfillment to Shipment***



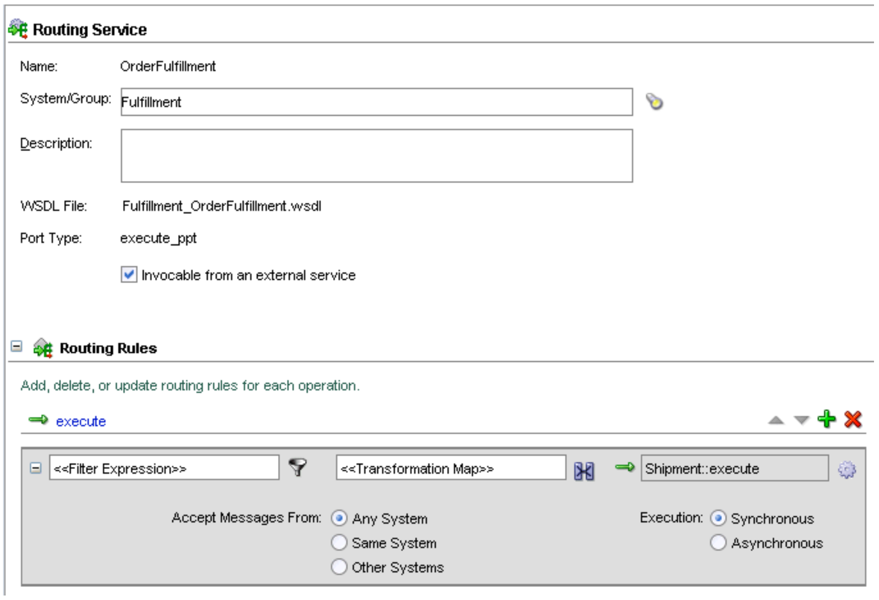
## 4.9.2 Between OrderFulfillment and JMS Adapter

The OrderFulfillment routing service routes orders to two places: Shipment and FulfillmentBatch (which is a JMS adapter service).

To create routing rule from OrderFulfillment to FulfillmentBatch:

1. Double-click OrderFulfillment in the top section of the icon. This displays the page for the `Fulfillment_OrderFulfillment.esbsvc` file.
2. In the Routing Rules section, click the [+] to expand it. You should see the rule that you created in the previous section (Section 4.9.1, "Between OrderFulfillment and Shipment").

***Figure 4–43 Definition for the OrderFulfillment Routing Service***



Routing Service

Name: OrderFulfillment

System/Group: Fulfillment

Description:

WSDL File: Fulfillment_OrderFulfillment.wsdl

Port Type: execute_ppt

[✓] Invocable from an external service

Routing Rules

Add, delete, or update routing rules for each operation.

execute

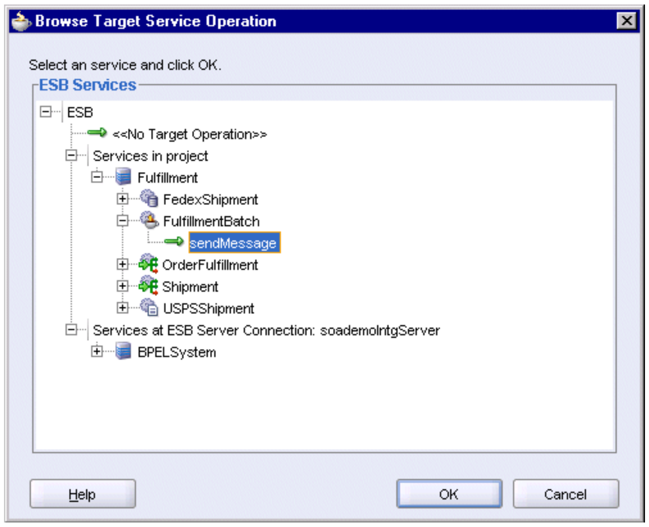
<<Filter Expression>> <<Transformation Map>> Shipment::execute

Accept Messages From: [✓ Any System] Same System Other Systems

Execution: [✓ Synchronous] Asynchronous

3. Click the green + icon to add another routing route. You may have to scroll to the right to see the + icon.
4. In the Browse Target Service Operation dialog, select **Services In Project** > **Fulfillment** > **FulfillmentBatch** > **sendMessage**.

***Figure 4–44 Browse Target Service Operation Dialog***



Browse Target Service Operation

Select an service and click OK.

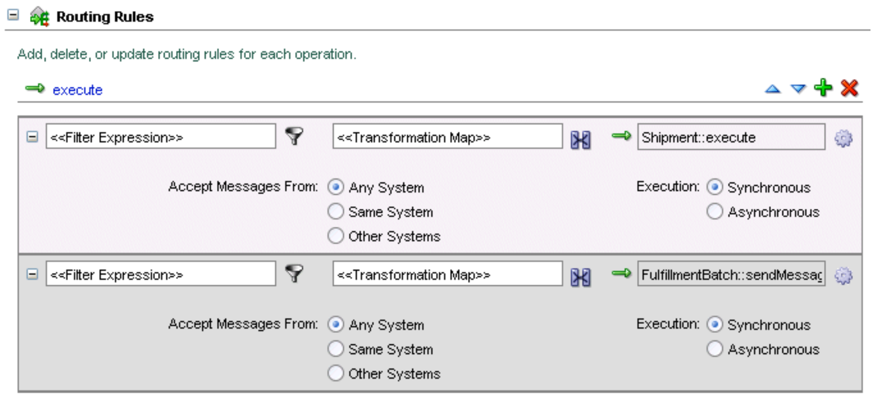
ESB Services

```
ESB
  <<No Target Operation>>
  Services in project
    Fulfillment
      FedexShipment
      FulfillmentBatch
        sendMessage
      OrderFulfillment
      Shipment
      USPSShipment
  Services at ESB Server Connection: soademoIntgServer
    BPELSystem
```

5. Click **OK** in the Browse Target Service Operation dialog.

   The routing rule area now contains two rules:

***Figure 4–45 Routing Rules for the OrderFulfillment Routing Service***


Routing Rules

Add, delete, or update routing rules for each operation.

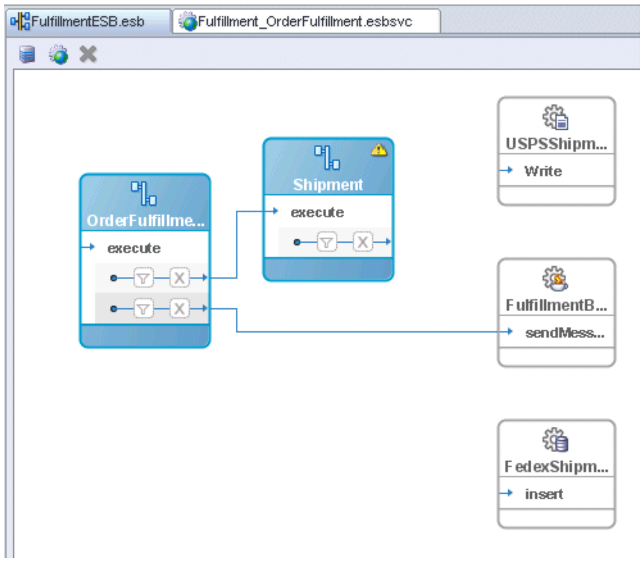
execute

|  |  |  |  |  |
|---|---|---|---|---|
| <<Filter Expression>> | <<Transformation Map>> | Shipment::execute | Accept Messages From: [✓ Any System] Same System Other Systems | Execution: [✓ Synchronous] Asynchronous |
| <<Filter Expression>> | <<Transformation Map>> | FulfillmentBatch::sendMessag | Accept Messages From: [✓ Any System] Same System Other Systems | Execution: [✓ Synchronous] Asynchronous |

6. Select File > Save to save your work.

Click the FulfillmentESB.esb tab in JDeveloper. From OrderFulfillment, there should be two arrows: one going to Shipment and one going to FulfillmentBatch.

***Figure 4–46 JDeveloper Showing Routing from OrderFulfillment to Shipment and JMSAdapter***



## 4.9.3 Between Shipment and USPSShipment

The Shipment routing service routes orders that are under $500 to the USPSShipment file adapter and orders that are $500 and over to the FedexShipment database adapter.

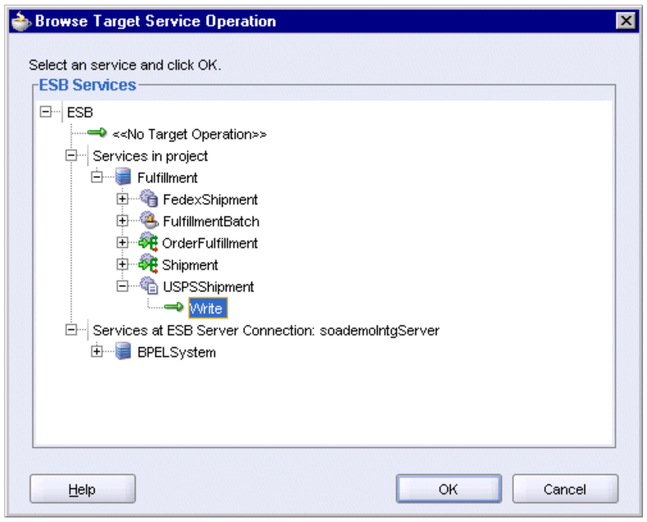
This section shows the routing rule for USPSShipment. It uses a filter to set the $500 rule, and it uses transformation to control what information is passed to USPSShipment. USPSShipment, which is a file adapter service, then writes the information to a file in the `C:\temp` directory.

To create the routing rule from Shipment to USPSShipment:

1. Double-click Shipment in the top section of the icon. This displays the page for the `Fulfillment_Shipment.esbsvc` file.
2. In the Routing Rules section, click the [+] to expand it.

3. Click the green + icon to add a routing route. You may have to scroll to the right to see the + icon.
4. In the Browse Target Service Operation dialog, select **Services In Project** > **Fulfillment** > **USPSShipment** > **Write**.

***Figure 4–47 Browse Target Service Operation Dialog***


Browse Target Service Operation

Select an service and click OK.

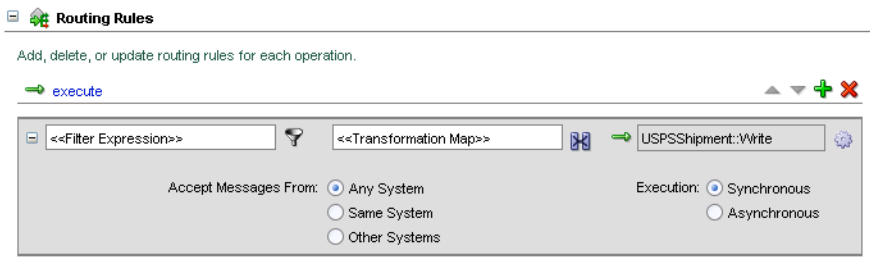
ESB Services

```
ESB
  <<No Target Operation>>
  Services in project
    Fulfillment
      FedexShipment
      FulfillmentBatch
      OrderFulfillment
      Shipment
      USPSShipment
        Write
  Services at ESB Server Connection: soademoIntgServer
    BPELSystem
```

5. Click **OK** in the Browse Target Service Operation dialog.

   The routing rule area now looks like this:

***Figure 4–48 Routing Rule from Shipment to USPSShipment***


Routing Rules

Add, delete, or update routing rules for each operation.

execute

<<Filter Expression>>   <<Transformation Map>>   USPSShipment::Write

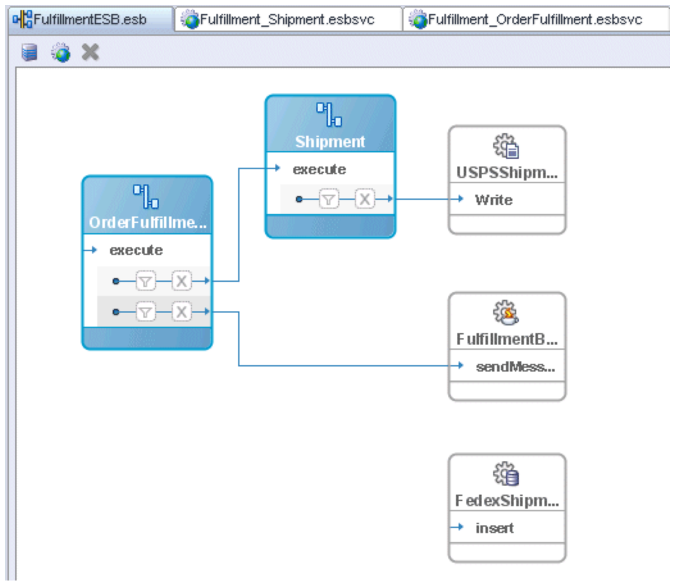
Accept Messages From: [✓ Any System] Same System Other Systems

Execution: [✓ Synchronous] Asynchronous

6. Select File > Save to save your work.

   Click the FulfillmentESB.esb tab in JDeveloper. You should see an arrow going from Shipment to USPSShipment.

*Figure 4–49 JDeveloper Showing Routing from Shipment to USPSShipment*



7. Create the filter so that only orders under $500 are directed to USPSShipment.

   a. Double-click Shipment in the top section of the icon to display the page for the `Fulfillment_Shipment.esbsvc` file.

   b. In the page for the `Fulfillment_Shipment.esbsvc` file, click the filter icon in the routing rules area. This displays the Expression Builder dialog.

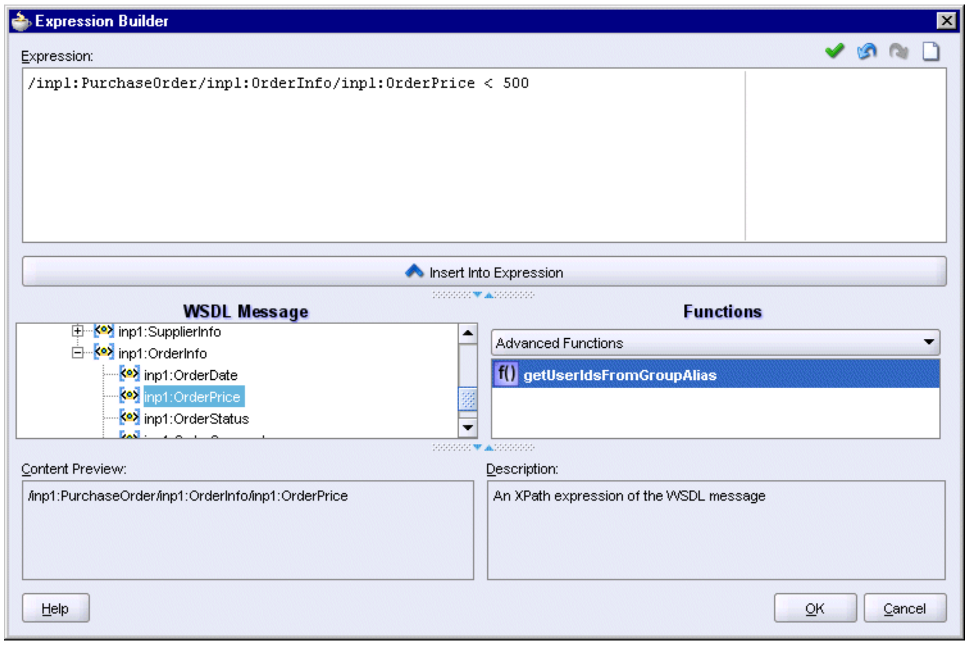
   c. In the Expression Builder dialog, in the WSDL Message box, select **Purchase Order_request** > **PurchaseOrder** > **inp1:PurchaseOrder** > **inp1:OrderInfo** > **inp1:OrderPrice**.

      The Content Preview box shows the path: /inp1:PurchaseOrder/inp1:OrderInfo/inp1:OrderPrice.

   d. Click **Insert Into Expression**. The path appears in the **Expression** box at the top of the dialog.

   e. In the Expression box, append **< 500** to the path, so that it now reads **/inp1:PurchaseOrder/inp1:OrderInfo/inp1:OrderPrice < 500**.

***Figure 4–50 Expression Builder Dialog***



```
/inp1:PurchaseOrder/inp1:OrderInfo/inp1:OrderPrice < 500
```

Content Preview: /inp1:PurchaseOrder/inp1:OrderInfo/inp1:OrderPrice

Description: An XPath expression of the WSDL message

f. Click **OK** in the Expression Builder.

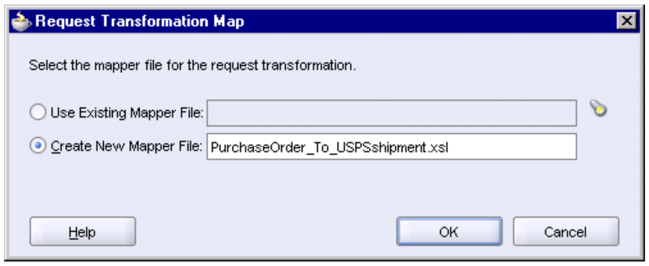
g. Select File > Save to save your work.

8. Create a transformation so that the USPSShipment file adapter gets the proper information in the proper fields.

   a. Click the transformation icon in the Routing Rules area.

   b. In the Request Transformation Map dialog, select **Create New Mapper File** and enter **PurchaseOrder_To_USPSshipment.xsl** as the filename.

***Figure 4–51 Request Transformation Map Dialog***



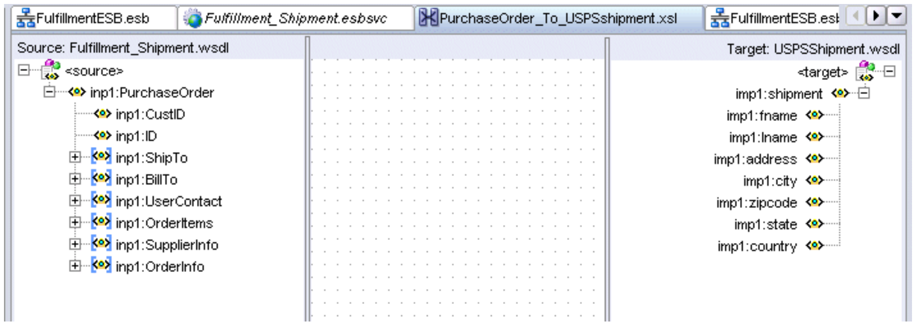
Select the mapper file for the request transformation.

Use Existing Mapper File:

[✓ Create New Mapper File:] PurchaseOrder_To_USPSshipment.xsl

   c. Click **OK**. This brings up the Data Mapper.

*Figure 4–52 Data Mapper*



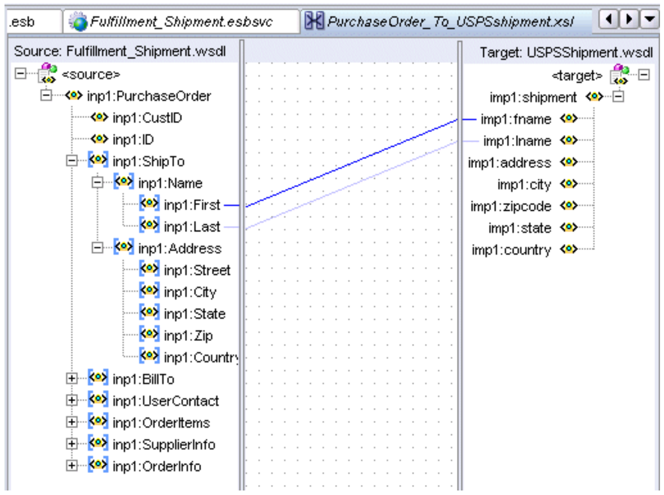
**d.** On the source (left) side, expand **inp1:ShipTo** > **inp1:Name** and **inp1:ShipTo** > **inp1:Address**.

**e.** Click and drag **inp1:First** to **imp1:fname**.

**f.** Click and drag **inp1:Last** to **imp1:lname**.

There should be two lines, one for First/fname and another one for Last/lname.

*Figure 4–53 Data Mapper Showing Transformation for First/fname and Last/lname*



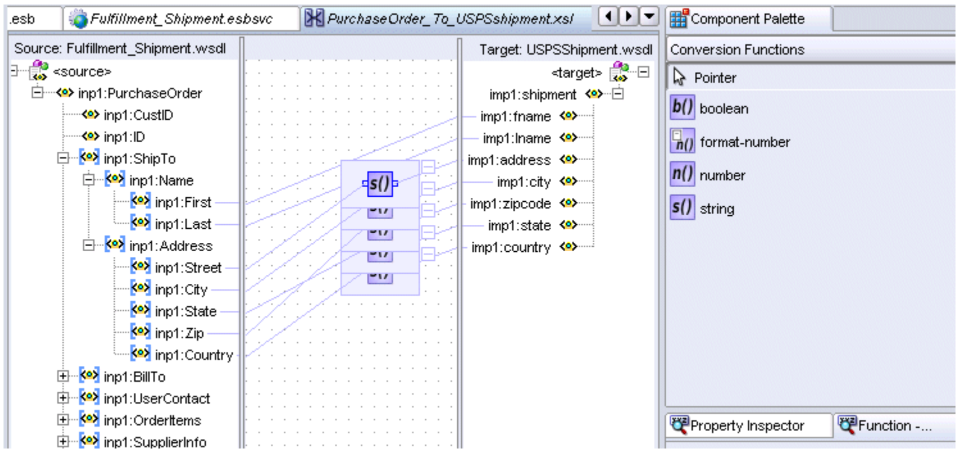
**g.** Click and drag to connect these pairs:

- **inp1:Street** to **imp1:address**
- **inp1:City** to **imp1:city**
- **inp1:State** to **imp1:state**
- **inp1:Zip** to **imp1:zipcode**
- **inp1:Country** to **imp1:country**

**h.** Select **Conversion Functions** from the dropdown in the Component Palette. You will need the `string` function for the next step.

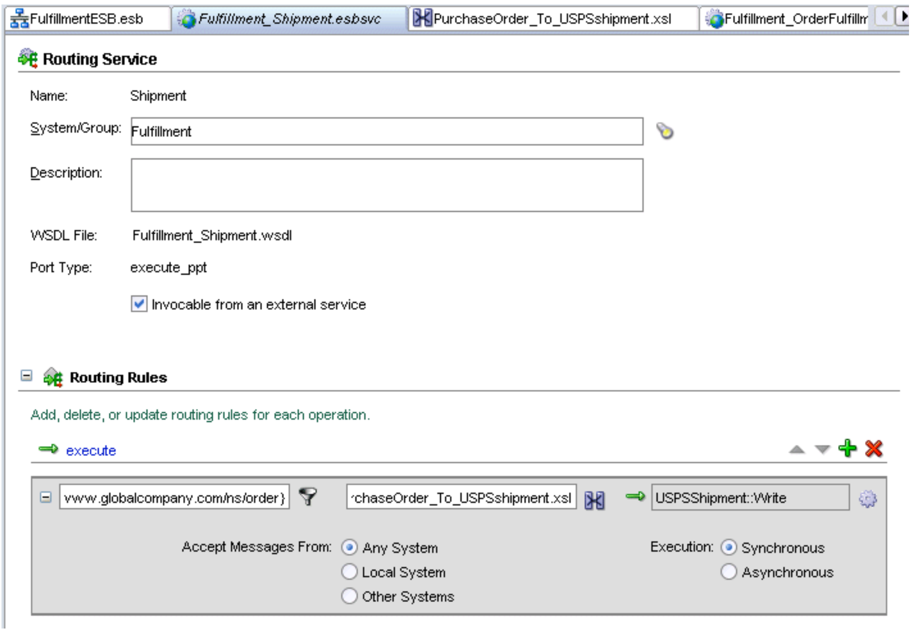
**i.** For each of the pairs listed in step (g), drag the **string** function from the Component Palette and drop it on each of the lines. You should end up with a diagram that looks like this:

***Figure 4–54 Data Mapper Showing Use of string Function During Transformation***



9. Select File > Save to save your work.
10. Click the Fulfillment_Shipment.esbsvc tab in JDeveloper. In the Routing Rules area, in the transformation section, you should see the name of the transformation file.

***Figure 4–55 Fulfillment_Shipment.esbsvc Showing Filter Information and Name of Transformation File***


FulfillmentESB.esb
Fulfillment_Shipment.esbsvc
PurchaseOrder_To_USPSshipment.xsl
Fulfillment_OrderFulfillm

**Routing Service**

Name: Shipment

System/Group: Fulfillment

Description:

WSDL File: Fulfillment_Shipment.wsdl

Port Type: execute_ppt

[✓] Invocable from an external service

**Routing Rules**

Add, delete, or update routing rules for each operation.

execute

vww.globalcompany.com/ns/order} | chaseOrder_To_USPSshipment.xsl | USPSShipment::Write

Accept Messages From: [● Any System] ○ Local System ○ Other Systems

Execution: [● Synchronous] ○ Asynchronous

11. Select File > Save to save Fulfillment_Shipment.esbsvc.
12. If you click the FulfillmentESB.esb tab, you can see that the filter and transformation icons for the Shipment routing service are no longer greyed out, unlike those for the OrderFulfillment routing service.

### 4.9.4 Between Shipment and FedexShipment

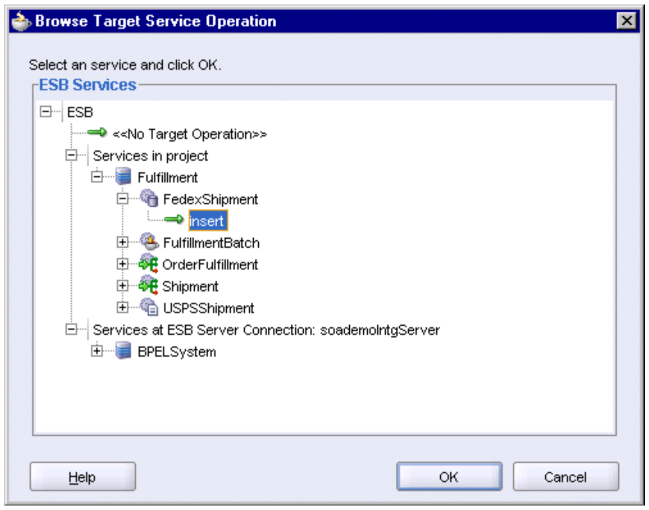
The Shipment routing service routes orders that are under $500 to the USPSShipment file adapter and orders that are $500 and over to the FedexShipment database adapter.

This section shows the routing rule for FedexShipment. It uses a filter to set the $500 rule, and it uses transformation to control what information is passed to FedexShipment. FedexShipment, which is a database adapter service, then writes the information to the FEDEXSHIPMENT table in the SOADEMO schema.

To create the routing rule from Shipment to FedexShipment:

1. Double-click Shipment or click the tab for Fulfillment_Shipment.esbsvc, if you have it open. This displays the page for the `Fulfillment_Shipment.esbsvc` file.
2. In the Routing Rules section, click the [+] to expand it.
3. Click the green + icon to add another routing route. You may have to scroll to the right to see the + icon.
4. In the Browse Target Service Operation dialog, select **Services In Project** > **Fulfillment** > **FedexShipment** > **insert**.

*Figure 4–56 Browser Target Service Operation Dialog*


Browse Target Service Operation

Select an service and click OK.

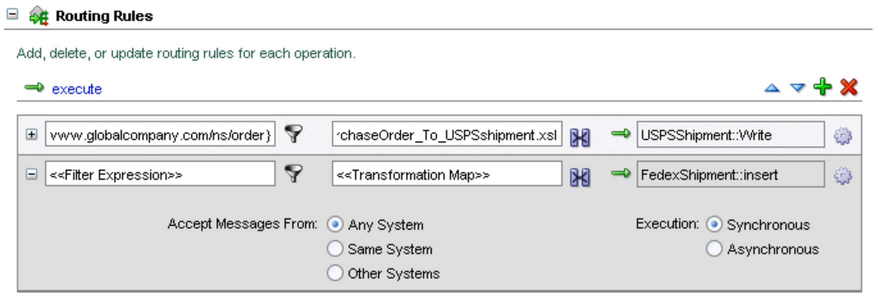
ESB Services

```
ESB
  <<No Target Operation>>
  Services in project
    Fulfillment
      FedexShipment
        insert
      FulfillmentBatch
      OrderFulfillment
      Shipment
      USPSShipment
  Services at ESB Server Connection: soademoIntgServer
    BPELSystem
```

5. Click **OK** in the Browse Target Service Operation dialog.

   The routing rule area now looks like this:

*Figure 4–57 Routing Rule from Shipment to FedexShipment*


Routing Rules

Add, delete, or update routing rules for each operation.

execute

| | | |
|---|---|---|
| vww.globalcompany.com/ns/order} | chaseOrder_To_USPSshipment.xsl | USPSShipment::Write |
| <<Filter Expression>> | <<Transformation Map>> | FedexShipment::insert |

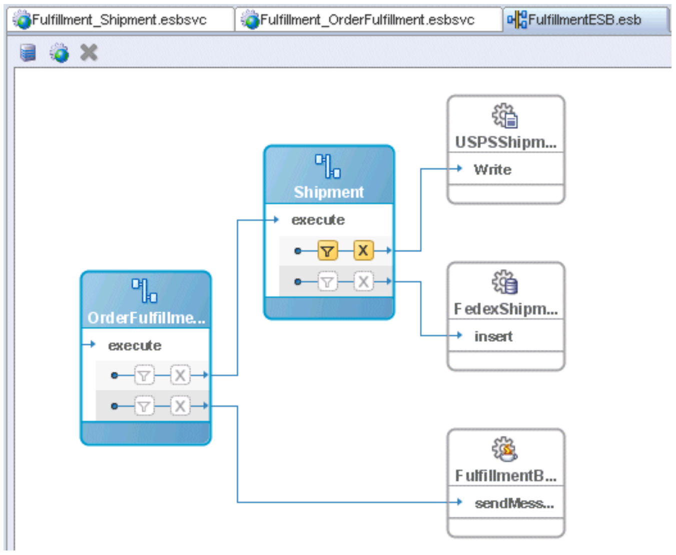
Accept Messages From: [✓ Any System] Same System Other Systems

Execution: [✓ Synchronous] Asynchronous

6. Select File > Save to save Fulfillment_Shipment.esbsvc.

   Click the FulfillmentESB.esb tab in JDeveloper. From Shipment, you should see two arrows: one going to USPSShipment and another one going to FedexShipment.

***Figure 4–58 JDeveloper Showing Routing from Shipment to USPSShipment and FedexShipment***



7. Create the filter that directs orders that are equal to or greater than $500 to FedexShipment.

   a. Double-click Shipment to display the page for the `Fulfillment_Shipment.esbsvc` file.

   b. In the page for the `Fulfillment_Shipment.esbsvc` file, click the filter icon for the FedexShipment rule in the routing rules area. This displays the Expression Builder dialog.

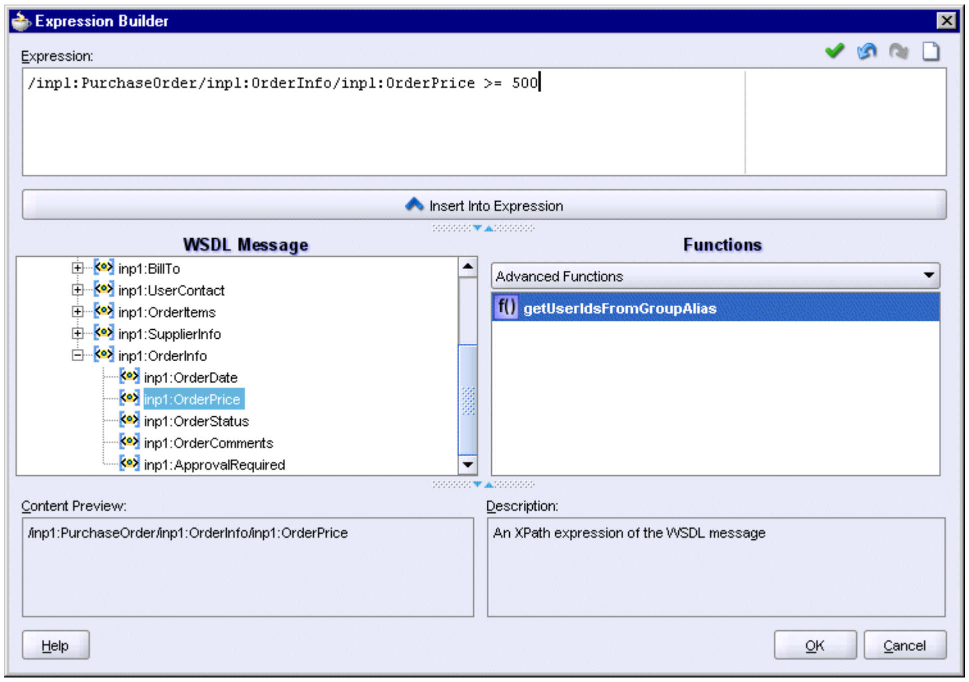
   c. In the Expression Builder dialog, in the WSDL Message box, select **Purchase Order_request** > **PurchaseOrder** > **inp1:PurchaseOrder** > **inp1:OrderInfo** > **inp1:OrderPrice**.

      The Content Preview box shows the path: /inp1:PurchaseOrder/inp1:OrderInfo/inp1:OrderPrice.

   d. Click **Insert Into Expression**. The path appears in the **Expression** box at the top of the dialog.

   e. In the Expression box, append **>= 500** to the path, so that it now reads **/inp1:PurchaseOrder/inp1:OrderInfo/inp1:OrderPrice >= 500**.

*Figure 4–59 Expression Builder Dialog*



```
/inp1:PurchaseOrder/inp1:OrderInfo/inp1:OrderPrice >= 500
```

inp1:BillTo
inp1:UserContact
inp1:OrderItems
inp1:SupplierInfo
inp1:OrderInfo
inp1:OrderDate
inp1:OrderPrice
inp1:OrderStatus
inp1:OrderComments
inp1:ApprovalRequired

f() getUserIdsFromGroupAlias

Content Preview: /inp1:PurchaseOrder/inp1:OrderInfo/inp1:OrderPrice

Description: An XPath expression of the WSDL message

f. Click **OK** in the Expression Builder.

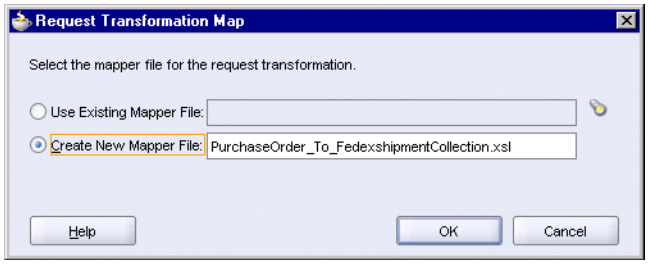
g. Select File > Save to save your work.

8. Create a transformation so that the FedexShipment database adapter gets the proper information in the proper fields.

   a. Click the transformation icon in the Routing Rules area.

   b. In the Request Transformation Map dialog, select **Create New Mapper File** and enter **PurchaseOrder_To_FedexshipmentCollection.xsl** as the filename.

*Figure 4–60 Request Transformation Map Dialog*



Select the mapper file for the request transformation.

Use Existing Mapper File:

[✓ Create New Mapper File:] PurchaseOrder_To_FedexshipmentCollection.xsl

   c. Click **OK**. This brings up the Data Mapper.

   d. On the source (left) side, expand **inp1:ShipTo** > **inp1:Name** and **inp1:ShipTo** > **inp1:Address**.

   e. On the target (right) side, expand **top:FedexshipmentCollection** > **top:Fedexshipment**.

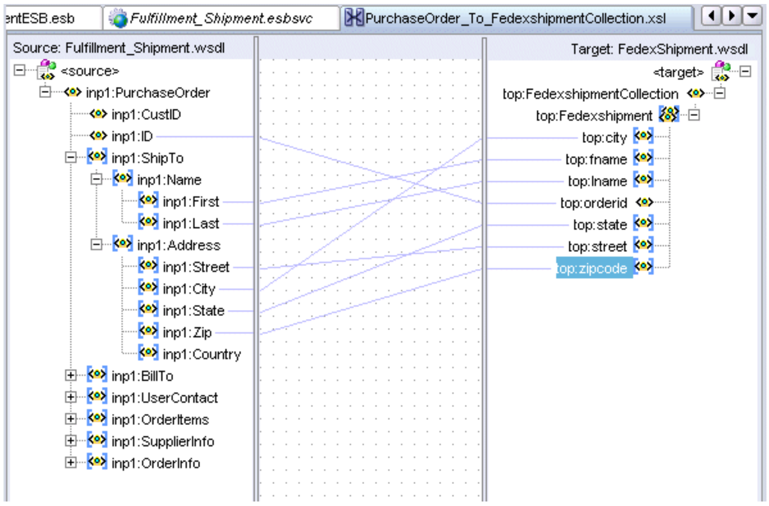
   f. Click and drag to connect these pairs:

      – **inp1:ID** to **top:orderid**

      – **inp1:First** to **top:fname**

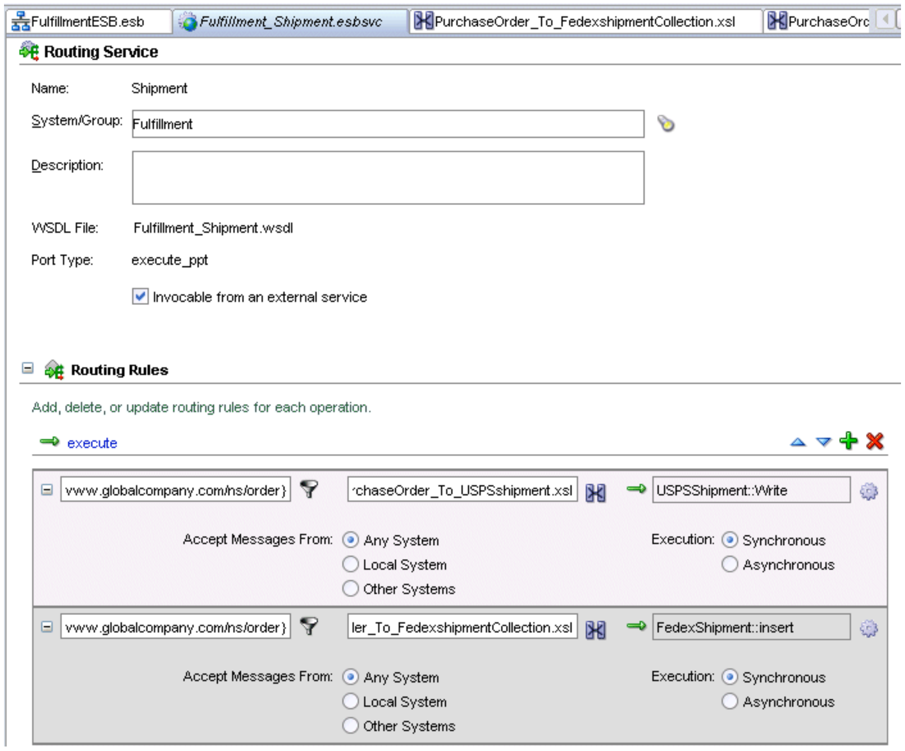
- **inp1:Last** to **top:lname**
- **inp1:Street** to **top:street**
- **inp1:City** to **top:city**
- **inp1:State** to **top:state**
- **inp1:Zip** to **top:zipcode**

*Figure 4–61 Data Mapper Showing Transformation from Shipment to FedexShipment*



9. Select File > Save to save `PurchaseOrder_To_FedexshipmentCollection.xsl`.
10. Click the Fulfillment_Shipment.esbsvc tab in JDeveloper. In the Routing Rules area, in the transformation section, you should see the name of the transformation file.

***Figure 4–62 Fulfillment_Shipment.esbsvc Showing Filter Information and Name of Transformation File***


FulfillmentESB.esb | Fulfillment_Shipment.esbsvc | PurchaseOrder_To_FedexshipmentCollection.xsl | PurchaseOrc

**Routing Service**

Name: Shipment
System/Group: Fulfillment
Description:
WSDL File: Fulfillment_Shipment.wsdl
Port Type: execute_ppt
[✓] Invocable from an external service

**Routing Rules**

Add, delete, or update routing rules for each operation.

execute

vww.globalcompany.com/ns/order} | chaseOrder_To_USPSshipment.xsl | USPSShipment::Write
Accept Messages From: [✓ Any System] Local System Other Systems
Execution: [✓ Synchronous] Asynchronous

vww.globalcompany.com/ns/order} | ler_To_FedexshipmentCollection.xsl | FedexShipment::insert
Accept Messages From: [✓ Any System] Local System Other Systems
Execution: [✓ Synchronous] Asynchronous

11. Select File > Save to save `Fulfillment_Shipment.esbsvc`.
12. If you click the FulfillmentESB.esb tab, you can see that there are two rows of icons in the Shipment routing service icon and these icons are not greyed out.

## 4.10 Save All Files in the FulfillmentESB Project

Browse through the FulfillmentESB files in the Application Navigator to ensure that all the files are saved. If you see a file in italics, select the file and save it.

## 4.11 Register the FulfillmentESB Project

In the Application Navigator, right-click the FulfillmentESB project and select **Register with ESB** > ***SoademoIntegServer***, where ***SoademoIntegServer*** is the name of the connection to the integration server. When registration is complete, JDeveloper displays a confirmation dialog.

You can view the services that you created in the FulfillmentESB project in the ESB Console. To do this, enter the URL of the ESB Console in a browser:

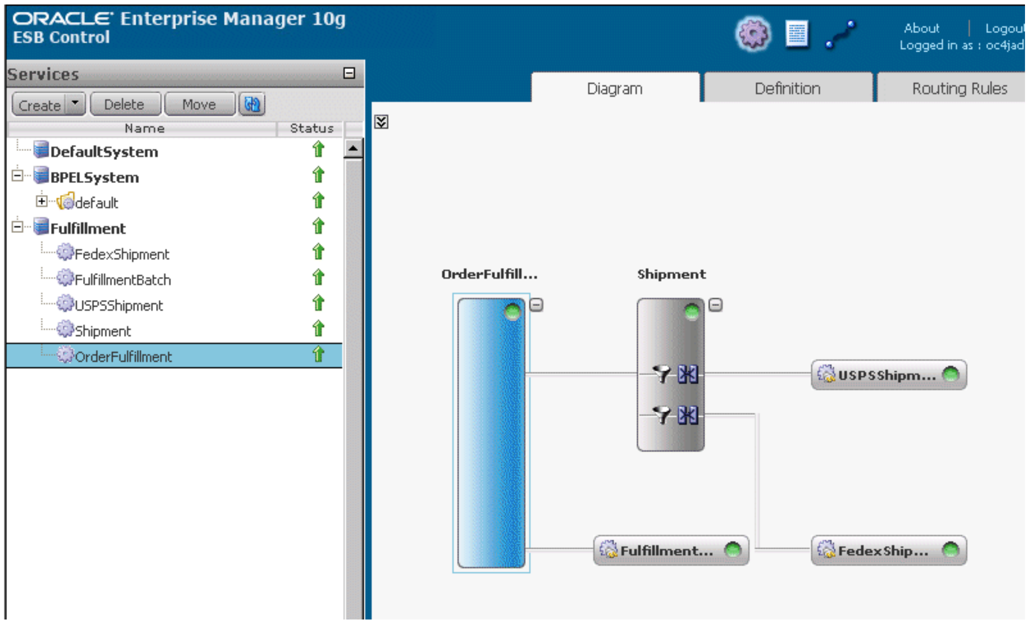
`http://`*`host`*`:`*`port`*`/esb/esb/EsbConsole.html`

*host* specifies the name of the machine running Oracle Application Server, and *port* specifies the HTTP port at which Oracle HTTP Server or OC4J is listening.

Log in as the `oc4jadmin` user.

The services are grouped under **Fulfillment**, which is the name of the system that you created in Section 4.3, "Create a System Called "Fulfillment"".

***Figure 4–63 ESB Console Showing the Services in the Fulfillment System***



# 5 Creating the CreditService Project

This chapter describes how to create the CreditService project. It contains these sections:

## 5.1 About the CreditService Project

The CreditService project checks whether a customer's credit card is valid or not. In this SOA Order Booking application, the code simply checks the value of the credit card number. If the credit card number is less than 12345678, then the card is invalid. Otherwise, it is valid.

The CreditService project is developed in a "top-down" fashion: you start with a WSDL and using this WSDL file, you generate Java classes. RapidService is the opposite: it is developed in a "bottom-up" fashion, where you start with Java classes and you develop a WSDL file from the Java classes.

Note that the WSDL file for the CreditService project contains hardcoded values of `localhost:8888`. You need to modify these values if you meet any of these conditions:

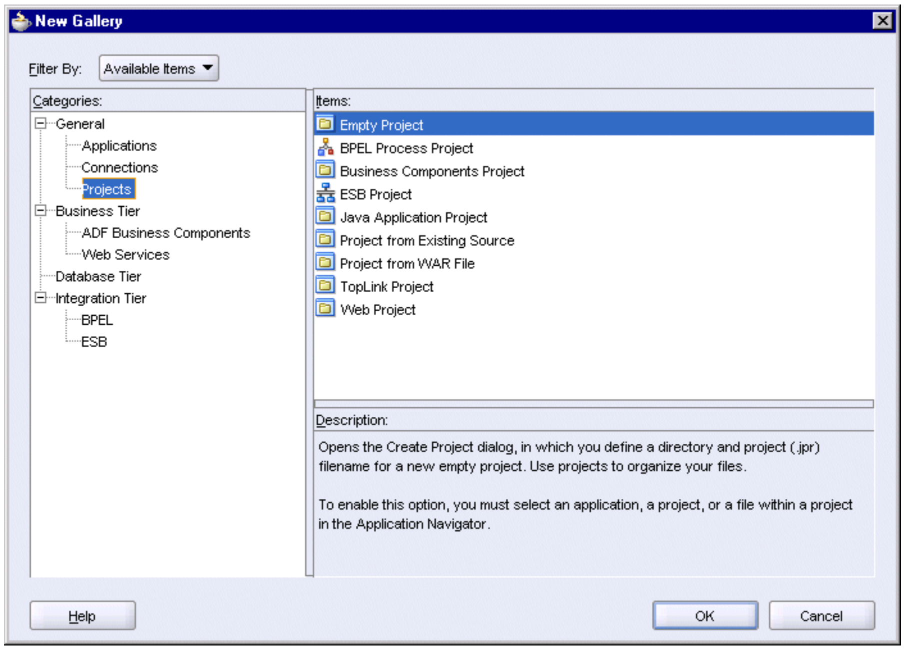
- If you are running JDeveloper and Oracle Application Server on different machines, change the localhost value to the name of the machine running Oracle Application Server.
- If your Oracle Application Server instance listens on a port other than 8888, you need to modify the port number.

## 5.2 Create a New Project for CreditService

Start by creating a new project for CreditService in JDeveloper:

1. Right-click the SOADEMO application, and select **New Project**.
2. In the New Gallery, in the Categories section, expand **General** and select **Projects**. In the Items section, select **Empty Project**.

*Figure 5–1 New Gallery for the CreditService Project*



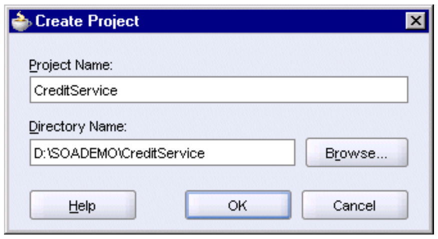
Opens the Create Project dialog, in which you define a directory and project (.jpr) filename for a new empty project. Use projects to organize your files.

To enable this option, you must select an application, a project, or a file within a project in the Application Navigator.

Click **OK**.

3. In the Create Project dialog, enter "**CreditService**" in the **Project Name** field.

*Figure 5–2 Create Project Dialog for CreditService*



Project Name: CreditService

Directory Name: D:\SOADEMO\CreditService

Click **OK**.

In the Application Navigator, you should see an empty CreditService project located under the SOADEMO application.

4. Select File > Save to save your work.

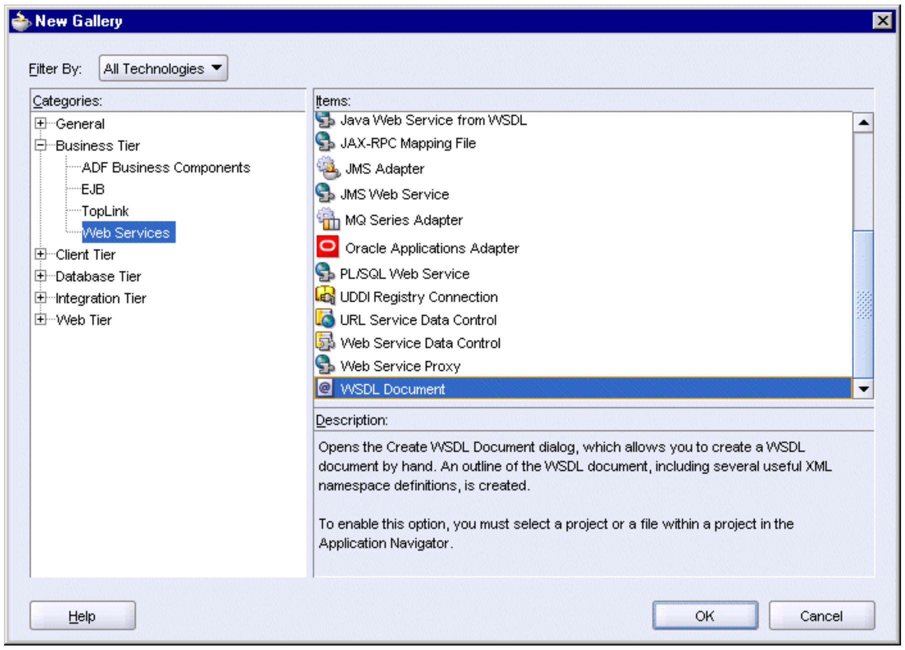
## 5.3 Copy the WSDL File

Define the project type and copy the WSDL file from the `soademo_101310_prod.zip` file to the `CreditService` directory.

1. Right-click the CreditService project, and select **New**.

2. In the New Gallery dialog, in the Categories section, expand **Business Tier** and select **Web Services**. In the Items section, select **WSDL Document**.

***Figure 5–3 New Gallery for Setting Up the WSDL File***



New Gallery

Filter By: All Technologies

Categories:
- General
- Business Tier
  - ADF Business Components
  - EJB
  - TopLink
  - Web Services
- Client Tier
- Database Tier
- Integration Tier
- Web Tier

Items:
- Java Web Service from WSDL
- JAX-RPC Mapping File
- JMS Adapter
- JMS Web Service
- MQ Series Adapter
- Oracle Applications Adapter
- PL/SQL Web Service
- UDDI Registry Connection
- URL Service Data Control
- Web Service Data Control
- Web Service Proxy
- WSDL Document

Description:

Opens the Create WSDL Document dialog, which allows you to create a WSDL document by hand. An outline of the WSDL document, including several useful XML namespace definitions, is created.

To enable this option, you must select a project or a file within a project in the Application Navigator.

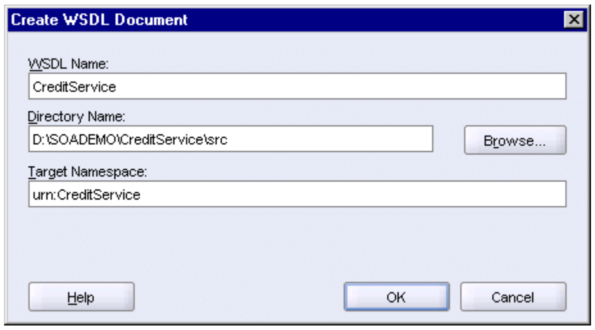
Help | OK | Cancel

Click **OK**. This launches the Create WSDL Document dialog.

3. In the Create WSDL Document dialog:

   - **WSDL Name**: enter **CreditService**.
   - **Directory Name**: accept the default (`*SOADEMO*\CreditService\src`).
   - **Target Namespace**: accept the default because you are going to overwrite the generated WSDL file anyway. In the WSDL file, the target namespace is http://www.globalcompany.com/ns/credit.

***Figure 5–4 Create WSDL Document Dialog***



Create WSDL Document

WSDL Name: CreditService

Directory Name: D:\SOADEMO\CreditService\src | Browse...

Target Namespace: urn:CreditService

Help | OK | Cancel

4. Click **OK**.

5. Close (by selecting File > Close) the `CreditService.wsdl` file that JDeveloper displays in the editor.

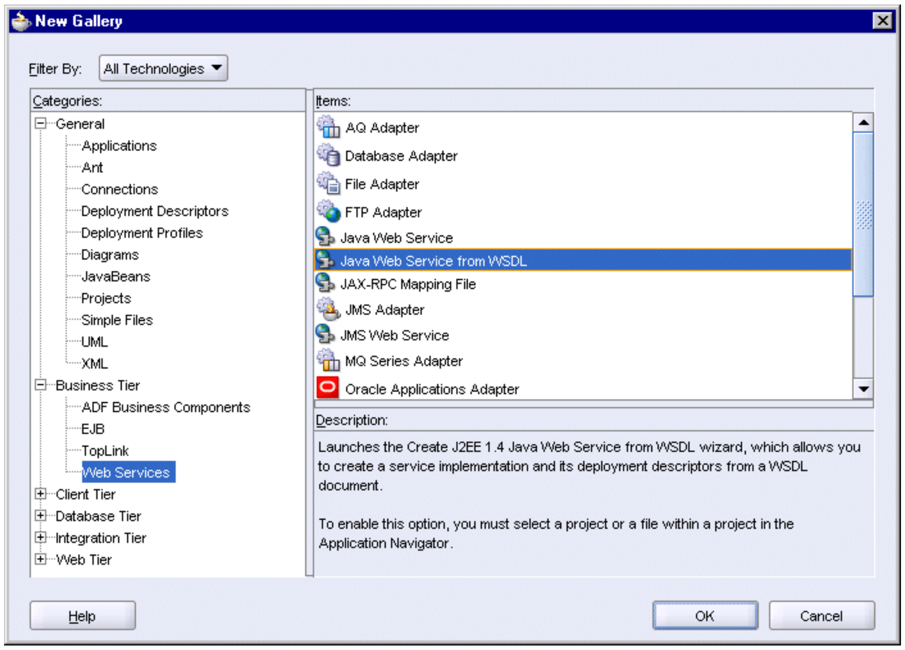
6. Copy `CreditService\src\CreditService.wsdl` from the `soademo_101310_prod.zip` file and overwrite the generated `CreditService.wsdl` in the *`SOADEMO`*`\CreditService\src` directory.

## 5.4 Generate Java from the WSDL

In this step, you generate Java classes for the methods declared in the WSDL file.

1. Right-click the CreditService project, and select **New**. In the New Gallery, in the Categories section, expand **Business Tier** and select **Web Services**. In the Items section, select **Java Web Service from WSDL**.

*Figure 5–5 New Gallery for Generating Java from WSDL*



Launches the Create J2EE 1.4 Java Web Service from WSDL wizard, which allows you to create a service implementation and its deployment descriptors from a WSDL document.

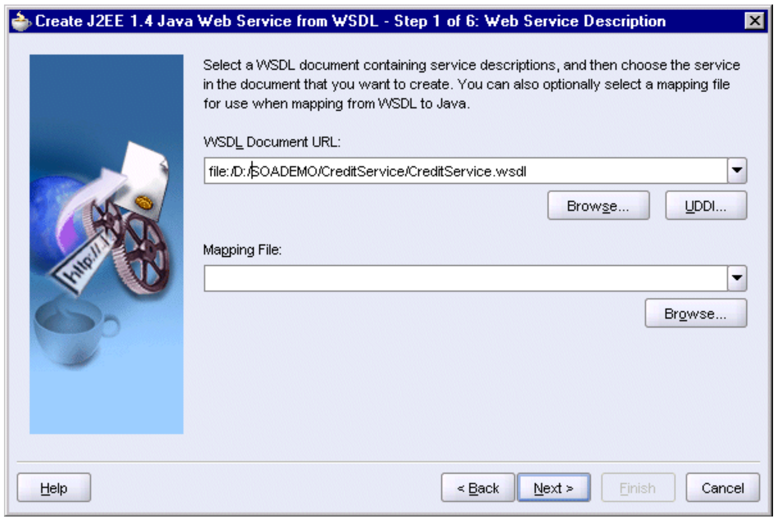
To enable this option, you must select a project or a file within a project in the Application Navigator.

Click **OK**. This launches the Create J2EE 1.4 Java Web Service from WSDL wizard. Click **Next** in the wizard to begin.

2. In Step 1, Web Service Description, click **Browse** and select the **CreditService.wsdl** file from the *`SOADEMO`*`\CreditService\src` directory.

   **Mapping File**: leave blank.

***Figure 5–6 Create J2EE 1.4 Java Web Service from WSDL Wizard: Step 1, Web Service Description***


Create J2EE 1.4 Java Web Service from WSDL - Step 1 of 6: Web Service Description

Select a WSDL document containing service descriptions, and then choose the service in the document that you want to create. You can also optionally select a mapping file for use when mapping from WSDL to Java.

WSDL Document URL: file:/D:/SOADEMO/CreditService/CreditService.wsdl

Mapping File:

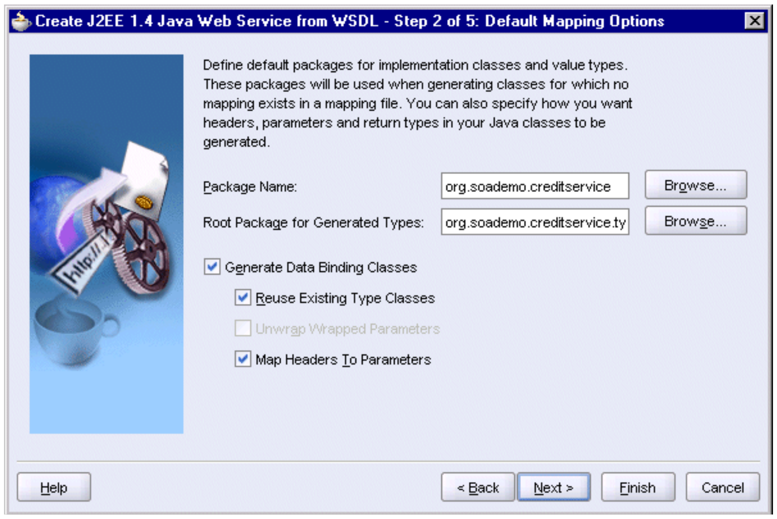
Browse...
UDDI...
Browse...
Help
< Back
Next >
Finish
Cancel

Click **Next**.

3. In Step 2, Default Mapping Options:

   - **Package Name**: enter **org.soademo.creditservice**.
   - **Root Package for Generated Types**: enter **org.soademo.creditservice.types**.
   - **Generate Data Binding Classes**: select this option.
   - **Reuse Existing Type Classes**: select this option.
   - **Map Headers to Parameters**: select this option.

***Figure 5–7 Create J2EE 1.4 Java Web Service from WSDL Wizard: Step 2, Default Mapping Options***


Create J2EE 1.4 Java Web Service from WSDL - Step 2 of 5: Default Mapping Options

Define default packages for implementation classes and value types. These packages will be used when generating classes for which no mapping exists in a mapping file. You can also specify how you want headers, parameters and return types in your Java classes to be generated.

Package Name: org.soademo.creditservice

Root Package for Generated Types: org.soademo.creditservice.ty

[✓] Generate Data Binding Classes

[✓] Reuse Existing Type Classes

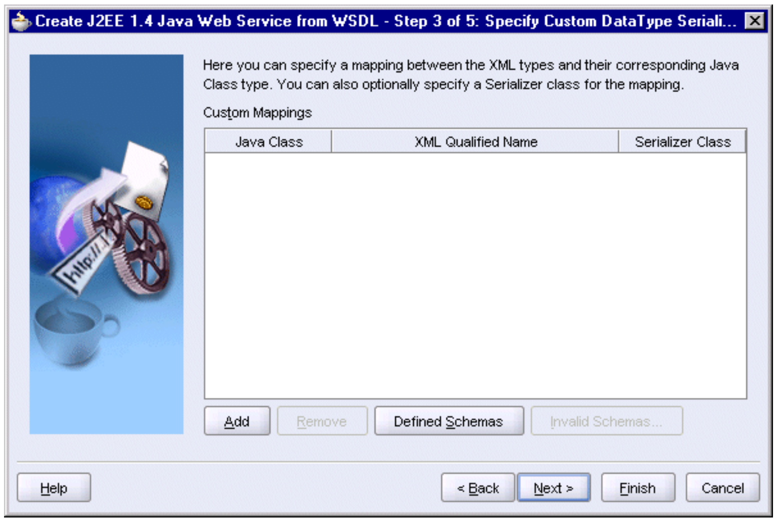
[ ] Unwrap Wrapped Parameters

[✓] Map Headers To Parameters

Click **Next**.

4. In Step 3, **Specify Custom Data Type Serializer**, leave blank and click **Next**.

***Figure 5–8 Create J2EE 1.4 Java Web Service from WSDL Wizard: Step 3, Specify Custom Data Type Serializer***


Create J2EE 1.4 Java Web Service from WSDL - Step 3 of 5: Specify Custom DataType Seriali...

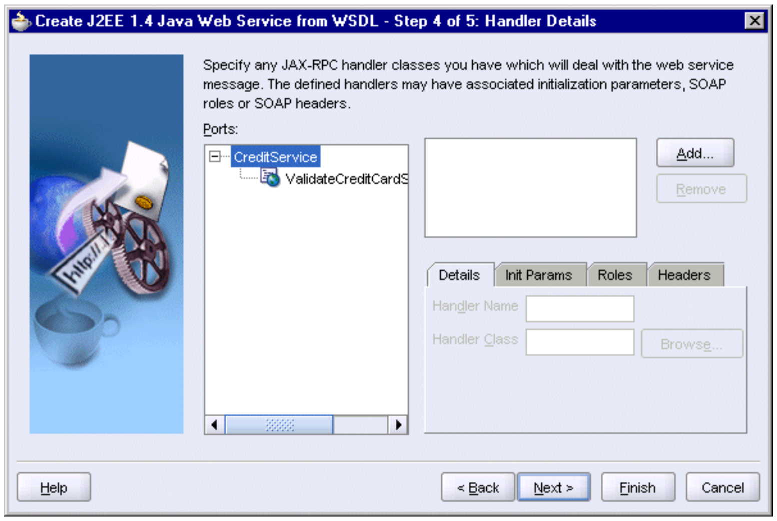
Here you can specify a mapping between the XML types and their corresponding Java Class type. You can also optionally specify a Serializer class for the mapping.

Custom Mappings

| Java Class | XML Qualified Name | Serializer Class |
|---|---|---|

5. In Step 4, Handler Details, accept the defaults and click **Next**.

***Figure 5–9 Create J2EE 1.4 Java Web Service from WSDL Wizard: Step 4, Handler Details***


Create J2EE 1.4 Java Web Service from WSDL - Step 4 of 5: Handler Details

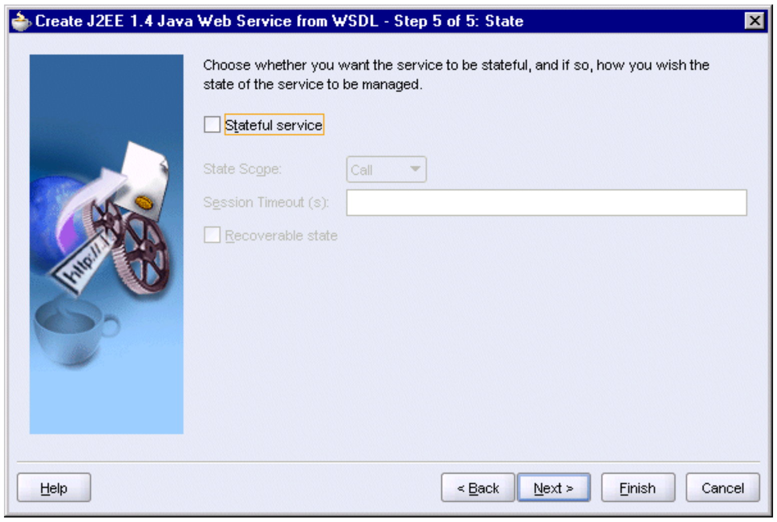
Specify any JAX-RPC handler classes you have which will deal with the web service message. The defined handlers may have associated initialization parameters, SOAP roles or SOAP headers.

Ports:

CreditService
ValidateCreditCardS

6. In Step 5, State, do not select **Stateful Service**. Click **Next**.

*Figure 5–10 Create J2EE 1.4 Java Web Service from WSDL Wizard: Step 5, State*


Create J2EE 1.4 Java Web Service from WSDL - Step 5 of 5: State
Help
< Back
Next >
Finish
Cancel

Choose whether you want the service to be stateful, and if so, how you wish the state of the service to be managed.

- [ ] Stateful service

State Scope: Call

Session Timeout (s):

- [ ] Recoverable state

7. In the Finish screen, click **Finish**.

   JDeveloper displays `CreditService.wsdl` in design view in the editor.

## 5.5 Display the List of Files in the Structure Window

You should see the following files in the Structure window:

1. Select View > Structure to display the Structure window.
2. In the Application Navigator, select **SOADEMO** > **CreditService** > **Application Sources** > **org.soademo.creditservice** > **CreditService**.

   In the Structure window, you should see the following files:

   - `CreditService.wsdl`
   - `ValidateCreditCard.java`
   - `CreditCardValidationFaultMessage.java`
   - `CreditCard.java`
   - `CreditService-java-wsdl-mapping.xml`
   - `ValidateCreditCardImpl.java`

## 5.6 Build CreditService

Right-click the CreditService project and select **Rebuild**.

## 5.7 Write the Code to Perform Credit Card Validation

Double-click `ValidateCreditCardImpl.java` (from the Structure window) and edit the `verifyCC` method so that it looks like the following:

```
public boolean verifyCC(CreditCard creditCard)
                                      throws CreditCardValidationFaultMessage {
   boolean validOrNot = false;
   if ((creditCard.getCcType().equals("AMEX")) ||
          (creditCard.getCcType().equals("Visa"))) {
            validOrNot = true;
            Long ccnum = new Long (creditCard.getCcNum());
            if (ccnum < 12345678){
               validOrNot = false;
            } else {
               validOrNot = true;
            }
         } else {
            validOrNot = false;
         }
         return validOrNot;
      }
```

## 5.8 Verify Hostname and Port in CreditService.wsdl

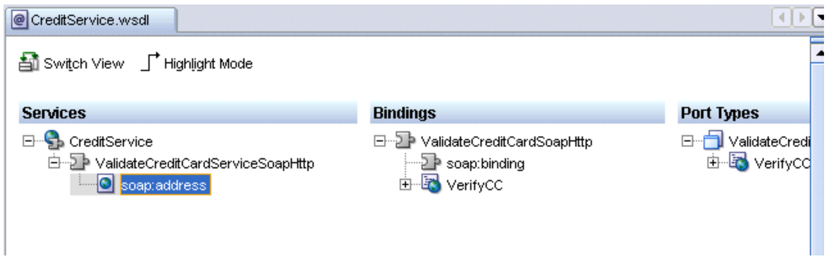
There are two `CreditService.wsdl` files:

- `*SOADEMO*\CreditService\src\CreditService.wsdl`
- `*SOADEMO*\CreditService\public_html\WEB-INF\wsdl\CreditService.wsdl`

You have to verify the hostname and port in both wsdl files.

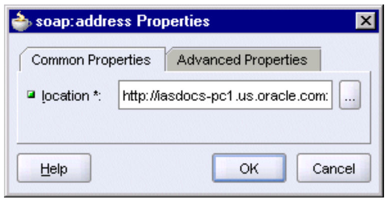
1. Double-click the first **CreditService.wsdl** (in the Application Navigator, CreditService.wsdl is located in **SOADEMO** > **CreditService** > **Application Sources**).
2. In the editor, under Services, expand **CreditService** > **ValidateCreditCardServiceSoapHttp** > **soap:address**.

***Figure 5–11 JDeveloper Showing the CreditService.wsdl File in the Editor***



3. Right-click **soap:address** and select **Properties**. This displays the soap:address Properties dialog.

***Figure 5–12 soap:address Properties Dialog***



location *: http://iasdocs-pc1.us.oracle.com:

4. In the **location** field, edit the hostname and port in the URL as necessary. You may need to scroll all the way to the left to see the beginning of the URL.

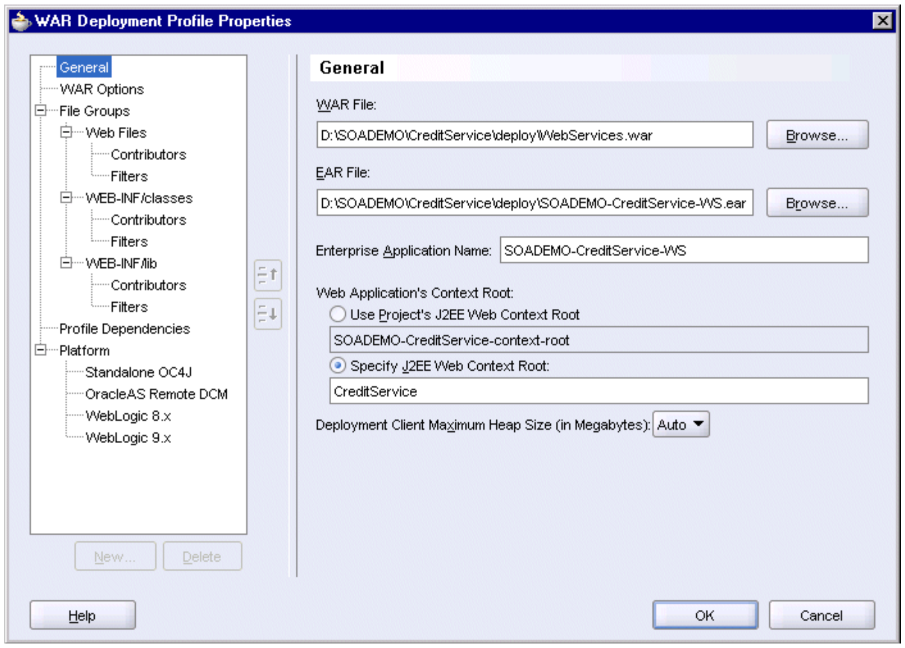
The hostname specifies where Oracle Application Server is running, and the port specifies the HTTP port at which Oracle HTTP Server or OC4J is listening.

5. Click **OK** if you made any changes to the location. Click **Cancel** if you did not make any changes.
6. Select File > Save to save any changes you made to the WSDL file.
7. Repeat the same steps for the second wsdl file, located in **CreditService** > **Web Content** > **WEB-INF\wsdl**.
8. Close both files in the editor.

## 5.9 Update the Context-Root

1. Right-click **WebServices.deploy** (located in **SOADEMO** > **CreditService** > **Resources**) and select **Properties**. This displays the WAR Deployment Profile Properties dialog.

*Figure 5–13 WAR Deployment Profile Properties Dialog, General Section*



General

WAR File: D:\SOADEMO\CreditService\deploy\WebServices.war

EAR File: D:\SOADEMO\CreditService\deploy\SOADEMO-CreditService-WS.ear

Enterprise Application Name: SOADEMO-CreditService-WS

Web Application's Context Root:

○ Use Project's J2EE Web Context Root

SOADEMO-CreditService-context-root

[✓ Specify J2EE Web Context Root:]

CreditService

Deployment Client Maximum Heap Size (in Megabytes): Auto

2. Select **General** on the left side. On the right side, select **Specify J2EE Web Context Root** and enter **CreditService** as its value.
3. Click **OK**.
4. Select File > Save to save your changes.

## 5.10 Rebuild CreditService

Right-click the CreditService project and select **Rebuild**.

## 5.11 Deploy Credit Service to Oracle Application Server

When you created the Credit Service project, JDeveloper automatically created a **WebServices.deploy** deployment profile for you. You can use this deployment profile to deploy the Credit Service project to Oracle Application Server.

1. Expand **CreditService** > **Resources** and right-click **WebServices.deploy**. Select **Deploy to** and your application server connection.
2. In the Configure Application dialog, click **OK**.

After deploying CreditService, you can enter the following URL in a browser to see the WSDL for CreditService:

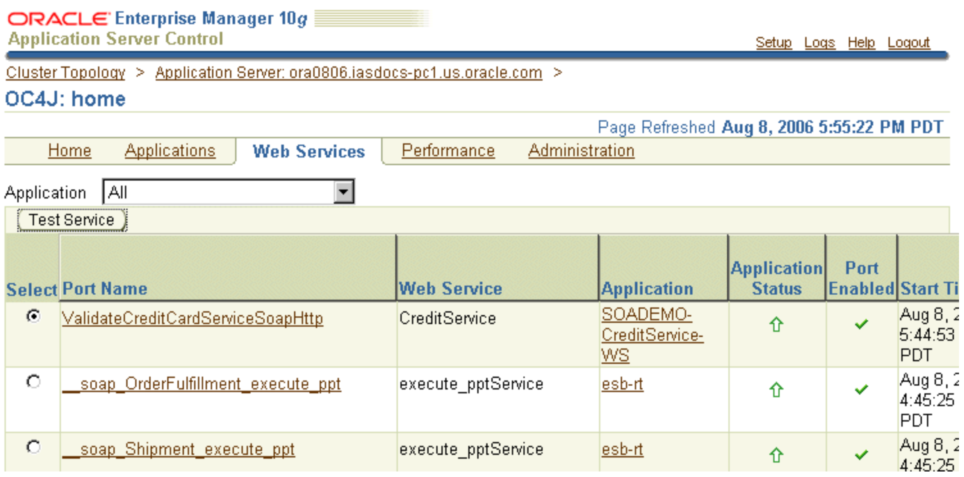
```
http://hostname:port/CreditService/ValidateCreditCardServiceSoap
Http?WSDL
```

For *hostname*, specify the name of the machine running Oracle Application Server.

For *port*, specify the HTTP port at which Oracle Application Server is listening. This is either the Oracle HTTP Server port or the OC4J port.

After deploying CreditService, you should see it in two places in the Application Server Control: in the Web Services tab (Figure 5–14) and the Applications tab (Figure 5–15) of the OC4J:home page.

***Figure 5–14 Web Services Tab of OC4J:home Page Showing the ValidateCreditCardServiceSoapHttp Web Service***

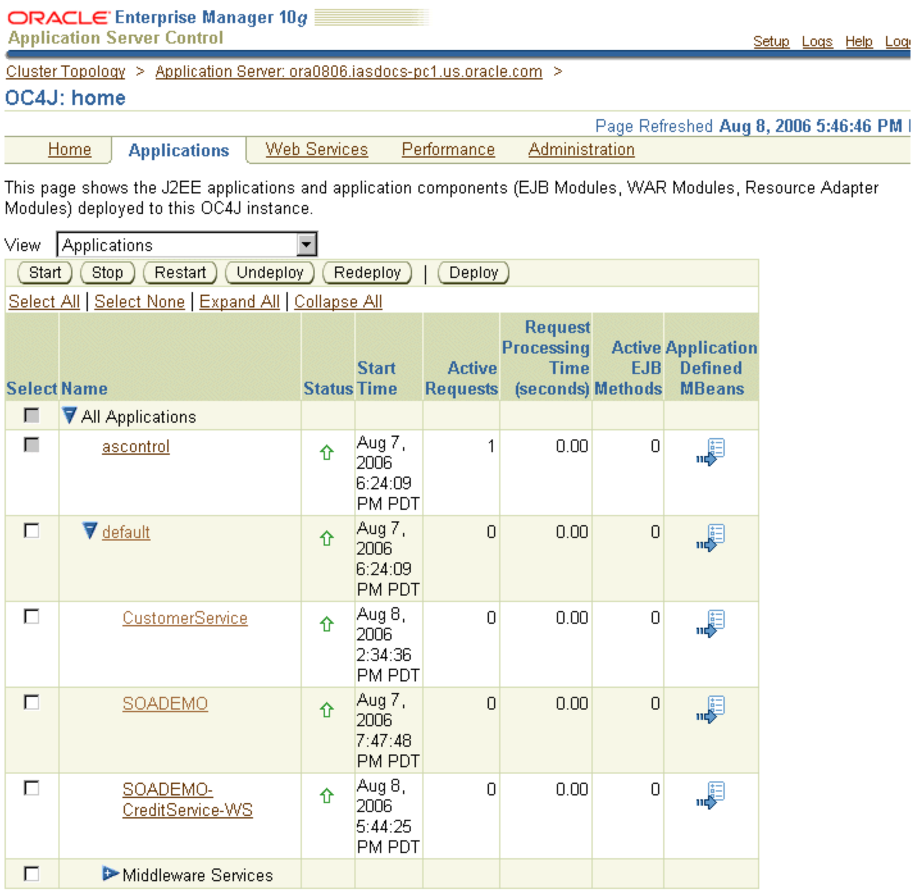

ORACLE Enterprise Manager 10g
Application Server Control
Setup Logs Help Logout
Cluster Topology > Application Server: ora0806.iasdocs-pc1.us.oracle.com >
OC4J: home
Home Applications Web Services Performance Administration
Test Service

Page Refreshed Aug 8, 2006 5:55:22 PM PDT

Application: All

| Select | Port Name | Web Service | Application | Application Status | Port Enabled | Start Ti |
|---|---|---|---|---|---|---|
| ● | ValidateCreditCardServiceSoapHttp | CreditService | SOADEMO-CreditService-WS | ⇧ | ✓ | Aug 8, 2 5:44:53 PDT |
| ○ | __soap_OrderFulfillment_execute_ppt | execute_pptService | esb-rt | ⇧ | ✓ | Aug 8, 2 4:45:25 PDT |
| ○ | __soap_Shipment_execute_ppt | execute_pptService | esb-rt | ⇧ | ✓ | Aug 8, 2 4:45:25 |

***Figure 5–15 Applications Tab of OC4J:home Page Showing the SOADEMO-CreditService-WS Application***


ORACLE Enterprise Manager 10g
Application Server Control
Setup Logs Help Log
Cluster Topology > Application Server: ora0806.iasdocs-pc1.us.oracle.com >
Home
Applications
Web Services
Performance
Administration
Start
Stop
Restart
Undeploy
Redeploy
Deploy
Select All | Select None | Expand All | Collapse All

OC4J: home

Page Refreshed Aug 8, 2006 5:46:46 PM

This page shows the J2EE applications and application components (EJB Modules, WAR Modules, Resource Adapter Modules) deployed to this OC4J instance.

View: Applications

| Select | Name | Status | Start Time | Active Requests | Request Processing Time (seconds) | Active EJB Methods | Application Defined MBeans |
|---|---|---|---|---|---|---|---|
| ☐ | All Applications | | | | | | |
| ☐ | ascontrol | ⇧ | Aug 7, 2006 6:24:09 PM PDT | 1 | 0.00 | 0 | |
| ☐ | default | ⇧ | Aug 7, 2006 6:24:09 PM PDT | 0 | 0.00 | 0 | |
| ☐ | CustomerService | ⇧ | Aug 8, 2006 2:34:36 PM PDT | 0 | 0.00 | 0 | |
| ☐ | SOADEMO | ⇧ | Aug 7, 2006 7:47:48 PM PDT | 0 | 0.00 | 0 | |
| ☐ | SOADEMO-CreditService-WS | ⇧ | Aug 8, 2006 5:44:25 PM PDT | 0 | 0.00 | 0 | |
| ☐ | Middleware Services | | | | | | |

# 6 Creating the RapidService Project

This chapter describes how to create the RapidService project. It contains these sections:

## 6.1 About the RapidService Project

The RapidService project represents a supplier that provides price quotes for customer orders. The other supplier which it competes with is SelectManufacturer. The supplier that provides the lower quote for a customer's order gets to fulfill the order.

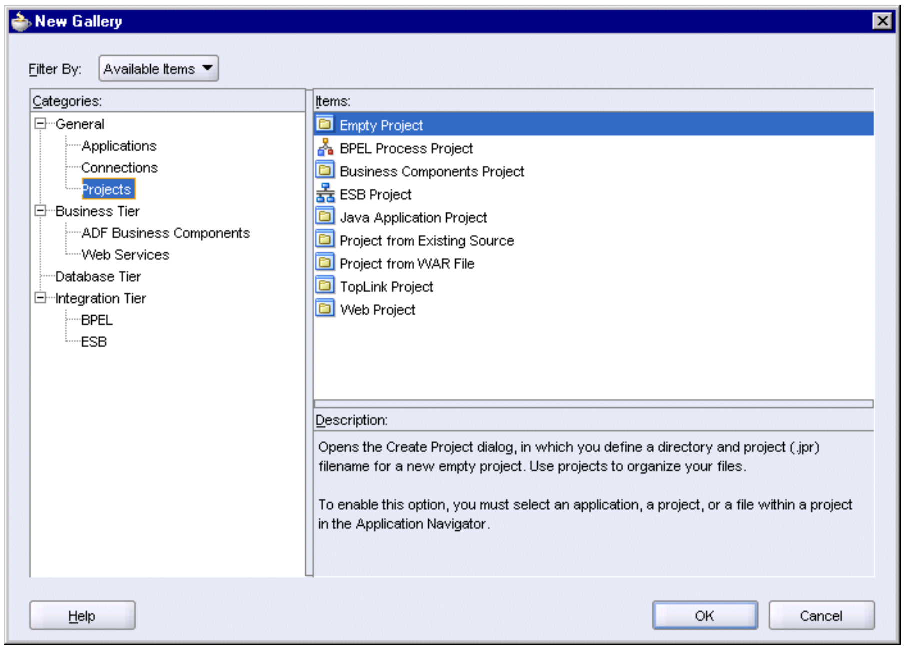
In the case of the RapidService and CreditService projects, the descriptors are generated at design time. The RapidService project is developed in a "bottom-up" fashion: you start with Java classes and you develop a WSDL file from the Java classes. CreditService is the opposite: it is developed in a "top-down" fashion, where you start with a WSDL and using this WSDL file, you generate Java classes.

## 6.2 Create a New Project for RapidService

Start by creating a new project for RapidService in JDeveloper:

1. Right-click the SOADEMO application, and select **New Project**.
2. In the New Gallery, in the Categories section, expand **General** and select **Projects**. In the Items section, select **Empty Project**.

***Figure 6–1 New Gallery for RapidService Project***



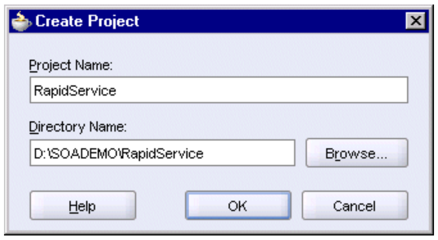
Opens the Create Project dialog, in which you define a directory and project (.jpr) filename for a new empty project. Use projects to organize your files.

To enable this option, you must select an application, a project, or a file within a project in the Application Navigator.

Click **OK**.

3. In the Create Project dialog, enter **RapidService** in the **Project Name** field.

***Figure 6–2 Create Project Dialog for RapidService Project***



Project Name: RapidService

Directory Name: D:\SOADEMO\RapidService

Click **OK**.

In the Application Navigator, you should see an empty RapidService project located under the SOADEMO application.

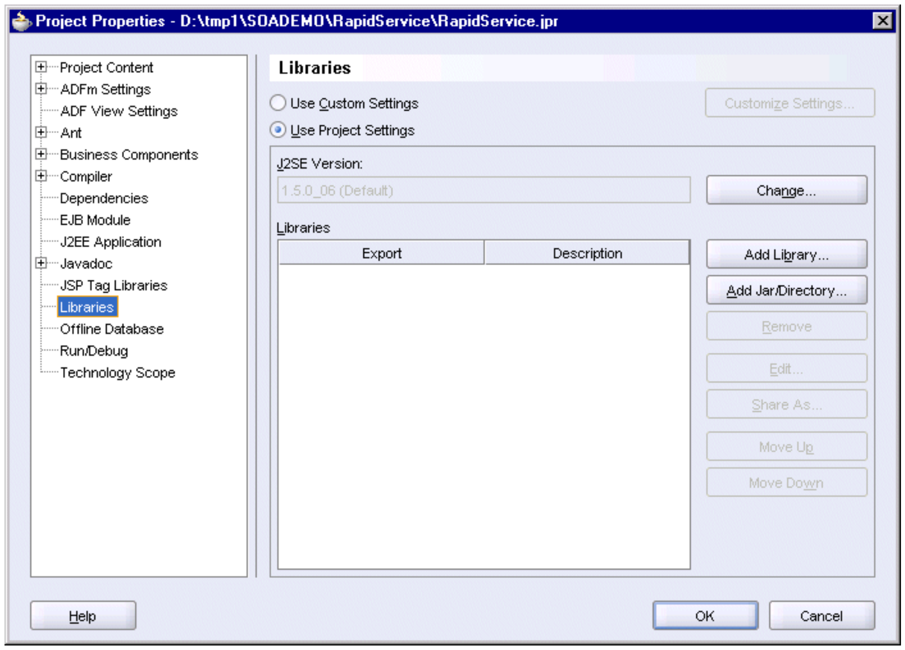
4. Select File > Save to save your work.

## 6.3 Add JSR-181 Library to the RapidService Project

Before you can compile and deploy the RapidService project, you need to add the JSR-181 library to it. `RequestQuote.java`, which you will create in Section 6.6, "Create RequestQuote.java", contains JSR-181 annotations.

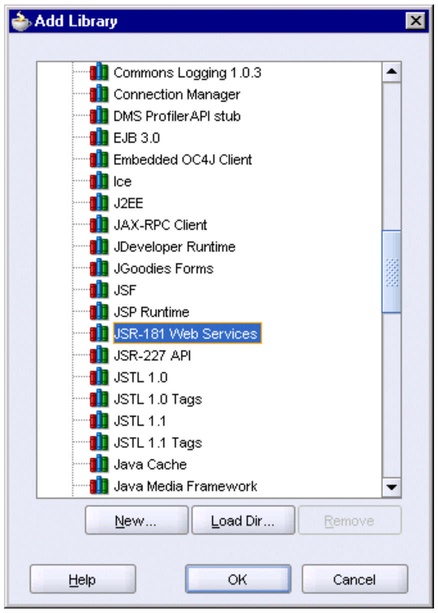
1. Right-click the RapidService project and select **Project Properties**. In the Project Properties dialog, select **Libraries** on the left side.

***Figure 6–3 Project Properties Dialog***



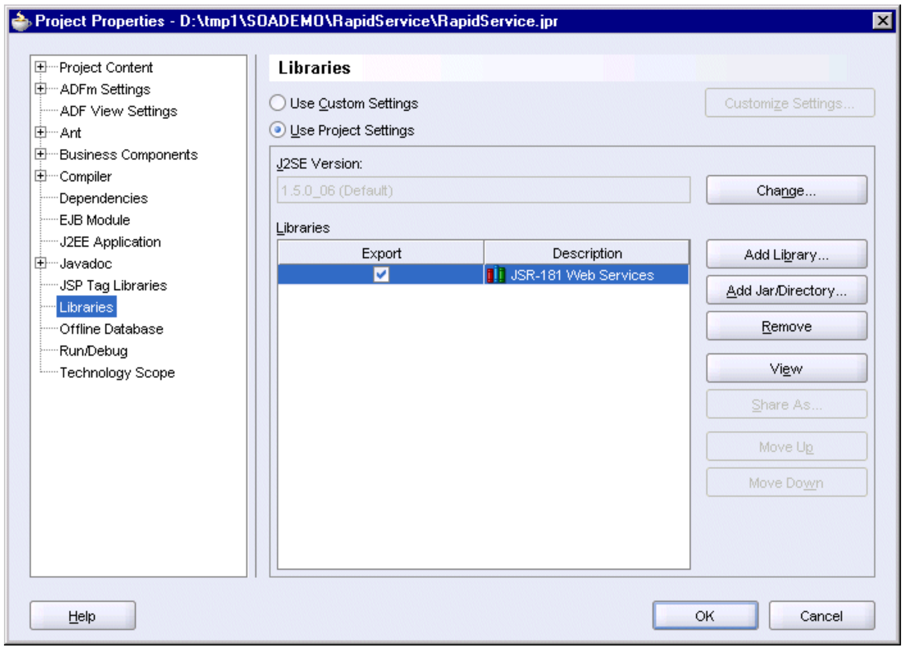
2. Click **Add Library**.
3. In the Add Library dialog, select **JSR-181 Web Services**, located under **Extension**.

***Figure 6–4 Add Library Dialog***



4. Click **OK** in the Add Library dialog. In the Project Properties dialog, you should see the JSR-181 library added to the list.

*Figure 6–5 Project Properties Dialog with JSR-181 Library Added*


Project Properties - D:\tmp1\SOADEMO\RapidService\RapidService.jpr

Libraries

Use Custom Settings
[✓ Use Project Settings]

J2SE Version: 1.5.0_06 (Default)

Libraries

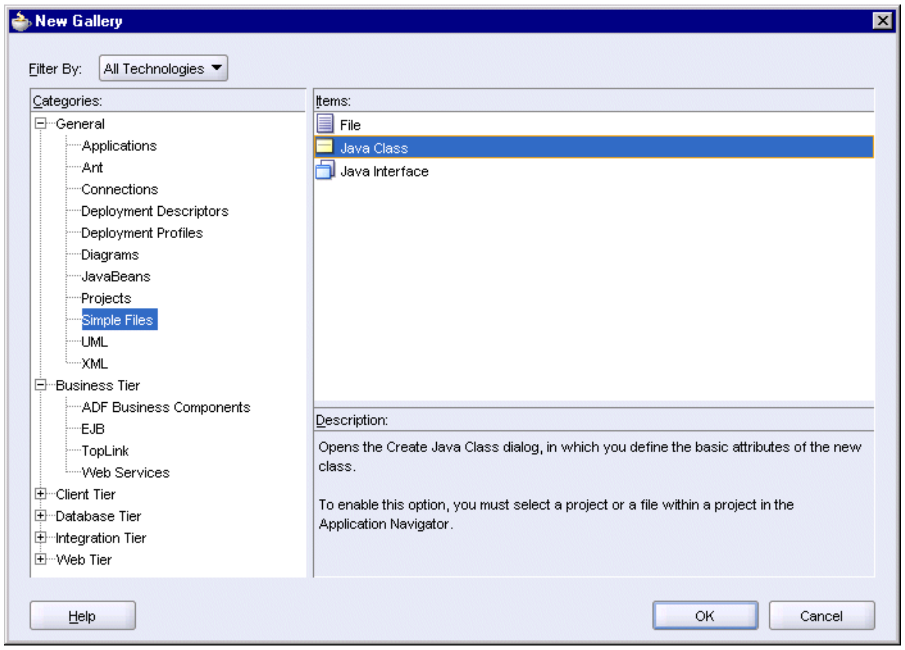
| Export | Description |
|---|---|
| ✓ | JSR-181 Web Services |

5. Click **OK** in the Project Properties dialog.
6. Select the RapidService project in the Application Navigator and select File > Save to save your work.

## 6.4 Create Item.java

1. Right-click the RapidService project, and select **New**. In the New Gallery, in the Categories section, expand **General** and select **Simple Files**. In the Items section, select **Java Class**.

***Figure 6–6 New Gallery for Creating a Simple Java Class***



Opens the Create Java Class dialog, in which you define the basic attributes of the new class.

To enable this option, you must select a project or a file within a project in the Application Navigator.

Click **OK**. This displays the Create Java Class dialog.

2. In the Create Java Class dialog, enter these values:
   - **Name**: enter **Item**.
   - **Package**: enter **org.soademo.rapidservice.types**.
   - **Extends**: enter **java.lang.Object**.
   - **Public**: select this option.
   - **Generate Default Constructor**: select this option.
   - **Generate Main Method**: do not select.

   Click **OK**. JDeveloper displays the `Item.java` file in the editor.

3. Edit the file so that it contains the following lines:

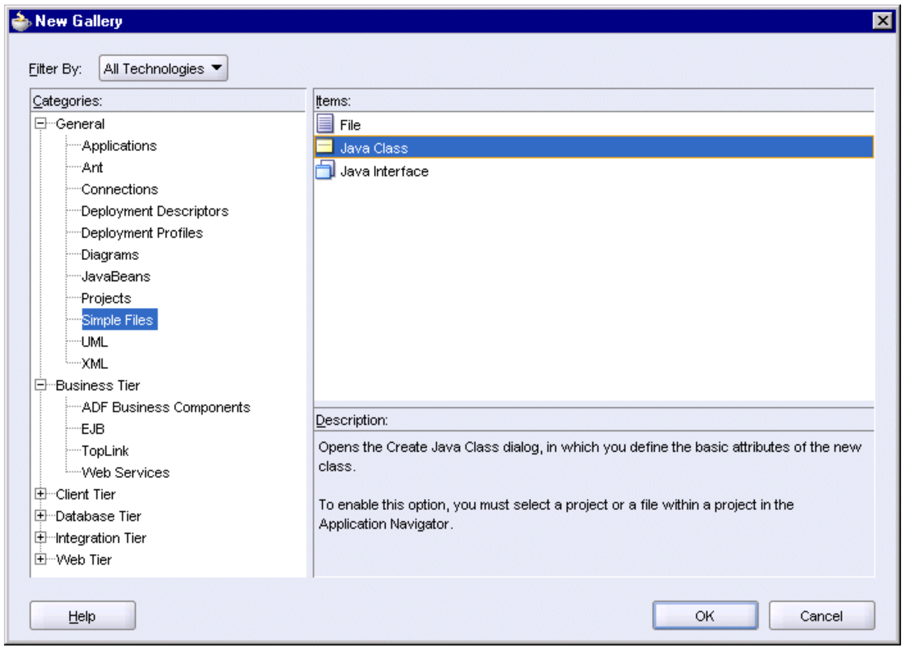
```
package org.soademo.rapidservice.types;

public class Item {
    public Item() {
    }

    String itemId;
    long Quantity;

    public void setItemId(String itemId) {
        this.itemId = itemId;
    }

    public String getItemId() {
        return itemId;
    }

    public void setQuantity(long quantity) {
        this.Quantity = quantity;
        }

        public long getQuantity() {
            return Quantity;
        }
    }
```

4. Select File > Save to save the file.

## 6.5 Create Quote.java

1. Right-click the RapidService project, and select **New**. In the New Gallery, in the Categories section, expand **General** and select **Simple Files**. In the Items section, select **Java Class**.

***Figure 6–7 New Gallery Dialog for Creating a Simple Java Class***



Opens the Create Java Class dialog, in which you define the basic attributes of the new class.

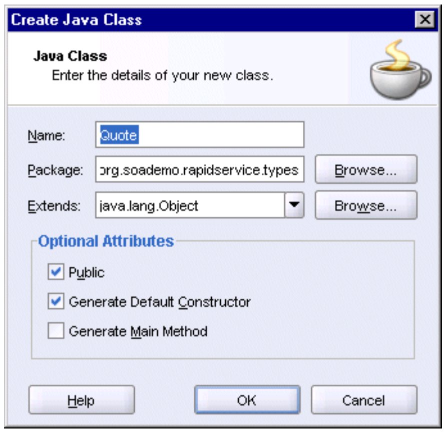
To enable this option, you must select a project or a file within a project in the Application Navigator.

Click **OK**. This displays the Create Java Class dialog.

2. In the Create Java Class dialog, enter these values:

   - **Name**: enter **Quote**.
   - **Package**: enter **org.soademo.rapidservice.types**.
   - **Extends**: enter **java.lang.Object**.
   - **Public**: select this option.
   - **Generate Default Constructor**: select this option.
   - **Generate Main Method**: do not select.

***Figure 6–8 Create Java Class Dialog for Quote.java***



Name: Quote
Package: org.soademo.rapidservice.types
Extends: java.lang.Object
☑ Public
☑ Generate Default Constructor
☐ Generate Main Method

Click **OK**. JDeveloper displays the `Quote.java` file in the editor.

3. Edit the file so that it contains the following lines:

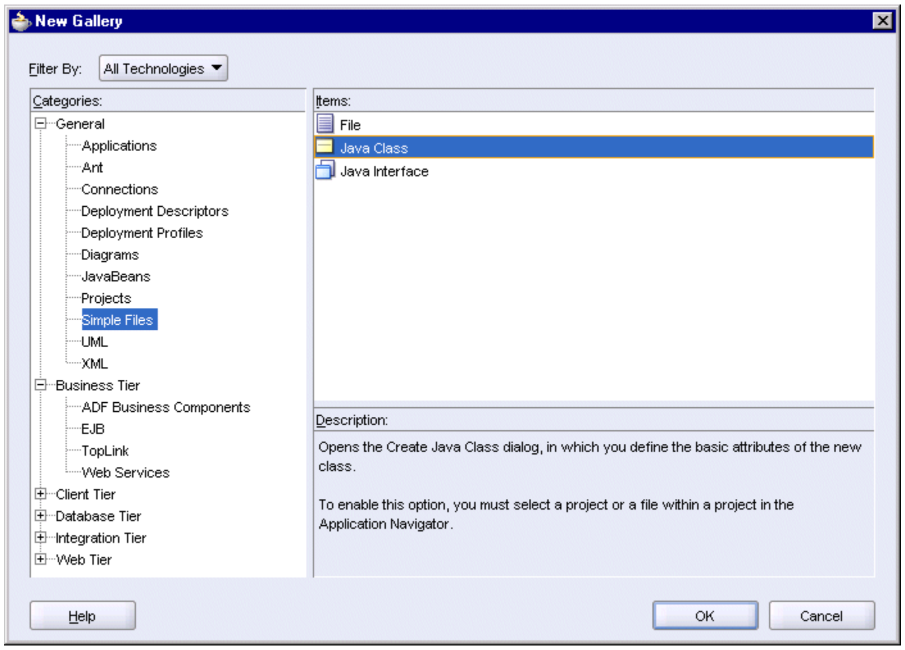
```
package org.soademo.rapidservice.types;

public class Quote implements java.io.Serializable {
    protected java.lang.String supplierName;
    protected java.lang.String supplierPrice;

    public Quote() {
    }

    public java.lang.String getSupplierName() {
        return supplierName;
    }

    public void setSupplierName(java.lang.String supplierName) {
        this.supplierName = supplierName;
    }

    public java.lang.String getSupplierPrice() {
        return supplierPrice;
    }

    public void setSupplierPrice(java.lang.String supplierPrice) {
        this.supplierPrice = supplierPrice;
    }
}
```

4. Select File > Save to save the file.

## 6.6 Create RequestQuote.java

1. Right-click the RapidService project, and select **New**. In the New Gallery, in the Categories section, expand **General** and select **Simple Files**. In the Items section, select **Java Class**.

***Figure 6–9 New Gallery for Creating a Simple Java Class***



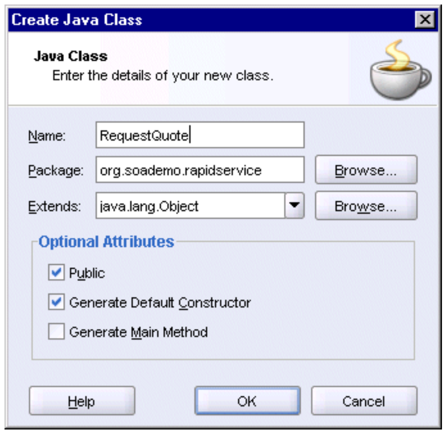
Opens the Create Java Class dialog, in which you define the basic attributes of the new class.

To enable this option, you must select a project or a file within a project in the Application Navigator.

Click **OK**. This displays the Create Java Class dialog.

2. In the Create Java Class dialog, enter these values:
   - **Name**: enter **RequestQuote**.
   - **Package**: enter **org.soademo.rapidservice**. Note that this is different from the previous Java classes you created.
   - **Extends**: enter **java.lang.Object**.
   - **Public**: select this option.
   - **Generate Default Constructor**: select this option.
   - **Generate Main Method**: do not select.

***Figure 6–10 Create Java Class Dialog for RequestQuote.java***



Enter the details of your new class.

Name: RequestQuote
Package: org.soademo.rapidservice
Extends: java.lang.Object

[✓] Public
[✓] Generate Default Constructor
[ ] Generate Main Method

Click **OK**. JDeveloper displays the file in the editor.

3. Edit the file so that it contains the following lines:

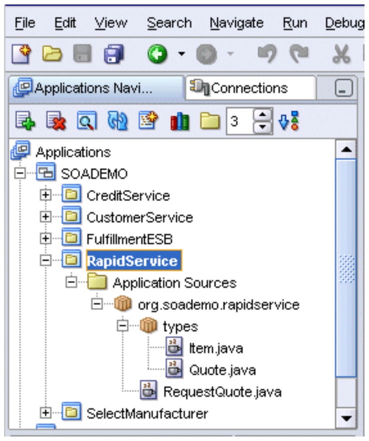
```
package org.soademo.rapidservice;

import javax.jws.WebMethod;
import javax.jws.WebService;

import org.soademo.rapidservice.types.Item;
import org.soademo.rapidservice.types.Quote;

@WebService(serviceName="RapidService",
            targetNamespace="http://www.globalcompany.com/ns/rapidservice")

public class RequestQuote {
    public RequestQuote() {
    }

    @WebMethod(operationName="OrderQuote")
    public Quote processRequestQuote(String productName, String itenType,
                                 String partnum, String quantity,
                                 String price) {
        Quote priceQuote = new Quote();
        priceQuote.setSupplierName("RapidDistributors");
        priceQuote.setSupplierPrice("5000");
        return priceQuote;
    }

    @WebMethod(operationName="POItemsQuote")
    public Quote processQuote(Item[] items){
        Long totalPrice = new Long(0);
        for ( int i=0; i<items.length; i++)  {
            Item localItem = items[i];
            totalPrice += localItem.getQuantity()*110;
        }
        Quote priceQuote = new Quote();
        priceQuote.setSupplierName("RapidDistributors");
        priceQuote.setSupplierPrice(totalPrice.toString());
        return priceQuote;
    }
}
```

4. Select File > Save to save the file.

## 6.7 Check Files in the Application Navigator

In the Application Navigator, you should see the following files for the RapidService project:

***Figure 6–11 Application Navigator Showing Files for RapidService***



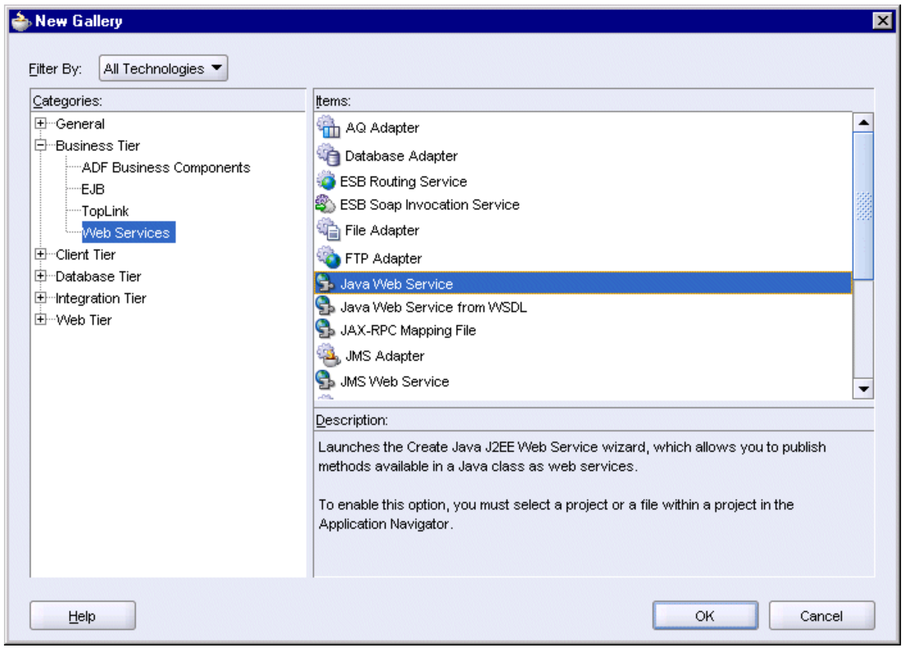
## 6.8 Compile the Files

Right-click the RapidService project and select **Rebuild**. Check the log window for any errors.

## 6.9 Publish the Project as a Web Service

1. Right-click the RapidService project, and select **New**. In the New Gallery, in the Categories section, expand **Business Tier** and select **Web Services**. In the Items section, select **Java Web Service**.

***Figure 6–12 New Gallery for Generating Java Web Services***



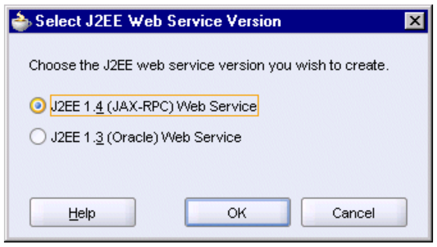
Launches the Create Java J2EE Web Service wizard, which allows you to publish methods available in a Java class as web services.

To enable this option, you must select a project or a file within a project in the Application Navigator.

Click **OK**. This displays the Create J2EE Web Service Version dialog.

2. In the Select J2EE Web Service Version dialog, select **J2EE 1.4 (JAX-RPC) Web Service** and click **OK**.

*Figure 6–13 Select J2EE Web Service Version Dialog*


Select J2EE Web Service Version

Choose the J2EE web service version you wish to create.

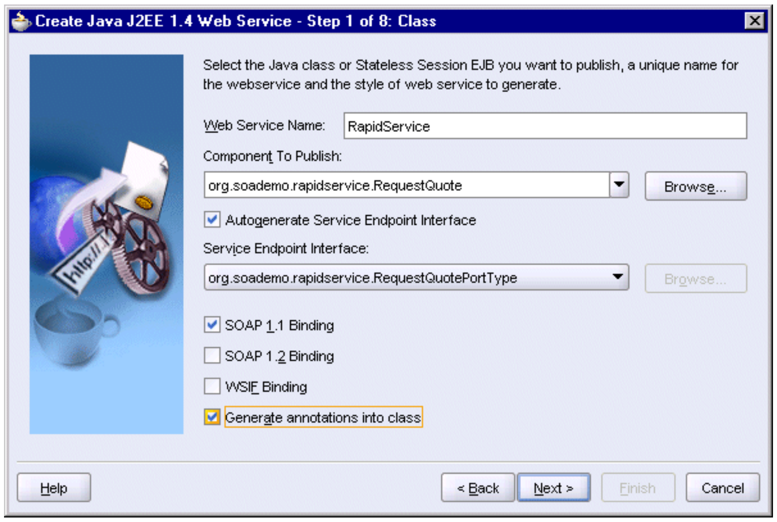
[● J2EE 1.4 (JAX-RPC) Web Service]

○ J2EE 1.3 (Oracle) Web Service

This launches the Create Java J2EE 1.4 Web Service wizard. Click **Next** to start.

3. In Step 1, Class:
   - **Web Service Name**: enter **RapidService**.
   - **Component to Publish**: select **org.soademo.rapidservice.RequestQuote** from the dropdown.
   - **Autogenerate Service Endpoint Interface**: select this option (should be automatically selected for you).
   - **Service Endpoint Interface**: select **org.soademo.rapidservice.RequestQuotePortType** (this should be entered for you automatically).
   - **SOAP 1.1 Binding**: select this option.
   - **SOAP 1.2 Binding**: do not select.
   - **WSIF Binding**: do not select.
   - **Generate annotations into class**: select this option.

*Figure 6–14 Create Java J2EE 1.4 Web Service Wizard: Step 1, Class*


Create Java J2EE 1.4 Web Service - Step 1 of 8: Class

Select the Java class or Stateless Session EJB you want to publish, a unique name for the webservice and the style of web service to generate.

Web Service Name: RapidService

Component To Publish: org.soademo.rapidservice.RequestQuote

☑ Autogenerate Service Endpoint Interface

Service Endpoint Interface: org.soademo.rapidservice.RequestQuotePortType

☑ SOAP 1.1 Binding

☐ SOAP 1.2 Binding

☐ WSIF Binding

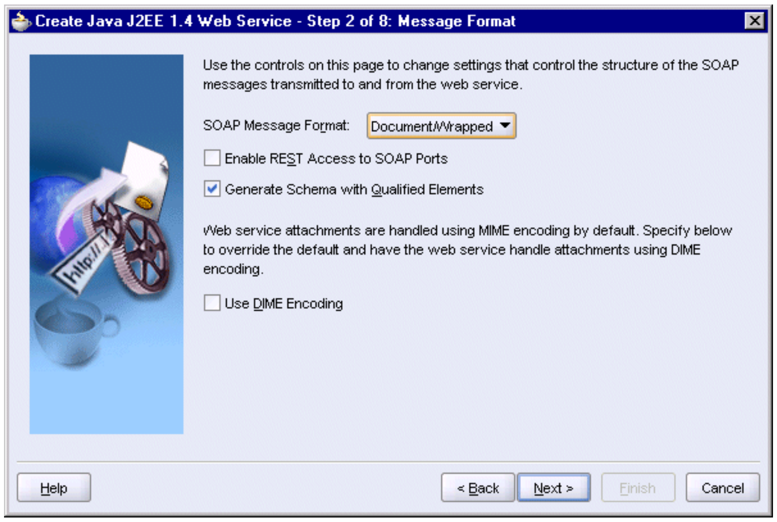
☑ Generate annotations into class

Click **Next**.

4. In Step 2, Message Format:
   - **SOAP Message Format**: select **Document/Wrapped**.
   - **Enable REST Access to SOAP Ports**: do not select.

- **Generate Schema with Qualified Elements**: select this option.
- **Use DIME Encoding**: do not select.

*Figure 6–15 Create Java J2EE 1.4 Web Service Wizard: Step 2, Message Format*



Create Java J2EE 1.4 Web Service - Step 2 of 8: Message Format

Use the controls on this page to change settings that control the structure of the SOAP messages transmitted to and from the web service.

SOAP Message Format: Document/Wrapped

☐ Enable REST Access to SOAP Ports

☑ Generate Schema with Qualified Elements

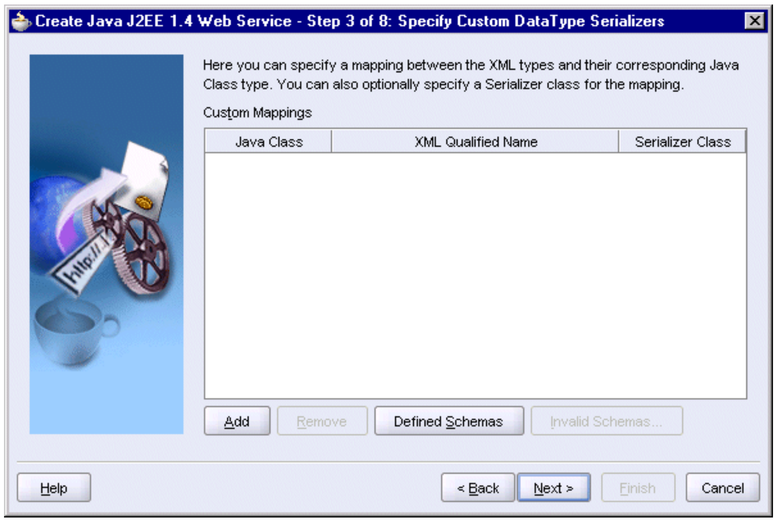
Web service attachments are handled using MIME encoding by default. Specify below to override the default and have the web service handle attachments using DIME encoding.

☐ Use DIME Encoding

Click **Next**.

5. In Step 3, Specify Custom Data Type Serializers, click **Next**.

*Figure 6–16 Create Java J2EE 1.4 Web Service Wizard: Step 3, Specify Custom Data Type Serializers*



Create Java J2EE 1.4 Web Service - Step 3 of 8: Specify Custom DataType Serializers

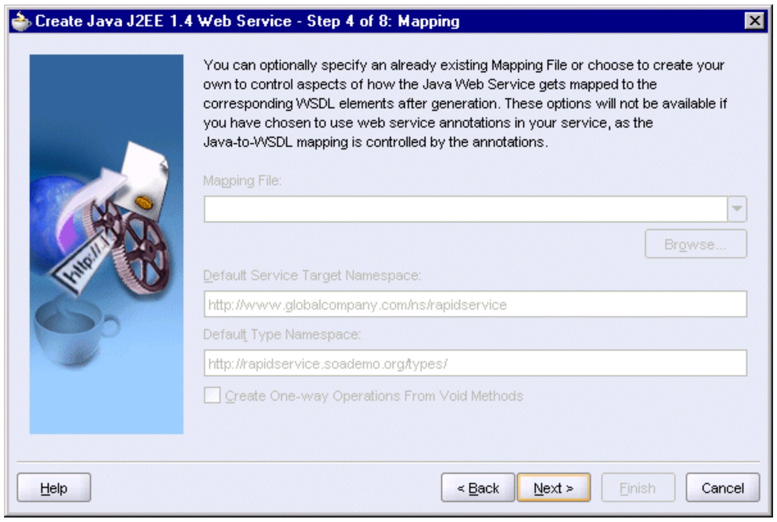
Here you can specify a mapping between the XML types and their corresponding Java Class type. You can also optionally specify a Serializer class for the mapping.

Custom Mappings

| Java Class | XML Qualified Name | Serializer Class |
|---|---|---|

6. In Step 4, Mapping, click **Next**.

***Figure 6–17 Create Java J2EE 1.4 Web Service Wizard: Step 4, Mapping***



You can optionally specify an already existing Mapping File or choose to create your own to control aspects of how the Java Web Service gets mapped to the corresponding WSDL elements after generation. These options will not be available if you have chosen to use web service annotations in your service, as the Java-to-WSDL mapping is controlled by the annotations.

Mapping File:

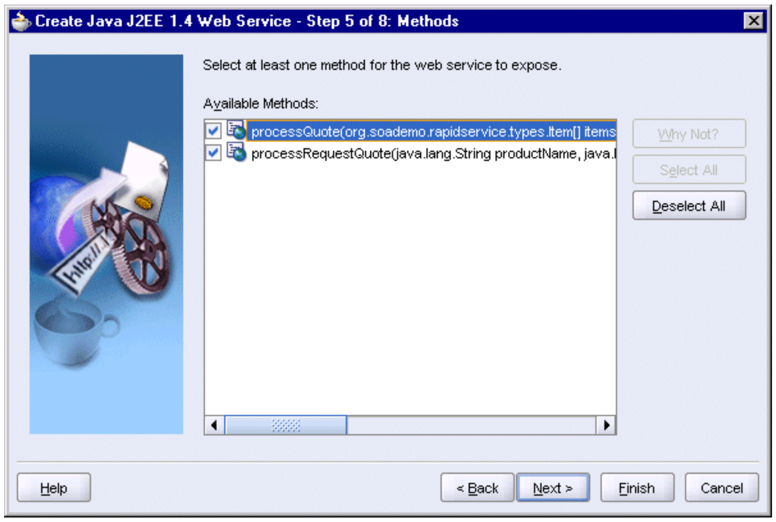
Default Service Target Namespace: http://www.globalcompany.com/ns/rapidservice

Default Type Namespace: http://rapidservice.soademo.org/types/

☐ Create One-way Operations From Void Methods

7. In Step 5, Methods, select **processQuote** and **processRequestQuote**.

***Figure 6–18 Create Java J2EE 1.4 Web Service Wizard: Step 5, Methods***



Select at least one method for the web service to expose.

Available Methods:

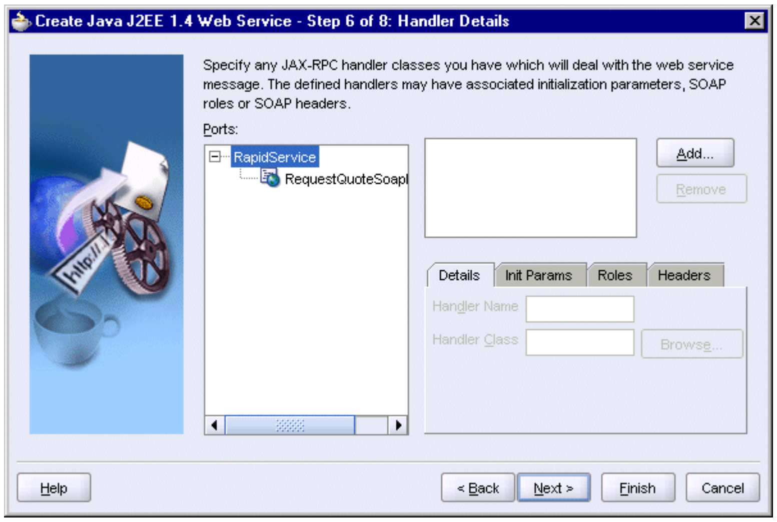
☑ processQuote(org.soademo.rapidservice.types.Item[] items

☑ processRequestQuote(java.lang.String productName, java.l

Click **Next**.

8. In Step 6, Handler Details, click **Next**.

***Figure 6–19 Create Java J2EE 1.4 Web Service Wizard: Step 6, Handler Details***


Create Java J2EE 1.4 Web Service - Step 6 of 8: Handler Details

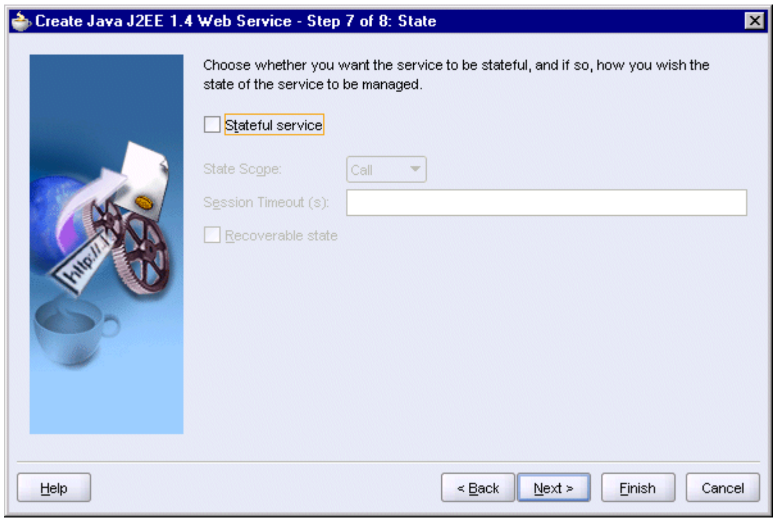
Specify any JAX-RPC handler classes you have which will deal with the web service message. The defined handlers may have associated initialization parameters, SOAP roles or SOAP headers.

Ports:

RapidService
RequestQuoteSoapl

9. In Step 7, State, click **Next**.

***Figure 6–20 Create Java J2EE 1.4 Web Service Wizard: Step 7, State***


Create Java J2EE 1.4 Web Service - Step 7 of 8: State

Choose whether you want the service to be stateful, and if so, how you wish the state of the service to be managed.

☐ Stateful service

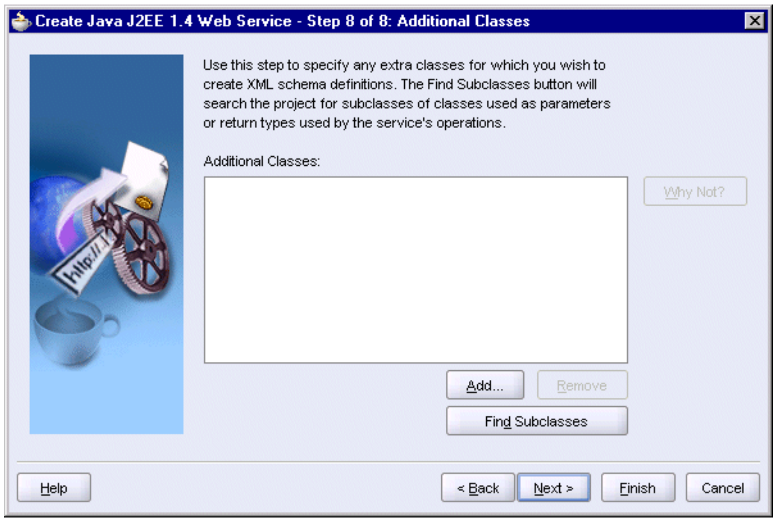
State Scope: Call

Session Timeout (s):

☐ Recoverable state

10. In Step 8, Additional Classes, click **Next**.

***Figure 6–21 Create Java J2EE 1.4 Web Service Wizard: Step 8, Additional Classes***


Create Java J2EE 1.4 Web Service - Step 8 of 8: Additional Classes

Use this step to specify any extra classes for which you wish to create XML schema definitions. The Find Subclasses button will search the project for subclasses of classes used as parameters or return types used by the service's operations.

Additional Classes:

**11.** In the Finish page, click **Finish**.

JDeveloper displays the `RapidService.wsdl` file in the editor. `RapidService.wsdl` is one of the files created by the wizard.

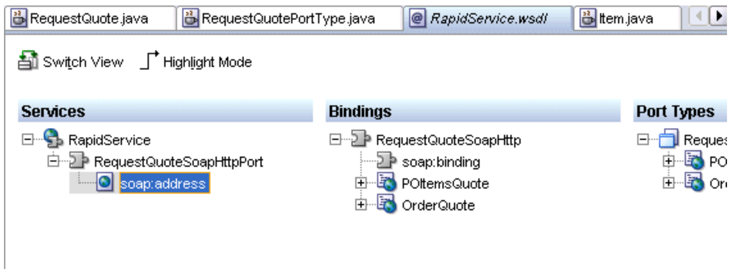
Continue with the next section to see the files JDeveloper created.

## 6.10 Verify the Hostname and Port in the Generated WSDL File

Verify that the hostname and port in the RapidService.wsdl file are correct.

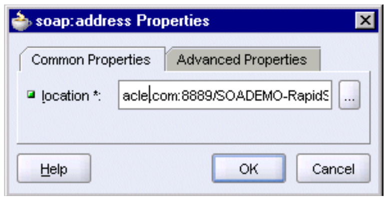
1. If `RapidService.wsdl` is not displayed in the editor, double-click it in the Application Navigator. The file is located under **RapidService** > **Web Content** > **WEB-INF\wsdl**.
2. Under **Services**, expand **RequestQuoteSoapHttpPort**.

***Figure 6–22 RapidService.wsdl***



3. Right-click **soap:address** and select **Properties**. This displays the soap:address Properties dialog.
4. In the soap:address Properties dialog, verify that the hostname and port are correct. The hostname specifies the name of the machine running Oracle Application Server, and the port specifies the HTTP port at which Oracle HTTP Server or OC4J is listening.

***Figure 6–23 soap:address Properties Dialog for RapidService.wsdl***



location *: acle.com:8889/SOADEMO-RapidS

5. Save your changes, if you made any.

## 6.11 Check Files in the Application Navigator

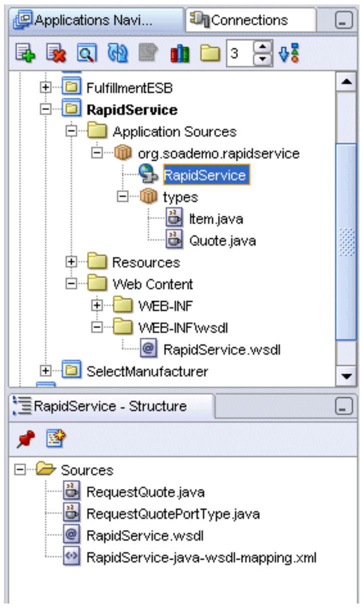
After the wizard has completed, you should see the following files in the Application Navigator and Structure window.

1. Select View > Structure to display the Structure window.
2. In the Application Navigator, select **SOADEMO** > **RapidService** > **Application Sources** > **org.soademo.rapidservice** > **RapidService**.

   In the Structure window, you should see the following files:

   - `RequestQuote.java`
   - `RequestQuotePortType.java`
   - `RapidService.wsdl`
   - `RapidService-java-wsdl-mapping.xml`

***Figure 6–24 Structure Window Showing Files Created***



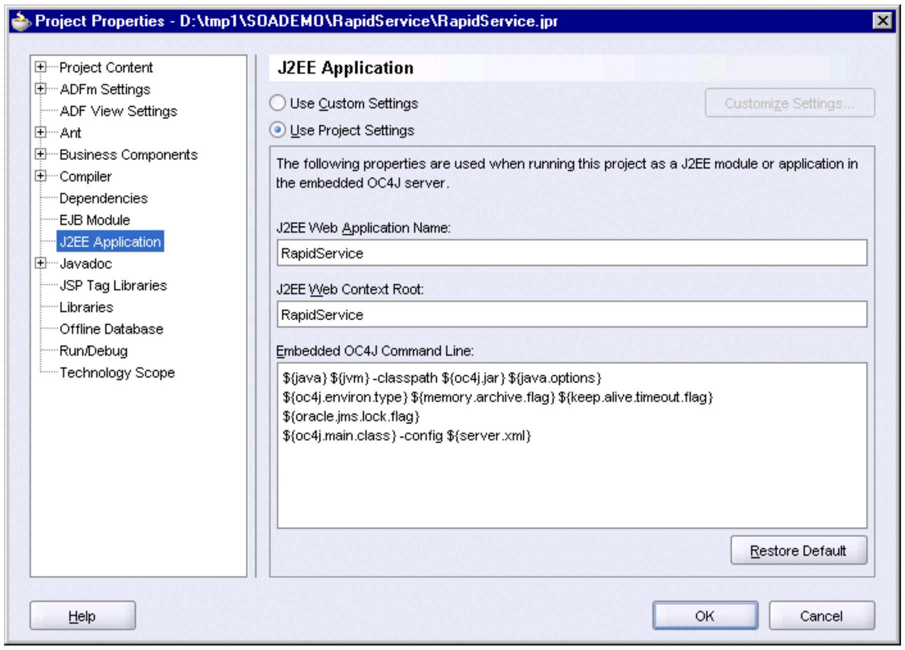
3. Expand the **SOADEMO** > **RapidService** > **Web Content** node in the Application Navigator to see the other files that JDeveloper created. See Figure 6–24.

## 6.12 Set the Context Root to RapidService

1. Double-click the RapidService project to display the Project Properties dialog.

2. On the left side, select **J2EE Application**.
3. Set the value of **J2EE Web Application Name** and **J2EE Web Context Root** to **RapidService**.

***Figure 6–25 Project Properties Dialog for RapidService***



The following properties are used when running this project as a J2EE module or application in the embedded OC4J server.

J2EE Web Application Name: RapidService

J2EE Web Context Root: RapidService

Embedded OC4J Command Line:

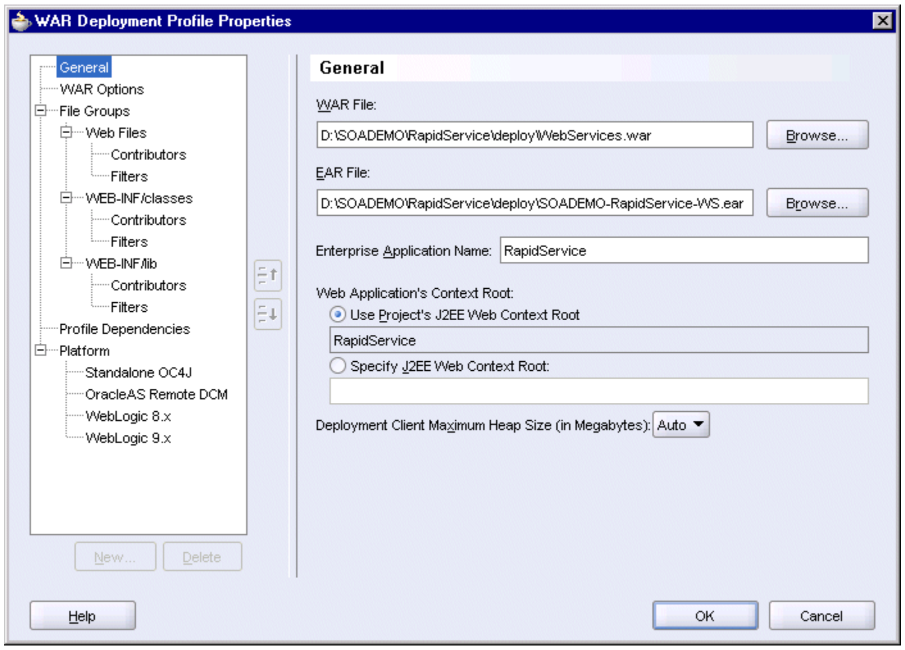
```
${java} ${jvm} -classpath ${oc4j.jar} ${java.options}
${oc4j.environ.type} ${memory.archive.flag} ${keep.alive.timeout.flag}
${oracle.jms.lock.flag}
${oc4j.main.class} -config ${server.xml}
```

4. Click **OK**.
5. Select File > Save to save your work.

## 6.13 Edit the Deployment Descriptor

1. Double-click the deployment descriptor (**Resources > WebServices.deploy**) to display the WAR Deployment Profile Properties dialog.
2. Select **General** on the left side.
3. Set **Enterprise Application Name** to **RapidService**.

***Figure 6–26 WAR Deployment Profile Properties Dialog, General Section***


WAR Deployment Profile Properties

General

WAR File: D:\SOADEMO\RapidService\deploy\WebServices.war

EAR File: D:\SOADEMO\RapidService\deploy\SOADEMO-RapidService-WS.ear

Enterprise Application Name: RapidService

Web Application's Context Root:
(●) Use Project's J2EE Web Context Root: RapidService
( ) Specify J2EE Web Context Root:

Deployment Client Maximum Heap Size (in Megabytes): Auto

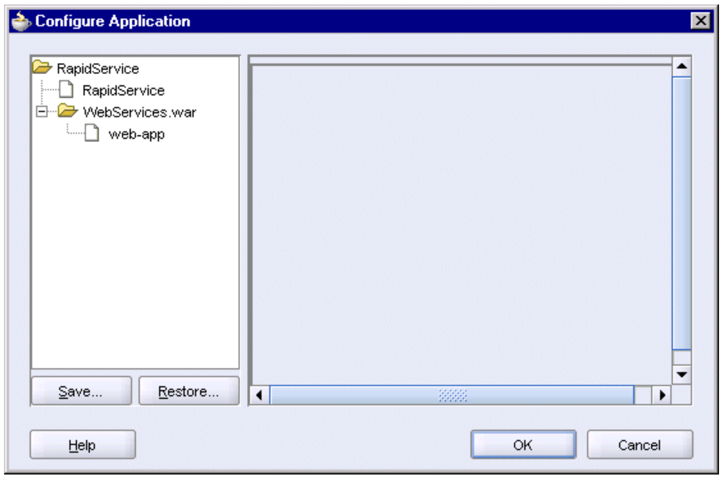
4. Click **OK**.
5. Select File > Save to save your work.

## 6.14 Deploy the RapidService Project

Right-click **Resources > WebServices.deploy** and select **Deploy To** > *SoademoApplicationServer*, where *SoademoApplicationServer* specifies the connection to your application server.

In the Configure Application dialog, click **OK**.

***Figure 6–27 Configure Application Dialog***



## 6.15 View the WSDL for RapidService

You can access the WSDL for RapidService by entering the following URL in a browser:

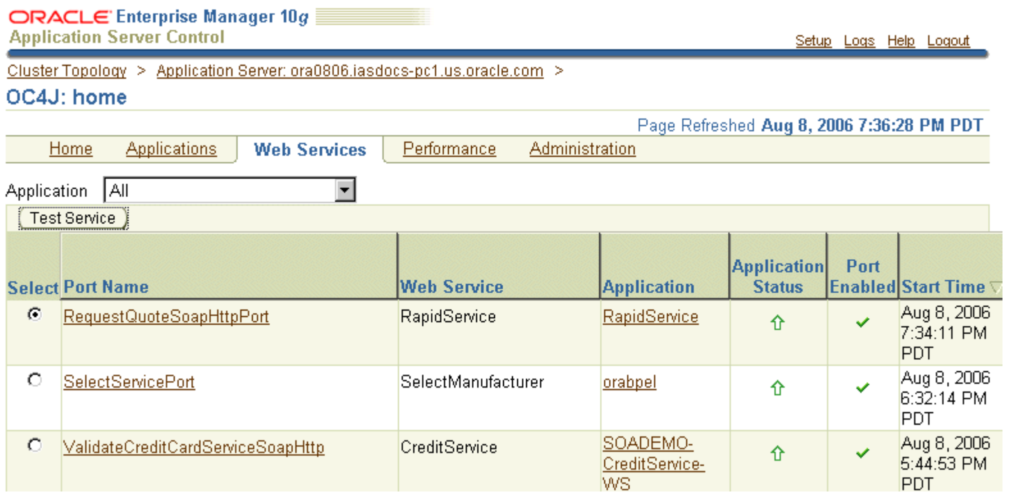
```
http://hostname:port/RapidService/RequestQuoteSoapHttpPort?WSDL
```

For *hostname*, enter the name of the machine running Oracle Application Server.

For *port*, enter the HTTP at which Oracle HTTP Server or OC4J is listening. The default port is 8888.

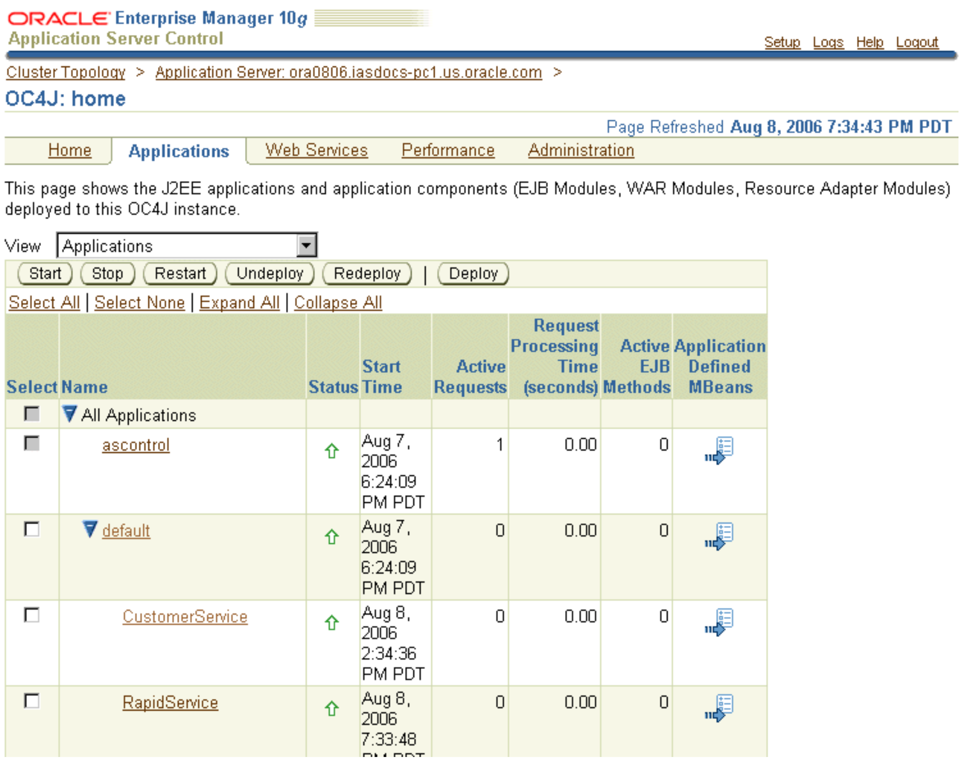
In the Application Server Control, RapidService appears in two places: in the Web Services tab (Figure 6–28) and the Applications tab (Figure 6–29) of the OC4J:home page.

***Figure 6–28 Web Services Tab of OC4J:home Page Showing the RapidService Web Service***


ORACLE Enterprise Manager 10g
Application Server Control
Setup Logs Help Logout
Cluster Topology > Application Server: ora0806.iasdocs-pc1.us.oracle.com >
OC4J: home
Page Refreshed Aug 8, 2006 7:36:28 PM PDT
Home Applications Web Services Performance Administration
Application All
Test Service

| Select | Port Name | Web Service | Application | Application Status | Port Enabled | Start Time |
|---|---|---|---|---|---|---|
| ● | RequestQuoteSoapHttpPort | RapidService | RapidService | ⇧ | ✓ | Aug 8, 2006 7:34:11 PM PDT |
| ○ | SelectServicePort | SelectManufacturer | orabpel | ⇧ | ✓ | Aug 8, 2006 6:32:14 PM PDT |
| ○ | ValidateCreditCardServiceSoapHttp | CreditService | SOADEMO-CreditService-WS | ⇧ | ✓ | Aug 8, 2006 5:44:53 PM PDT |

***Figure 6–29 Applications Tab of OC4J:home Page Showing the RapidService Application***


ORACLE Enterprise Manager 10g
Application Server Control
Setup Logs Help Logout
Cluster Topology > Application Server: ora0806.iasdocs-pc1.us.oracle.com >
Home
Applications
Web Services
Performance
Administration
Start
Stop
Restart
Undeploy
Redeploy
Deploy
Select All | Select None | Expand All | Collapse All

OC4J: home

Page Refreshed **Aug 8, 2006 7:34:43 PM PDT**

This page shows the J2EE applications and application components (EJB Modules, WAR Modules, Resource Adapter Modules) deployed to this OC4J instance.

View: Applications

| Select | Name | Status | Start Time | Active Requests | Request Processing Time (seconds) | Active EJB Methods | Application Defined MBeans |
|---|---|---|---|---|---|---|---|
| ☐ | All Applications | | | | | | |
| ☐ | ascontrol | ⇧ | Aug 7, 2006 6:24:09 PM PDT | 1 | 0.00 | 0 | |
| ☐ | default | ⇧ | Aug 7, 2006 6:24:09 PM PDT | 0 | 0.00 | 0 | |
| ☐ | CustomerService | ⇧ | Aug 8, 2006 2:34:36 PM PDT | 0 | 0.00 | 0 | |
| ☐ | RapidService | ⇧ | Aug 8, 2006 7:33:48 | 0 | 0.00 | 0 | |

# 7 Creating the SelectManufacturer Project

This chapter describes how to create the SelectManufacturer project. It contains these sections:

## 7.1 About the SelectManufacturer Project

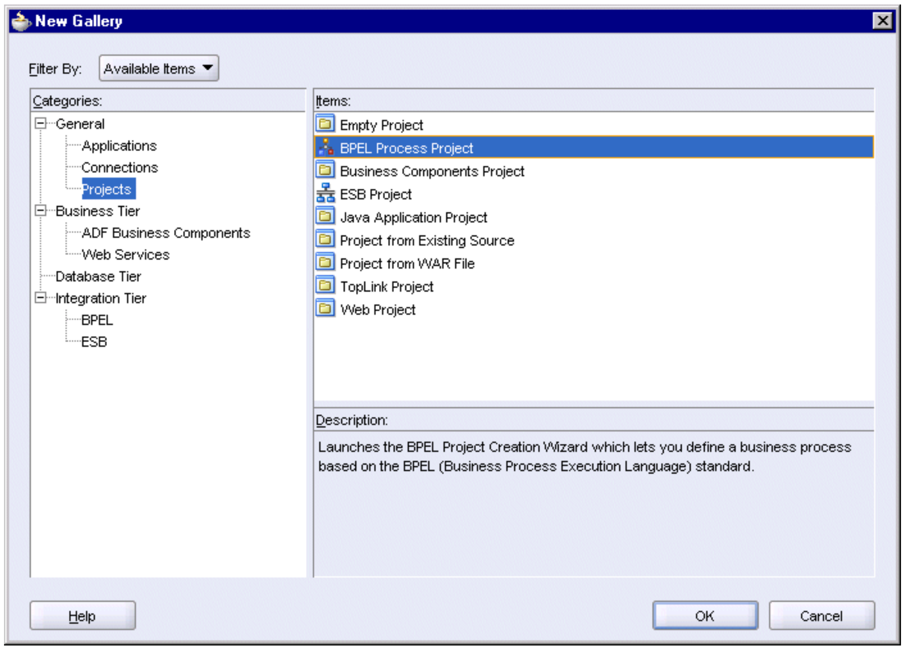
The SelectManufacturer project represents a supplier called Select Manufacturer. When a customer places an order, the order is sent to two suppliers, Select Manufacturer and Rapid Distributors, to get quote requests from both suppliers. The supplier that responds with the lower quote gets to fulfill the customer's order.

The SelectManufacturer project is an asynchronous BPEL process. This means that it contains a receive activity to initiate the BPEL process flow and an invoke activity to call back the client asynchronously with the results (that is, the quote) at the end of the flow.

## 7.2 Create a New BPEL Project for SelectManufacturer

1. Right-click the SOADEMO application in the Application Navigator and select **New Project** to display the New Gallery.
2. In the New Gallery, under Categories, expand **General** and select **Projects**. Under Items, select **BPEL Process Project**.

*Figure 7–1 New Gallery for SelectManufacturer Project*

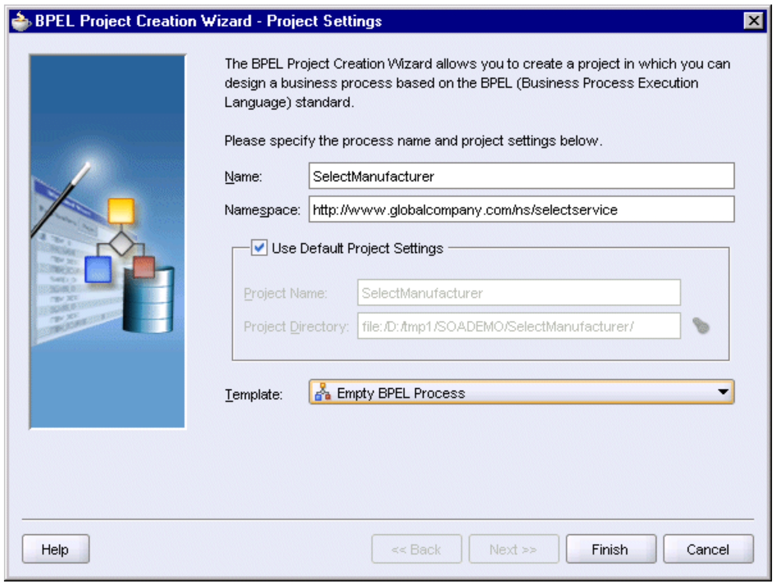


Launches the BPEL Project Creation Wizard which lets you define a business process based on the BPEL (Business Process Execution Language) standard.

Click **OK**. This displays the BPEL Project Creation wizard.

3. On the Project Settings page of the BPEL Project Creation wizard:
   - **Name**: enter **SelectManufacturer**.
   - **Namespace**: enter **http://www.globalcompany.com/ns/selectservice**.
   - **Use Default Project Settings**: select this option.
   - **Template**: select **Empty BPEL Process**.

*Figure 7–2 BPEL Project Creation Wizard - Project Settings Page*



The BPEL Project Creation Wizard allows you to create a project in which you can design a business process based on the BPEL (Business Process Execution Language) standard.

Please specify the process name and project settings below.

Name: SelectManufacturer

Namespace: http://www.globalcompany.com/ns/selectservice

[✓] Use Default Project Settings

Project Name: SelectManufacturer

Project Directory: file:/D:/tmp1/SOADEMO/SelectManufacturer/

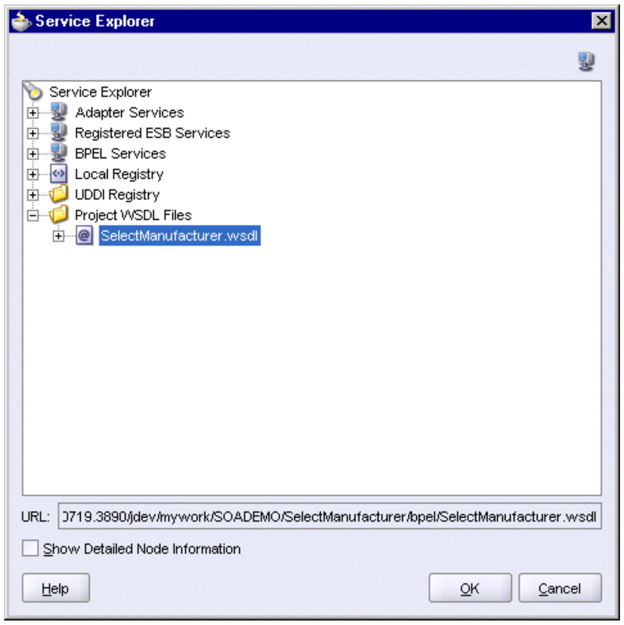
Template: Empty BPEL Process

Click **Finish**.

## 7.3 Create "SelectService" Partner Link

1. Copy the `SelectManufacturer\bpel\SelectManufacturer.wsdl` file from the `soademo_101310_prod.zip` file to the *`SOADEMO`*`\SelectManufacturer\bpel` directory.
2. Select View > Component Palette to display the Component Palette. You need the Component Palette to drag and drop BPEL activities and services onto the SelectManufacturer BPEL flow you are about to create.
3. Select **Services** from the dropdown in the Component Palette.
4. Drag the Partner Link icon from the Component Palette and drop it on a **Services** swimlane. You can drop it on either the left side or the right side.
5. In the Partner Link dialog:
   - **Name**: enter **SelectService**.
   - **WSDL**: click the Service Explorer icon (the second one from the left) to display the Service Explorer dialog. In the Service Explorer dialog, expand **Project WSDL Files** and select **SelectManufacturer.wsdl**.

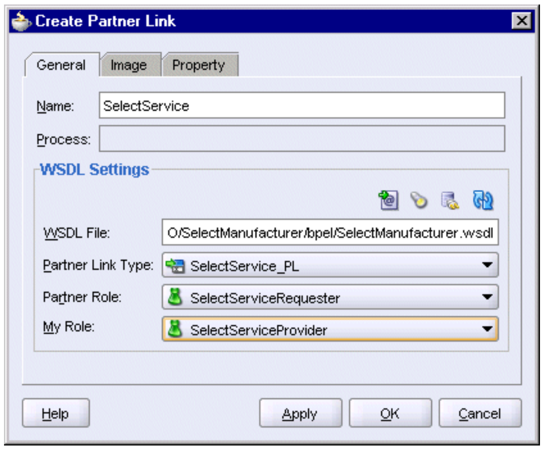
***Figure 7–3 Service Explorer Dialog for SelectService***



URL: 0719.3890/jdev/mywork/SOADEMO/SelectManufacturer/bpel/SelectManufacturer.wsdl

   Click **OK** in the Service Explorer dialog.
   - **Partner Link Type**: select **SelectService_PL** (automatically filled in for you).
   - **Partner Role**: select **SelectServiceRequester**.
   - **My Role**: select **SelectServiceProvider**.

***Figure 7–4 Create Partner Link Dialog for SelectService***



Name: SelectService

Process:

WSDL File: O/SelectManufacturer/bpel/SelectManufacturer.wsdl

Partner Link Type: SelectService_PL

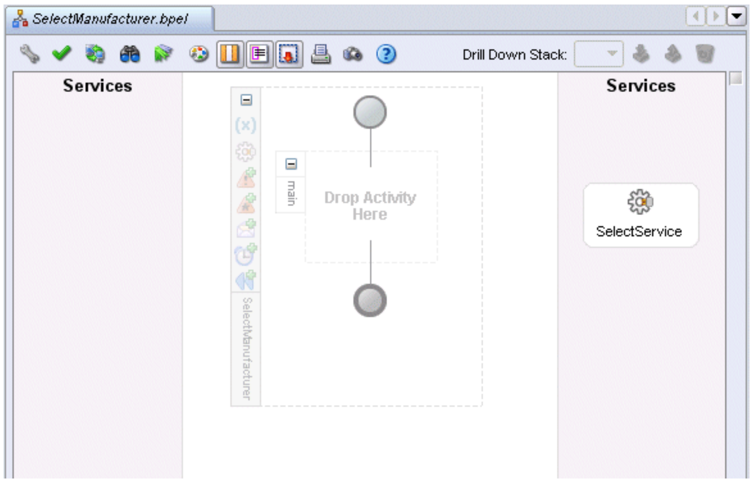
Partner Role: SelectServiceRequester

My Role: SelectServiceProvider

6. Click **OK** in the Create Partner Link dialog.

At this point, the SelectManufacturer.bpel page should look like this:

***Figure 7–5 SelectManufacturer.bpel Page in JDeveloper***



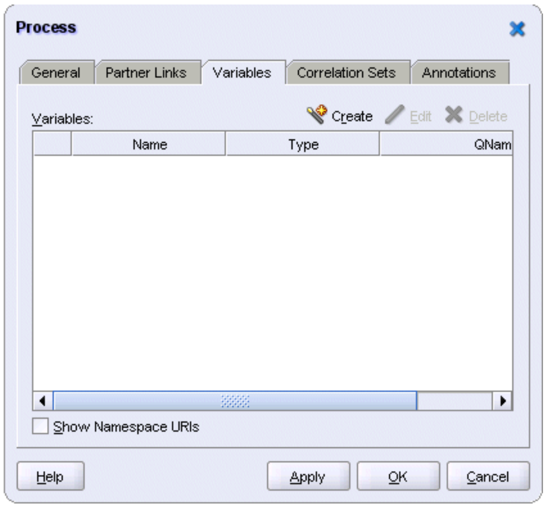
## 7.4 Define Variables for the SelectManufacturer Project

In this step, you create two variables called `inputVariable` and `outputVariable` for the SelectManufacturer project. Variables defined at the project level can be accessed by all activities in the project.

1. Double-click the SelectManufacturer scope to display the Process dialog. You can double-click the "SelectManufacturer" text that is displayed sideways.

2. In the Process dialog, click the Variables tab.

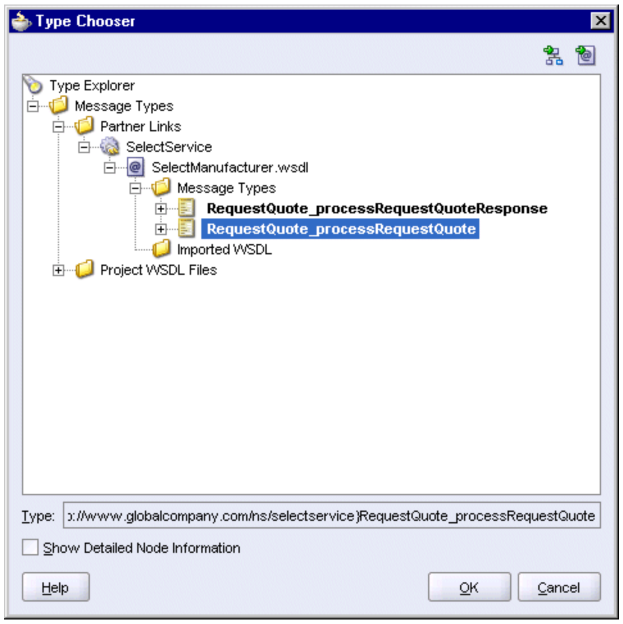
*Figure 7–6 Process Dialog, Variables Tab, for SelectManufacturer*



3. Create a variable called **inputVariable**.
   a. Click **Create** to display the Create Variable dialog.
   b. In the Create Variable dialog, set these values:
      – **Name**: enter **inputVariable**.
      – **Type**: select **Message Type**, and click the flashlight icon. This displays the Type Chooser dialog.

        In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **SelectService** > **SelectManufacture.wsdl** > **Message Types** > **RequestQuote_processRequestQuote**.

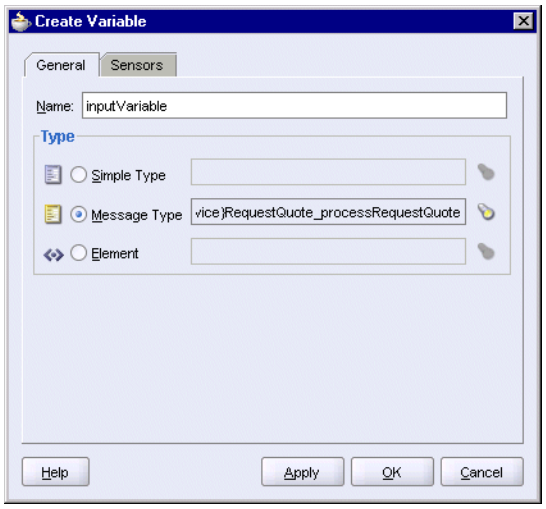
*Figure 7–7 Type Chooser for inputVariable*



Type: ):/www.globalcompany.com/ns/selectservice}RequestQuote_processRequestQuote

Click **OK** in the Type Chooser. The Create Variable dialog now looks like this:

***Figure 7–8 Create Variable Dialog for inputVariable***



Name: inputVariable

Type

Simple Type

Message Type: vice}RequestQuote_processRequestQuote

Element

c. Click **OK** in the Create Variable dialog. This returns you to the Process dialog. You should see the **inputVariable** in the dialog.

4. Create a second variable called **outputVariable**.

   a. Click **Create** to display the Create Variable dialog.

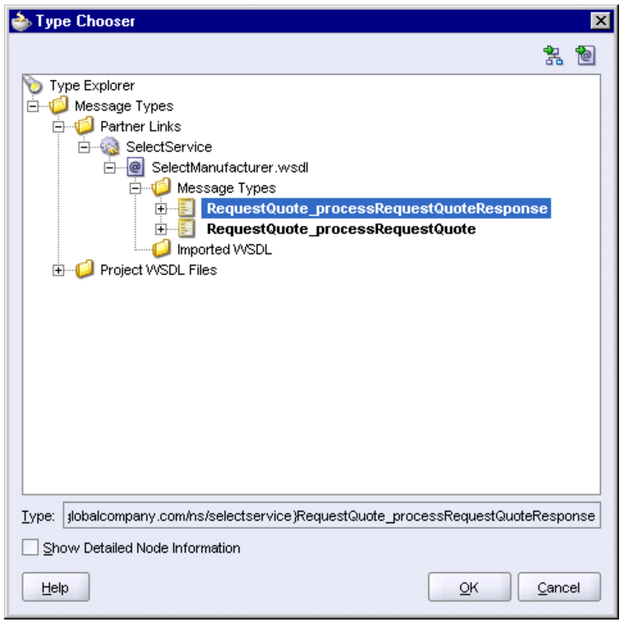
   b. In the Create Variable dialog, set these values:

      – **Name**: enter **outputVariable**.

      – **Type**: select **Message Type**, and click the flashlight icon. This displays the Type Chooser dialog.

        In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **SelectService** > **SelectManufacture.wsdl** > **Message Types** > **RequestQuote_processRequestQuoteResponse**.

***Figure 7–9 Type Chooser for outputVariable***

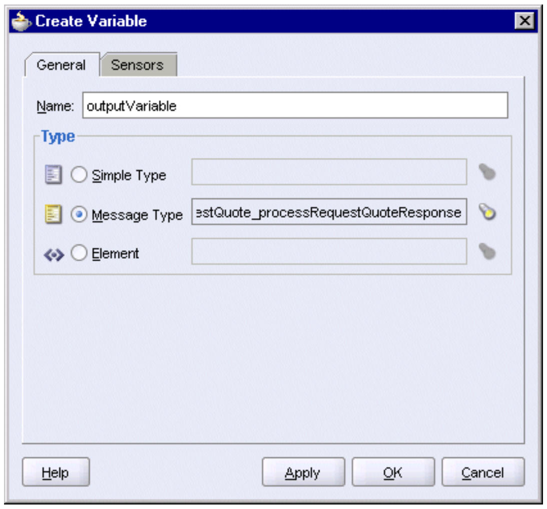


Type: }lobalcompany.com/ns/selectservice}RequestQuote_processRequestQuoteResponse

Show Detailed Node Information

Click **OK** in the Type Chooser. The Create Variable dialog now looks like this:

***Figure 7–10 Create Variable Dialog for outputVariable***



Name: outputVariable

( ) Simple Type

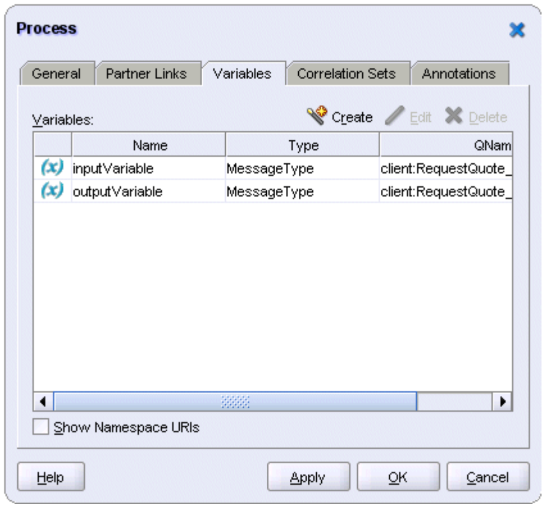
(●) Message Type: estQuote_processRequestQuoteResponse

( ) Element

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

5. In the Process dialog, you should see the two variables:

***Figure 7–11 Process Dialog Showing inputVariable and outputVariable***



| Name | Type | QNam |
|---|---|---|
| inputVariable | MessageType | client:RequestQuote_ |
| outputVariable | MessageType | client:RequestQuote_ |

6. Click **OK** in the Process dialog.

7. Select File > Save to save your work.

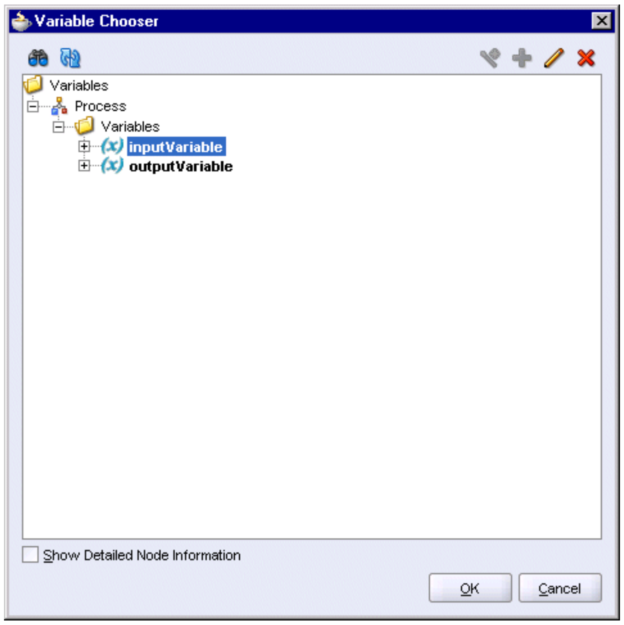
## 7.5 Receive Order Data from the Client through a Receive Activity

Create a receive activity as the starting point for this BPEL process. The receive activity receives requests from clients (in this case, the client is the SOAOrderBooking project, which is another BPEL process), and the requests can contain parameters.

1. Select **Process Activities** from the dropdown in the Component Palette.

2. Drag the Receive activity icon from the Component Palette and drop it in the "Drop Activity Here" box on the page.
3. Drag an arrow from the newly created receive activity and drop it on the SelectService partner link. As you drag, you should see a line connecting the receive activity with partner link. When you release, JDeveloper displays the Receive dialog.
4. In the Receive dialog:
   - **Name**: enter **Receive_1**.
   - **Partner Link**: should be set to **SelectService**. This should be filled in automatically for you.
   - **Operation**: should be set to **processRequestQuote**. This should be filled in automatically for you.
   - **Variable**: click the Browse Variables icon (the icon on the right) to display the Variable Chooser dialog. Select **inputVariable**.

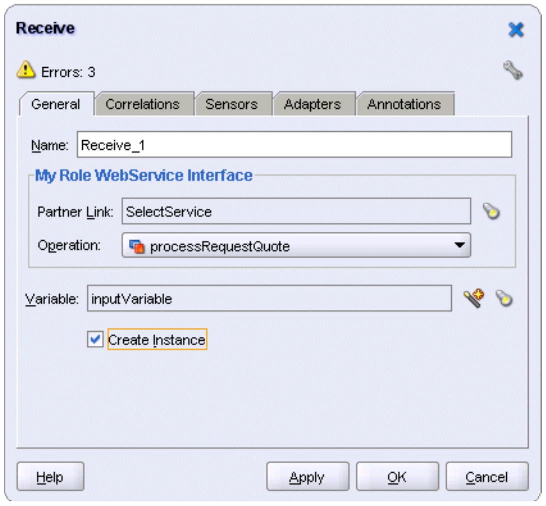
***Figure 7–12 Variable Chooser Dialog***



   Click **OK** in the Variable Chooser.
   - **Create Instance**: select this option.

The Receive dialog now looks like this:

***Figure 7–13 Receive Dialog***


Receive

Errors: 3

Name: Receive_1

My Role WebService Interface

Partner Link: SelectService

Operation: processRequestQuote

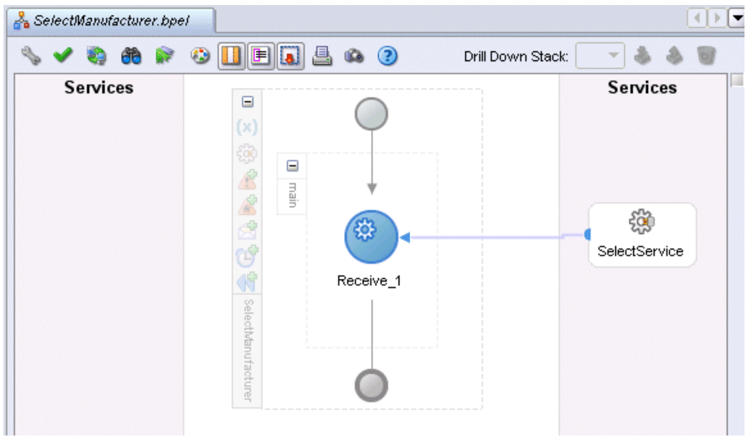
Variable: inputVariable

[✓] Create Instance

5. Click **OK** in the Receive dialog.

   The SelectManufacturer.bpel page now contains a link from the SelectService partner link to the receive activity.

***Figure 7–14 SelectManufacturer.bpel Showing Link from SelectService Partner Link to the Receive Activity***



6. Select File > Save to save your work.

## 7.6 Assign Values to be Returned

In this assign activity, you set the values that are returned by Select Manufacturer when it is asked for a quote. To simplify things in this SOA Order Booking application, the SelectManufacturer BPEL process returns two values:

- its name ("SelectDistributors")
- the quote for the order. Select Manufacturer simply returns 120 multiplied by the number of items in the order to get the quote.

These values are set in the `outputVariable` variable, which will be returned to the client.

1. Select **Process Activities** from the dropdown in the Component Palette.

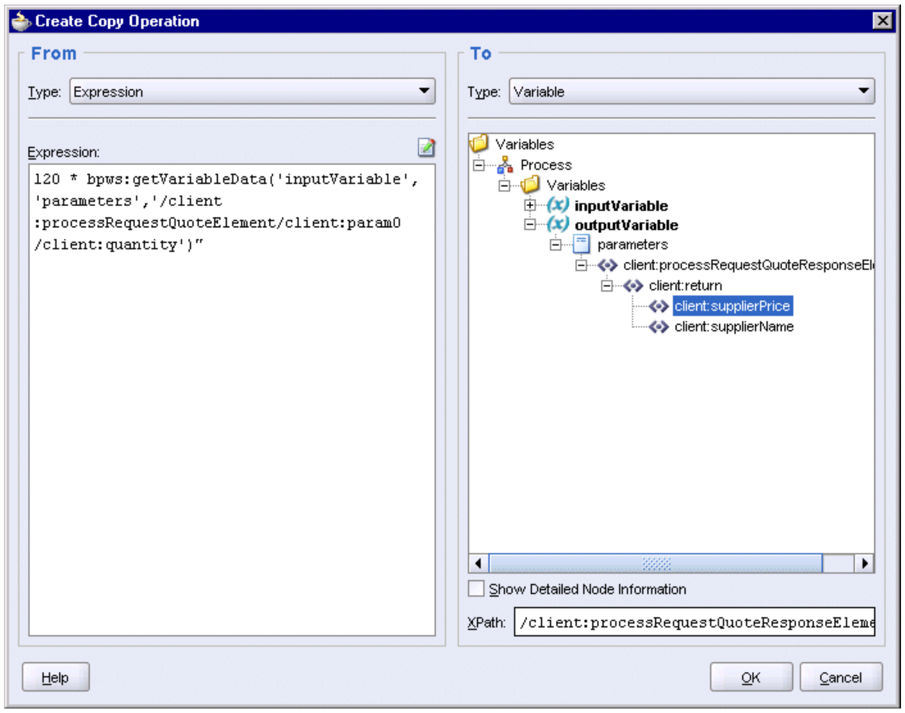
2. Drag the Assign activity icon from the Component Palette and drop it after the **Receive_1** activity.
3. Double-click the new Assign instance to display the Assign dialog.
4. Click the Copy Operation tab in the Assign dialog.
5. In the Copy Operation tab, create the first copy operation. This copy operation sets the quote value to return.
   a. Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.
   b. In the Create Copy Operation dialog:
      – On the **From** side, select **Expression** from the **Type** dropdown. Enter the following into the Expression box:

      ```
      120 * bpws:getVariableData('inputVariable','parameters',
      '/client:processRequestQuoteElement/client:param0/client:quantity')
      ```

      This formula multiplies the number of items in the order by 120 to get the quote price.
      – On the **To** side, select **Variable** from the **Type** dropdown. Select **Variables** > **Process** > **Variables** > **outputVariable** > **parameters** > **client:processRequestQuoteResponseElement** > **client:return** > **client:supplierPrice**. Note that the prefix ("client") may be different on your machine.

      The Create Copy Variable dialog should look like this:

*Figure 7–15 Create Copy Variable Dialog for Returning the Supplier Price*



Type: Expression

Expression:

```
120 * bpws:getVariableData('inputVariable',
'parameters','/client
:processRequestQuoteElement/client:param0
/client:quantity')"
```

Type: Variable

```
Variables
  Process
    Variables
      inputVariable
      outputVariable
        parameters
          client:processRequestQuoteResponseEl
            client:return
              client:supplierPrice
              client:supplierName
```

Show Detailed Node Information

XPath: /client:processRequestQuoteResponseEleme

   c. Click **OK** in the Create Copy Operation dialog.
6. Create the second copy operation. This copy operation sets the name to return.

**a.** Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.

**b.** In the Create Copy Operation dialog:

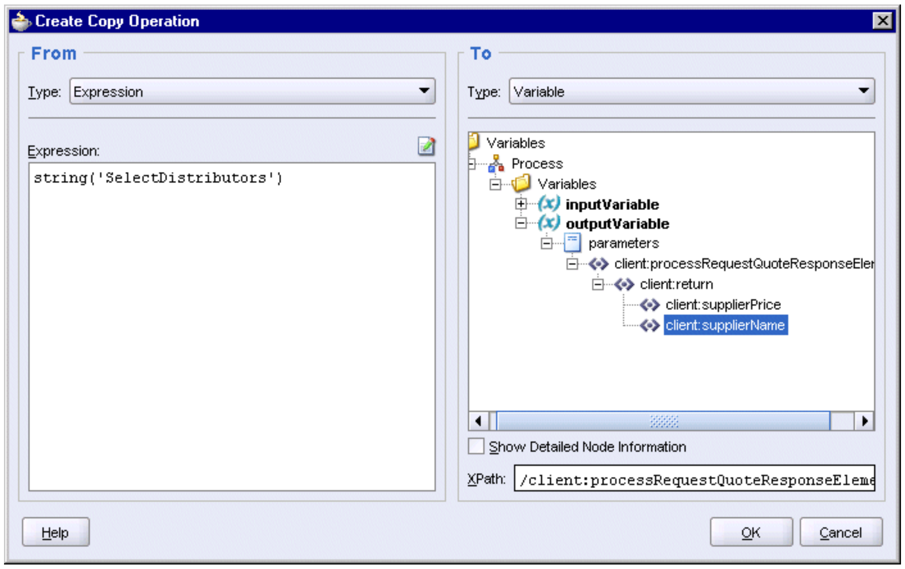
– On the **From** side, select **Expression** from the **Type** dropdown. Enter the following into the Expression box:

```
string('SelectDistributors')
```

– On the **To** side, select **Variable** from the **Type** dropdown. Select **Variables** > **Process** > **Variables** > **outputVariable** > **parameters** > **client:processRequestQuoteResponseElement** > **client:return** > **client:supplierName**.

The Create Copy Variable dialog should look like this:

***Figure 7–16 Create Copy Variable Dialog for Returning the Supplier Name***



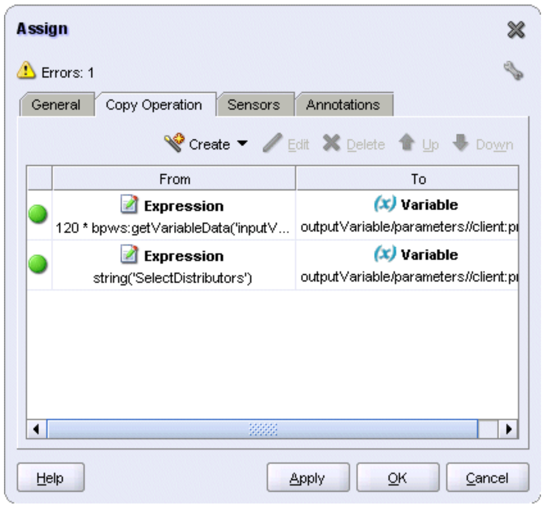
```
string('SelectDistributors')
```

```
/client:processRequestQuoteResponseEleme
```

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

The Assign dialog should look like this:

***Figure 7–17 Assign Dialog***

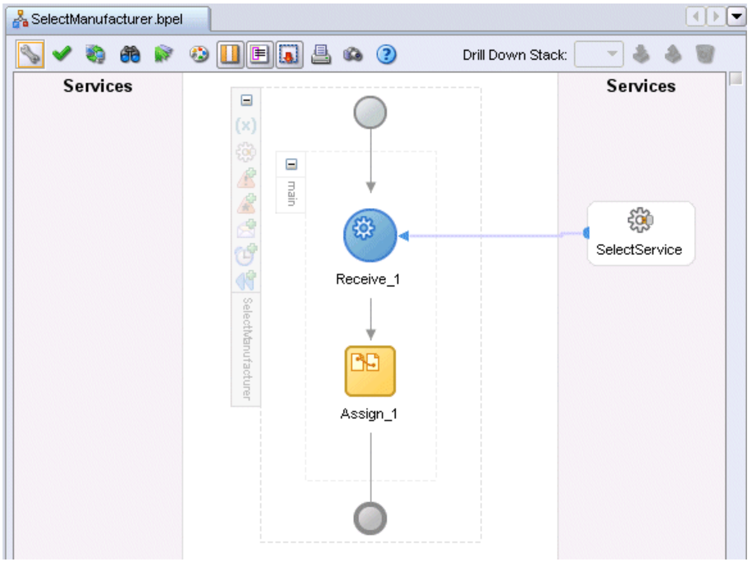


| | From | To |
|---|---|---|
| ● | Expression 120 * bpws:getVariableData('inputV... | Variable outputVariable/parameters//client:p |
| ● | Expression string('SelectDistributors') | Variable outputVariable/parameters//client:p |

7. Click **OK** in the Assign dialog.
8. Select File > Save to save your work.

The SelectManufacturer.bpel page should now look like this:

***Figure 7–18 SelectManufacturer.bpel Page Showing the Assign Activity***



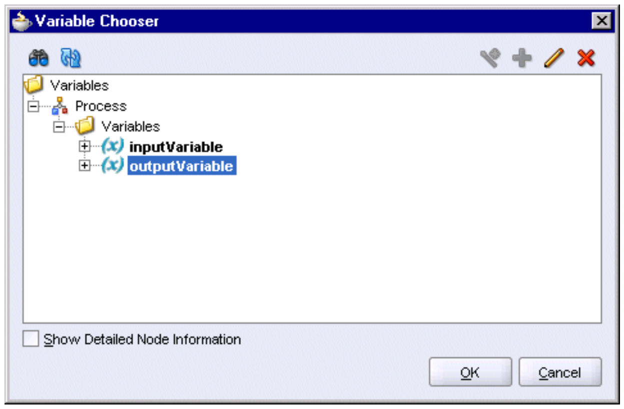
## 7.7 Return Values to the Client Using an Invoke Activity

The Invoke activity returns the values in the `outputVariable` to the client.

1. Select **Process Activities** from the dropdown in the Component Palette.
2. Drag the Invoke activity icon from the Component Palette and drop it after the **Assign_1** activity.
3. Drag an arrow from the newly created invoke activity and drop it on the SelectService partner link. This displays the Invoke dialog.
4. In the Invoke dialog:

- **Name**: enter **Invoke_1**.
- **Partner Link**: should be set to **SelectService**.
- **Operation**: select **processRequestQuoteResponse**. This is set for you automatically.
- **Input Variable**: click the Browser Variables icon (the one on the right) to display the Variable Chooser. In the Variable Chooser, select **Variables** > **Process** > **Variables** > **outputVariable**.

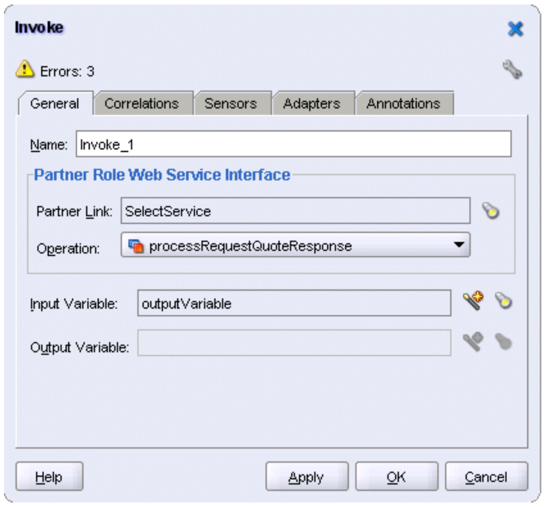
*Figure 7–19 Variable Chooser for the Input Variable*



Click **OK** in the Variable Chooser.

The Invoke dialog should now look like this:

*Figure 7–20 Invoke Dialog*

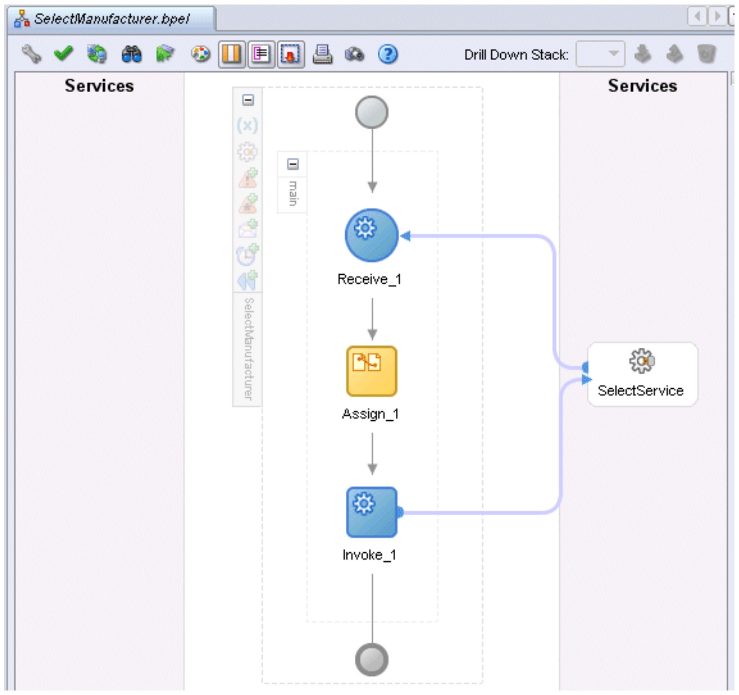


Name: Invoke_1
Partner Link: SelectService
Operation: processRequestQuoteResponse
Input Variable: outputVariable
Output Variable:

5. Click **OK** in the Invoke dialog.
6. Select File > Save to save your work.

The SelectManufacturer.bpel page now looks like this:

***Figure 7–21 SelectManufacturer.bpel Page with Invoke Activity***



## 7.8 Deploy the BPEL Process

1. Double-click **build.properties**, located under **SelectManufacturer** > **Resources** in the Application Navigator. This file defines values that are used by `build.xml` when you deploy the BPEL project.
2. Uncomment (by removing the # character) these lines in the `build.properties` file:

```
platform=ias_10g
domain=default
rev=1.0
admin.user=oc4jadmin
admin.password=welcome99
http.hostname=myAppServerMachine.mydomain.com
http.port=8888
j2ee.hostname=myAppServerMachine.mydomain.com
rmi.port=23793
opmn.requestport=6005
oc4jinstancename=home
```

3. Edit the values as necessary. The values in bold italics are the typical values you need to modify.

   To determine the value for `rmi.port`, run:

```
ORACLE_HOME\opmn\bin\opmnctl status -l
```

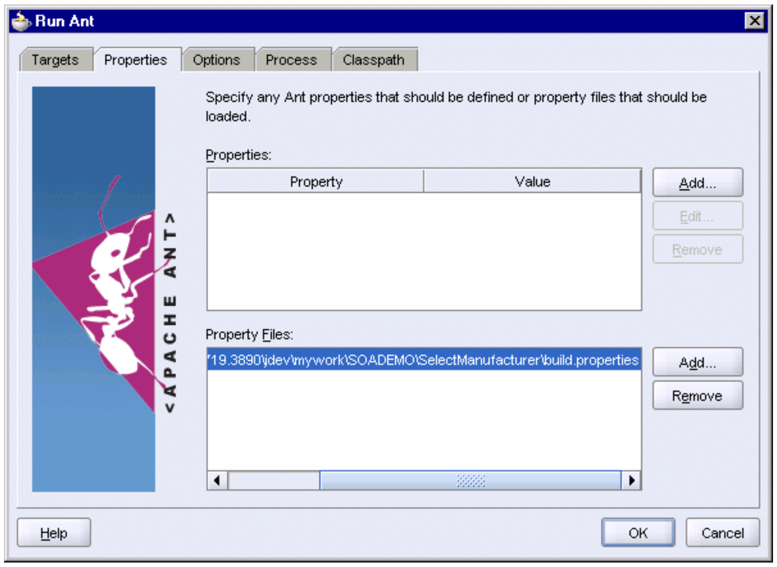
   *ORACLE_HOME* specifies the Oracle home for Oracle Application Server.

   To determine the value for `opmn.requestport`, see step 6 on page 2-11.
4. Select File > Save to save your changes to `build.properties`.

5. Right-click **build.xml** (located under **SelectManufacturer** > **Resources**) and select **Run Ant**.
6. In the Run Ant dialog, click the Properties tab.
7. In the **Property Files** section, click **Add**. In the Add Ant Property File dialog, select the `build.properties` file in the `SelectManufacturer` directory and click **Open**.

   The Run Ant dialog should look like this:

***Figure 7–22 Run Ant Dialog, Properties Tab, With build.properties File Loaded***



Specify any Ant properties that should be defined or property files that should be loaded.

`19.3890\jdev\mywork\SOADEMO\SelectManufacturer\build.properties`

8. Click **OK**. JDeveloper runs Ant to compile and deploy the project. If you get errors, see the next section, Section 7.8.1, "Deploying Using Ant from the Developer Prompt".

## 7.8.1 Deploying Using Ant from the Developer Prompt

If you get errors, check that the values you entered in the `build.properties` file are correct.

If the values are correct, but you still get errors, you can run `ant` from the Developer Prompt to deploy the project:

1. On the machine running Oracle Application Server, select **Start** > **Programs** > **Oracle -** *instanceName* > **Oracle BPEL Process Manager** > **Developer Prompt**. This displays a shell window configured for Oracle BPEL Process Manager.

   Note that you must run `ant` from the Developer Prompt shell window to deploy the SelectManufacturer project. Running `ant` from a regular operating system shell for deploying the project is not supported.

2. In the Developer Prompt window, change directory to the *`SOADEMO`*`\SelectManufacturer` directory, where *`SOADEMO`* refers to the directory where you created the SOA Order Booking application.

```
> cd SOADEMO
> cd SelectManufacturer
```

If you are running JDeveloper and Oracle Application Server on separate machines, you can copy the `SelectManufacturer` directory from the JDeveloper machine to the Oracle Application Server machine. You can place it anywhere on the Oracle Application Server machine. In the Developer Prompt, you can just navigate to that directory.

3. Run `ant`.

```
> ant
```

### 7.8.2 Viewing SelectManufacturer in the Oracle BPEL Control

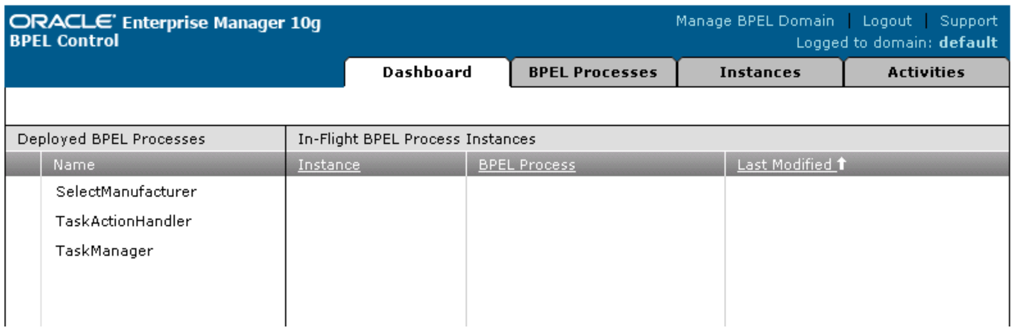
After deployment, SelectManufacturer appears in the Oracle BPEL Control. Enter the following URL in a browser to bring up the Oracle BPEL Control:

`http://`*`hostname`*`:`*`port`*`/BPELConsole`

Log in as the `oc4jadmin` user.

SelectManufacturer appears in the Dashboard tab of the Oracle BPEL Control:

***Figure 7–23 Oracle BPEL Control Showing SelectManufacturer***


ORACLE Enterprise Manager 10g
BPEL Control
Manage BPEL Domain | Logout | Support
Logged to domain: default
Dashboard
BPEL Processes
Instances
Activities

| Deployed BPEL Processes | In-Flight BPEL Process Instances | | |
|---|---|---|---|
| Name | Instance | BPEL Process | Last Modified |
| SelectManufacturer | | | |
| TaskActionHandler | | | |
| TaskManager | | | |

# 8 Creating the SOAOrderBooking Project

This chapter describes how to create the SOAOrderBooking project, which is a BPEL project. It contains these sections:

## 8.1 About the SOAOrderBooking Project

The SOAOrderBooking project, which is a BPEL project, represents the main flow in the SOA Order Booking application. It sends the order information to the appropriate services at the appropriate times. For example, it contacts CreditService to check the customer's credit card, and if the credit card is acceptable, it contacts the suppliers (Select Manufacturer and Rapid Distributors) to get price quotes for the order.

The SOAOrderBooking project is a large project. This chapter begins by giving an overview of the major blocks in the project, then it goes into detail for each block.

### 8.1.1 Blocks in the SOAOrderBooking Project

Table 8–1 lists the major blocks in the SOAOrderBooking project:

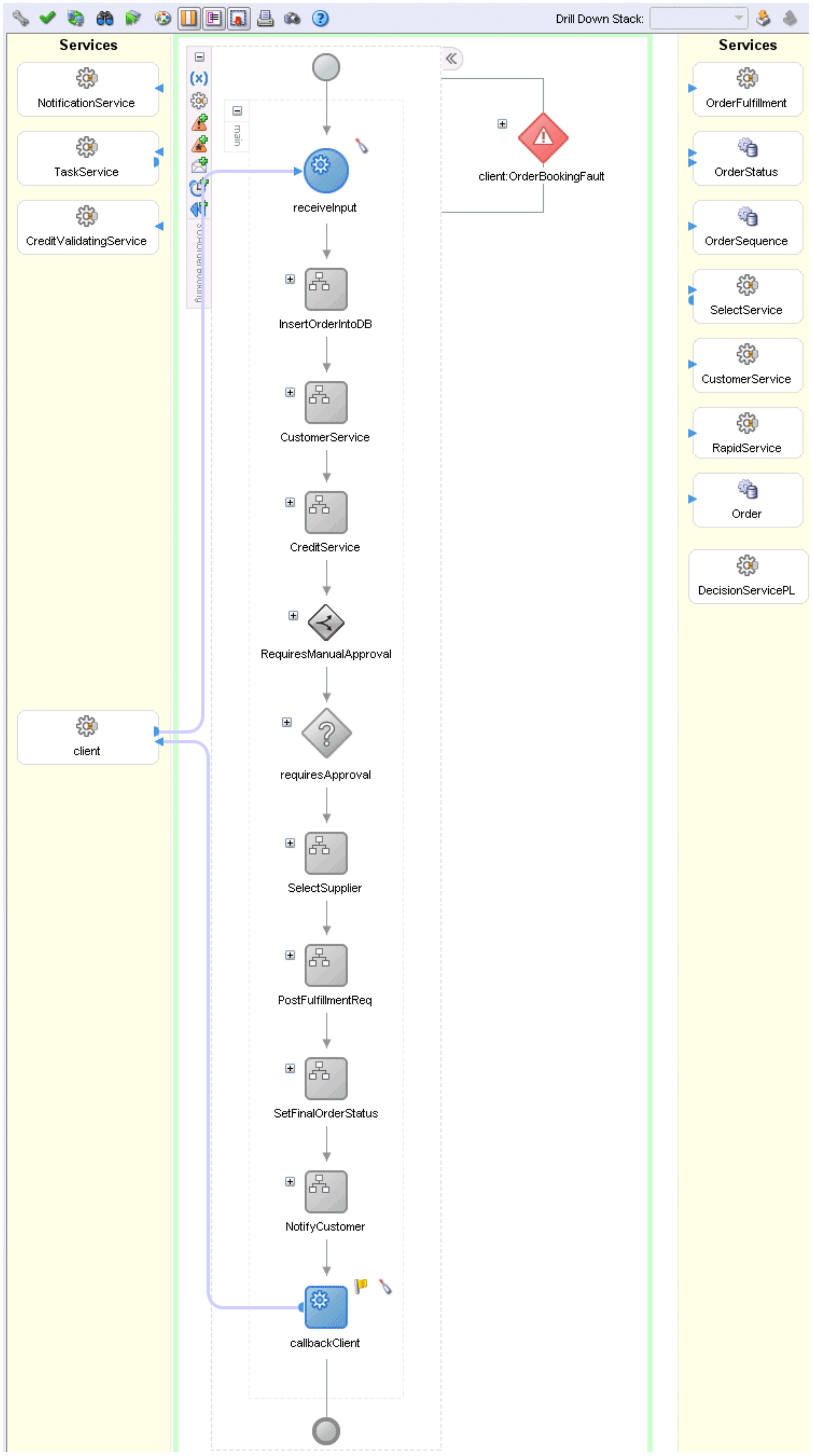
***Table 8–1 Major Blocks in the SOAOrderBooking Project***

| Block | Type | Description |
|---|---|---|
| receiveInput | Receive activity | This activity receives incoming requests, which include the order information. |
| InsertOrderIntoDB | Scope | This scope inserts the order information into the database. |
| CustomerService | Scope | This scope retrieves the customer's information from the database. |
| CreditService | Scope | This scope verifies that the customer has acceptable credit. |
| RequiresManualApproval | Decision | This scope is a decide activity: it consults the rules set up in a rules repository to determine whether or not an order needs to be approved by a manager. The manager can approve or reject the order. |
| requiresApproval | Switch | This switch checks whether the manager approved or rejected the order, and performs the appropriate activities.<br>For approved orders, it just continues with the rest of the activities in this SOAOrderBooking project.<br>For rejected orders, it throws a fault and does not continue. |
| SelectSupplier | Scope | This scope selects which supplier (Select Manufacturer or Rapid Distributors) gets to fulfill the order. |
| PostFulfillmentReq | Scope | This scope calls the FulfillmentESB project, which determines the shipping method for the order. |
| SetFinalOrderStatus | Scope | This scope writes the final order status in the database. |
| NotifyCustomer | Scope | This scope is an email service. It sends out email to the customers informing them that their orders have been processed successfully. |
| callbackClient | Invoke activity | This invoke activity notifies the client that it is done. |

### 8.1.2 Blocks Shown in Minimized View

Figure 8–1 shows the SOAOrderBooking.bpel page in JDeveloper with the blocks minimized. Later sections in this chapter expand the blocks to show their contents and describe how to create the blocks.

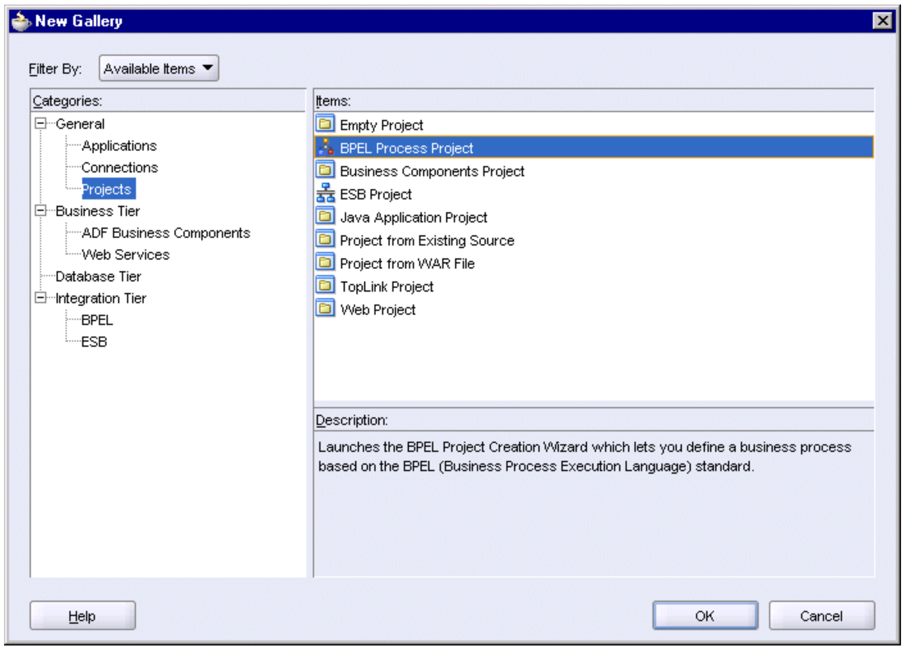
***Figure 8–1 Minimized View of the Blocks in SOAOrderBooking Project***



## 8.2 Create a New BPEL Project for SOAOrderBooking

1. Right-click the SOADEMO application in the Application Navigator and select **New Project** to display the New Gallery.
2. In the New Gallery, under Categories, expand **General** and select **Projects**. Under Items, select **BPEL Process Project**.

***Figure 8–2 New Gallery for SOAOrderBooking Project***

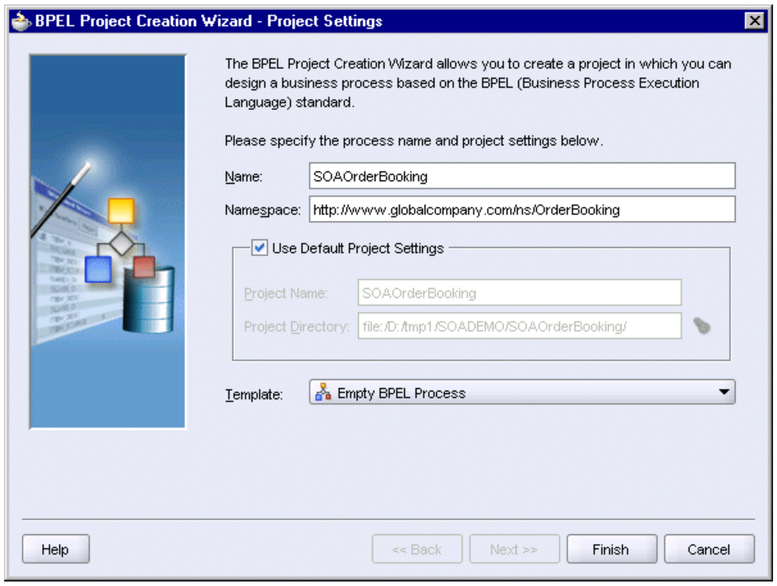


Launches the BPEL Project Creation Wizard which lets you define a business process based on the BPEL (Business Process Execution Language) standard.

Click **OK**. This displays the BPEL Project Creation wizard.

3. On the Project Settings page of the BPEL Project Creation wizard:
   - **Name**: enter **SOAOrderBooking**.
   - **Namespace**: enter **http://www.globalcompany.com/ns/OrderBooking**.
   - **Use Default Project Settings**: select this option.
   - **Template**: select **Empty BPEL Process**.

*Figure 8–3 BPEL Project Creation Wizard: Project Settings Page*


BPEL Project Creation Wizard - Project Settings

The BPEL Project Creation Wizard allows you to create a project in which you can design a business process based on the BPEL (Business Process Execution Language) standard.

Please specify the process name and project settings below.

Name: SOAOrderBooking

Namespace: http://www.globalcompany.com/ns/OrderBooking

[✓] Use Default Project Settings

Project Name: SOAOrderBooking

Project Directory: file:/D:/tmp1/SOADEMO/SOAOrderBooking/

Template: Empty BPEL Process

Click **Finish**.

## 8.3 Copy Files

Copy the following files from the `soademo_101310_prod.zip` file to the `SOAOrderBooking\bpel` directory:

- `SOAOrderBooking.wsdl`
- `OrderBookingPO.xsd`
- `OrderBookingRules.xsd`

In the `soademo_101310_prod.zip` file, these files are located in the `SOAOrderBooking\bpel` directory.

## 8.4 Define Variables for the SOAOrderBooking Project

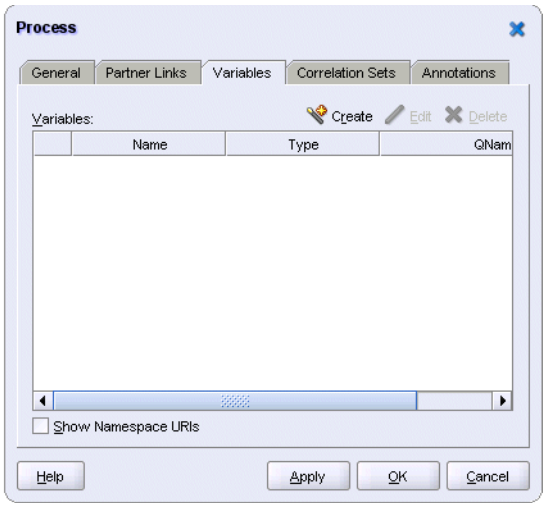
In this step, you create two variables called `inputVariable` and `outputVariable` for the SOAOrderBooking project. Variables defined at the project level can be accessed by all activities in the project.

1. Double-click the SOAOrderBooking scope. You can double-click the "SOAOrderBooking" text that is displayed sideways.

   This displays the Process dialog.

2. In the Process dialog, click the Variables tab.

***Figure 8–4 Process Dialog for SOAOrderBooking***



3. Create a variable called **inputVariable**.

   a. Click **Create** to display the Create Variable dialog.

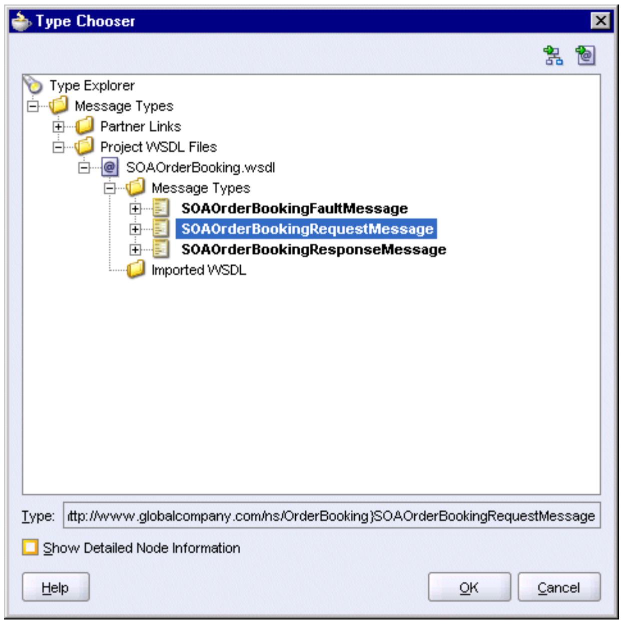
   b. In the Create Variable dialog, set these values:

      – **Name**: enter **inputVariable**.

      – **Type**: select **Message Type**, and click the flashlight icon. This displays the Type Chooser dialog.

      In the Type Chooser, select **Type Explorer** > **Message Types** > **Project WSDL Files** > **SOAOrderBooking.wsdl** > **Message Types** > **SOAOrder-BookingRequestMessage**.

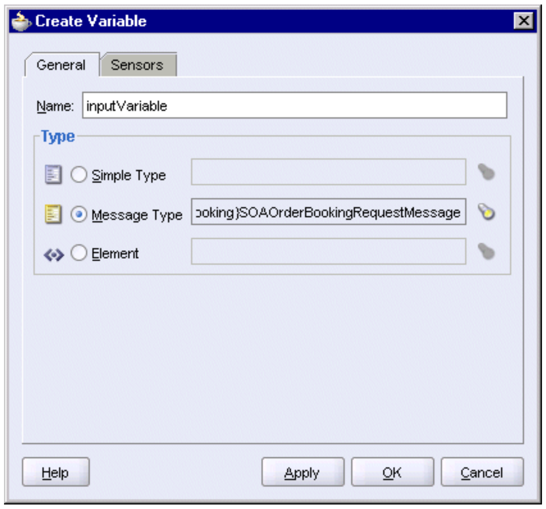
***Figure 8–5 Type Chooser for inputVariable***



Type: ttp://www.globalcompany.com/ns/OrderBooking}SOAOrderBookingRequestMessage

Click **OK** in the Type Chooser. The Create Variable dialog now looks like this:

***Figure 8–6 Create Variable Dialog for inputVariable***



Name: inputVariable

Simple Type

Message Type: ɔoking}SOAOrderBookingRequestMessage

Element

c. Click **OK** in the Create Variable dialog. This returns you to the Process dialog. You should see the **inputVariable** in the dialog.

4. Create a second variable called **outputVariable**.

   a. Click **Create** in the Process dialog to display the Create Variable dialog.

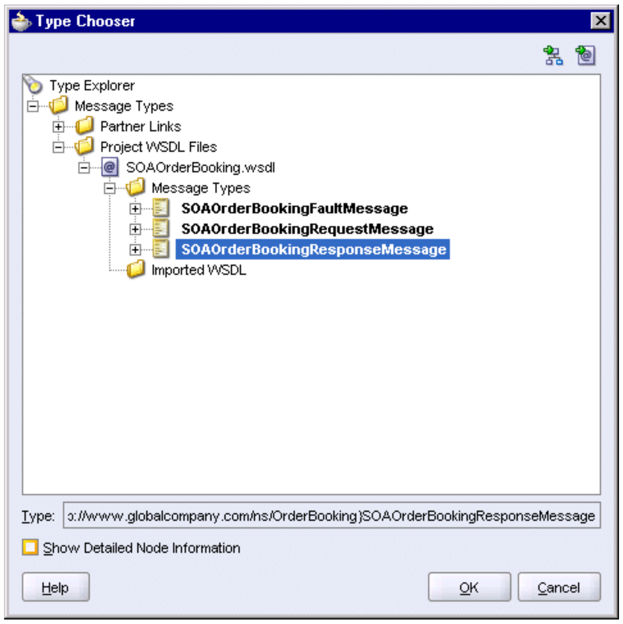
   b. In the Create Variable dialog, set these values:

      – **Name**: enter **outputVariable**.

      – **Type**: select **Message Type**, and click the flashlight icon. This displays the Type Chooser dialog.

      In the Type Chooser, select **Type Explorer** > **Message Types** > **Project WSDL Files** > **SOAOrderBooking.wsdl** > **Message Types** > **SOAOrder-BookingResponseMessage**.

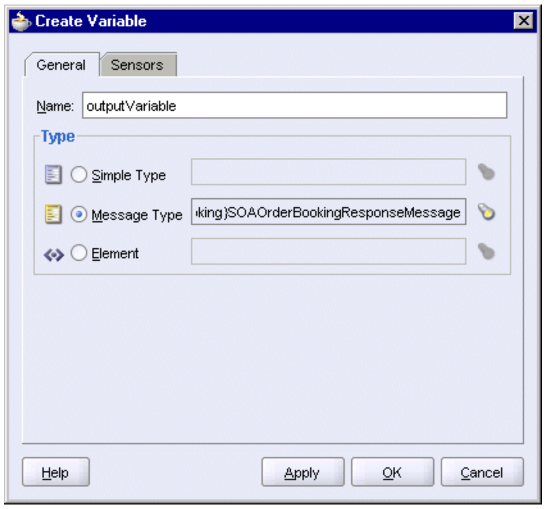
***Figure 8–7 Type Chooser for outputVariable***



Type: ɔ://www.globalcompany.com/ns/OrderBooking}SOAOrderBookingResponseMessage

Click **OK** in the Type Chooser. The Create Variable dialog now looks like this:

***Figure 8–8 Create Variable Dialog for outputVariable***



Create Variable

General | Sensors

Name: outputVariable

Type

( ) Simple Type

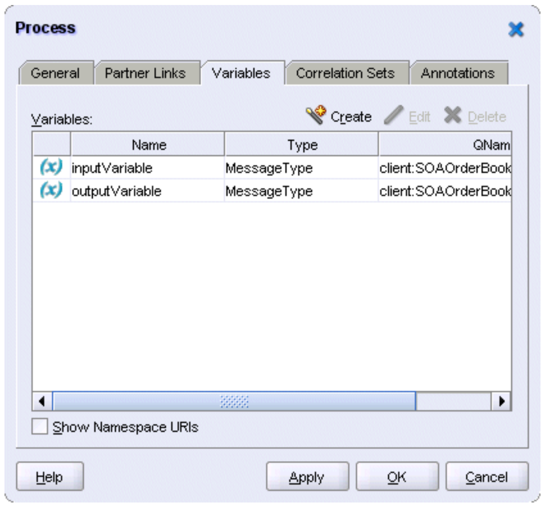
(●) Message Type: {king}SOAOrderBookingResponseMessage

( ) Element

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

5. In the Process dialog, you should see the two variables:

***Figure 8–9 Process Dialog Showing inputVariable and outputVariable***



Process

General | Partner Links | Variables | Correlation Sets | Annotations

Variables:

| | Name | Type | QNam |
|---|---|---|---|
| (x) | inputVariable | MessageType | client:SOAOrderBook |
| (x) | outputVariable | MessageType | client:SOAOrderBook |

[ ] Show Namespace URIs

6. Click **OK** in the Process dialog.

7. Select File > Save to save your work.

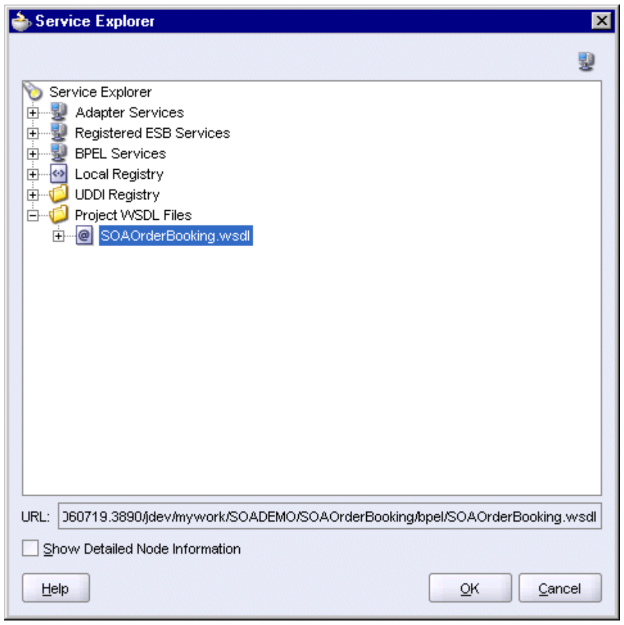
## 8.5 Create "client" Partner Link

This client partner link represents the client, which passes data to the receiveInput activity and gets invoked at the end of the flow to receive the return value.

1. If the Component Palette is not showing, select View > Component Palette. Select **Services** from the dropdown in the Component Palette.

2. Drag the Partner Link icon from the Component Palette and drop it into a Services swimlane. This displays the Create Partner Link dialog.
3. In the Create Partner Link dialog, set these values:
   - **Name**: enter **client**.
   - **WSDL File**: click the Service Explorer icon (second icon from the left) to display the Service Explorer dialog. In the Service Explorer dialog, expand **Project WSDL Files** and select **SOAOrderBooking.wsdl**.

***Figure 8–10 Service Explorer for client Partner Link***

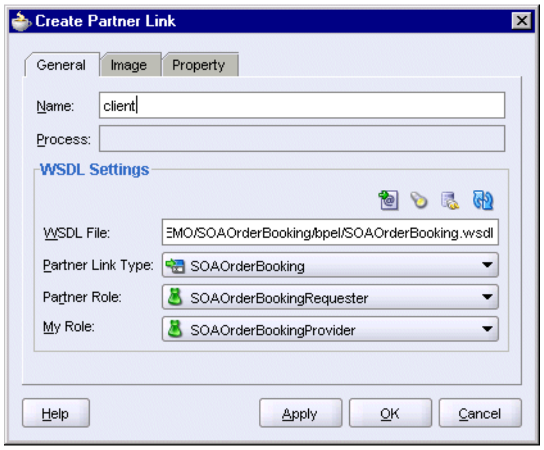


URL: ]60719.3890/jdev/mywork/SOADEMO/SOAOrderBooking/bpel/SOAOrderBooking.wsdl

   Click **OK** in the Service Explorer.
   - **Partner Link Type**: select **SOAOrderBooking** (automatically filled in for you).
   - **Partner Role**: select **SOAOrderBookingRequester**.
   - **My Role**: select **SOAOrderBookingProvider**.
   - **Process**: leave it blank.

   Before clicking **OK**, check that **Name** is still set to **client**. JDeveloper may have changed it to SOAOrderBooking when it was filling in the other fields for you.

***Figure 8–11 Create Partner Link Dialog for client***



Create Partner Link

General | Image | Property

Name: client

Process:

WSDL Settings

WSDL File: EMO/SOAOrderBooking/bpel/SOAOrderBooking.wsdl

Partner Link Type: SOAOrderBooking

Partner Role: SOAOrderBookingRequester

My Role: SOAOrderBookingProvider

4. Click **OK** in the Create Partner Link dialog.
5. Select File > Save to save your work.

## 8.6 Receive Input from the Client (Receive Activity)

Create a receive activity to receive the input data from the client. In the receive activity, you also define a sensor to send data to a JMS topic.

- Section 8.6.1, "Create the Receive Activity"
- Section 8.6.2, "Create a Sensor for the Receive Activity"

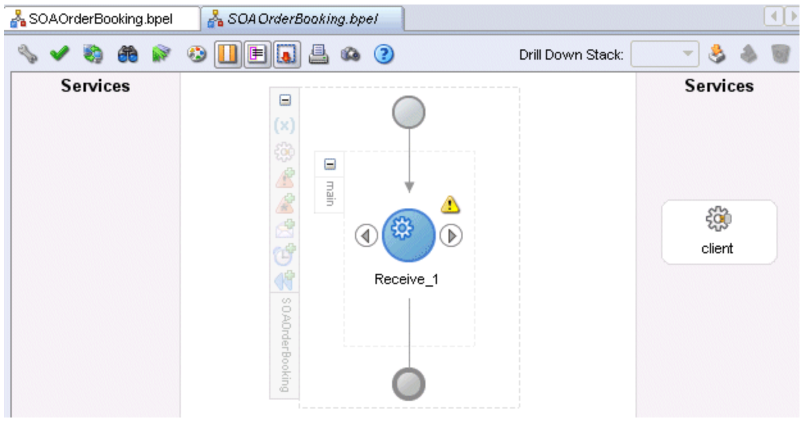
### 8.6.1 Create the Receive Activity

Create the receive activity:

1. Select **Process Activities** from the dropdown in the Component Palette.
2. Drag the Receive icon from the Component Palette and drop it on the page where it says "Drop Activity Here".

   The page should look like this at this point:

***Figure 8–12 SOAOrderBooking Page with Receive Activity***

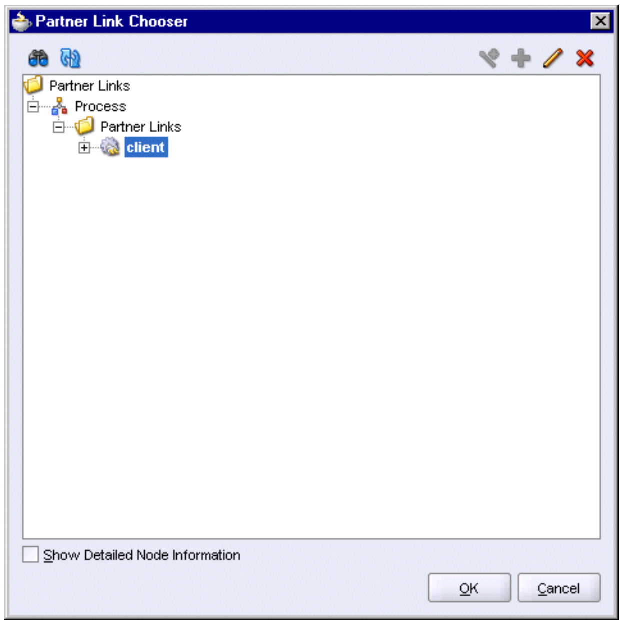


3. Do one of the following to display the Receive dialog:

- Drag one of the arrows on the side of the Receive_1 activity and drop it on the "client" partner link. This associates the receive activity with the partner link.
- Double-click the new Receive_1 activity.

4. In the Receive dialog, enter these values:
   - **Name**: enter **receiveInput**.
   - **Partner Link**: should be set to **client**. This is filled in for you if you dragged the arrow from the Receive_1 activity and dropped it on the "client" partner link. If not, click the flashlight to display the Partner Link Chooser dialog and select **client**.

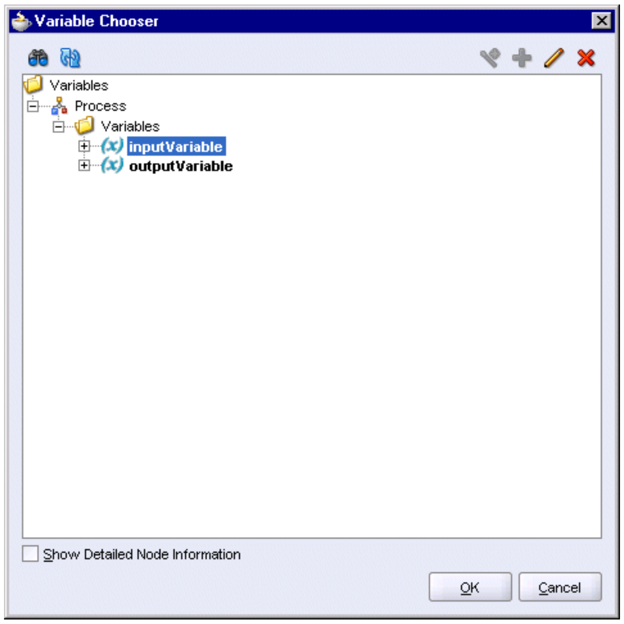
***Figure 8–13 Partner Link Chooser Dialog for "receiveInput" Receive Activity***



Click **OK** in the Partner Link Chooser dialog.

   - **Operation**: select **initiate**. This should be filled in automatically for you.
   - **Variable**: click the Browse Variables icon (the icon on the right). In the Variable Chooser dialog, select **inputVariable**.

*Figure 8–14 Variable Chooser Dialog for "receiveInput" Receive Activity*

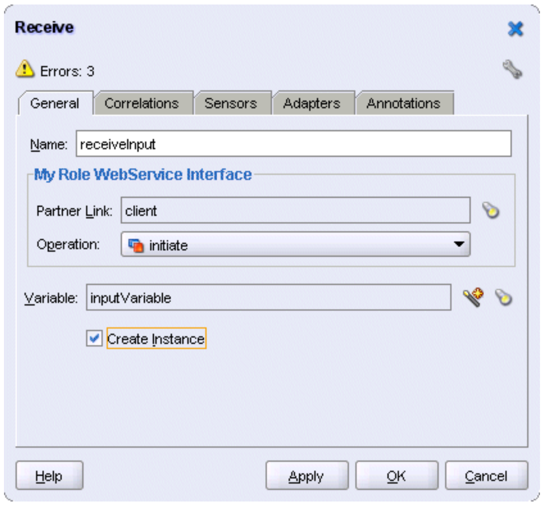


Click **OK** in the Variable Chooser.

- **Create Instance**: select this option.

The Receive dialog now looks like this:

*Figure 8–15 Receive Dialog for "receiveInput" Receive Activity*



Name: receiveInput
Partner Link: client
Operation: initiate
Variable: inputVariable
☑ Create Instance

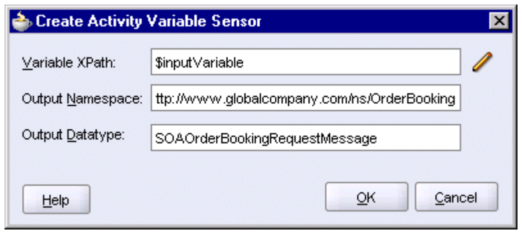
5. Click **OK** in the Receive dialog.
6. Select File > Save to save your work.

## 8.6.2 Create a Sensor for the Receive Activity

In this receive activity create an activity sensor for the receive activity. After this activity runs, this sensor writes the order information to a JMS topic. There is no consumer for this JMS topic; the purpose of this sensor is to show how to send order information to another destination.

1. Double-click the "receiveInput" activity to display the Receive dialog.
2. Click the **Sensors** tab in the Receive dialog.
3. Click **Create** to create a new sensor. This displays the Create Activity Sensor dialog.
4. In the Create Activity Sensor dialog, set the **Name** to **InstanceStart**.
5. Set the **Evaluation Time** to **Completion**. This specifies when the sensor fires. Completion signifies that the sensor fires after this activity has run.
6. In the Activity Variable Sensors section, click **Create** to display the Create Activity Variable Sensor dialog.

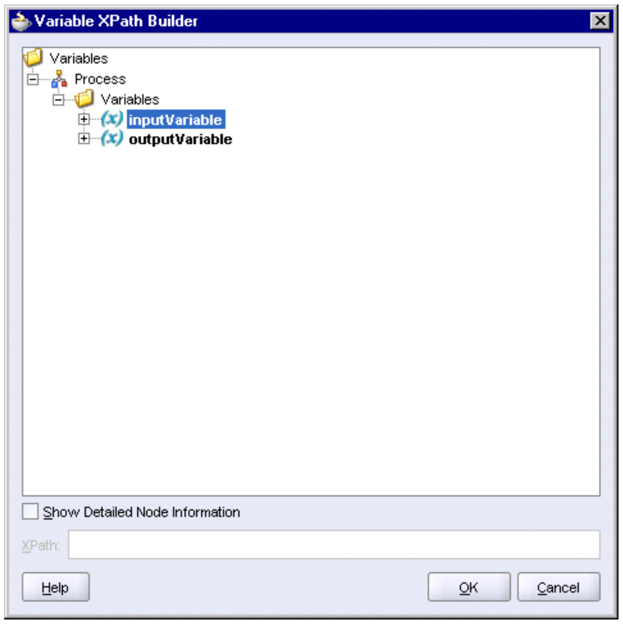
***Figure 8–16 Create Activity Variable Sensor Dialog***



Variable XPath: $inputVariable
Output Namespace: ttp://www.globalcompany.com/ns/OrderBooking
Output Datatype: SOAOrderBookingRequestMessage

7. In the Create Activity Variable Sensor dialog, click the pencil icon for **Variable XPath**. This displays the Variable XPath Builder dialog.

***Figure 8–17 Variable XPath Builder Dialog***



8. Select **Variables** > **Process** > **Variables** > **inputVariable**.
9. Click **OK** in the Variable XPath Builder. The Create Activity Variable Sensor dialog should be filled in with these values for you (see Figure 8–16):

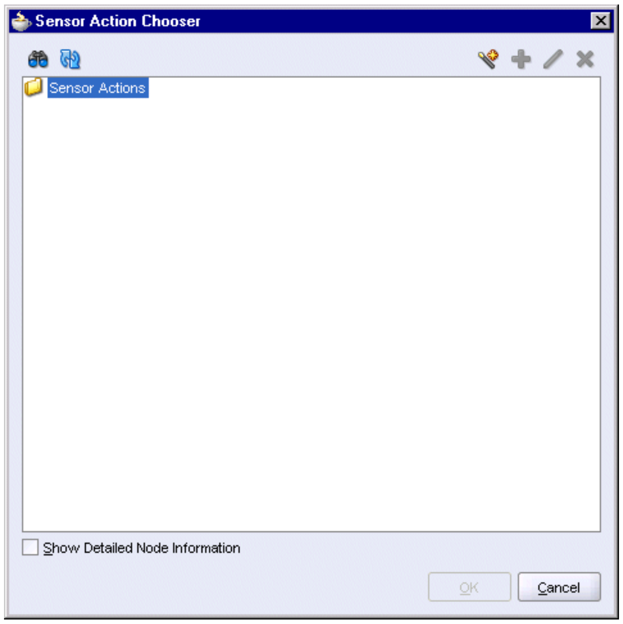
   **Variable XPath**: **$inputVariable**

   **Output Namespace**: **http://www.globalcompany.com/ns/OrderBooking**

**Output Datatype**: **SOAOrderBookingRequestMessage**

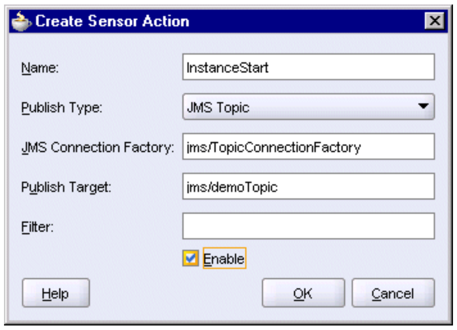
10. Click **OK** in the Create Activity Variable Sensor dialog. This takes you back to the Create Activity Sensor dialog (Figure 8–21).
11. In the Create Activity Sensor dialog, click the **Add** icon in the Sensor Actions section. This displays the Sensor Action Chooser dialog.

***Figure 8–18 Sensor Action Chooser Dialog***



12. In the Sensor Action Chooser dialog, select **Sensor Actions** and select **Sensor Action** from the wand icon. This displays the Create Sensor Action dialog.
13. In the Create Sensor Action dialog:
   - **Name**: enter **InstanceStart**.
   - **Publish Type**: select **JMS Topic**.
   - **JMS Connection Factory**: enter **jms/TopicConnectionFactory**.
   - **Publish Target**: enter **jms/demoTopic**.
   - **Filter**: leave blank.
   - **Enable**: select this option.

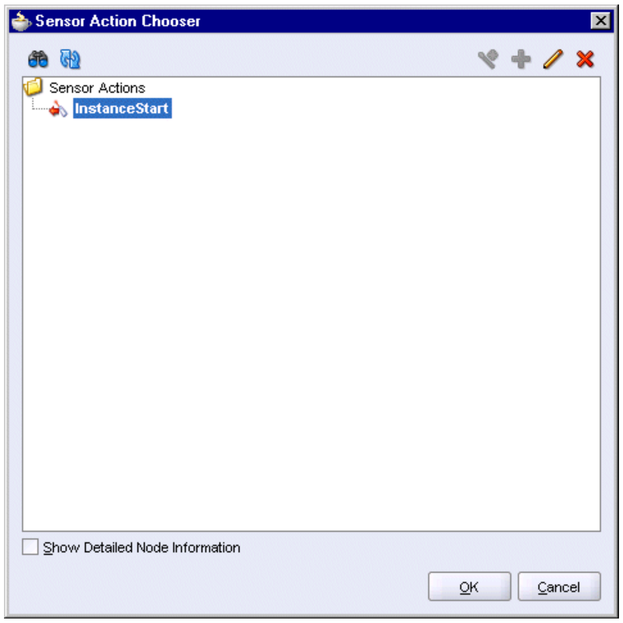
***Figure 8–19 Create Sensor Action Dialog***


Create Sensor Action

Name: InstanceStart
Publish Type: JMS Topic
JMS Connection Factory: jms/TopicConnectionFactory
Publish Target: jms/demoTopic
Filter:
[✓ Enable]

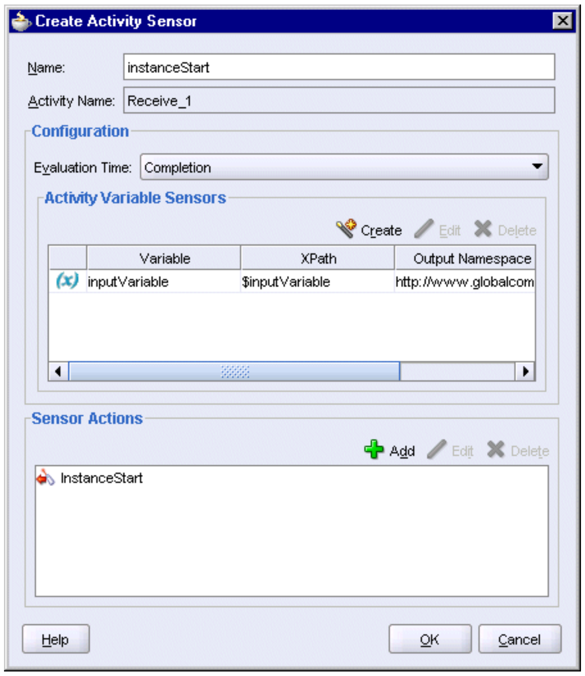
14. Click **OK** in the Create Sensor Action dialog. The Sensor Action Chooser dialog now shows the **InstanceStart** sensor action.

***Figure 8–20 Sensor Action Chooser Dialog***



15. Click **OK** in the Sensor Action Chooser. This takes you back to the Create Activity Sensor dialog, which now looks like this:

***Figure 8–21 Create Activity Sensor Dialog***



Name: instanceStart
Activity Name: Receive_1
Evaluation Time: Completion

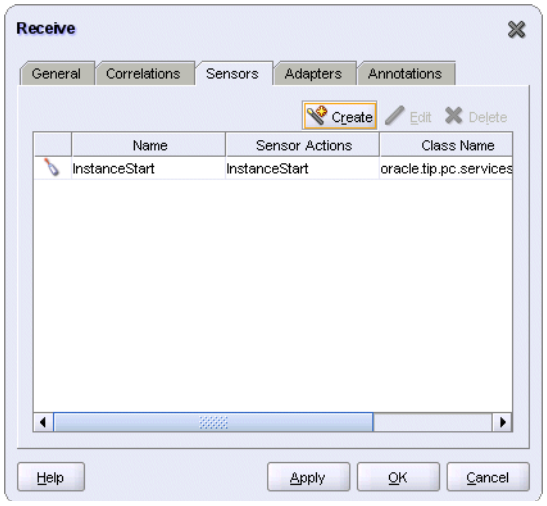
| Variable | XPath | Output Namespace |
|---|---|---|
| inputVariable | $inputVariable | http://www.globalcom |

InstanceStart

16. Click **OK** in the Create Activity Sensor dialog.

    In the Receive dialog, the Sensors tab now looks like this:

***Figure 8–22 Receive Dialog, Sensors Tab***



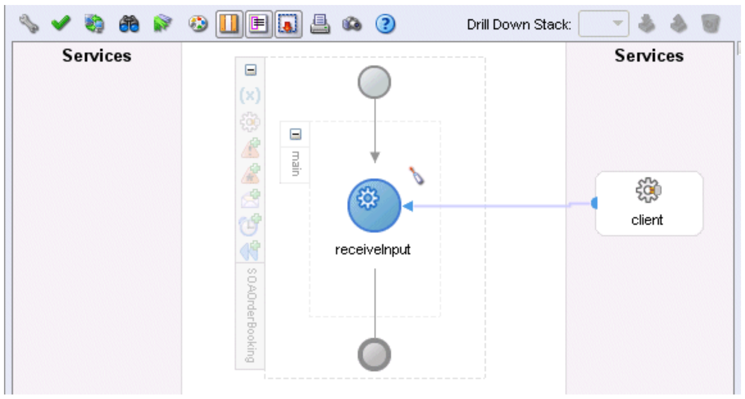
| Name | Sensor Actions | Class Name |
|---|---|---|
| InstanceStart | InstanceStart | oracle.tip.pc.services |

**17.** Click **OK** in the Receive dialog.

**18.** Select File > Save to save your work.

The SOAOrderBooking page now looks like this:

***Figure 8–23 SOAOrderBooking.bpel Page with Receive Activity***



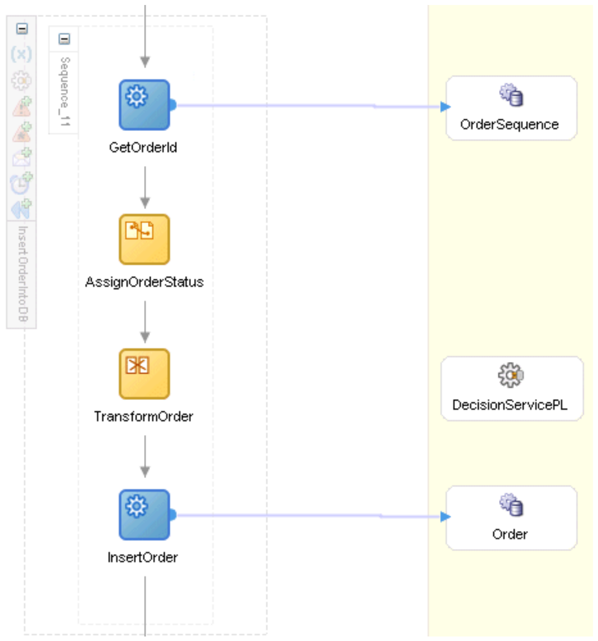
The sensor information is stored in these files in the `SOAOrderBooking\bpel` directory:

- `sensor.xml`
- `sensorAction.xml`

## 8.7 Insert Order Information in the Database ("InsertOrderIntoDB" Scope)

In this scope, you create activities to insert the order information into the database. Figure 8–24 shows the activities that you will create for the "InsertOrderIntoDB" scope.

*Figure 8–24 Activities in the "InsertOrderIntoDB" Scope*



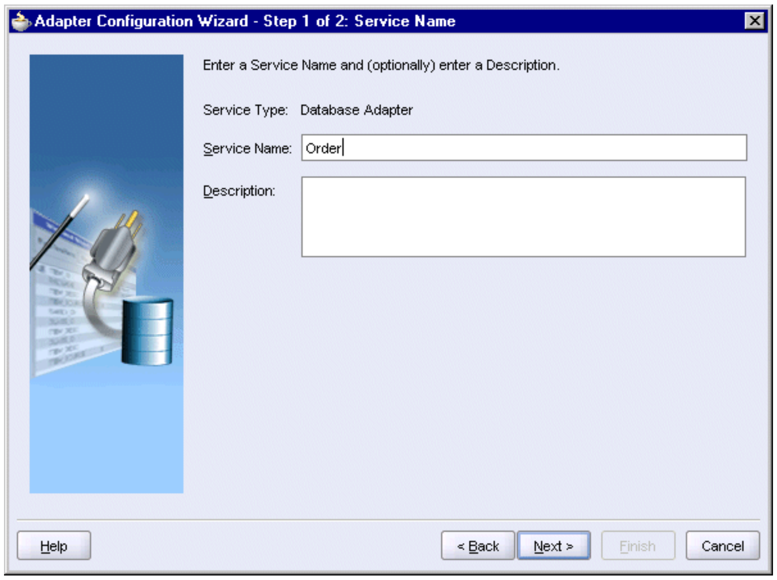
## 8.7.1 Create a Database Adapter for Writing to the ORDERS Table

Activities in the "InsertOrderIntoDB" scope use a database adapter for writing order information to the ORDERS table in the database. During runtime, the database adapter connects to the database through the `eis/DB/soademo` connection that you set up in Section 2.6.4, "Create a Database Adapter Connection Factory".

To create the database adapter:

1. In the Component Palette, select **Services** from the dropdown.
2. Drag the Database Adapter icon from the Component Palette and drop it in a Services swimlane. This launches the Adapter Configuration wizard. Click **Next** on the welcome page to continue.
3. In Step 1, Service Name, enter **Order** as the **Service Name**, and click **Next**.

***Figure 8–25 Adapter Configuration Wizard, Step 1, Service Name***


Adapter Configuration Wizard - Step 1 of 2: Service Name

Enter a Service Name and (optionally) enter a Description.

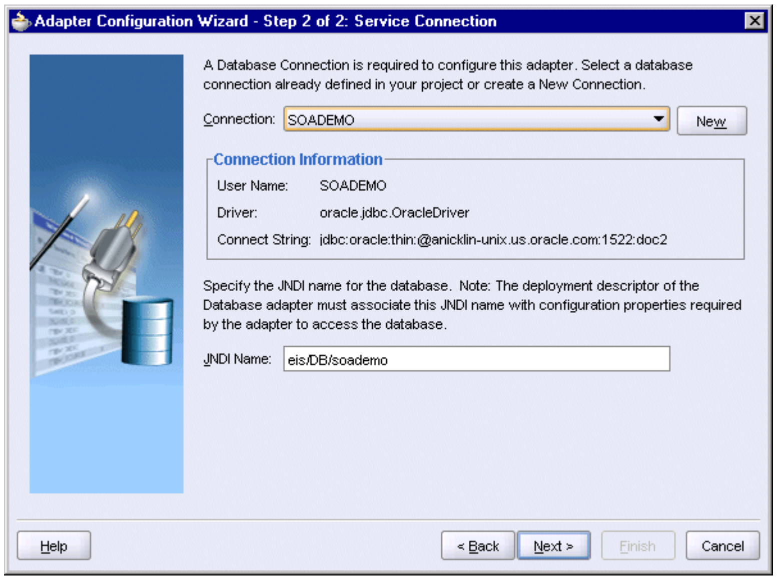
Service Type: Database Adapter

Service Name: Order

Description:

4. In Step 2, Service Connection:
   - **Connection**: select the database connection for the SOADEMO schema.
   - **JNDI Name**: enter **eis/DB/soademo**. This is the JNDI location you specified when you created connection factory in Oracle Application Server (see Section 2.6.4, "Create a Database Adapter Connection Factory").

***Figure 8–26 Adapter Configuration Wizard, Step 2, Service Connection***


Adapter Configuration Wizard - Step 2 of 2: Service Connection

A Database Connection is required to configure this adapter. Select a database connection already defined in your project or create a New Connection.

Connection: SOADEMO

Connection Information

User Name: SOADEMO

Driver: oracle.jdbc.OracleDriver

Connect String: jdbc:oracle:thin:@anicklin-unix.us.oracle.com:1522:doc2

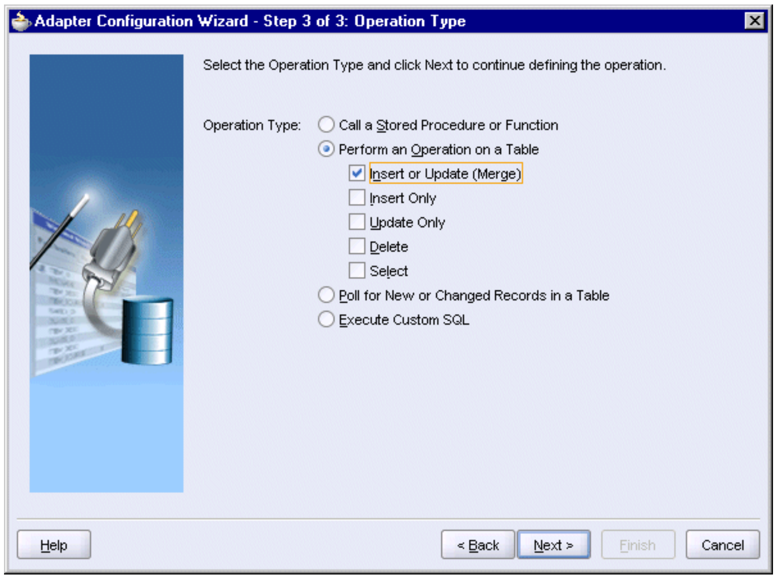
Specify the JNDI name for the database. Note: The deployment descriptor of the Database adapter must associate this JNDI name with configuration properties required by the adapter to access the database.

JNDI Name: eis/DB/soademo

Click **Next**.

5. In Step 3, Operation Type, select **Perform an Operation on a Table**, and select **Insert or Update (Merge)**. The SOA Order Booking application only needs to insert rows in the table.

*Figure 8–27 Adapter Configuration Wizard, Step 3, Operation Type*



Select the Operation Type and click Next to continue defining the operation.

Operation Type:
- ( ) Call a Stored Procedure or Function
- (●) Perform an Operation on a Table
  - [✓] Insert or Update (Merge)
  - [ ] Insert Only
  - [ ] Update Only
  - [ ] Delete
  - [ ] Select
- ( ) Poll for New or Changed Records in a Table
- ( ) Execute Custom SQL

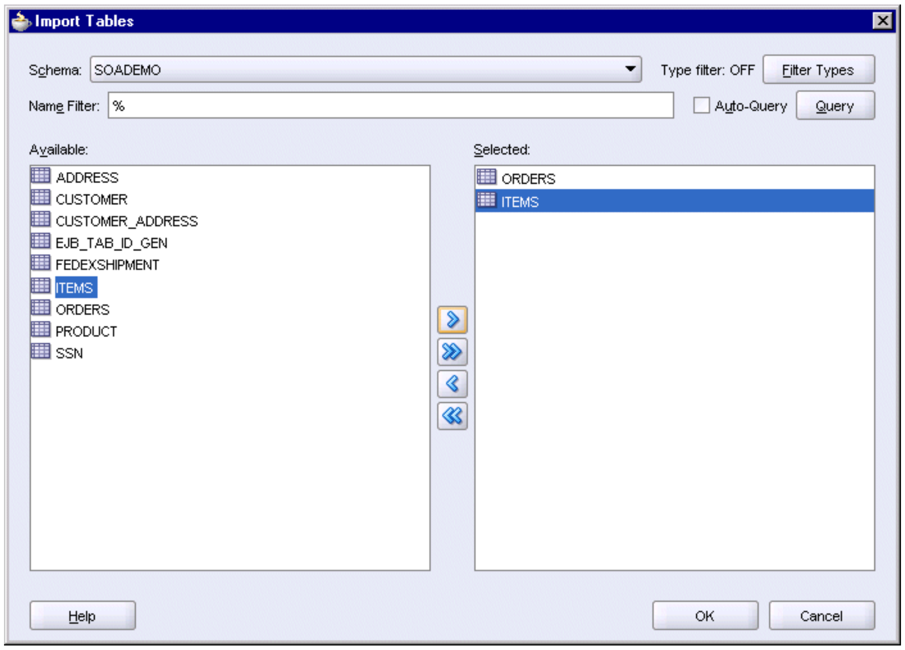
Click **Next**.

6. In Step 4, Select Table, click **Import Tables**.

   In the Import Tables dialog, click **Query**.

   Select **ORDERS** and **ITEMS** and click the right-arrow button to move them to the Selected box. The database adapter will write to these tables.

*Figure 8–28 Import Tables Dialog for FedexShipment*



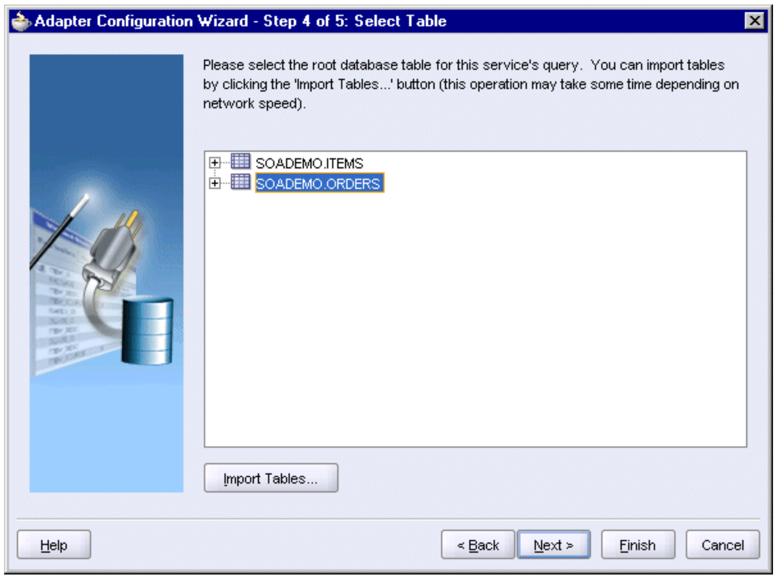
Schema: SOADEMO
Type filter: OFF
Name Filter: %
[ ] Auto-Query

Available:
ADDRESS
CUSTOMER
CUSTOMER_ADDRESS
EJB_TAB_ID_GEN
FEDEXSHIPMENT
ITEMS
ORDERS
PRODUCT
SSN

Selected:
ORDERS
ITEMS

Click **OK** in the Import Tables dialog. Step 4, Select Table, now looks like this:

*Figure 8–29 Adapter Configuration Wizard, Step 4, Select Table*

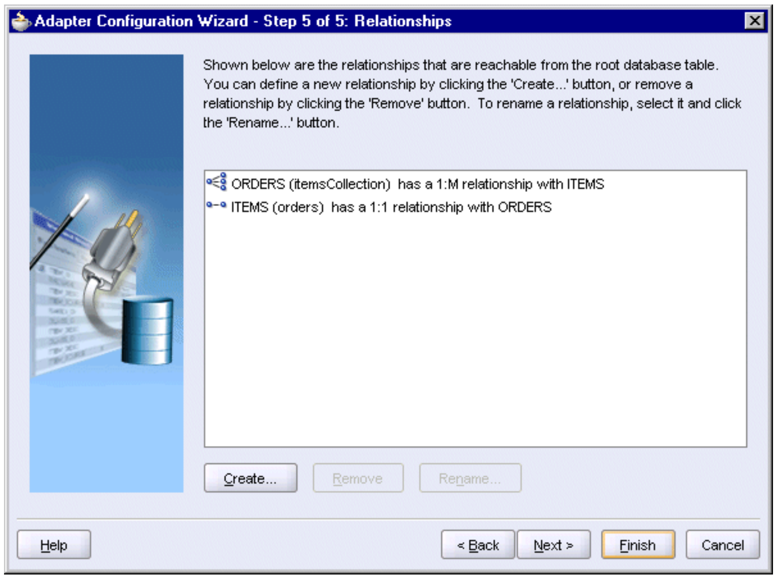


Please select the root database table for this service's query. You can import tables by clicking the 'Import Tables...' button (this operation may take some time depending on network speed).

SOADEMO.ITEMS
SOADEMO.ORDERS

7. Select **SOADEMO.ORDERS** and click **Next**.
8. In Step 5, Relationships, click **Next**.

*Figure 8–30 Adapter Configuration Wizard, Step 5, Relationships*

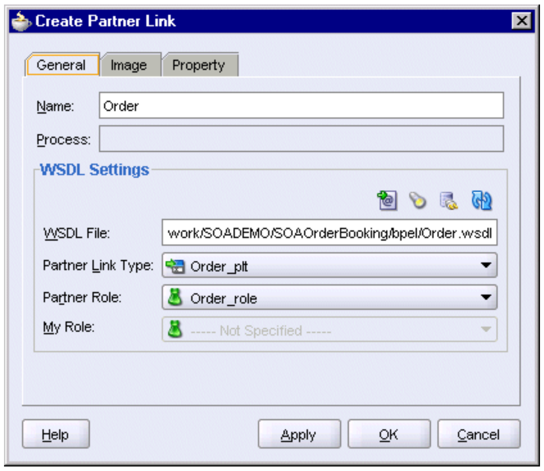


Shown below are the relationships that are reachable from the root database table. You can define a new relationship by clicking the 'Create...' button, or remove a relationship by clicking the 'Remove' button. To rename a relationship, select it and click the 'Rename...' button.

ORDERS (itemsCollection) has a 1:M relationship with ITEMS
ITEMS (orders) has a 1:1 relationship with ORDERS

9. On the Finish page, click **Finish**.
10. JDeveloper displays the Create Partner Link dialog with the fields filled in:

***Figure 8–31 Create Partner Link Dialog for Order Database Adapter***



Name: Order
Process:
WSDL File: work/SOADEMO/SOAOrderBooking/bpel/Order.wsdl
Partner Link Type: Order_plt
Partner Role: Order_role
My Role: ----- Not Specified -----

Click **OK** in the Create Partner Link dialog. You should see the "Orders" database adapter in the Services swimlane.

11. Select File > Save to save your work.

The wizard creates the following files in the `SOAOrderBooking` directory:

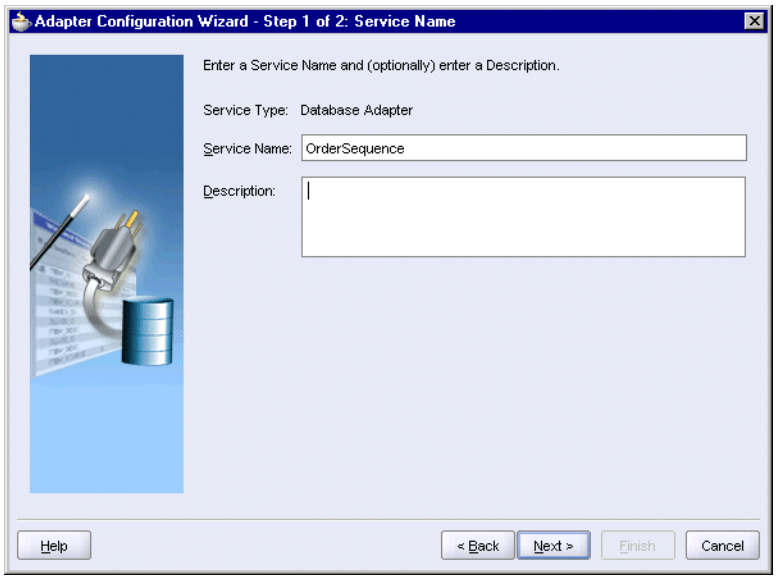
- `bpel\DBAdapterOutboundHeader.wsdl` -- this file contains generic information for connecting to a database.
- `bpel\Order.wsdl` -- this file contains the information that you specified in the wizard.
- `bpel\Order_table.xsd` -- this file contains the schema information for the ORDERS and ITEMS tables.
- `bpel\Order_toplink_mappings.xml` -- this file is used by TopLink
- `src\Order\Orders.java`
- `src\Order\Items.java`
- `database\SOADEMO\ORDERS.table`
- `database\SOADEMO\ITEMS.table`
- `toplink\Order\Order.mwp`

### 8.7.2 Create a Database Adapter for Retrieving the Order ID from the Database

Before you can insert order information in the ORDERS table in the database, you need to retrieve the order ID from the database. The order ID is generated from a database sequence.

1. In the Component Palette, select **Services** from the dropdown.
2. Drag the Database Adapter icon from the Component Palette and drop it in a Services swimlane. This launches the Adapter Configuration Wizard. Click **Next** on the welcome page to continue.
3. In Step 1, Service Name, enter **OrderSequence** as the **Service Name**, and click **Next**.

***Figure 8–32 Adapter Configuration Wizard, Step 1, Service Name***


Adapter Configuration Wizard - Step 1 of 2: Service Name

Enter a Service Name and (optionally) enter a Description.

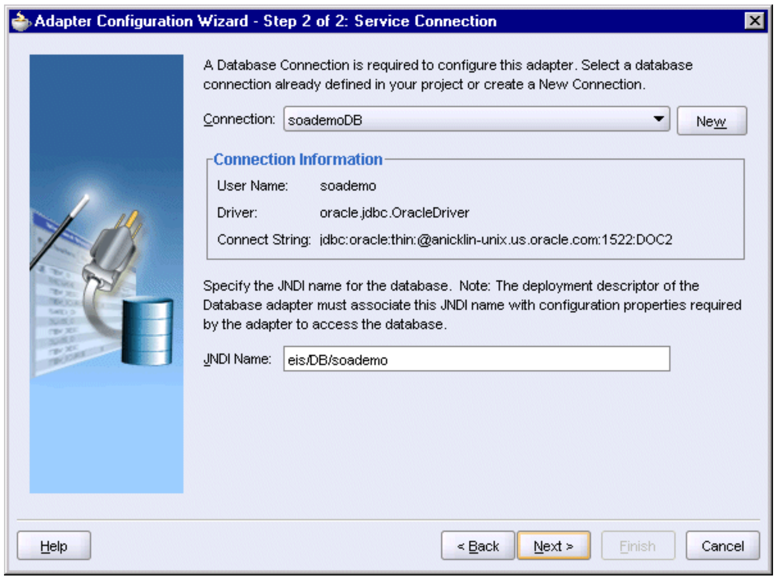
Service Type: Database Adapter

Service Name: OrderSequence

Description:

4. In Step 2, Service Connection:
   - **Connection**: select the database connection for the SOADEMO schema.
   - **JNDI Name**: enter **eis/DB/soademo**. This is the JNDI location you specified when you created connection factory in Oracle Application Server (see Section 2.6.4, "Create a Database Adapter Connection Factory").

***Figure 8–33 Adapter Configuration Wizard, Step 2, Service Connection***


Adapter Configuration Wizard - Step 2 of 2: Service Connection

A Database Connection is required to configure this adapter. Select a database connection already defined in your project or create a New Connection.

Connection: soademoDB

Connection Information

User Name: soademo

Driver: oracle.jdbc.OracleDriver

Connect String: jdbc:oracle:thin:@anicklin-unix.us.oracle.com:1522:DOC2

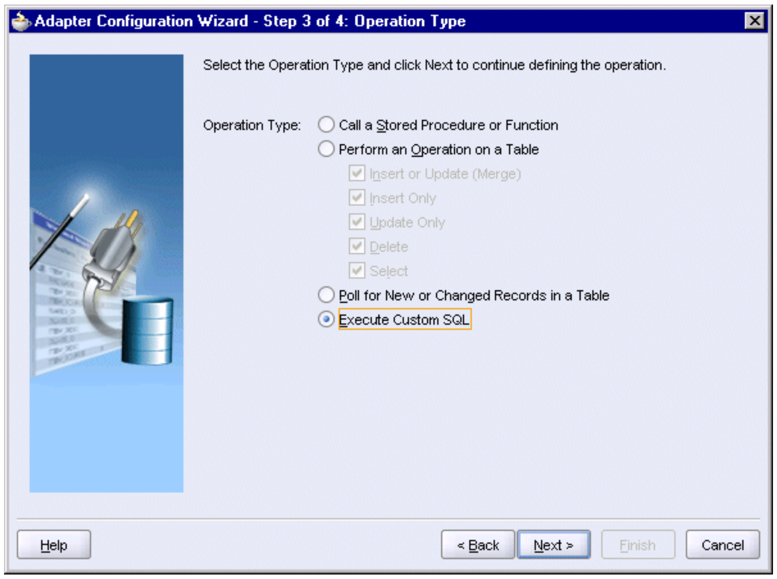
Specify the JNDI name for the database. Note: The deployment descriptor of the Database adapter must associate this JNDI name with configuration properties required by the adapter to access the database.

JNDI Name: eis/DB/soademo

Click **Next**.

5. In Step 3, Operation Type, select **Execute Custom SQL**.

***Figure 8–34 Adapter Configuration Wizard, Step 3, Operation Type***



Select the Operation Type and click Next to continue defining the operation.

Operation Type:
- ○ Call a Stored Procedure or Function
- ○ Perform an Operation on a Table
  - ✓ Insert or Update (Merge)
  - ✓ Insert Only
  - ✓ Update Only
  - ✓ Delete
  - ✓ Select
- ○ Poll for New or Changed Records in a Table
- ● Execute Custom SQL

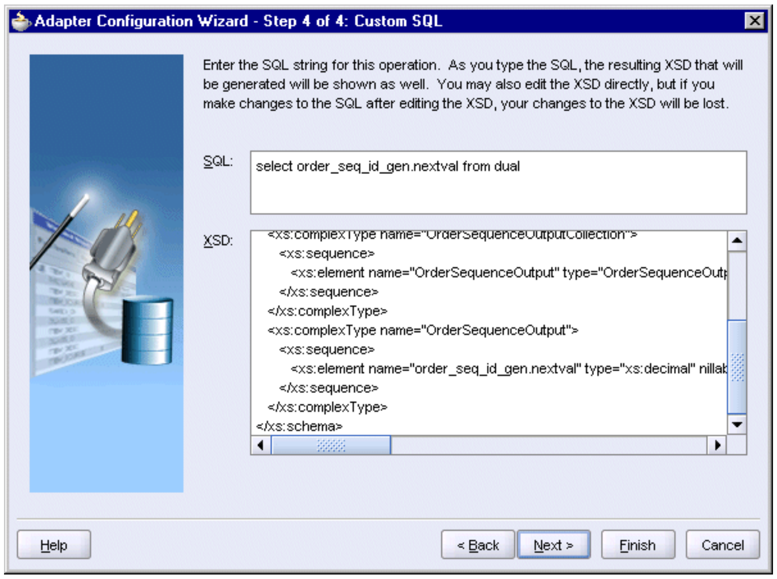
Click **Next**.

6. In Step 4, Custom SQL, enter the following SQL statement in the **SQL** box:

   **select order_seq_id_gen.nextval from dual**

   The wizard displays the appropriate statements in the **XSD** box.

***Figure 8–35 Adapter Configuration Wizard, Step 4, Custom SQL***



Enter the SQL string for this operation. As you type the SQL, the resulting XSD that will be generated will be shown as well. You may also edit the XSD directly, but if you make changes to the SQL after editing the XSD, your changes to the XSD will be lost.

SQL: select order_seq_id_gen.nextval from dual

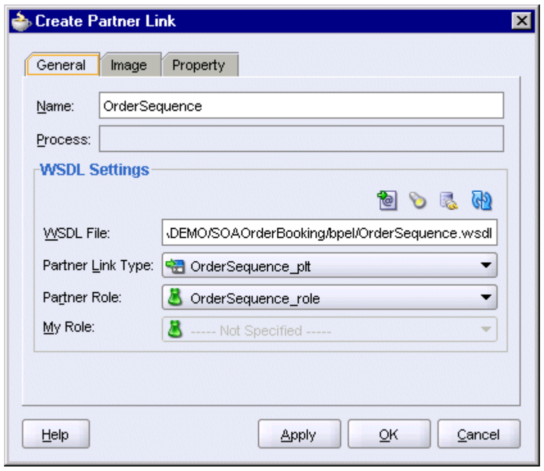
XSD:

```
  <xs:complexType name="OrderSequenceOutputCollection">
    <xs:sequence>
      <xs:element name="OrderSequenceOutput" type="OrderSequenceOutp
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="OrderSequenceOutput">
    <xs:sequence>
      <xs:element name="order_seq_id_gen.nextval" type="xs:decimal" nillab
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Click **Next**.

7. On the Finish page, click **Finish**.
8. JDeveloper displays the Create Partner Link dialog with the fields filled in:

*Figure 8–36 Create Partner Link Dialog for OrderSequence Database Adapter*



Name: OrderSequence
Process:
WSDL File: \DEMO/SOAOrderBooking/bpel/OrderSequence.wsdl
Partner Link Type: OrderSequence_plt
Partner Role: OrderSequence_role
My Role: ----- Not Specified -----

Click **OK** in the Create Partner Link dialog. You should see the OrderSequence database adapter in the Services swimlane.

9. Select File > Save to save your work.

The wizard creates the following files in the `SOAOrderBooking` directory:

- `bpel\OrderSequence.wsdl` -- this file contains the information that you specified in the wizard.
- `bpel\OrderSequence.xsd` -- this file defines the format of the sequence input and output.

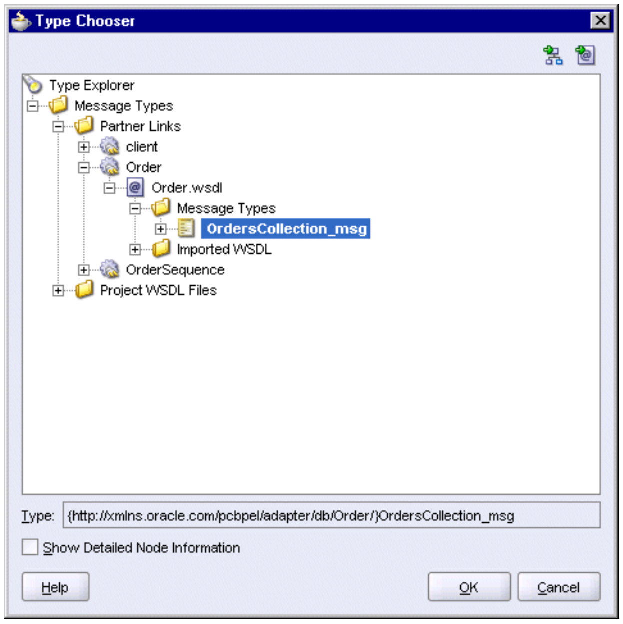
## 8.7.3 Create the "InsertOrderIntoDB" Scope

Create a new scope called "InsertOrderIntoDB" to contain the activities for writing order information in the database.

1. In the Component Palette, select **Process Activities** from the dropdown.
2. Drag the Scope icon from the Component Palette and drop it between the "receiveInput" activity and the "callbackClient" activity".
3. Double-click the new scope to display the Scope dialog.
4. In the Scope dialog, in the General tab:
   - **Name**: enter **InsertOrderIntoDB**.
   - **Variable Access Serializable**: do not select.
5. Click the Variables tab. You need to create three variables for this scope: `orderRequest`, `orderSequenceInput`, `orderSequenceOutput`.
6. Create the `orderRequest` variable:
   a. In the Variables tab, click **Create**.
   b. In the Create Variable dialog:
      – **Name**: enter **orderRequest**.
      – Select **Message Type** and click the flashlight icon to display the Type Chooser. In the Type Chooser, select **Type Explorer** > **Message Types** >

**Partner Links** > **Order** > **Order.wsdl** > **Message Types** > **OrdersColllection_msg**.

***Figure 8–37 Type Chooser Dialog for orderRequest Variable***



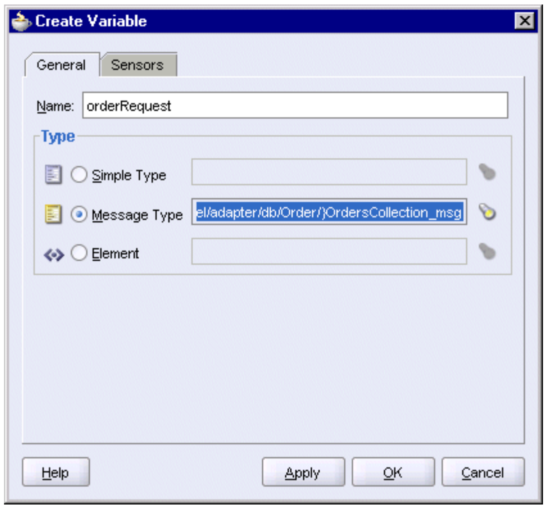
Type: {http://xmlns.oracle.com/pcbpel/adapter/db/Order/}OrdersCollection_msg

Show Detailed Node Information

Click **OK** in the Type Chooser.

In the Create Variable dialog, the Message Type is set to `{http://xmlns.oracle.com/pcb-pel/adapter/db/Order/}OrdersCollection_msg`.

***Figure 8–38 Create Variable Dialog for orderRequest Variable***



Name: orderRequest

Message Type: el/adapter/db/Order/}OrdersCollection_msg

c. Click **OK** in the Create Variable dialog. This returns you to the Scope dialog.

7. Create the `orderSequenceInput` variable:

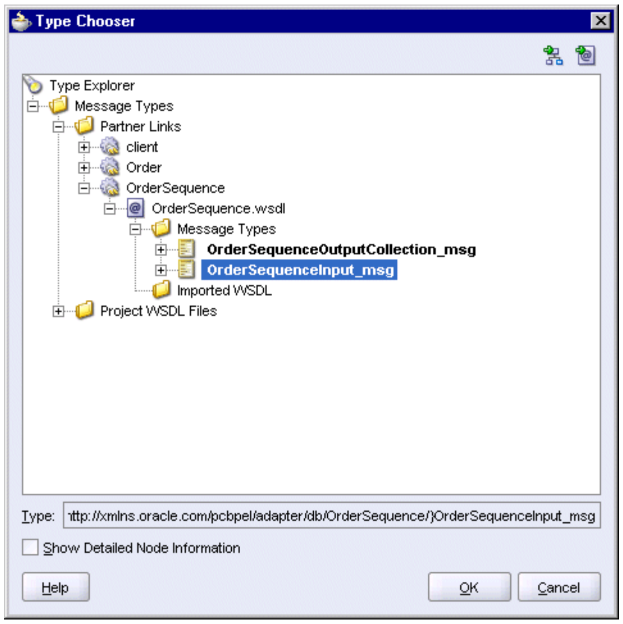
a. In the Variables tab, click **Create**.

b. In the Create Variable dialog:

– **Name**: enter **orderSequenceInput**.

– Select **Message Type** and click the flashlight icon to display the Type Chooser. In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **OrderSequence** > **OrderSequence.wsdl** > **Message Types** > **OrderSequenceInput_msg**.

***Figure 8–39 Type Chooser Dialog for orderSequenceInput Variable***

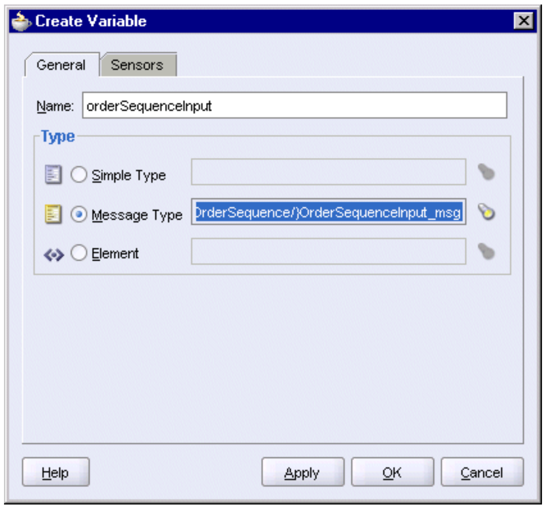


Type: ttp://xmlns.oracle.com/pcbpel/adapter/db/OrderSequence/}OrderSequenceInput_msg

Click **OK** in the Type Chooser.

In the Create Variable dialog, the Message Type is set to `{http://xmlns.oracle.com/pcbpel/adapter/db/OrderSequence/}OrderSequenceInput_msg`.

***Figure 8–40 Create Variable Dialog for orderSequenceInput Variable***



Name: orderSequenceInput

Message Type: OrderSequence/}OrderSequenceInput_msg

c. Click **OK** in the Create Variable dialog. This returns you to the Scope dialog.

8. Create the `orderSequenceOutput` variable:

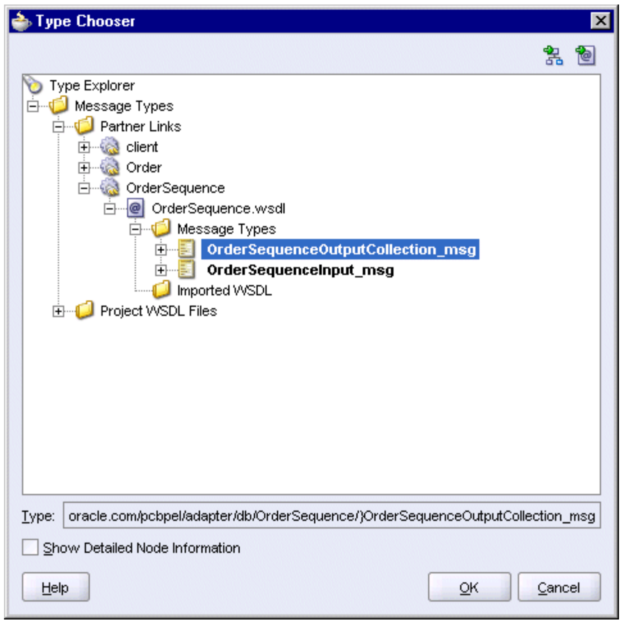
**a.** In the Variables tab, click **Create**.

**b.** In the Create Variable dialog:

– **Name**: enter **orderSequenceOutput**.

– Select **Message Type** and click the flashlight icon to display the Type Chooser. In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **OrderSequence** > **OrderSequence.wsdl** > **Message Types** > **OrderSequenceOutputCollection_msg**.

***Figure 8–41 Type Chooser Dialog for orderSequenceOutput Variable***

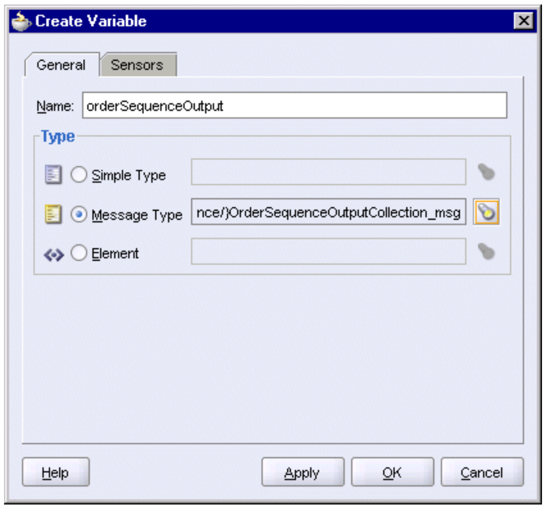


Type: oracle.com/pcbpel/adapter/db/OrderSequence/}OrderSequenceOutputCollection_msg

Click **OK** in the Type Chooser.

In the Create Variable dialog, the Message Type is set to `{http://xmlns.oracle.com/pcbpel/adapter/db/OrderSequence/}OrderSequenceOutputCollection_msg`.

***Figure 8–42 Create Variable Dialog for orderSequenceOutput Variable***

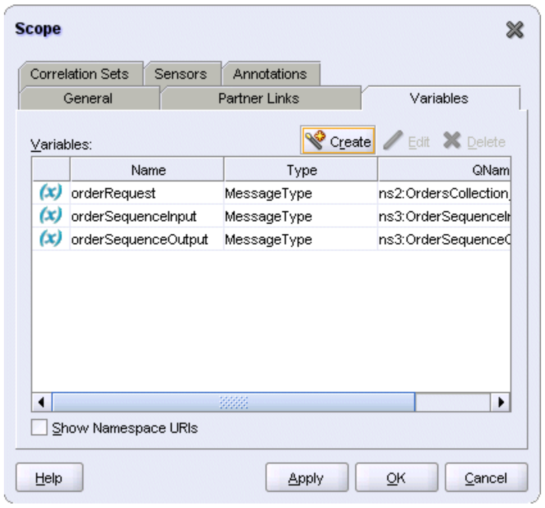


Name: orderSequenceOutput

Message Type: nce/}OrderSequenceOutputCollection_msg

c. Click **OK** in the Create Variable dialog. This returns you to the Scope dialog. You should see all three variables in the dialog.

***Figure 8–43 Scope Dialog for InsertOrderIntoDB, Variables Tab***



Variables:

| Name | Type | QNam |
|---|---|---|
| orderRequest | MessageType | ns2:OrdersCollection |
| orderSequenceInput | MessageType | ns3:OrderSequenceIr |
| orderSequenceOutput | MessageType | ns3:OrderSequenceC |

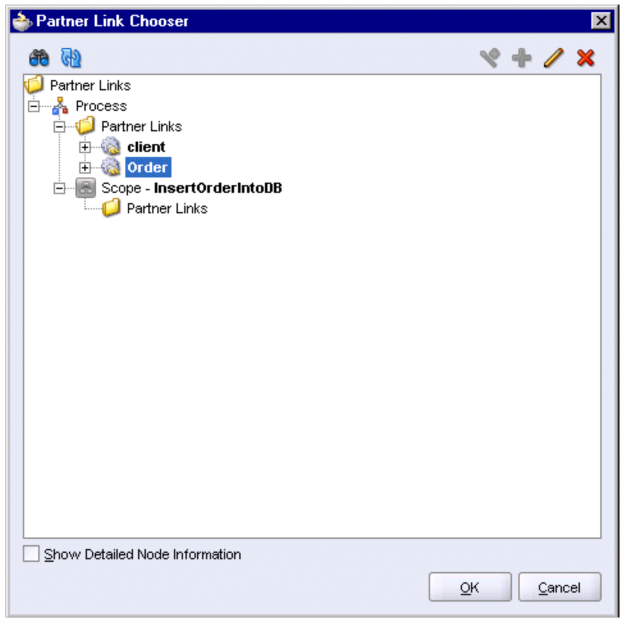
9. Click **OK** in the Scope dialog.
10. Select File > Save to save your work.

## 8.7.4 Retrieve the Order ID from the Database Sequence ("GetOrderId" Invoke Activity)

This invoke activity retrieves the next value from the `order_seq_id_gen` database sequence and stores it in the `orderSequenceOutput` variable.

1. Expand the "InsertOrderIntoDB" scope.
2. Drag the Invoke icon from the Component Palette and drop it in the "InsertOrderIntoDB" scope.
3. Do one of the following to display the Invoke dialog:
   - Drag one of the arrows on the side of the "Invoke_1" activity and drop it on the "OrderSequence" database adapter. This associates the invoke activity with the database adapter.
   - Double-click the new Invoke_1 activity.
4. In the Invoke dialog, set these values:
   - **Name**: enter **GetOrderId**.
   - **Partner Link**: should be set to **OrderSequence**. If not, click the flashlight and select **OrderSequence** from the Partner Link Chooser.

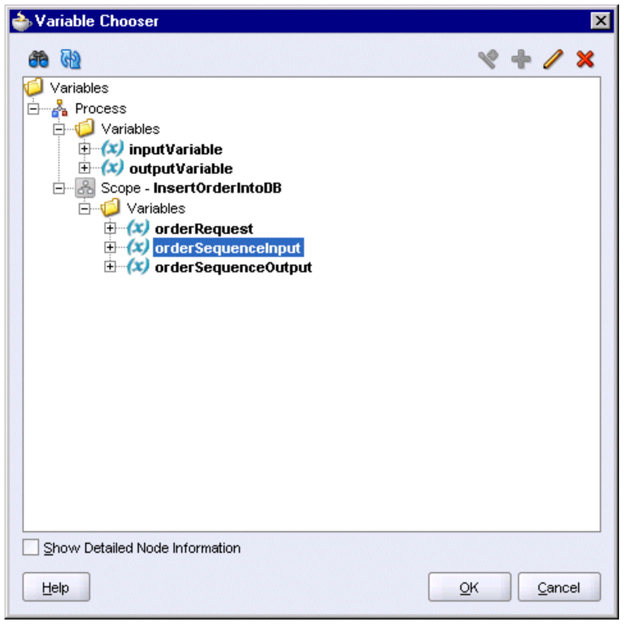
*Figure 8–44 Partner Link Chooser for "InsertOrder" Invoke Activity*



Click **OK** in the Partner Link Chooser.

- **Operation**: select **OrderSequence**.
- **Input Variable**: click the Browse Variables icon (the second icon from the left) and select **Process** > **Variables** > **Scope - InsertOrderIntoDB** > **Variables** > **orderSequenceInput**.

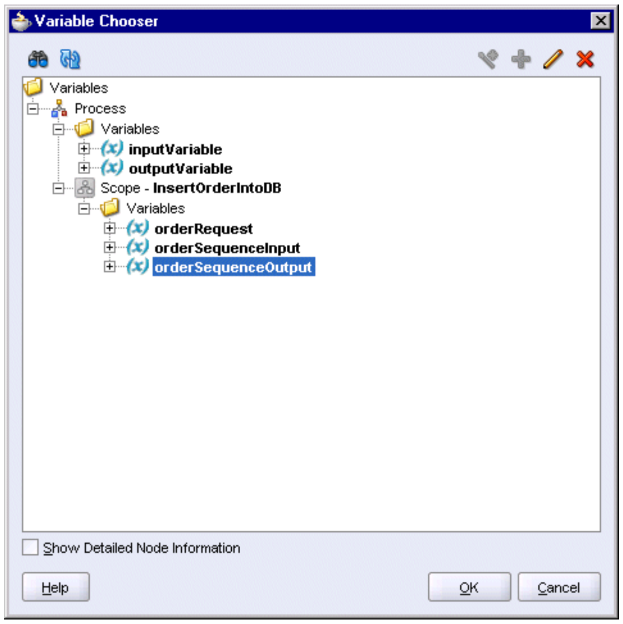
*Figure 8–45 Variable Chooser Dialog for Input Variable for "GetOrderId" Invoke Activity*



Click **OK** in the Variable Chooser.

- **Output Variable**: click the Browse Variables icon (the second icon from the left) and select **Process** > **Variables** > **Scope - InsertOrderIntoDB** > **Variables** > **orderSequenceOutput**.

*Figure 8–46 Variable Chooser Dialog for Output Variable for "GetOrderId" Invoke Activity*



Variable Chooser

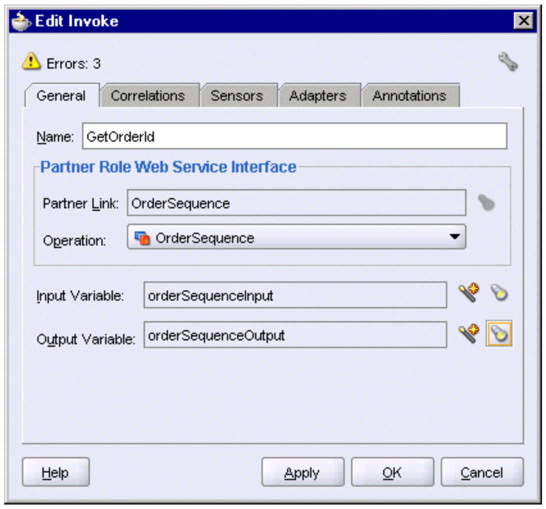
- Variables
  - Process
    - Variables
      - inputVariable
      - outputVariable
    - Scope - InsertOrderIntoDB
      - Variables
        - orderRequest
        - orderSequenceInput
        - orderSequenceOutput

Show Detailed Node Information

Click **OK** in the Variable Chooser.

The Invoke dialog should look like this:

*Figure 8–47 Invoke Dialog for "GetOrderId" Invoke Activity*



Edit Invoke

Errors: 3

Name: GetOrderId

Partner Role Web Service Interface

Partner Link: OrderSequence

Operation: OrderSequence

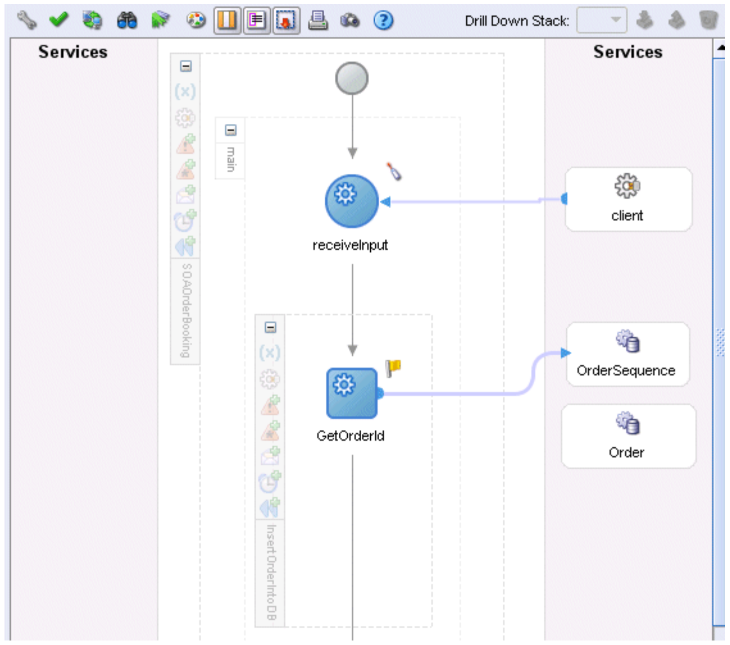
Input Variable: orderSequenceInput

Output Variable: orderSequenceOutput

5. Click **OK** in the Invoke dialog.
6. Select File > Save to save your work.

The SOAOrderBooking.bpel page should now look like this:

*Figure 8–48 SOAOrderBooking.bpel Page*



## 8.7.5 Prepare the Order ID and Order Status Information ("AssignOrderStatus" Assign Activity)

This assign activity prepares two values for insertion into the database:

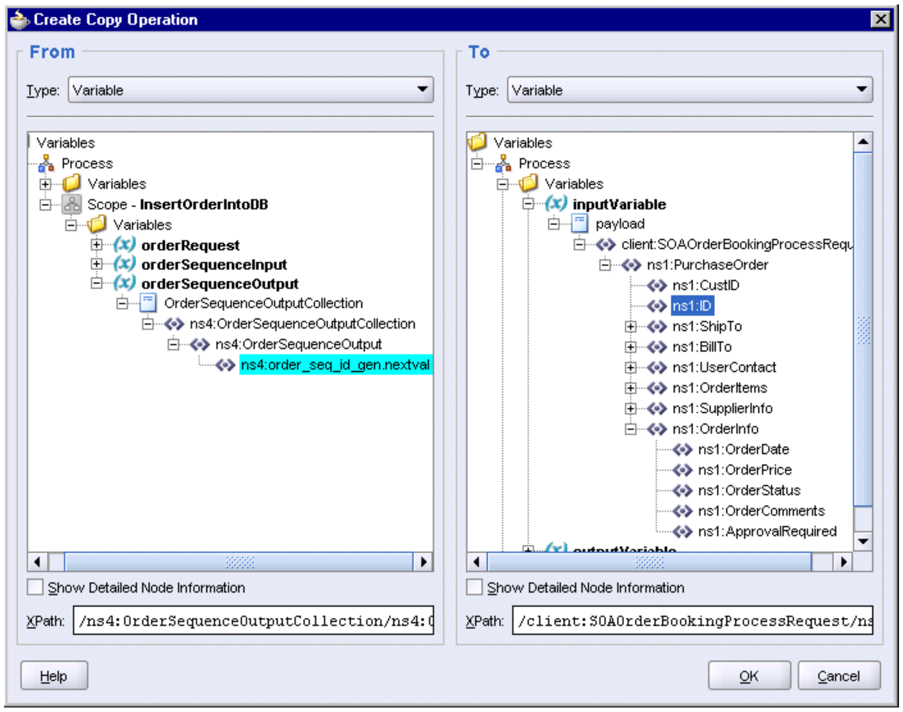
- It invokes the `order_seq_id_gen` database sequence to get the order ID.
- It sets the order status to "pending".

These values are used by the "InsertOrder" invoke activity when it writes the order information to the database.

To create this assign activity:

1. Drag the Assign activity icon from the Component Palette and drop it below the "GetOrderId" activity in the "InsertOrderIntoDB" scope.
2. Double-click the new assign activity to display the Assign dialog.
3. In the Assign dialog, click the General tab, and set the **Name** to **AssignOrderStatus**.
4. Still in the Assign dialog, click the Copy Operation tab and create two copy operations: one to copy the order ID and another one to copy the order status.
5. Create the copy operation to copy the order ID:
   a. Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.
   b. In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - InsertOrderIntoDB** > **Variables** > **orderSequenceOutput** > **OrderSequenceOutputCollection** > **ns4:OrderSequenceOutputCollection** > **ns4:OrderSequenceOutput** > **ns4:order_seq_id_gen.nextval**.
   c. In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder** > **ns1:ID**.

*Figure 8–49 Create Copy Operation Dialog for "AssignOrderStatus" Assign Activity, Copy the Order ID*



From — Type: Variable

- Variables
  - Process
    - Variables
    - Scope - **InsertOrderIntoDB**
      - Variables
        - **orderRequest**
        - **orderSequenceInput**
        - **orderSequenceOutput**
          - OrderSequenceOutputCollection
            - ns4:OrderSequenceOutputCollection
              - ns4:OrderSequenceOutput
                - ns4:order_seq_id_gen.nextval

Show Detailed Node Information

XPath: `/ns4:OrderSequenceOutputCollection/ns4:(`

To — Type: Variable

- Variables
  - Process
    - Variables
      - **inputVariable**
        - payload
          - client:SOAOrderBookingProcessRequ
            - ns1:PurchaseOrder
              - ns1:CustID
              - ns1:ID
              - ns1:ShipTo
              - ns1:BillTo
              - ns1:UserContact
              - ns1:OrderItems
              - ns1:SupplierInfo
              - ns1:OrderInfo
                - ns1:OrderDate
                - ns1:OrderPrice
                - ns1:OrderStatus
                - ns1:OrderComments
                - ns1:ApprovalRequired
      - **outputVariable**

Show Detailed Node Information

XPath: `/client:SOAOrderBookingProcessRequest/ns`

  **d.** Click **OK** in the Create Copy Operation dialog.

**6.** Create the copy operation to copy the order status:

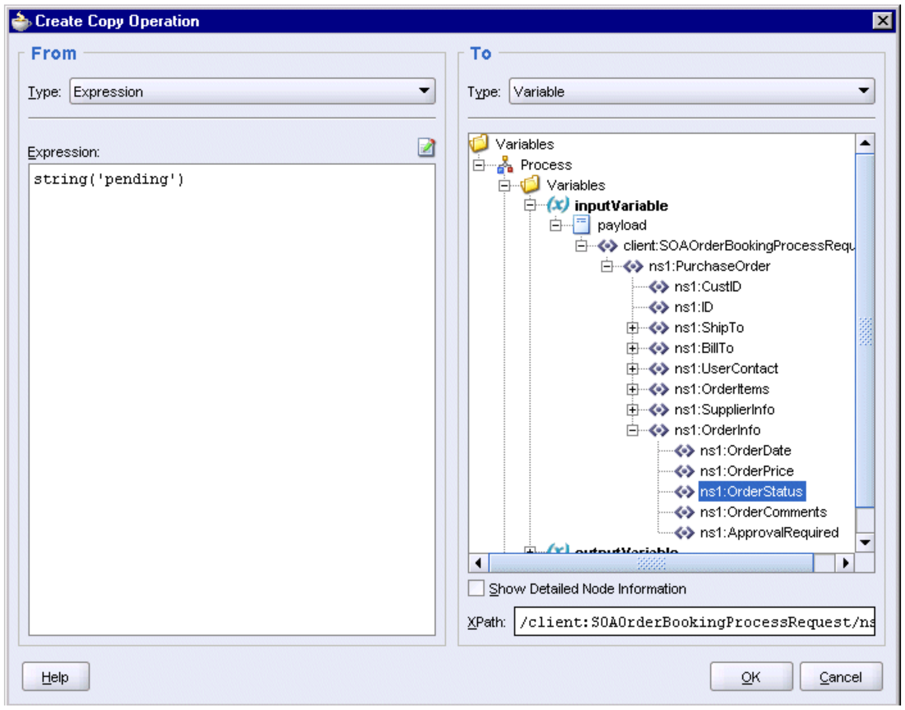
  **a.** Select **Copy Operation** from the **Create** dropdown again to create the second copy operation. This displays the Create Copy Operation dialog.

  **b.** In the **From** side, set **Type** to **Expression**, and enter the following line in the Expression box:

```
string('pending')
```

  **c.** In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder** > **ns1:OrderInfo** > **ns1:OrderStatus**.

***Figure 8–50 Create Copy Operation Dialog for "AssignOrderStatus" Assign Activity, Copy the Order Status***


Create Copy Operation

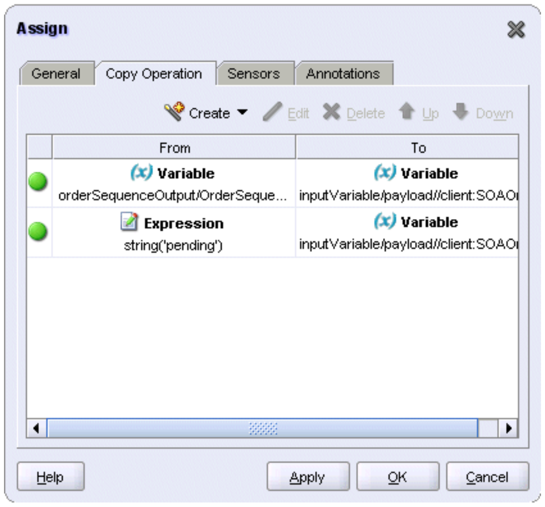
From
Type: Expression
Expression:
```
string('pending')
```

To
Type: Variable
```
Variables
  Process
    Variables
      inputVariable
        payload
          client:SOAOrderBookingProcessRequ
            ns1:PurchaseOrder
              ns1:CustID
              ns1:ID
              ns1:ShipTo
              ns1:BillTo
              ns1:UserContact
              ns1:OrderItems
              ns1:SupplierInfo
              ns1:OrderInfo
                ns1:OrderDate
                ns1:OrderPrice
                ns1:OrderStatus
                ns1:OrderComments
                ns1:ApprovalRequired
```
Show Detailed Node Information
XPath: /client:SOAOrderBookingProcessRequest/ns

d. Click **OK** in the Create Copy Operation dialog.

7. You should see two copy operations in the Assign dialog. Click **OK**.

***Figure 8–51 Assign Dialog for "AssignOrderStatus" Activity***


Assign

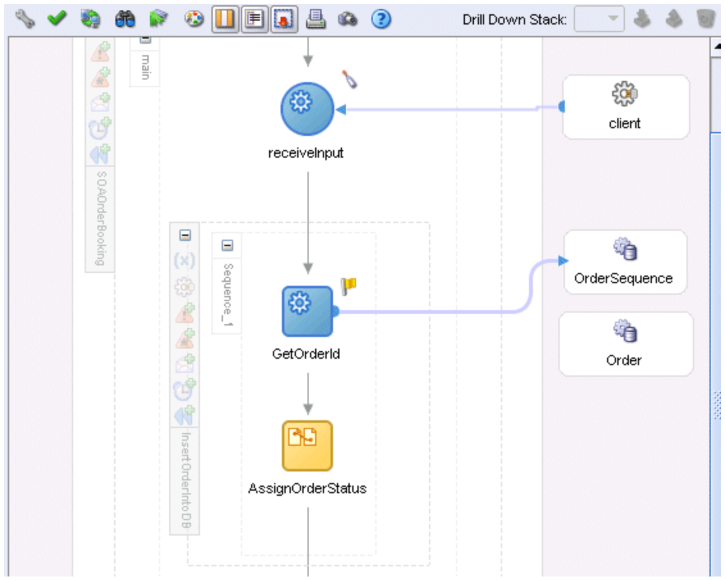
General | Copy Operation | Sensors | Annotations

| | From | To |
|---|---|---|
| ● | Variable<br>orderSequenceOutput/OrderSeque... | Variable<br>inputVariable/payload//client:SOAOı |
| ● | Expression<br>string('pending') | Variable<br>inputVariable/payload//client:SOAOı |

8. Select File > Save to save your work.

The SOAOrderBooking.bpel page should now look like this:

***Figure 8–52 SOAOrderBooking.bpel Page***



### 8.7.6 Create the Mapping File ("TransformOrder" BPEL Service)

In this transform service, you create a file called `TransformOrder.xsl` to map the incoming order information to the schema defined in `Order_table.xsd`, which prepares it for insertion in the database. `Order_table.xsd` was created by the Adapter Configuration wizard that you ran in Section 8.7.1, "Create a Database Adapter for Writing to the ORDERS Table".

1. In the Component Palette, select **Process Activities** from the dropdown.
2. Drag the Transform icon from the Component Palette and drop it after the "AssignOrderStatus" activity.
3. Double-click the new transform activity to display the Transform dialog.
4. In the Transform dialog, click the General tab and set the **Name** to **TransformOrder**.
5. Click the Transformation tab in the dialog and set these values:
   - **Source Variable**: select **inputVariable**. The **Source Part** should be set to **payload**.
   - **Target Variable**: select **orderRequest**. The **Target Part** should be set to **OrdersCollection**.
   - **Mapper File**: enter **TransformOrder.xsl** and click the Create Mapping icon (the middle icon). This displays the Data Mapping tool for `TransformOrder.xsl`.

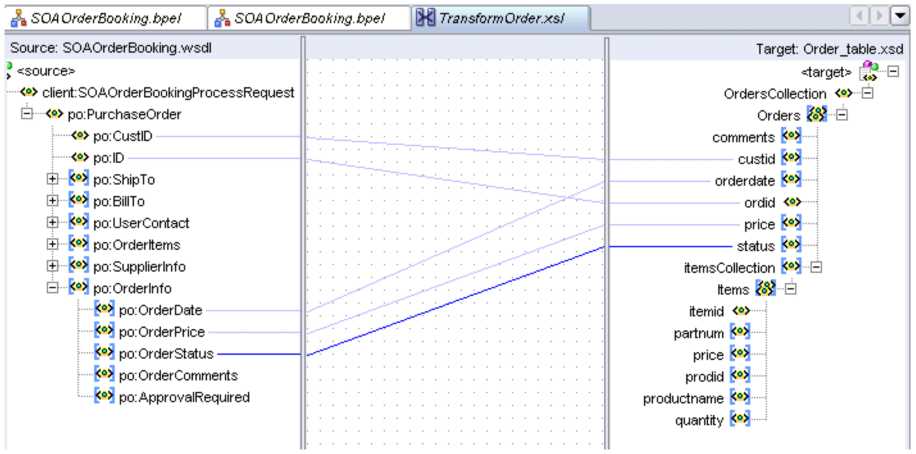
     In the Data Mapping tool, create the simple mappings shown in Table 8–2. The left column shows the source side and the right column shows the target side. You create the simple mappings by dragging and dropping the labels from the source side to the target side.

*Table 8–2 Simple Mappings*

| Source > client:SOAOrderBookingProcessRequest > po:PurchaseOrder | Target > OrdersCollection > Orders |
|---|---|
| po:CustID | custid |
| po:ID | ordid |
| po:OrderInfo > po:OrderDate | orderdate |
| po:OrderInfo > po:OrderPrice | price |
| po:OrderInfo > po:OrderStatus | status |

Figure 8–53 shows the Data Mapper with the simple mappings done.

*Figure 8–53 Data Mapper for Transform Activity in InsertOrderIntoDB Scope*



Process all the items in the order by creating a "for-each" element in the XSL file:

a. Select **XSLT Constructs** from the dropdown in the Component Palette in the Data Mapper.

b. On the target side, expand **itemsCollection** and **Items**.

c. Drag the **for-each** item from the Component Palette and drop it on **Items**. You want the **for-each** label to show up between **itemsCollection** and **Items** on the target side.

d. Expand **po:OrderItems** on the source side to that you can see **po:Item** below it. Expand **po:Item** as well.

e. Drag a line from **po:Item** on the source side to the **for-each** item on the target side.

f. Map the following item fields:

*Table 8–3 Mappings for the "for-each" Items*

| Source > client:SOAOrderBookingProcessRequest > po:PurchaseOrder > po:OrderItems > po:Item | Target > OrdersCollection > Orders > itemsCollection > for-each > Items |
|---|---|
| po:ProductName | productname |
| po:partnum | partnum |
| po:price | price |
| po:Quantity | quantity |

For **itemid** on the target side, you want to map it to the **position()** function. To do this in the Data Mapper:

a. Select **Node-set Functions** from the dropdown in the Component Palette.

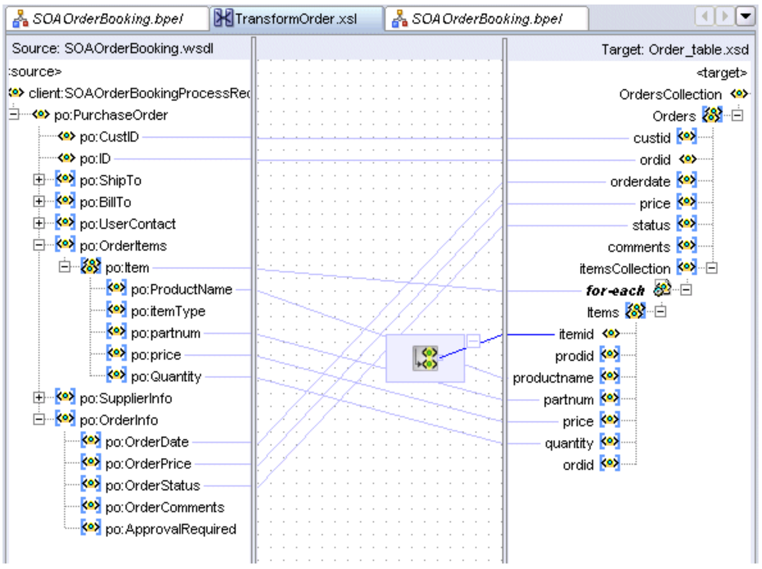
b. Drag the **position** item from the Component Palette and drop it in the middle area (between the source and target areas).

c. Drag a line from **itemid** on the target side to the **position** item in the middle area.

d. Select File > Save to save `TransformOrder.xsl`.

Figure 8–54 shows the complete transformation in the Data Mapper.

*Figure 8–54 Data Mapper Showing Complete Mappings for the Transformation Activity*



e. Select File > Close to close `TransformOrder.xsl`. This takes you back to the main editor in JDeveloper.

6. Select File > Save in the main editor to save SOAOrderBooking.bpel.

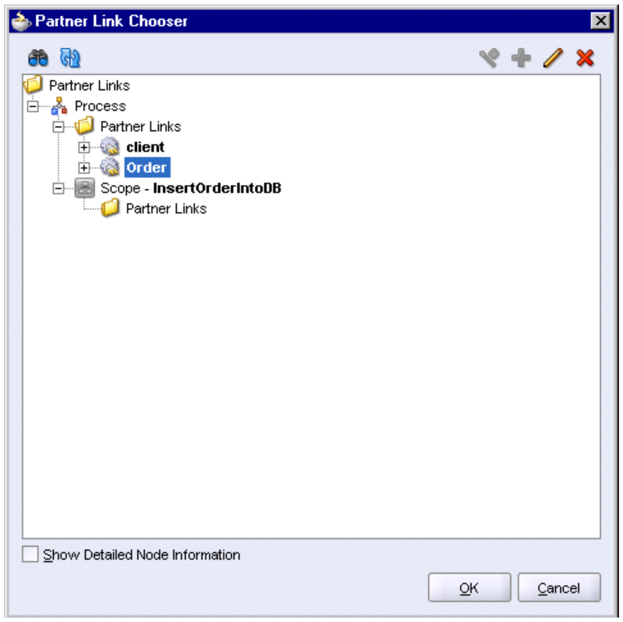
## 8.7.7 Insert the Order Information into the Database ("InsertOrder" Invoke Activity)

This invoke activity inserts the data into the database.

1. In the Component Palette, select **Process Activities** from the dropdown.

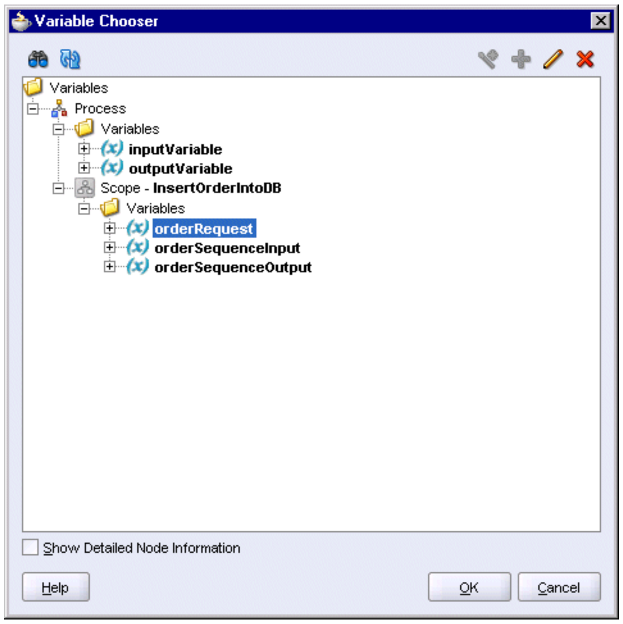
2. Drag the Invoke icon from the Component Palette and drop it below the "TransformOrder" activity.
3. Do one of the following to display the Invoke dialog:
   - Drag one of the arrows on the side of the Invoke_1 activity and drop it on the "Order" database adapter. This associates the Invoke_1 activity with the database adapter.
   - Double-click the new Invoke_1 activity.
4. In the Invoke dialog, set these values:
   - **Name**: enter **InsertOrder**.
   - **Partner Link**: should be set to **Order**. If not, click the flashlight and select **Order** from the Partner Link Chooser.

***Figure 8–55 Partner Link Chooser for "InsertOrder" Invoke Activity***



     Click **OK** in the Partner Link Chooser.
   - **Operation**: select **write**.
   - **Input Variable**: click the Browse Variables icon (the second icon from the left) and select **Variables** > **Process** > **Scope - InsertOrderIntoDB** > **Variables** > **orderRequest**.

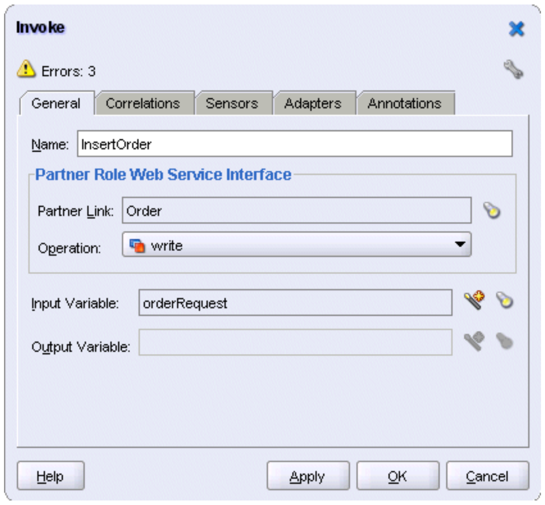
*Figure 8–56 Variable Chooser Dialog for Input Variable for "InsertOrder" Invoke Activity*



Click **OK** in the Variable Chooser.

The Invoke dialog should look like this:

*Figure 8–57 Invoke Dialog for "InsertOrder" Invoke Activity*



Name: InsertOrder

Partner Link: Order

Operation: write

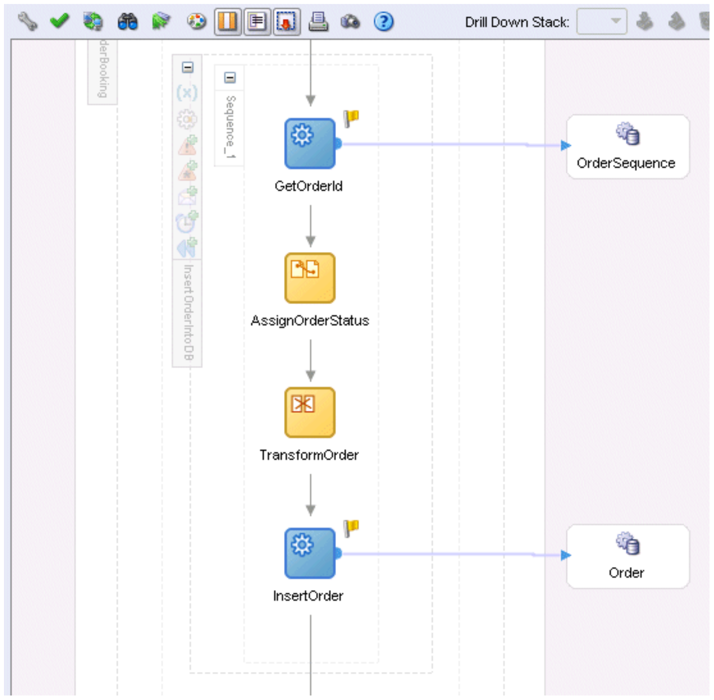
Input Variable: orderRequest

Output Variable:

5. Click **OK** in the Invoke dialog.
6. Select File > Save to save your work.

The SOAOrderBooking.bpel project should now look like this:

***Figure 8–58 SOAOrderBooking.bpel Page***



### 8.7.8 Minimize the "InsertOrderIntoDB" Scope

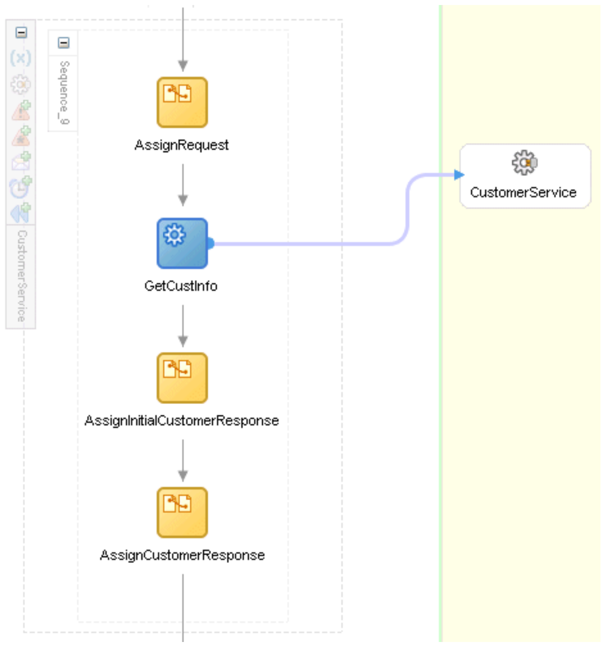
Click the [-] icon for the "InsertOrderIntoDB" scope to minimize it. When it is minimized, it makes it easier to create a new scope that is at the same level as the scope you minimized. Otherwise, you can accidentally drag and drop a new scope inside the existing scope. To see what a minimized scope looks like, see Figure 8–1.

## 8.8 Retrieve Information About the Customer ("CustomerService" Scope)

This scope invokes the CustomerService service to retrieve information about the customer. It uses the assign activity to populate variables with the returned information.

Figure 8–59 shows the activities in the "CustomerService" scope.

***Figure 8–59 Activities in the "CustomerService" Scope***



## 8.8.1 Create the "CustomerService" Partner Link

The "CustomerService" partner link provides the SOAOrderBooking project with a way to communicate with the CustomerService service deployed on Oracle Application Server. The `CustomerSvc.wsdl` file includes a URL that returns the WSDL for CustomerService.

1. Copy the following file from the `soademo_101310_prod.zip` file to the `SOAOrderBooking\bpel` directory.

   - `CustomerSvc.wsdl`

   In the `soademo_101310_prod.zip` file, the `CustomerSvc.wsdl` file is located in the `SOAOrderBooking\bpel` directory.

2. Verify the URL in the `CustomerSvc.wsdl` file.

   a. In JDeveloper, select File > Open and open the `CustomerSvc.wsdl` file.

   b. Click the Source tab at the bottom of the editor to view the lines in the file.

   c. The `http://localhost:8888` reference in the file assumes that Oracle Application Server is running on the same machine as JDeveloper, and that Oracle Application Server is listening for requests on port 8888.

      If necessary, change `localhost` to the name of the machine running Oracle Application Server, and `8888` to the correct port used by your Oracle Application Server installation, for example: `mypc.mydomain.com:8889`.

   d. If you edited the file, save the file and close it.

3. In the Component Palette, select **Services** from the dropdown.

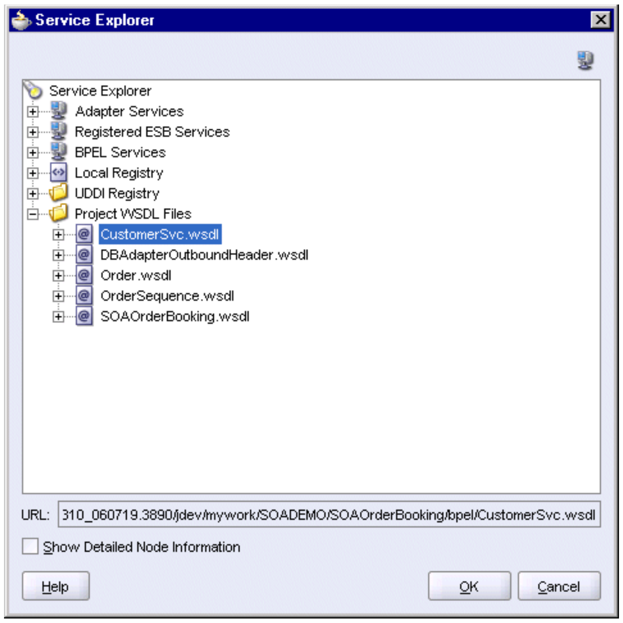
4. Drag the Partner Link icon from the Component Palette and drop it in a **Services** swimlane.

5. In the Create Partner Link dialog:

   - **Name**: enter **CustomerService**.

- **WSDL File**: click the Service Explorer icon (second icon from the left) to display the Service Explorer dialog. In the Service Explorer dialog, expand **Project WSDL Files** and select **CustomerSvc.wsdl**.

***Figure 8–60 Service Explorer for "CustomerService" Partner Link***



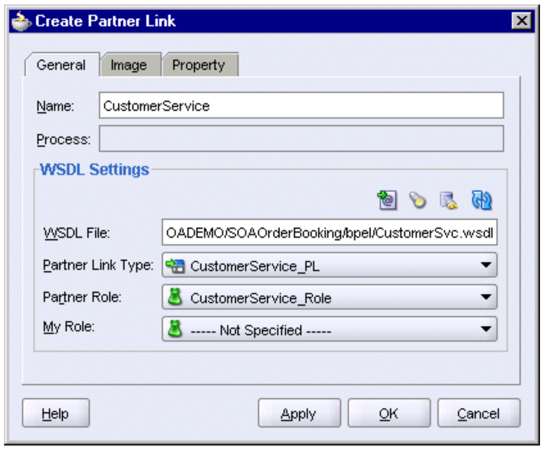
URL: 310_060719.3890/jdev/mywork/SOADEMO/SOAOrderBooking/bpel/CustomerSvc.wsdl

Click **OK** in the Service Explorer.

- **Partner Link Type**: select **CustomerService_PL** (automatically filled in for you).
- **Partner Role**: select **CustomerService_Role**.
- **My Role**: leave it blank.

The Create Partner Link dialog should look like this:

***Figure 8–61 Create Partner Link Dialog for "CustomerService" Partner Link***



Name: CustomerService
Process:
WSDL File: OADEMO/SOAOrderBooking/bpel/CustomerSvc.wsdl
Partner Link Type: CustomerService_PL
Partner Role: CustomerService_Role
My Role: ----- Not Specified -----

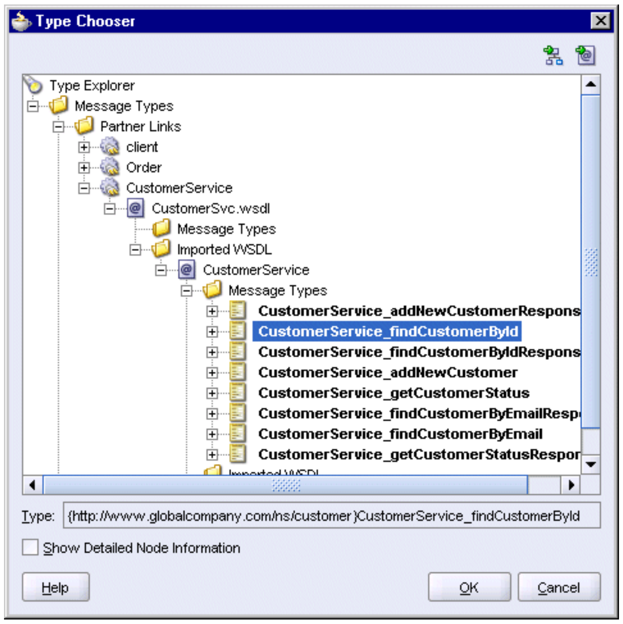
Before clicking OK, check that the **Name** is **CustomerService**. JDeveloper may have changed it **CustomerSvc**. Click **OK** in the Create Partner Link dialog.

### 8.8.2 Create the "CustomerService" Scope

Create a new scope called "CustomerService".

1. In the Component Palette, select **Process Activities** from the dropdown.
2. Drag the Scope icon from the Component Palette and drop it below the "InsertOrderIntoDB" scope.
3. Double-click the new scope to display the Scope dialog.
4. In the Scope dialog, in the General tab:
   - **Name**: enter **CustomerService**.
   - **Variable Access Serializable**: do not select.
5. Click the Variables tab. You need to create a variable for this scope.
6. In the Variables tab, click **Create**.
7. In the Create Variable dialog:
   - **Name**: enter **customerServiceRequest**.
   - Select **Message Type** and click the flashlight icon to display the Type Chooser. In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **CustomerService** > **CustomerSvc.wsdl** > **Imported WSDL** > **CustomerService** > **Message Types** > **CustomerService_findCustomerById**.

***Figure 8–62 Type Chooser Dialog for "customerServiceRequest" Variable***

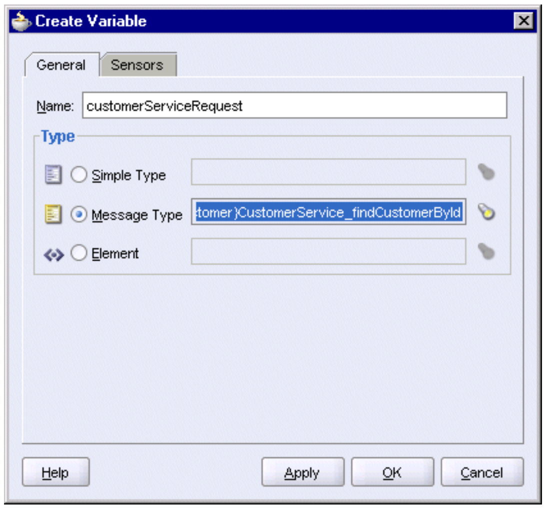

Type Chooser
Type Explorer
Message Types
Partner Links
client
Order
CustomerService
CustomerSvc.wsdl
Message Types
Imported WSDL
CustomerService
Message Types
CustomerService_addNewCustomerRespons
CustomerService_findCustomerById
CustomerService_findCustomerByIdRespons
CustomerService_addNewCustomer
CustomerService_getCustomerStatus
CustomerService_findCustomerByEmailResp
CustomerService_findCustomerByEmail
CustomerService_getCustomerStatusRespor
Show Detailed Node Information
Help
OK
Cancel

Type: {http://www.globalcompany.com/ns/customer}CustomerService_findCustomerById

   Click **OK** in the Type Chooser.

8. In the Create Variable dialog, the Message Type is set to `{http://www.globalcompany.com/ns/customer}CustomerService_findCustomerById`.

***Figure 8–63 Create Variable Dialog for "customerServiceRequest" Variable***



Name: customerServiceRequest

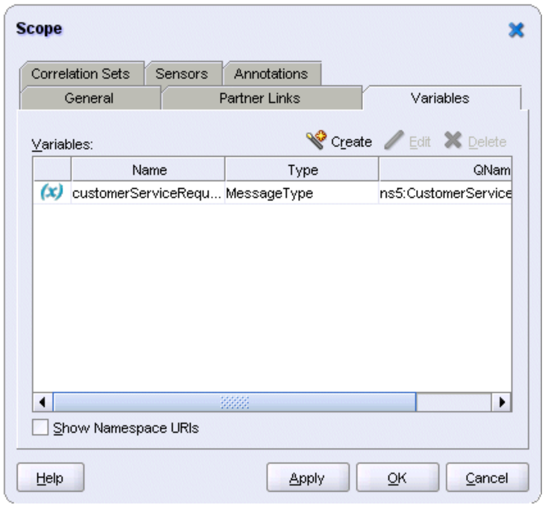
Simple Type

(●) Message Type: tomer}CustomerService_findCustomerById

Element

9. Click **OK** in the Create Variable dialog.
10. The `customerServiceRequest` variable appears in the Variables tab of the Scope dialog.

***Figure 8–64 Scope Dialog Showing Variables Tab for CustomerService Scope***



Variables:

| | Name | Type | QNam |
|---|---|---|---|
| (x) | customerServiceRequ... | MessageType | ns5:CustomerService |

Click **OK** in the Scope dialog.

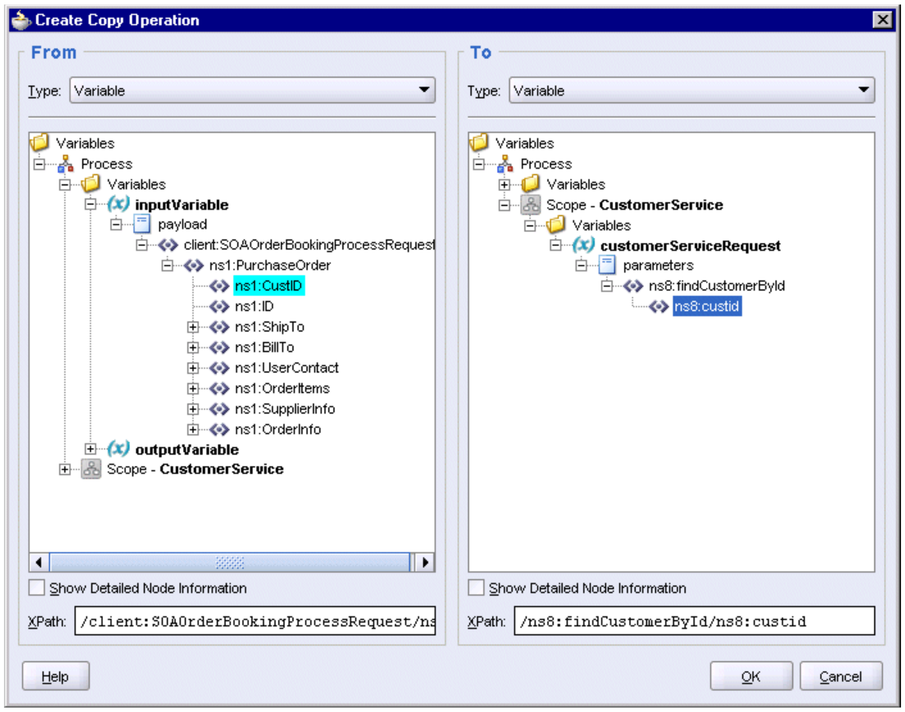
## 8.8.3 Assign Customer ID to the findCustomerById Operation ("AssignRequest" Assign Activity)

This assign activity assigns the customer ID information to the `customerServiceRequest` variable. This variable is then used as the input variable in the "GetCustInfo" invoke activity.

1. Expand the CustomerService scope.
2. Drag the Assign activity icon from the Component Palette and drop it in the CustomerService scope.
3. Double-click the new assign activity to display the Assign dialog.

4. In the Assign dialog, click the General tab, and set the **Name** to **AssignRequest**.
5. Still in the Assign dialog, click the Copy Operation tab.
6. Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.
   – In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder** > **ns1:CustID**.
   – In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - Customer Service** > **Variables** > **customerServiceRequest** > **parameters** > **ns8:findCustomerById** > **ns8:custid**.

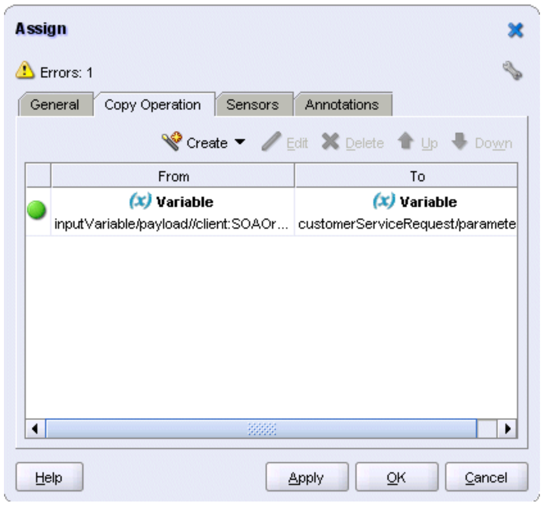
***Figure 8–65 Create Copy Operation Dialog for "AssignRequest" Activity***



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

7. You should see the copy operation in the Assign dialog. Click **OK**.

*Figure 8–66 Assign Dialog for "AssignRequest" Activity*



|  | From | To |
|---|---|---|
| ● | Variable inputVariable/payload//client:SOAOr... | Variable customerServiceRequest/paramete |

## 8.8.4 Create a Variable to Contain the Results of findCustomerById ("customerServiceResponse" Process Variable)

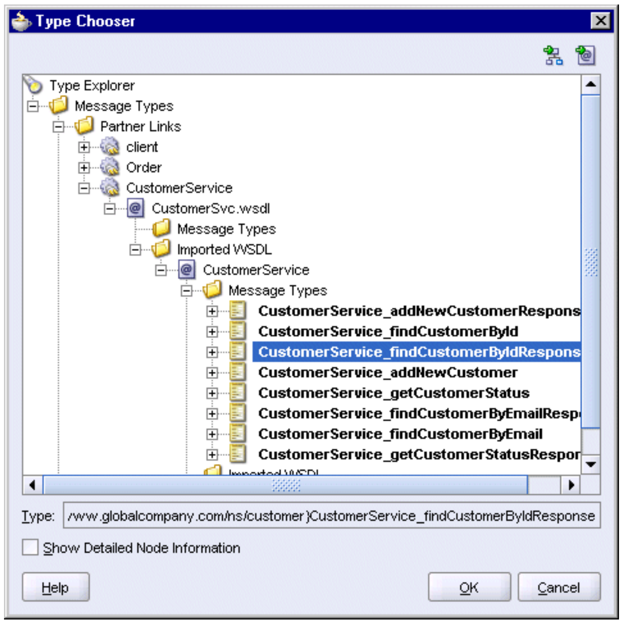
The `customerServiceResponse` variable is used to contain the results of the findCustomerById operation.

Create the `customerServiceResponse` variable in the SOAOrderBooking scope. The variable is created at this level so that any activity in this BPEL process can access it.

1. Double-click the SOAOrderBooking scope. You can double-click the "SOAOrderBooking" text that is sideways. This displays the Process dialog.
2. In the Process dialog, click **Create** in the Variables tab. This displays the Create Variable dialog.
3. In the Create Variable dialog:
   - **Name**: enter **customerServiceResponse**.
   - **Type**: select **Message Type**, and click the flashlight icon. This displays the Type Chooser dialog.

     In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **CustomerService** > **CustomerSvc.wsdl** > **Imported WSDL** > **Customer Service** > **Message Types** > **CustomerService_findCustomerByIdResponse**.

***Figure 8–67 Type Chooser Dialog for "customerServiceResponse" Process Variable***

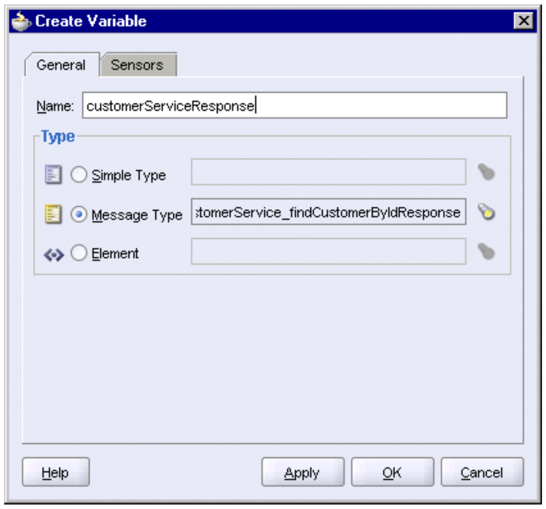

Type Chooser
Type Explorer
Message Types
Partner Links
client
Order
CustomerService
CustomerSvc.wsdl
Message Types
Imported WSDL
CustomerService
Message Types
CustomerService_addNewCustomerRespons
CustomerService_findCustomerById
CustomerService_findCustomerByIdRespons
CustomerService_addNewCustomer
CustomerService_getCustomerStatus
CustomerService_findCustomerByEmailResp
CustomerService_findCustomerByEmail
CustomerService_getCustomerStatusRespor
Help
OK
Cancel

Type: /www.globalcompany.com/ns/customer}CustomerService_findCustomerByIdResponse

Show Detailed Node Information: unchecked

Click **OK** in the Type Chooser. The Create Variable dialog now looks like this:

***Figure 8–68 Create Variable Dialog for "customerServiceResponse" Process Variable***

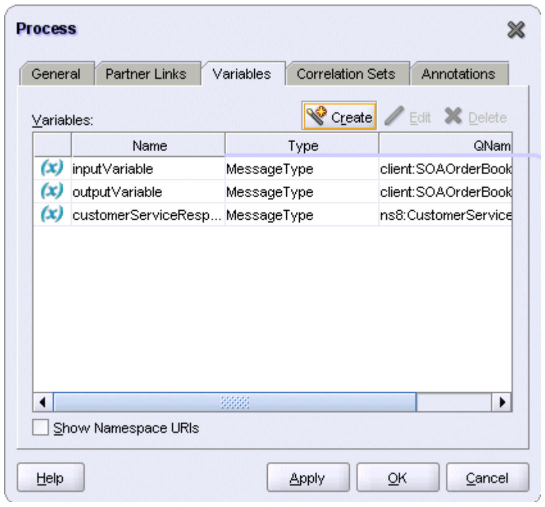


Name: customerServiceResponse

Simple Type ○
Message Type ● stomerService_findCustomerByIdResponse
Element ○

4. Click **OK** in the Create Variable dialog. The `customerServiceResponse` variable appears in the Process dialog.

*Figure 8–69 Process Dialog Showing customerServiceResponse Variable*



Variables:

| Name | Type | QNam |
|---|---|---|
| inputVariable | MessageType | client:SOAOrderBook |
| outputVariable | MessageType | client:SOAOrderBook |
| customerServiceResp... | MessageType | ns8:CustomerService |

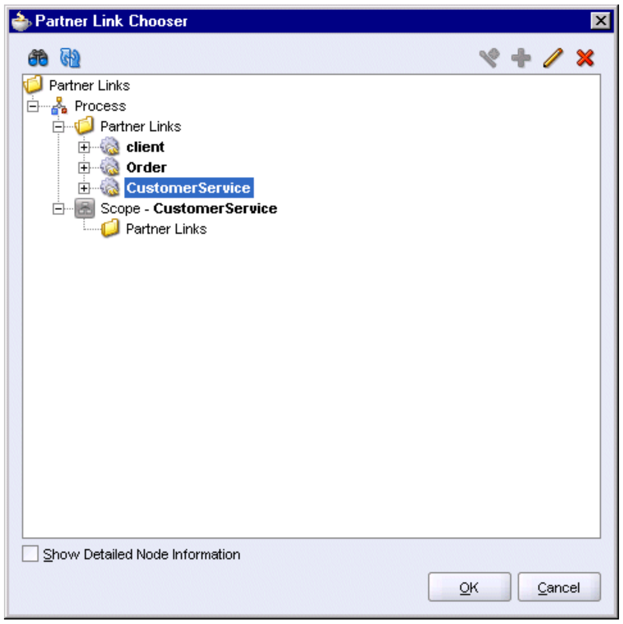
5. Click **OK** in the Process dialog.
6. Select File > Save to save your work.

## 8.8.5 Invoke findCustomerById ("GetCustInfo" Invoke Activity)

This invoke activity accesses the CustomerService partner link and invokes the `findCustomerById` operation. The operation is invoked with the customer ID assigned in the "AssignRequest" activity. The results of the operation is stored in the `customerServiceResponse` variable.

1. Drag the Invoke icon from the Component Palette and drop it below the "AssignRequest" activity.
2. Do one of the following to display the Invoke dialog:
   - Drag one of the arrows on the side of the Invoke_1 activity and drop it on the "CustomerService" partner link. This associates the invoke activity with the partner link.
   - Double-click the new Invoke_1 activity.
3. In the Invoke dialog, set these values:
   - **Name**: enter **GetCustInfo**.
   - **Partner Link**: should be set to **CustomerService**. If not, click the flashlight and select **CustomerService** from the Partner Link Chooser.

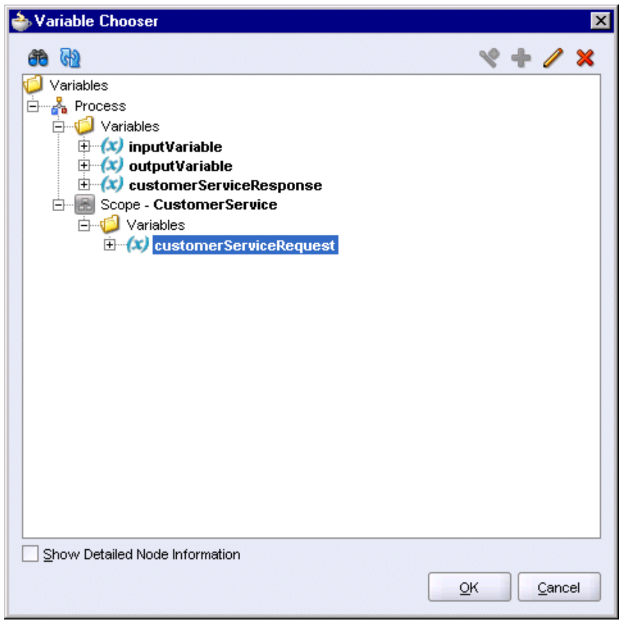
***Figure 8–70 Partner Link Chooser Dialog for "GetCustInfo" Invoke Activity***



Click **OK** in the Partner Link Chooser.

- **Operation**: select **findCustomerById**.
- **Input Variable**: click the Browse Variables icon (the second icon from the left) and select **Variables** > **Process** > **Scope - CustomerService** > **Variables** > **customerServiceRequest**.

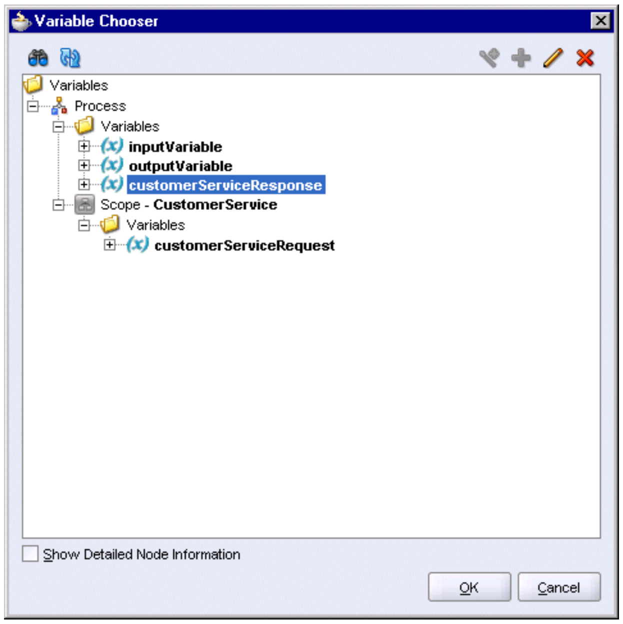
***Figure 8–71 Variable Chooser Dialog for the Input Variable for the "GetCustInfo" Invoke Activity***



Click **OK** in the Variable Chooser.

- **Output Variable**: click the Browse Variables icon (the second icon from the left) and select **Variables** > **Process** > **Variables** > **customerServiceResponse**.

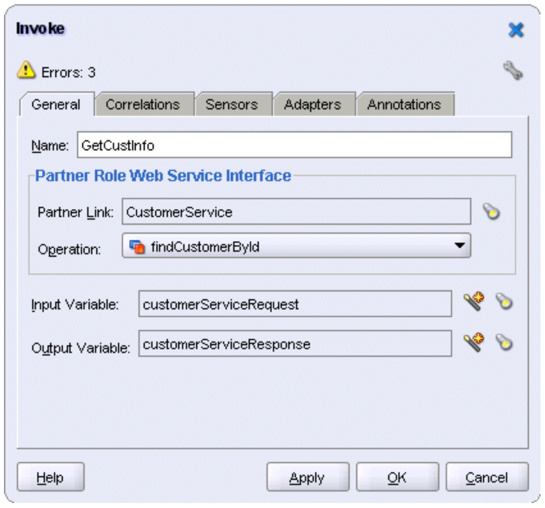
***Figure 8–72 Variable Chooser Dialog for the Output Variable for the "GetCustInfo" Invoke Activity***



Click **OK** in the Variable Chooser.

The Invoke dialog should look like this:

***Figure 8–73 Invoke Dialog for the "GetCustInfo" Invoke Activity***



Name: GetCustInfo
Partner Link: CustomerService
Operation: findCustomerById
Input Variable: customerServiceRequest
Output Variable: customerServiceResponse

4. Click **OK** in the Invoke dialog.
5. Select File > Save to save your work.

## 8.8.6 Create the "AssignInitialCustomerResponse" Assign Activity

This assign activity appends the customer's first name and last name to the payload part of the inputVariable. It uses an XML fragment to perform this append operation.

1. Drag the Assign activity icon from the Component Palette and drop it below the "GetCustInfo" activity.

2. Double-click the new assign activity to display the Assign dialog.
3. In the Assign dialog, click the General tab, and set the **Name** to **AssignInitialCustomerResponse**.
4. Still in the Assign dialog, click the Copy Operation tab. You will create an append operation.
5. Select **Append Operation** from the **Create** dropdown. This displays the Create Append Operation dialog.
   - In the **From** side, select **XML Fragment** from the **Type** dropdown, and enter the following in the **XML Fragment** box:

     ```
     <nsx:ShipTo xmlns:nsx="http://www.globalcompany.com/ns/order">
        <nsx:Name>
           <nsx:First/>
           <nsx:Last/>
        </nsx:Name>
     </nsx:ShipTo>
     ```

     Note that you need to replace the *nsx* prefix with the prefix for "`http://www.globalcompany.com/ns/order`". To determine the prefix, scroll to the beginning of your `SOAOrderBooking.bpel` file and look for this line:

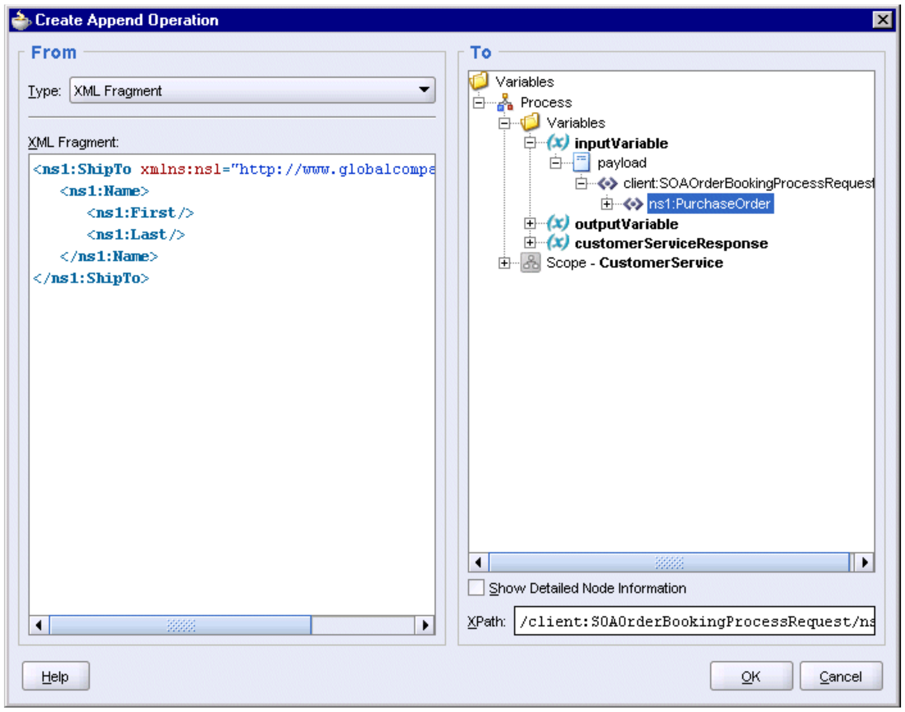
     `xmlns:`*`prefix`*`="http://www.globalcompany.com/ns/order"`

     For example, if the line in your file looks like the following:

     ```
     xmlns:ns1="http://www.globalcompany.com/ns/order"
     ```

     then you need to change the prefix to `ns1` in the XML fragment.
   - In the **To** side, select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder**.

***Figure 8–74 Create Append Operation Dialog for the "AssignInitialCustomerResponse" Activity***



```
<ns1:ShipTo xmlns:ns1="http://www.globalcompa
    <ns1:Name>
        <ns1:First/>
        <ns1:Last/>
    </ns1:Name>
</ns1:ShipTo>
```

XPath: /client:SOAOrderBookingProcessRequest/ns

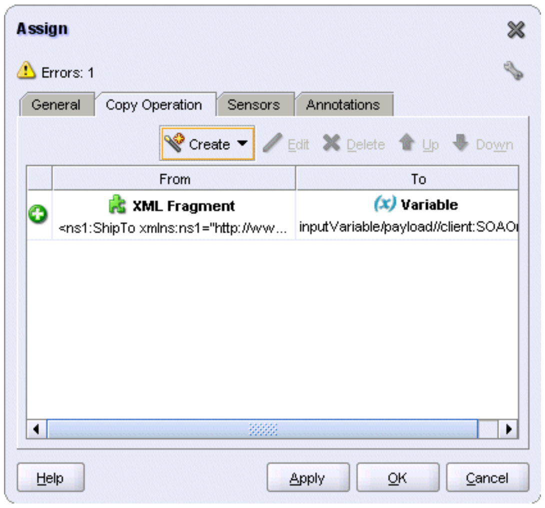
```
<ns1:ShipTo xmlns:ns1="http://www.globalcompany.com/ns/order">
   <ns1:Name>
      <ns1:First/>
      <ns1:Last/>
   </ns1:Name>
</ns1:ShipTo>
```

*****************************************************************************************

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

**6.** You should see the append operation in the Assign dialog.

***Figure 8–75 Assign Dialog for the "AssignInitialCustomerResponse" Activity***



| From | To |
|---|---|
| XML Fragment<br><ns1:ShipTo xmlns:ns1="http://www... | Variable<br>inputVariable/payload//client:SOAOr |

Click **OK** in the Assign dialog.

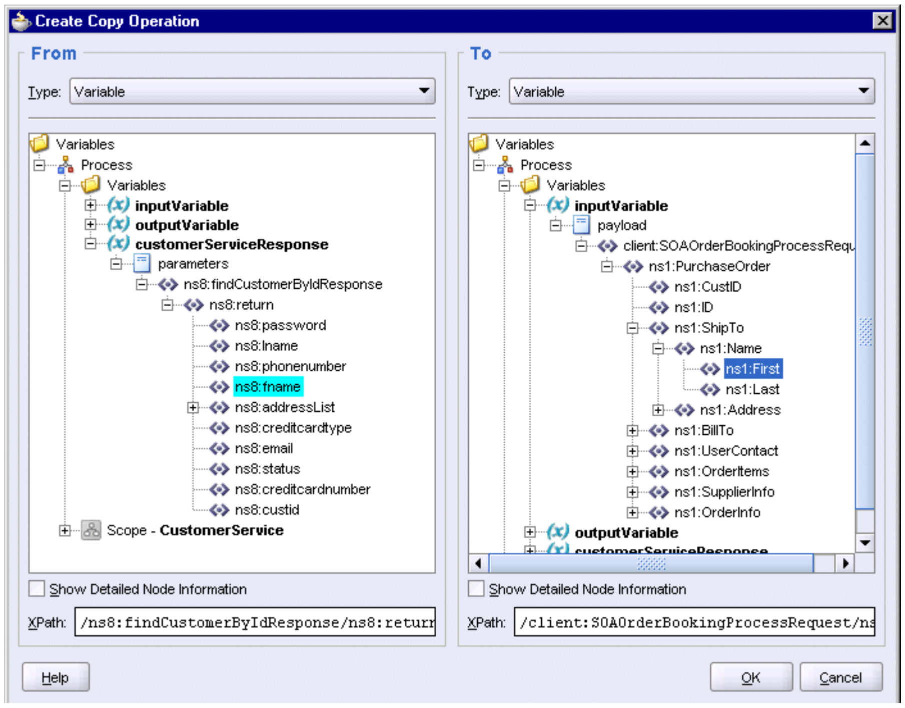
7. Select File > Save to save your work.

## 8.8.7 Copy the Customer's First and Last Names to the inputVariable ("AssignCustomerResponse" Assign Activity)

This assign activity assigns the first and last names of the customer (which were retrieved from the database) to the `inputVariable`.

1. Drag the Assign activity icon from the Component Palette and drop it below the "AssignInitialCustomerResponse" activity.
2. Double-click the new assign activity to display the Assign dialog.
3. In the Assign dialog, click the General tab, and set the **Name** to **AssignCustomerResponse**.
4. Still in the Assign dialog, click the Copy Operation tab. You will create two copy operations.
5. Create the first copy operation: Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.
   - In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **customerServiceResponse** > **parameters** > **ns8:findCustomerByIdResponse** > **ns8:return** > **ns8:fname**.
   - In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder** > **ns1:ShipTo** > **ns1:Name** > **ns1:First**.

***Figure 8–76 Create Copy Operation Dialog for "AssignCustomerResponse" Activity, First Copy Operation***

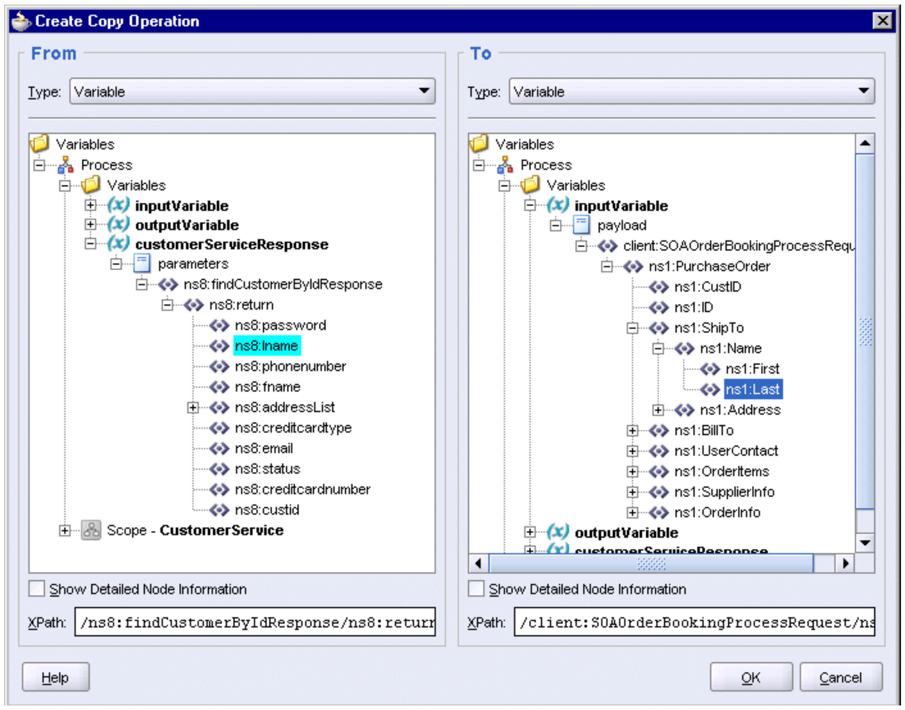


```
From
Type: Variable
Variables
  Process
    Variables
      inputVariable
      outputVariable
      customerServiceResponse
        parameters
          ns8:findCustomerByIdResponse
            ns8:return
              ns8:password
              ns8:lname
              ns8:phonenumber
              ns8:fname
              ns8:addressList
              ns8:creditcardtype
              ns8:email
              ns8:status
              ns8:creditcardnumber
              ns8:custid
    Scope - CustomerService
Show Detailed Node Information
XPath: /ns8:findCustomerByIdResponse/ns8:retur

To
Type: Variable
Variables
  Process
    Variables
      inputVariable
        payload
          client:SOAOrderBookingProcessRequ
            ns1:PurchaseOrder
              ns1:CustID
              ns1:ID
              ns1:ShipTo
                ns1:Name
                  ns1:First
                  ns1:Last
                ns1:Address
              ns1:BillTo
              ns1:UserContact
              ns1:OrderItems
              ns1:SupplierInfo
              ns1:OrderInfo
      outputVariable
      customerServiceResponse
Show Detailed Node Information
XPath: /client:SOAOrderBookingProcessRequest/ns
```

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

6. Create the second copy operation: Select **Copy Operation** from the **Create** dropdown again. This displays the Create Copy Operation dialog.
   - In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **customerServiceResponse** > **parameters** > **ns8:findCustomerByIdResponse** > **ns8:return** > **ns8:lname**.
   - In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder** > **ns1:ShipTo** > **ns1:Name** > **ns1:Last**.

***Figure 8–77 Create Copy Operation Dialog for "AssignCustomerResponse" Activity, Second Copy Operation***



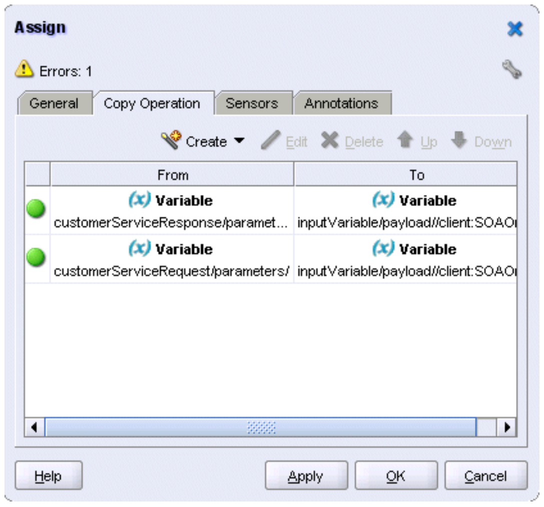
XPath: `/ns8:findCustomerByIdResponse/ns8:returr`

XPath: `/client:SOAOrderBookingProcessRequest/ns`

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

7. You should see two copy operations in the Assign dialog. Click **OK**.

***Figure 8–78 Assign Dialog for the "AssignCustomerResponse" Activity***



| | From | To |
|---|---|---|
| ● | Variable customerServiceResponse/paramet... | Variable inputVariable/payload/client:SOAO |
| ● | Variable customerServiceRequest/parameters/ | Variable inputVariable/payload/client:SOAO |

8. Select File > Save to save your work.

### 8.8.8 Minimize the "CustomerService" Scope

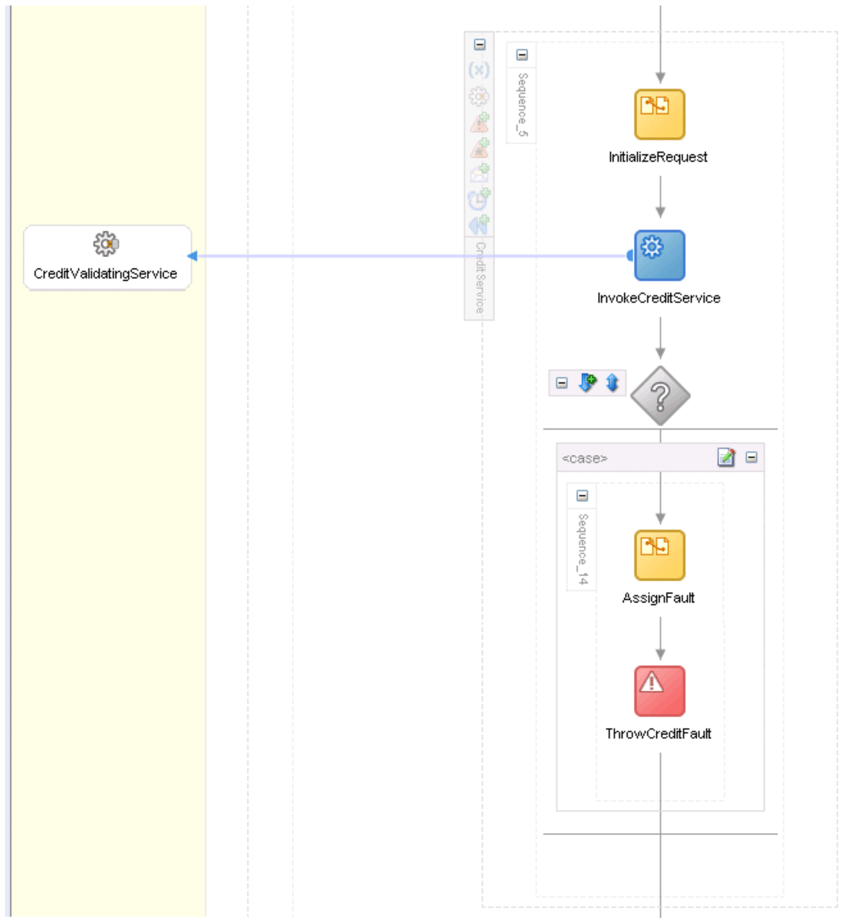
Click the [-] icon to minimize the "CustomerService" scope.

## 8.9 Verify the Customer's Credit Card ("CreditService" Scope)

This scope verifies the credit of the customer. If a customer does not pass the credit check, the scope throws a fault and does not continue with the rest of the flow.

Figure 8–79 shows the activities in the "CreditService" scope.

*Figure 8–79 Activities in the CreditService Scope*



### 8.9.1 Create "CreditValidatingService" Partner Link

The "CreditService" scope uses the CreditService created in Chapter 5, "Creating the CreditService Project". The "CreditValidatingService" partner link is the interface to the CreditService.

1. Copy the following file from the `soademo_101310_prod.zip` file to the `SOAOrderBooking\bpel` directory.

   - `CreditValidatingService.wsdl`

   In the `soademo_101310_prod.zip` file, the `CreditValidatingService.wsdl` file is located in the `SOAOrderBooking\bpel` directory.

2. Verify the URL in the `CreditValidatingService.wsdl` file.

   a. In JDeveloper, select File > Open and open the `CreditValidatingService.wsdl` file.

   b. Click the Source tab at the bottom of the editor to view the lines in the file.

   c. The `http://localhost:8888` reference in the file assumes that Oracle Application Server is running on the same machine as JDeveloper, and that Oracle Application Server is listening for requests on port 8888.

If necessary, change `localhost` to the name of the machine running Oracle Application Server, and `8888` to the correct port used by your Oracle Application Server installation, for example: `mypc.mydomain.com:8889`.

**d.** If you edited the file, save the file and close it.

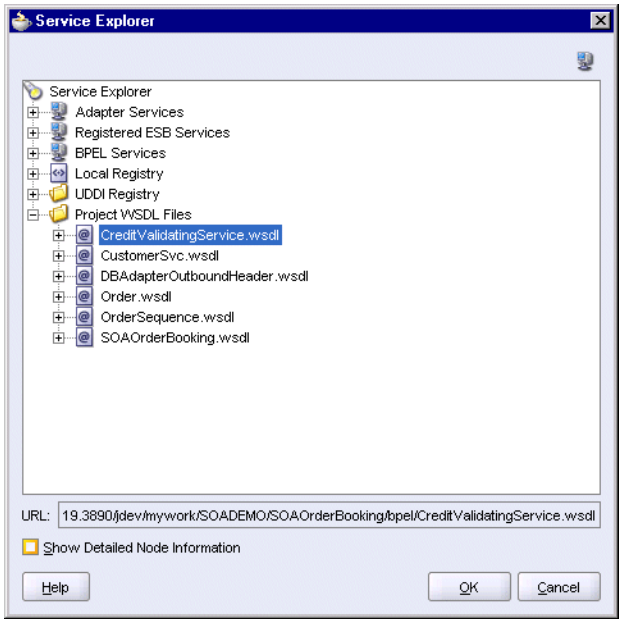
**3.** In the Component Palette, select **Services** from the dropdown.

**4.** Drag the Partner Link icon from the Component Palette and drop it in a **Services** swimlane.

**5.** In the Create Partner Link dialog:

- **Name**: enter **CreditValidatingService**.
- **WSDL File**: click the Service Explorer icon (second icon from the left) to display the Service Explorer dialog. In the Service Explorer dialog, expand **Project WSDL Files** and select **CreditValidatingService.wsdl**.

***Figure 8–80 Service Explorer Dialog for "CreditValidatingService" Partner Link***



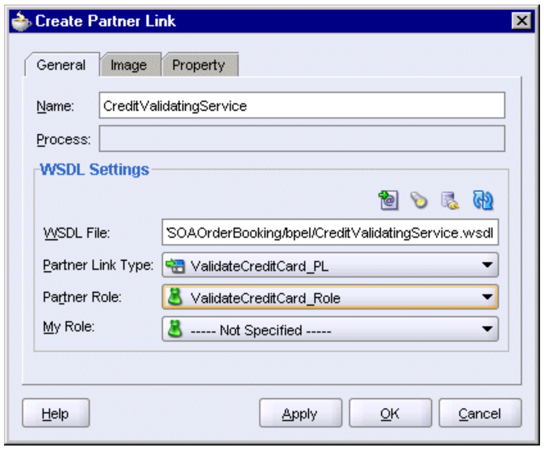
URL: 19.3890/jdev/mywork/SOADEMO/SOAOrderBooking/bpel/CreditValidatingService.wsdl

Click **OK** in the Service Explorer.

- **Partner Link Type**: select **ValidateCreditCard_PL** (automatically filled in for you).
- **Partner Role**: select **ValidateCreditCard_Role**.
- **My Role**: leave it blank.

The Create Partner Link dialog should look like this:

***Figure 8–81 Create Partner Link for the "CreditValidatingService" Partner Link***



Name: CreditValidatingService
Process:
WSDL File: SOAOrderBooking/bpel/CreditValidatingService.wsdl
Partner Link Type: ValidateCreditCard_PL
Partner Role: ValidateCreditCard_Role
My Role: ----- Not Specified -----

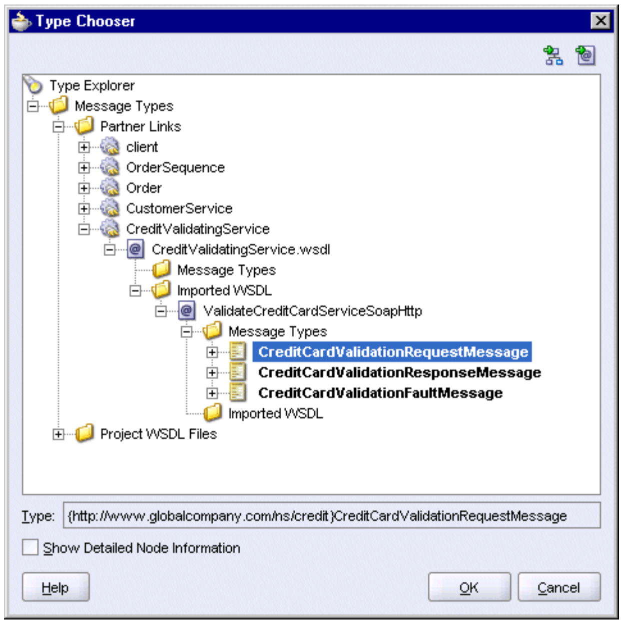
Click **OK** in the Create Partner Link dialog.

## 8.9.2 Create the "CreditService" Scope

Create a new scope called "CreditService".

1. In the Component Palette, select **Process Activities** from the dropdown.
2. Drag the Scope icon from the Component Palette and drop it below the "CustomerService" scope.
3. Double-click the new scope to display the Scope dialog.
4. In the Scope dialog, in the General tab:
   - **Name**: enter **CreditService**.
   - **Variable Access Serializable**: do not select.
5. Click the Variables tab. You need to create two variables for this scope.
6. In the Variables tab, click **Create**.
7. In the Create Variable dialog:
   - **Name**: enter **validateRequest**.
   - Select **Message Type** and click the flashlight icon to display the Type Chooser. In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **CreditValidatingService** > **CreditValidatingService.wsdl** > **Imported WSDL** > **ValidateCreditCardServiceSoapHttp** > **Message Types** > **CreditCardValidationRequestMessage**.

***Figure 8–82 Type Chooser Dialog for the "validateRequest" Variable***

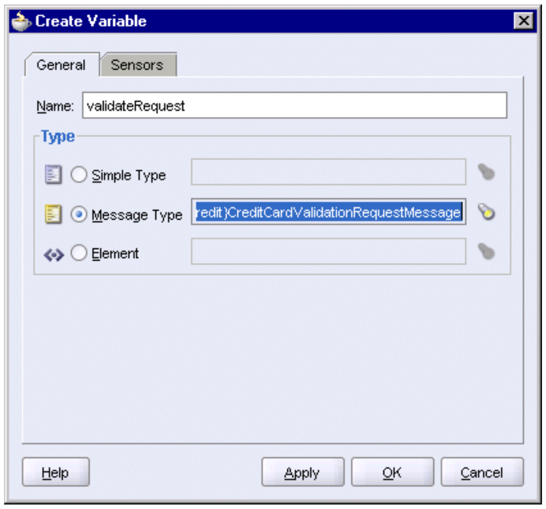


Type: {http://www.globalcompany.com/ns/credit}CreditCardValidationRequestMessage

Click **OK** in the Type Chooser.

8. In the Create Variable dialog, the Message Type is set to `{http://www.globalcompany.com/ns/credit}CreditCardValidationRequestMessage`.

***Figure 8–83 Create Variable Dialog for the "validateRequest" Variable***



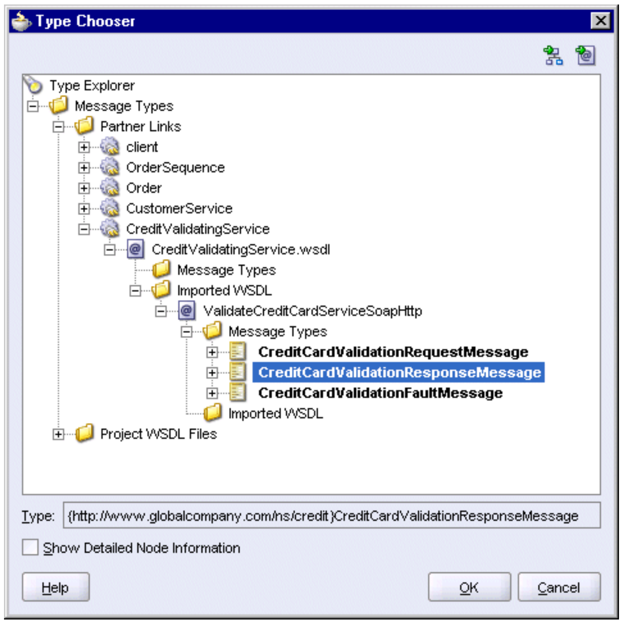
Name: validateRequest

[✓ Message Type]: redit}CreditCardValidationRequestMessage

9. Click **OK** in the Create Variable dialog.
10. Click **Create** again to create a second variable.
11. In the Create Variable dialog:
    - **Name**: enter **validateResponse**.
    - Select **Message Type** and click the flashlight icon to display the Type Chooser. In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **CreditValidatingService** > **CreditValidatingService.wsdl** > **Imported WSDL**

> **ValidateCreditCardServiceSoapHttp** > **Message Types** > **CreditCardValidationResponseMessage**.

*Figure 8–84 Type Chooser Dialog for the "validateResponse" Variable*


Type Chooser

Type Explorer
- Message Types
  - Partner Links
    - client
    - OrderSequence
    - Order
    - CustomerService
    - CreditValidatingService
      - CreditValidatingService.wsdl
        - Message Types
        - Imported WSDL
          - ValidateCreditCardServiceSoapHttp
            - Message Types
              - **CreditCardValidationRequestMessage**
              - **CreditCardValidationResponseMessage**
              - **CreditCardValidationFaultMessage**
            - Imported WSDL
  - Project WSDL Files

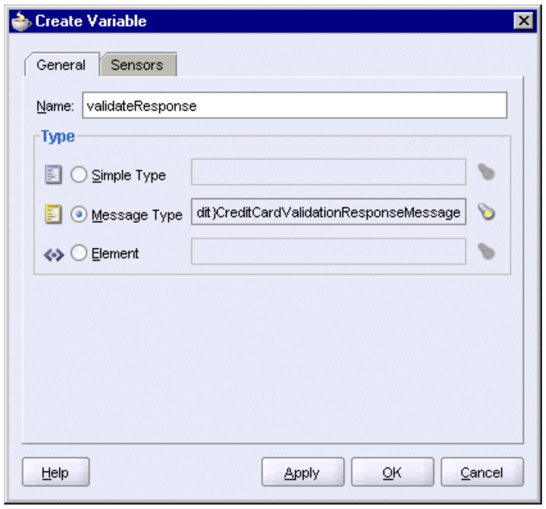
Type: {http://www.globalcompany.com/ns/credit}CreditCardValidationResponseMessage

Show Detailed Node Information

Click **OK** in the Type Chooser.

12. In the Create Variable dialog, the Message Type is set to `{http://www.globalcompany.com/ns/credit}CreditCardValidationResponseMessage`.

*Figure 8–85 Create Variable Dialog for the "validateResponse" Variable*


Create Variable

Name: validateResponse

Type

Simple Type

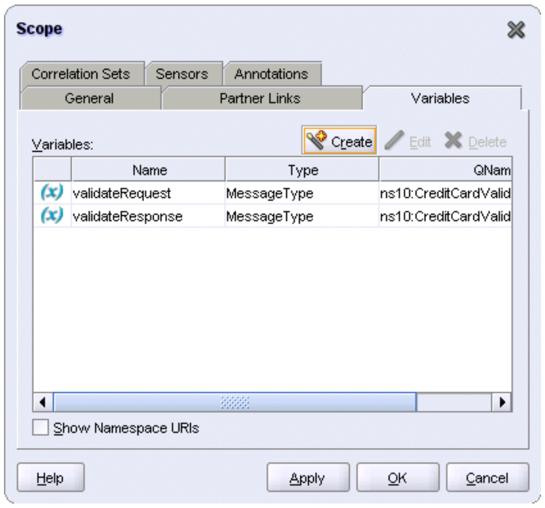
[✓ Message Type] dit}CreditCardValidationResponseMessage

Element

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

14. The `validateRequest` and `validateResponse` variables appear in the Variables tab of the Scope dialog.

*Figure 8–86 Scope Dialog for the "CreditService" Scope*



| Name | Type | QNam |
|---|---|---|
| validateRequest | MessageType | ns10:CreditCardValid |
| validateResponse | MessageType | ns10:CreditCardValid |

Click **OK** in the Scope dialog.

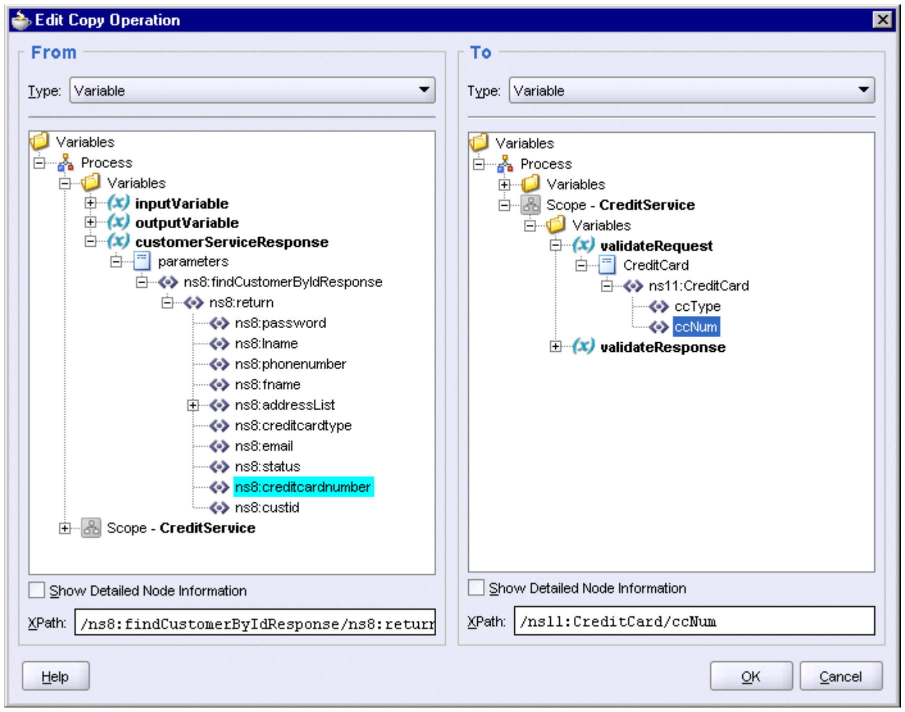
**15.** Select File > Save to save your work.

## 8.9.3 Assign the Credit Card Number and Credit Card Type Information ("InitializeRequest" Assign Activity)

This assign activity copies the credit card number and type (which were retrieved from the CustomerService's findCustomerById operation) to the `validateRequest` variable.

1. Expand the "CreditService" scope.
2. Drag the Assign activity icon from the Component Palette and drop it in the "CreditService" scope.
3. Double-click the new assign activity to display the Assign dialog.
4. In the Assign dialog, click the General tab, and set the **Name** to **InitializeRequest**.
5. Still in the Assign dialog, click the Copy Operation tab. You will create two copy operations.
6. Create the first copy operation: Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.
   - In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **customerServiceResponse** > **parameters** > **ns8:findCustomerByIdResponse** > **ns8:return** > **ns8:creditcardnumber**.
   - In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - Credit Service** > **Variables** > **validateRequest** > **CreditCard** > **ns11:CreditCard** > **ccNum**.

*Figure 8–87 Create Copy Operation Dialog for the "InitializeRequest" Activity, First Copy Operation*



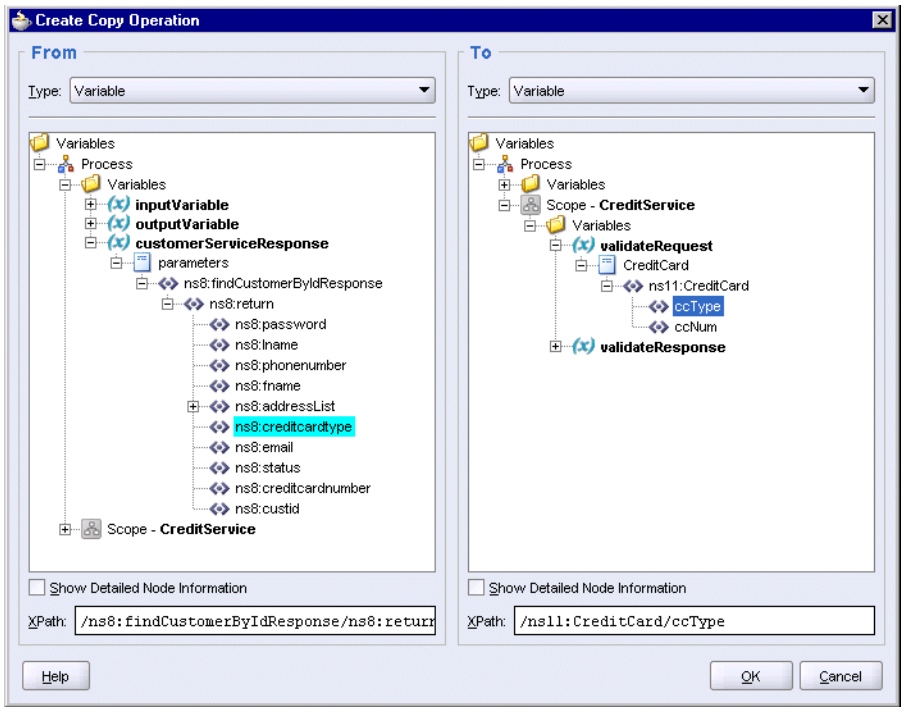
Click **OK** in the Create Copy Operation dialog.

7. Create the second copy operation: Select **Copy Operation** from the **Create** dropdown again. This displays the Create Copy Operation dialog.

   - In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **customerServiceResponse** > **parameters** > **ns8:findCustomerByIdResponse** > **ns8:return** > **ns8:creditcardtype**.

   - In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - Credit Service** > **Variables** > **validateRequest** > **CreditCard** > **ns11:CreditCard** > **ccType**.

*Figure 8–88 Create Copy Operation Dialog for the "InitializeRequest" Activity, Second Copy Operation*



From Type: Variable

XPath: /ns8:findCustomerByIdResponse/ns8:return

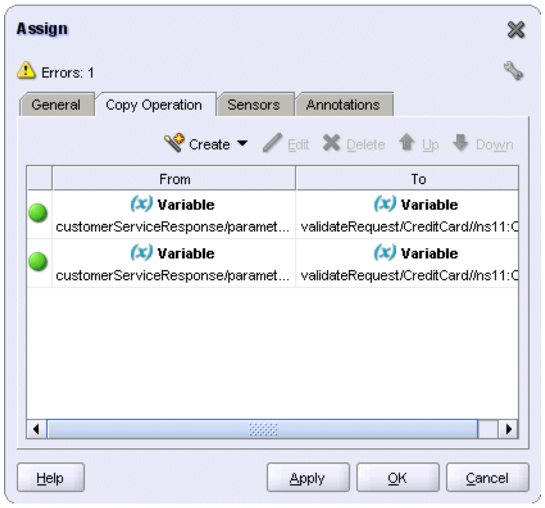
To Type: Variable

XPath: /ns11:CreditCard/ccType

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

8. You should see the copy operations in the Assign dialog. Click **OK**.

*Figure 8–89 Assign Dialog for the "InitializeRequest" Activity*



| From | To |
|---|---|
| Variable customerServiceResponse/paramet... | Variable validateRequest/CreditCard//ns11:C |
| Variable customerServiceResponse/paramet... | Variable validateRequest/CreditCard//ns11:C |

## 8.9.4 Verify the Customer's Credit Card ("InvokeCreditService" Invoke Activity)

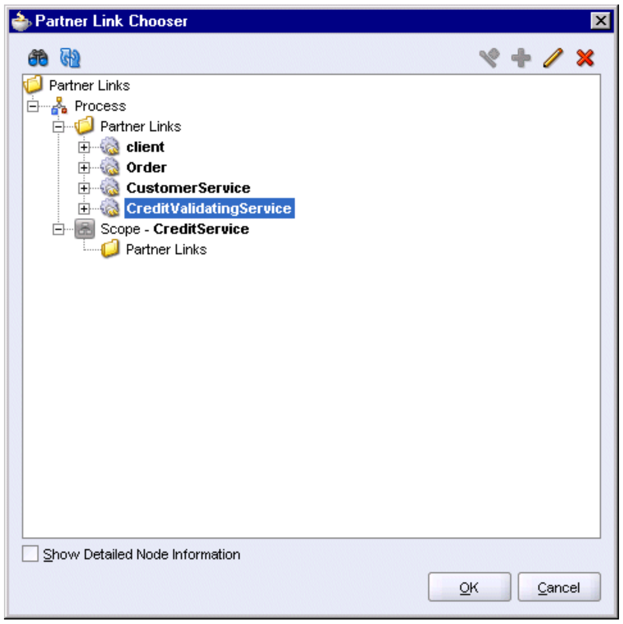
This invoke activity checks whether or not the customer's credit card is valid. The invoke activity uses the values assigned in the previous assign activity.

1. Drag the Invoke icon from the Component Palette and drop it below the "InitializeRequest" activity.
2. Do one of the following to display the Invoke dialog:

- Drag one of the arrows on the side of the Invoke_1 activity and drop it on the "CreditValidatingService" partner link. This associates the invoke activity with the partner link.
- Double-click the new Invoke_1 activity.

3. In the Invoke dialog, set these values:
   - **Name**: enter **InvokeCreditService**.
   - **Partner Link**: should be set to **CreditValidatingService**. If not, click the flashlight and select **CreditValidatingService** from the Partner Link Chooser.

***Figure 8–90 Partner Link Chooser for the "InvokeCreditService" Activity***

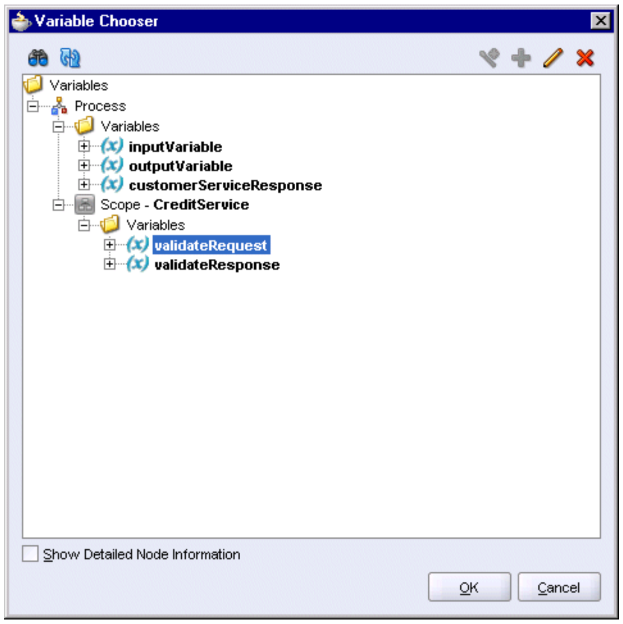

Partner Link Chooser

```
Partner Links
  Process
    Partner Links
      client
      Order
      CustomerService
      CreditValidatingService
    Scope - CreditService
      Partner Links
```

Click **OK** in the Partner Link Chooser.

- **Operation**: select **VerifyCC** (should be filled in for you automatically).
- **Input Variable**: click the Browse Variables icon (the second icon from the left) and select **Variables** > **Process** > **Scope - CreditService** > **Variables** > **validateRequest**.

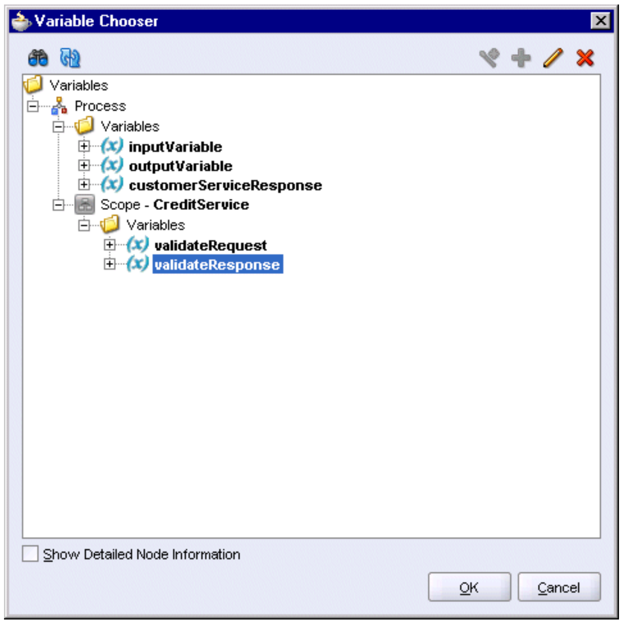
*Figure 8–91 Variable Chooser Dialog for the Input Variable for the "InvokeCreditService" Activity*



Click **OK** in the Variable Chooser.

- **Output Variable**: click the Browse Variables icon (the second icon from the left) and select **Variables** > **Process** > **Scope - CreditService** > **Variables** > **validateResponse**.

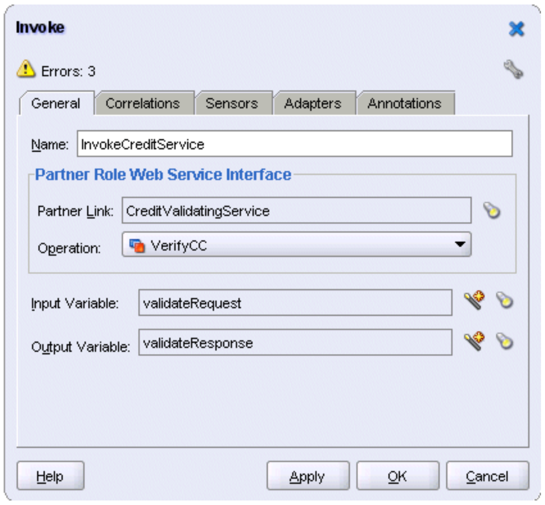
*Figure 8–92 Variable Chooser Dialog for the Output Variable for the "InvokeCreditService" Activity*



Click **OK** in the Variable Chooser.

The Invoke dialog should look like this:

*Figure 8–93 Invoke Dialog for the "InvokeCreditService" Activity*



Name: InvokeCreditService

Partner Role Web Service Interface

Partner Link: CreditValidatingService

Operation: VerifyCC

Input Variable: validateRequest

Output Variable: validateResponse

4. Click **OK** in the Invoke dialog.
5. Select File > Save to save your work.

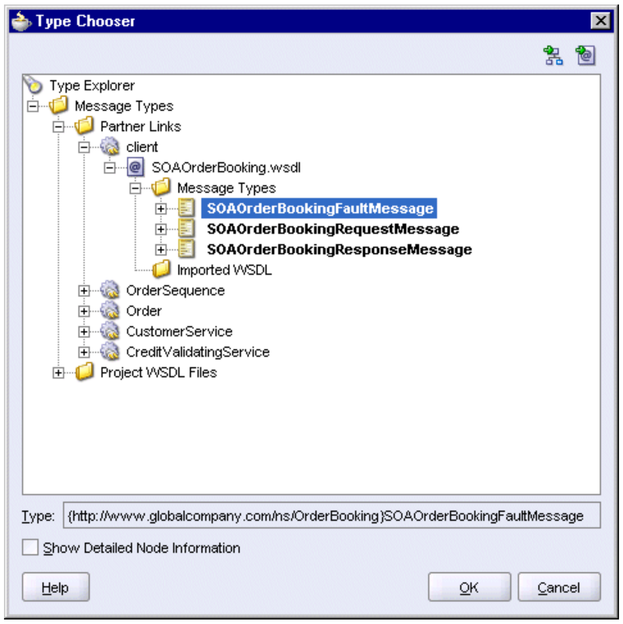
## 8.9.5 Create the "OrderBookingFault" Process Variable

Create the `OrderBookingFault` variable in the SOAOrderBooking scope. This variable is created at this level so that any activity in this BPEL flow can access it.

1. Scroll to the top of the page and double-click the SOAOrderBooking scope. You can double-click the "SOAOrderBooking" text that is sideways. This displays the Process dialog.
2. In the Process dialog, click **Create** in the Variables tab. This displays the Create Variable dialog.
3. In the Create Variable dialog:
   - **Name**: enter **OrderBookingFault**.
   - **Type**: select **Message Type**, and click the flashlight icon. This displays the Type Chooser dialog.

     In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **client** > **SOAOrderBooking.wsdl** > **Message Types** > **SOAOrderBookingFaultMessage**.

***Figure 8–94 Type Chooser Dialog for the "OrderBookingFault" Process Variable***

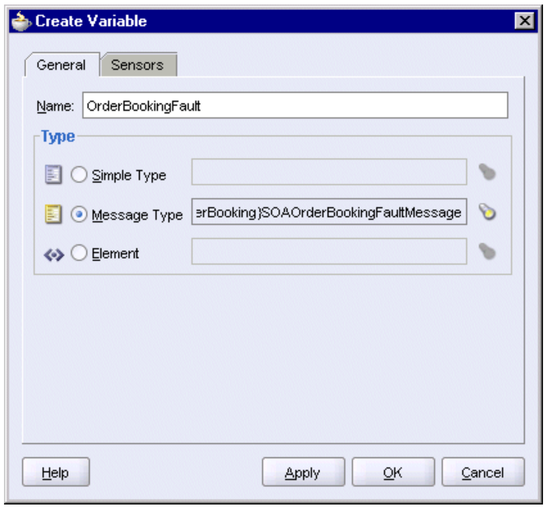


Type: {http://www.globalcompany.com/ns/OrderBooking}SOAOrderBookingFaultMessage

[ ] Show Detailed Node Information

Click **OK** in the Type Chooser. The Create Variable dialog now looks like this:

***Figure 8–95 Create Variable Dialog for the "OrderBookingFault" Process Variable***



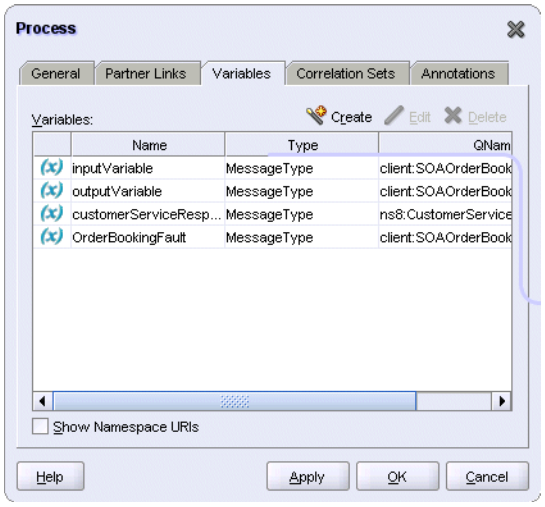
Name: OrderBookingFault

Simple Type [✓ Message Type] Element

Message Type: erBooking}SOAOrderBookingFaultMessage

4. Click **OK** in the Create Variable dialog. The `OrderBookingFault` variable appears in the Process dialog.

***Figure 8–96 Process Dialog***



Variables:

| | Name | Type | QNam |
|---|---|---|---|
| (x) | inputVariable | MessageType | client:SOAOrderBook |
| (x) | outputVariable | MessageType | client:SOAOrderBook |
| (x) | customerServiceResp... | MessageType | ns8:CustomerService |
| (x) | OrderBookingFault | MessageType | client:SOAOrderBook |

5. Select File > Save to save your work.

## 8.9.6 Check the Results of the Credit Card Validation (Switch Activity)

This switch checks the result of the "InvokeCreditService" invoke activity. If the customer's credit card is valid, the flow continues. If the customer's credit card is not valid, the switch throws a fault.

1. Drag the Switch icon from the Component Palette and drop it below the "InvokeCreditService" activity.
2. Expand the switch.
3. Delete the <otherwise> case. This switch only handles invalid credit responses, for which it throws a fault. For credit cards that are valid, the switch does not apply to them and for those cases, they just continue to the next step in the flow.

### 8.9.6.1 Specify the Condition for <case>

For the <case> branch, you want to handle cases where a customer's credit is not valid. This information is stored in the `validateResponse` variable.

1. Double-click the title bar of the <case> box to display the Switch Case dialog.
2. In the Switch Case dialog, click the XPath Expression Builder icon above the Expression box to display the Expression Builder dialog.
3. In the Expression Builder dialog, in the BPEL Variables box, select **Variables** > **Process** > **Scope - CreditService** > **Variables** > **validateResponse** > **valid** > **ns11:valid**.

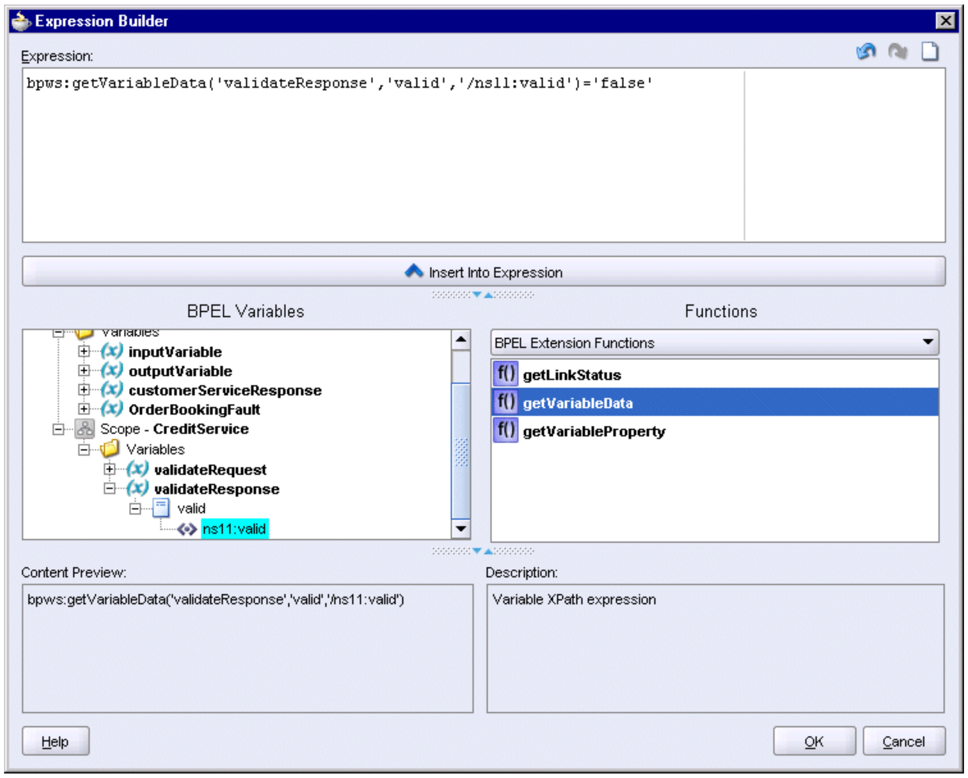
   The **Content Preview** box should show **bpws:getVariableData('validateResponse', 'valid', 'ns11:valid')**.

   The `ns11` prefix maps to the "`http://www.globalcompany.com/ns/credit.xsd`" namespace. It may be different on your system. If you want, you can scroll to the top of your `SOAOrderBooking.bpel` file (in source view) to verify the prefix.
4. Click **Insert Into Expression**. The Expression box should show the function with the three parameters.

5. Append **='false'** to the expression in the Expression box so that the expression looks like this:

```
bpws:getVariableData('validateResponse','valid','/ns11:valid')='false'
```

***Figure 8–97 Expression Builder Dialog Showing the Complete Expression for <case>***



```
bpws:getVariableData('validateResponse','valid','/ns11:valid')='false'
```

Content Preview: bpws:getVariableData('validateResponse','valid','/ns11:valid')

Description: Variable XPath expression

6. Click **OK** in the Expression Builder dialog.
7. Click **OK** in the Switch Case dialog.

### 8.9.6.2 Set the Value of the OrderBookingFault Variable ("AssignFault" Assign Activity)

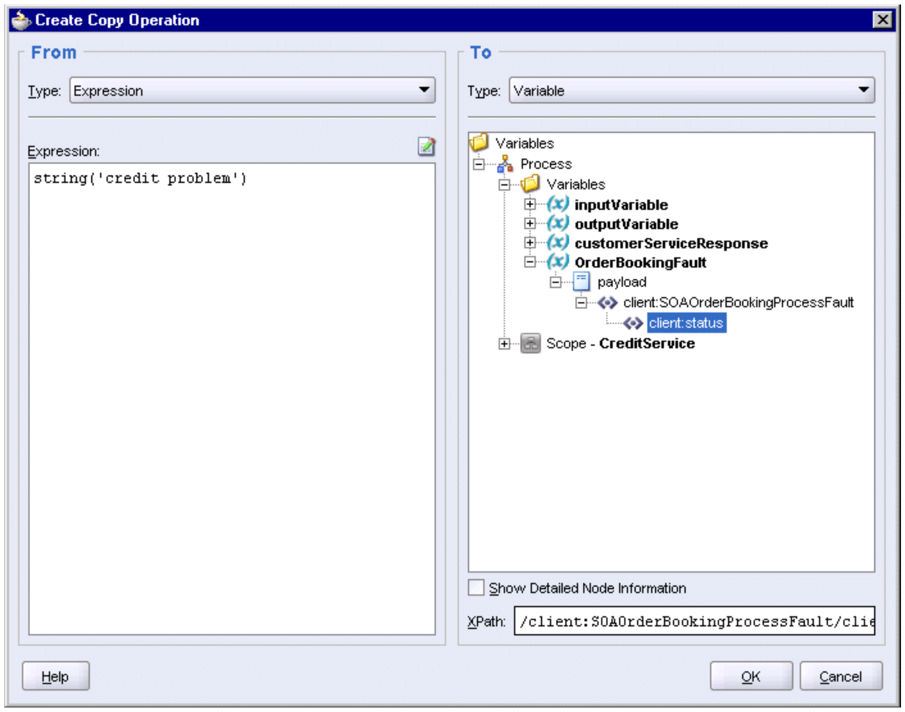
This assign activity sets the value of the `OrderBookingFault` variable to "credit problem".

1. Drag the Assign activity icon from the Component Palette and drop it in the <case> area of the switch.
2. Double-click the new assign activity to display the Assign dialog.
3. In the Assign dialog, click the General tab, and set the **Name** to **AssignFault**.
4. Still in the Assign dialog, click the Copy Operation tab. You will create one copy operation.
5. Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.
   - In the **From** side, set **Type** to **Expression**, and enter the following line in the Expression box:

     ```
     string('credit problem')
     ```

- In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **OrderBookingFault** > **payload** > **client:SOAOrderBookingProcessFault** > **client:status**.

***Figure 8–98 Create Copy Operation Dialog for the "AssignFault" Activity***



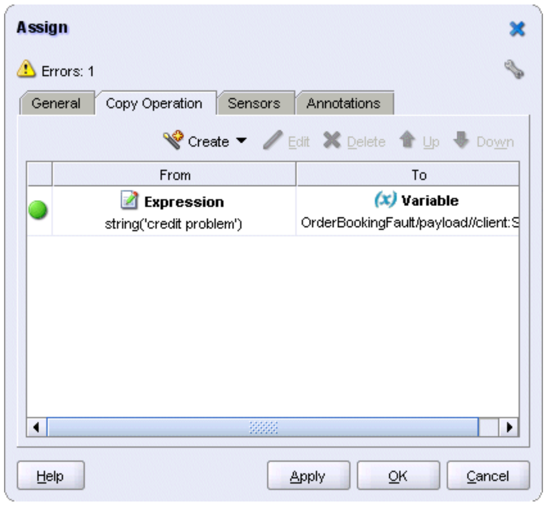
```
string('credit problem')
```

XPath: `/client:SOAOrderBookingProcessFault/clie`

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

6. You should see the copy operation in the Assign dialog. Click **OK**.

***Figure 8–99 Assign Dialog for the "AssignFault" Activity***



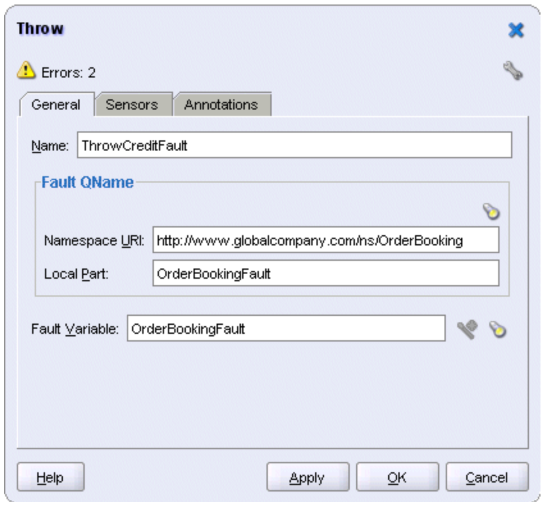
| | From | To |
|---|---|---|
| ● | Expression string('credit problem') | Variable OrderBookingFault/payload//client:S |

#### 8.9.6.3 Create the "ThrowCreditFault" Throw Activity

This throw activity throws a fault called `OrderBookingFault`. This fault value is stored in a variable also called `OrderBookingFault`. The SOAOrderBooking process terminates after executing the throw activity.

1. Drag the Throw icon from the Component Palette and drop it below the "AssignFault" activity.
2. Double-click the new throw activity to display the Throw dialog.
3. In the Throw dialog:
   - **Name**: enter **ThrowCreditFault**.
   - **Namespace URI**: enter **http://www.globalcompany.com/ns/OrderBooking**. You have to enter it manually.
   - **Local Part**: enter **OrderBookingFault**. You have to enter it manually.
   - **Fault Variable**: click the flashlight and select **OrderBookingFault**.

***Figure 8–100 Throw Dialog for the "ThrowCreditFault" Throw Activity***


Throw

Errors: 2

Name: ThrowCreditFault

Fault QName

Namespace URI: http://www.globalcompany.com/ns/OrderBooking

Local Part: OrderBookingFault

Fault Variable: OrderBookingFault

4. Click **OK** in the Throw dialog.
5. Select File > Save to save your work.

## 8.9.7 Minimize the "CreditService" Scope

Click the [-] to minimize the "CreditService" scope.

## 8.10 Set up Oracle Business Rules

The repository for Oracle Business Rules contains the rules used by the decision service in Oracle BPEL Process Manager to determine whether or not an order needs to be approved manually by a manager. The Oracle Business Rules repository is separate from the SOA Order Booking application: you can edit the rules without modifying and redeploying the SOA Order Booking application.

The rules that you will create in the repository are:

- If a customer's status is platinum, then a manager's approval is not required, regardless of the amount of the order.
- If an order's total is $1000 or more *and* the customer's status is not platinum, then a manager's approval is required.
- If an order's total is under $1000, then a manager's approval is not required.

## 8.10.1 Set up the Repository File

To create a repository file for Oracle Business Rules and to define the rules in it, you use Oracle Business Rules Rule Author ("Rule Author"), which is a Web-based tool that enables you to create and manage Oracle Business Rules repositories.

### Location of the Repository File

Create the repository file in the `SOAOrderBooking\bpel\rules\oracle` directory.

However, if you are running JDeveloper and Oracle Application Server on different machines, you have to create the repository file on the Oracle Application Server machine (because Rule Author creates the file on the Oracle Application Server machine). After you have created the repository file and populated it with rules, you copy it from the Oracle Application Server machine to the JDeveloper machine.

1. Create the following directory where you are building the SOA Order Booking application:

   *`SOADEMO`*`\SOAOrderBooking\bpel\rules\oracle\`

   This is the directory where you will place the Oracle Business Rules repository file.

2. In a browser, go to the Rule Author page. The URL for Rule Author is:

   `http://`*`host`*`:`*`port`*`/ruleauthor`

   *host* specifies the machine running Oracle Application Server, and *port* specifies the HTTP port (for example, 8888).

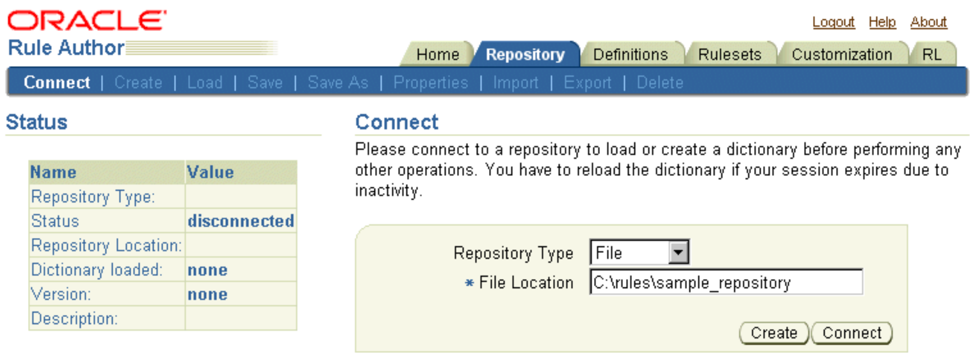
3. Log in as the `oc4jadmin` user.

4. In the **Repository** tab:

   - **Repository Type**: select **File**.
   - **File Location**: enter *`SOADEMO`*`\SOAOrderBooking\bpel\rules\oracle\sample_repository`. (*`SOADEMO`* refers to the directory where you are building the SOA Order Booking application.) Rule Author will create the `sample_repository` file.

     If you are running JDeveloper and Oracle Application Server on different machines, enter a path on the Oracle Application Server machine, for example, `C:\rules\sample_repository`. It does not matter where you place it, because after creating the file and defining the rules in it, you copy it from the Oracle Application Server machine to the *`SOADEMO`*`\SOAOrderBooking\bpel\rules\oracle\` directory on the JDeveloper machine.

***Figure 8–101 Rule Author, Connect Page***


ORACLE
Rule Author
Logout Help About
Home Repository Definitions Rulesets Customization RL
Connect | Create | Load | Save | Save As | Properties | Import | Export | Delete
Create Connect

Status

| Name | Value |
|---|---|
| Repository Type: | |
| Status | disconnected |
| Repository Location: | |
| Dictionary loaded: | none |
| Version: | none |
| Description: | |

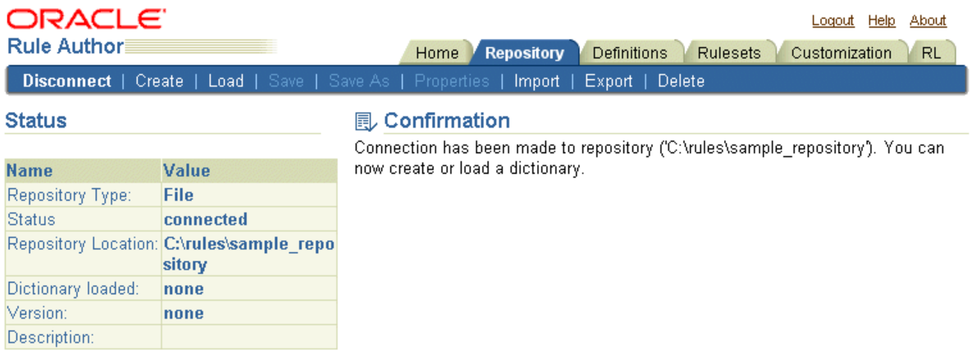
Connect

Please connect to a repository to load or create a dictionary before performing any other operations. You have to reload the dictionary if your session expires due to inactivity.

| | |
|---|---|
| Repository Type | File |
| * File Location | C:\rules\sample_repository |

Click **Create**. You should see a confirmation page. Rule Author is now connected to the new repository, and you can define rules in it.

***Figure 8–102 Rule Author, Confirmation Page***


ORACLE
Rule Author
Logout Help About
Home Repository Definitions Rulesets Customization RL
Disconnect | Create | Load | Save | Save As | Properties | Import | Export | Delete

Status

| Name | Value |
|---|---|
| Repository Type: | File |
| Status | connected |
| Repository Location: | C:\rules\sample_repository |
| Dictionary loaded: | none |
| Version: | none |
| Description: | |

Confirmation

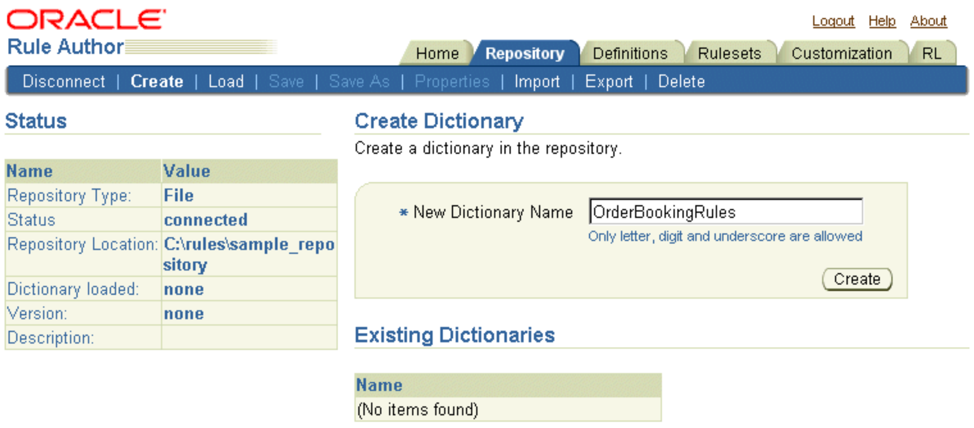
Connection has been made to repository ('C:\rules\sample_repository'). You can now create or load a dictionary.

## 8.10.2 Create a Dictionary in the Repository

A repository contains one or more dictionaries. A dictionary contains rulesets, which contain rules. A dictionary typically contains rulesets for an application.

1. Click the **Create** secondary tab on the Confirmation page. This displays the Create Dictionary page.
2. On the Create Dictionary page, enter **OrderBookingRules** as the dictionary name.

***Figure 8–103 Rule Author, Create Dictionary Page***


ORACLE
Rule Author
Logout Help About
Home | Repository | Definitions | Rulesets | Customization | RL
Disconnect | Create | Load | Save | Save As | Properties | Import | Export | Delete

Status

| Name | Value |
|---|---|
| Repository Type: | File |
| Status | connected |
| Repository Location: | C:\rules\sample_repository |
| Dictionary loaded: | none |
| Version: | none |
| Description: | |

Create Dictionary

Create a dictionary in the repository.

* New Dictionary Name: OrderBookingRules

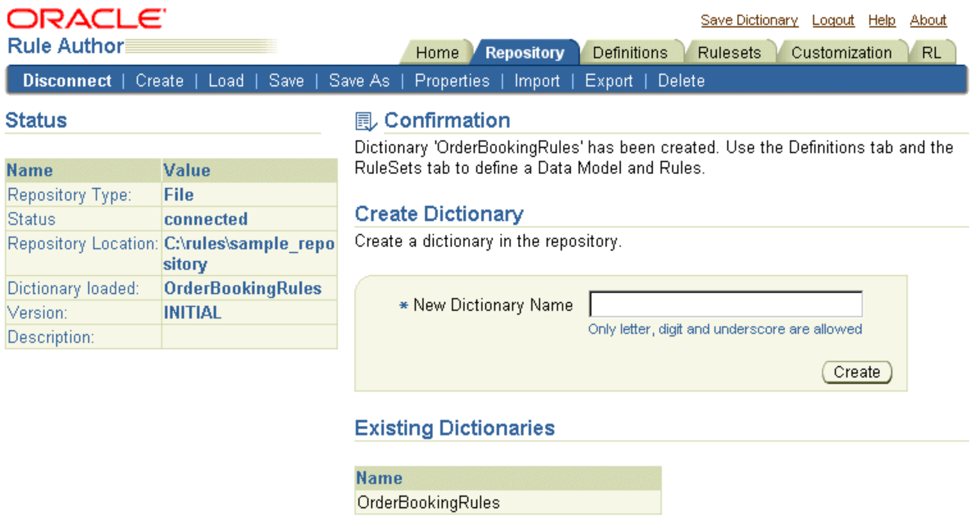
Only letter, digit and underscore are allowed

Existing Dictionaries

| Name |
|---|
| (No items found) |

3. Click **Create**. You should get a confirmation page.

***Figure 8–104 Rule Author, Create Dictionary Page, Confirmation***


ORACLE
Rule Author
Save Dictionary Logout Help About
Home | Repository | Definitions | Rulesets | Customization | RL
Disconnect | Create | Load | Save | Save As | Properties | Import | Export | Delete

Status

| Name | Value |
|---|---|
| Repository Type: | File |
| Status | connected |
| Repository Location: | C:\rules\sample_repository |
| Dictionary loaded: | OrderBookingRules |
| Version: | INITIAL |
| Description: | |

Confirmation

Dictionary 'OrderBookingRules' has been created. Use the Definitions tab and the RuleSets tab to define a Data Model and Rules.

Create Dictionary

Create a dictionary in the repository.

* New Dictionary Name:

Only letter, digit and underscore are allowed

Existing Dictionaries

| Name |
|---|
| OrderBookingRules |

## 8.10.3 Copy OrderBookingRules.xsd to the Oracle Application Server Machine

This step is required only if you are running JDeveloper and Oracle Application Server on different machines. If you are running both on the same machine, you already have the `OrderBookingRules.xsd` file on the Oracle Application Server machine (you copied the file in Section 8.3, "Copy Files").

The `OrderBookingRules.xsd` file in the `soademo_101310_prod.zip` file describes the XML elements that provide the facts for Oracle Business Rules. The XSD file is located in the `SOAOrderBooking\bpel` directory in the zip file.

If you are running JDeveloper and Oracle Application Server on different machines, copy this file from the `soademo_101310_prod.zip` file to the Oracle Application Server machine, to the directory where you placed the repository file (for example, `C:\rules`). See step 4 on page 8-71.

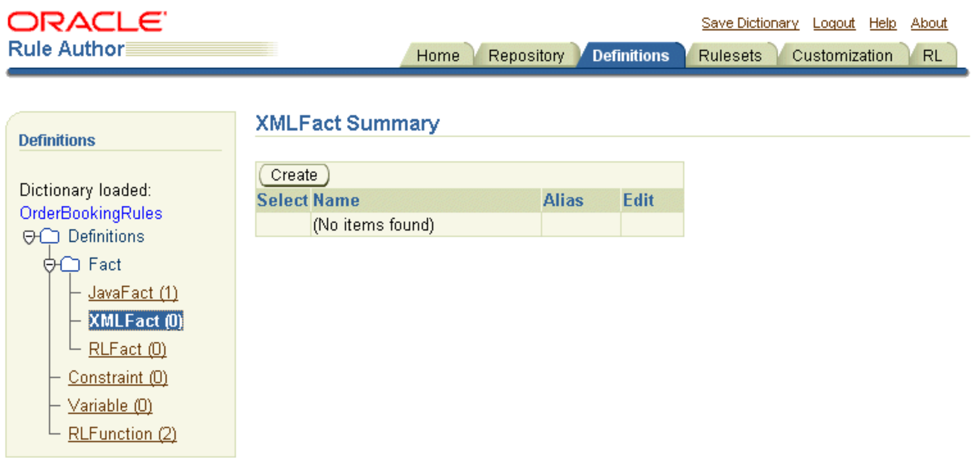
In Section 8.10.4, "Generate JAXB Classes for the Elements in the XML Schema", you use Rule Author to generate Java classes for the XML elements defined in `OrderBookingRules.xsd`.

### 8.10.4 Generate JAXB Classes for the Elements in the XML Schema

Use Rule Author to generate Java objects for the elements in the `OrderBookingRules.xsd` file.

1. Click the **Definitions** tab, then click **XMLFact** on the left side. This displays the XML Fact Summary page. At this time, the OrderBookingRules dictionary does not contain any XML facts.

***Figure 8–105 XML Fact Summary Page***



| Select | Name | Alias | Edit |
|---|---|---|---|
| | (No items found) | | |

2. Click **Create**.

3. On the XML Schema Selector page:

   - **XML Schema**: enter the fullpath to the `OrderBookingRules.xsd` file.

     If you are running JDeveloper and Oracle Application Server on the same machine, enter ***SOADEMO*\SOAOrderBooking\bpel\OrderBookingRules.xsd**.

     If you are running JDeveloper and Oracle Application Server on different machines, enter **C:\rules\OrderBookingRules.xsd**.

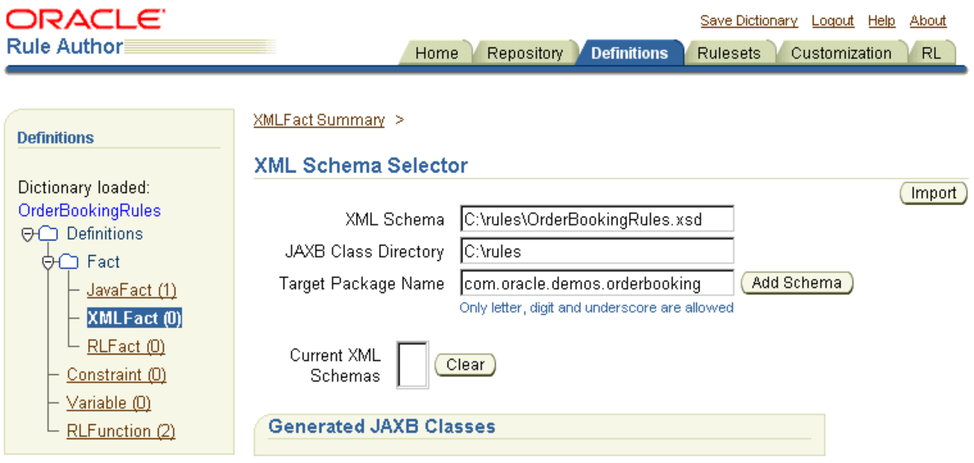
   - **JAXB Class Directory**: enter the fullpath to the directory where you want Rule Author to create the Java objects (.java and .class files).

     If you are running JDeveloper and Oracle Application Server on the same machine, enter ***SOADEMO*\SOAOrderBooking\bpel\rules**.

     If you are running JDeveloper and Oracle Application Server on different machines, enter **C:\rules**.

   - **Target Package Name**: enter **com.oracle.demos.orderbooking**. This specifies the package name for the classes that are to be created.

***Figure 8–106 XML Schema Selector Page***

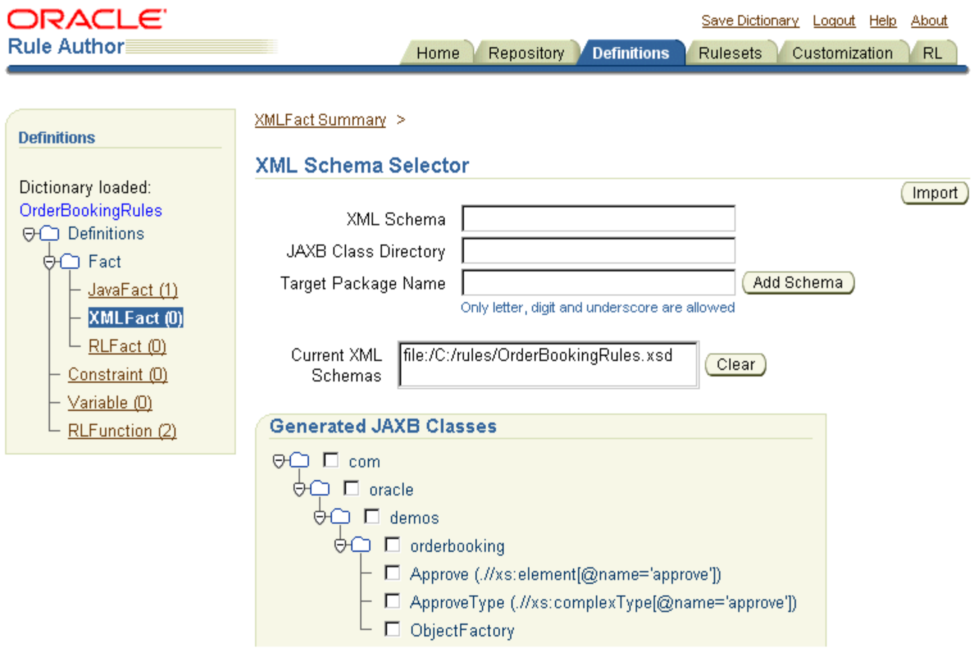


XML Schema: C:\rules\OrderBookingRules.xsd
JAXB Class Directory: C:\rules
Target Package Name: com.oracle.demos.orderbooking

4. Click **Add Schema**.

   Figure 8–107 shows the resulting page with the package hierarchy expanded.

***Figure 8–107 XML Schema Selector Page, Showing the Generated Classes***



Current XML Schemas: file:/C:/rules/OrderBookingRules.xsd

In the directory that you specified in the **JAXB Class Directory** field, you should see the following files:

- `Approve.java` and `Approve.class`
- `ApproveImpl.java` and `ApproveImpl.class`
- `ApproveType.java` and `ApproveType.class`
- `ApproveTypeImpl.java` and `ApproveTypeImpl.class`
- `jaxb.properties`

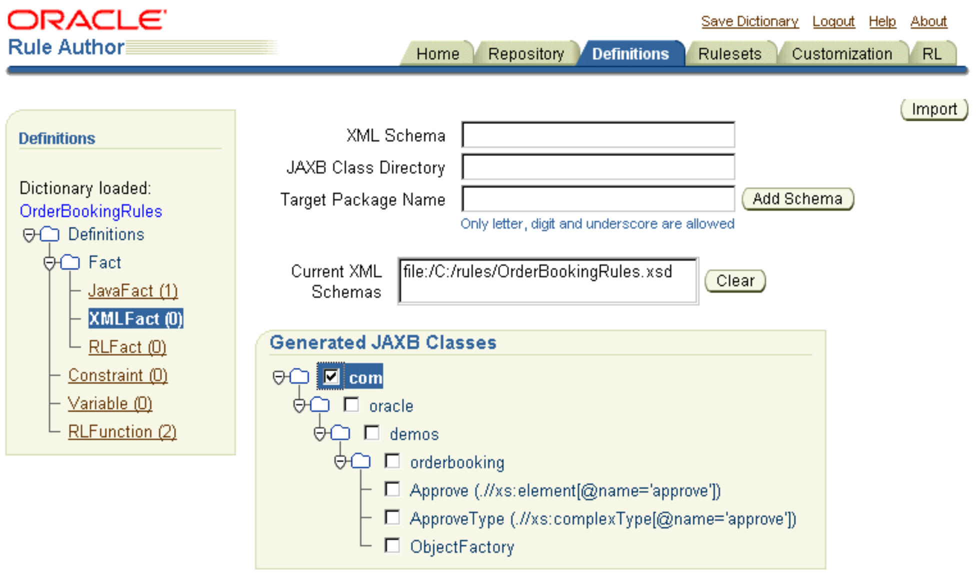
- `ObjectFactory.java` and `ObjectFactory.class`

### 8.10.5 Import the JAXB Classes into the Oracle Business Rules Data Model

After generating the JAXB classes, you can import them into the Oracle Business Rules data model. These JAXB classes become XML facts that you can use when you create your rules.

1. If you are not on the XML Schema Selector page, click the **Definitions** tab, then click **XML Fact** on the left side, then click **Create** on the XMLFact Summary page.
2. Select the check box next to **com**.

***Figure 8–108 XML Schema Selector Page, with "com" Selected***



Dictionary loaded:
OrderBookingRules
- Definitions
  - Fact
    - JavaFact (1)
    - XMLFact (0)
    - RLFact (0)
  - Constraint (0)
  - Variable (0)
  - RLFunction (2)

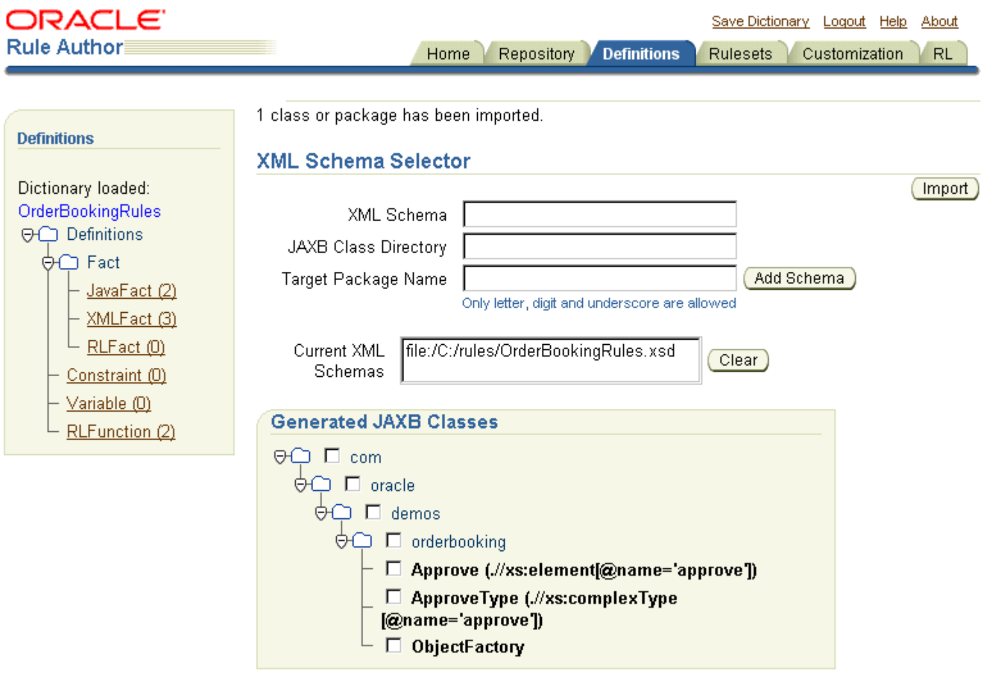
XML Schema:
JAXB Class Directory:
Target Package Name:
Only letter, digit and underscore are allowed

Current XML Schemas: file:/C:/rules/OrderBookingRules.xsd

- [✓] com
  - [ ] oracle
    - [ ] demos
      - [ ] orderbooking
        - [ ] Approve (.//xs:element[@name='approve'])
        - [ ] ApproveType (.//xs:complexType[@name='approve'])
        - [ ] ObjectFactory

3. Click **Import**. You should see a confirmation page. The classes that have been imported are shown in bold. Also on the left side, note that there are now three XML Facts.

***Figure 8–109 XML Schema Selector Page Showing the Imported Classes***



1 class or package has been imported.

XML Schema Selector

XML Schema
JAXB Class Directory
Target Package Name
Only letter, digit and underscore are allowed

Current XML Schemas: file:/C:/rules/OrderBookingRules.xsd

Dictionary loaded: OrderBookingRules

- Definitions
  - Fact
    - JavaFact (2)
    - XMLFact (3)
    - RLFact (0)
  - Constraint (0)
  - Variable (0)
  - RLFunction (2)

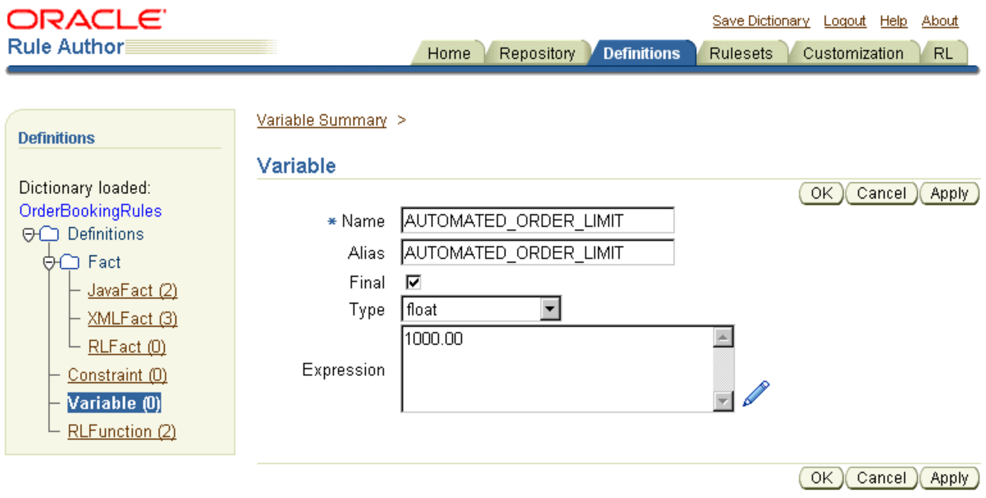
- com
  - oracle
    - demos
      - orderbooking
        - Approve (.//xs:element[@name='approve'])
        - ApproveType (.//xs:complexType [@name='approve'])
        - ObjectFactory

## 8.10.6 Define a Variable in the Data Model

You define variables in the data model so that if you need to make changes later, you only need to edit the value of the variable. In the case of the SOA Order Booking application, you create a variable called AUTOMATED_ORDER_LIMIT 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.

1. In the **Definitions** tab, click **Variable** on the left side.
2. In the Variable Summary page, click **Create**.
3. On the Variable page:
   - **Name**: enter **AUTOMATED_ORDER_LIMIT**.
   - **Alias**: enter **AUTOMATED_ORDER_LIMIT**.
   - **Final**: select this option.
   - **Type**: select **float**.
   - **Expression**: enter **1000.00**.

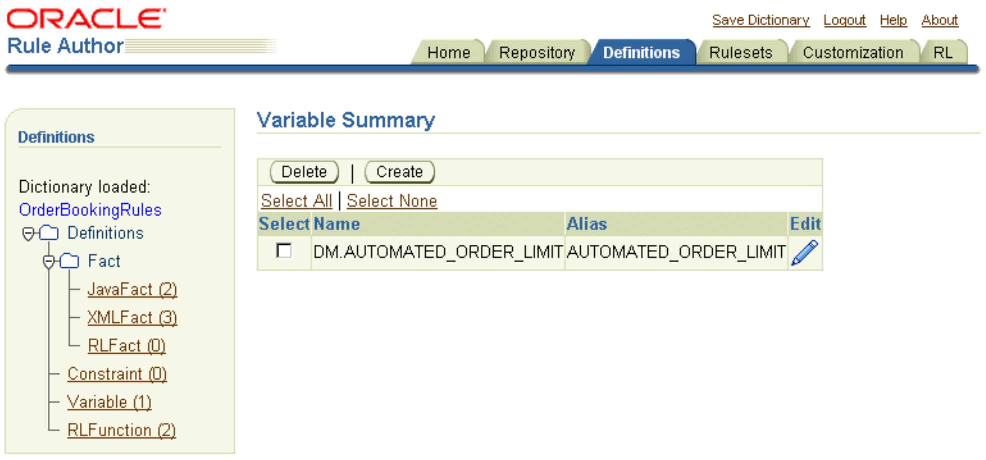
***Figure 8–110 Variable Page***



| | |
|---|---|
| * Name | AUTOMATED_ORDER_LIMIT |
| Alias | AUTOMATED_ORDER_LIMIT |
| Final | ✓ |
| Type | float |
| Expression | 1000.00 |

4. Click **OK**. Rule Author shows the Variable Summary page. Note that the variable name is prefixed with `DM` (for "data model").

***Figure 8–111 Variable Summary Page***



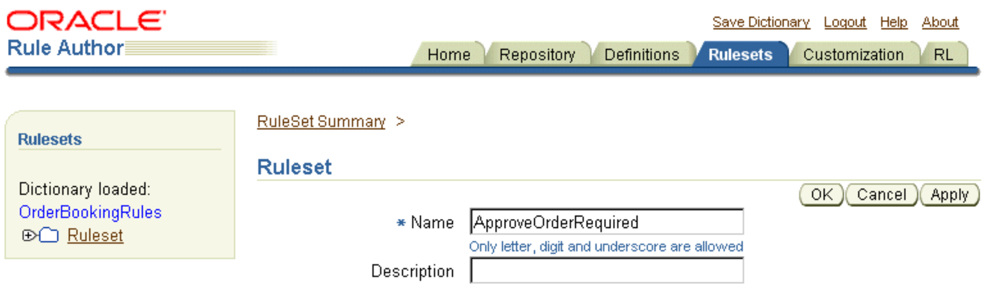
| Select | Name | Alias | Edit |
|---|---|---|---|
| ☐ | DM.AUTOMATED_ORDER_LIMIT | AUTOMATED_ORDER_LIMIT | ✎ |

## 8.10.7 Create a Ruleset

A ruleset contains rules. Before you can create rules, you need a ruleset.

1. Click the **Rulesets** tab. This displays the RuleSet Summary page.
2. On the RuleSet Summary page, click **Create**. This displays the Ruleset page.
3. On the Ruleset page, enter **ApproveOrderRequired** as the **Name**. You can also enter a description if you like.

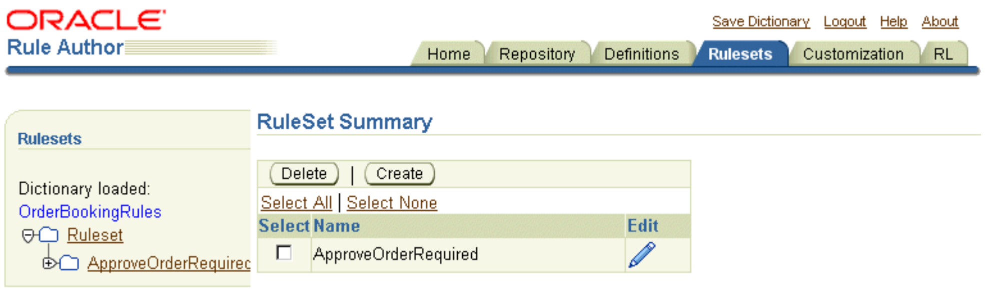
*Figure 8–112 Ruleset Page*



| | |
|---|---|
| * Name | ApproveOrderRequired |
| | Only letter, digit and underscore are allowed |
| Description | |

4. Click **OK**. You should see the RuleSet Summary page showing the new ruleset. The new ruleset also appears on the left side.

*Figure 8–113 RuleSet Summary Page*



| Select | Name | Edit |
|---|---|---|
| ☐ | ApproveOrderRequired | ✎ |

## 8.10.8 Create Rules

You can now define your rules in the "ApproveOrderRequired" ruleset. For the SOA Order Booking application, create the following three rules:

*Table 8–4 Rules*

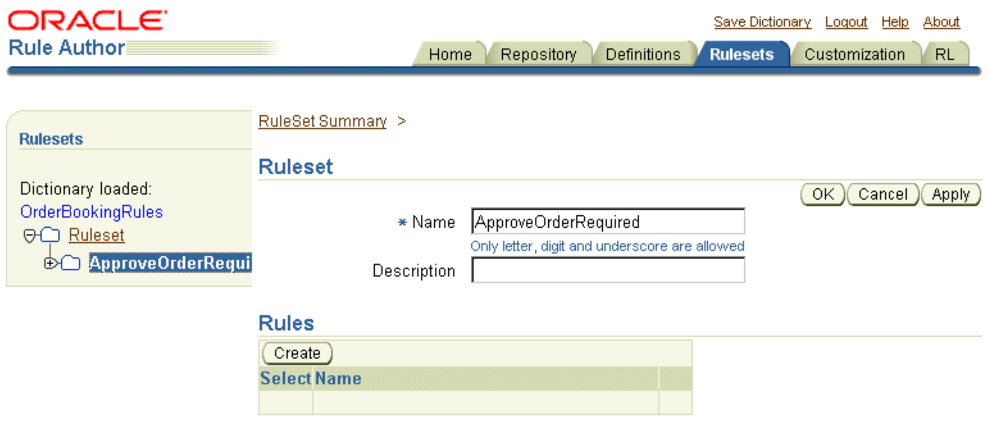
| Rule Name | Description |
|---|---|
| `belowLimit` | If an order's total price is less than the value set in the AUTOMATED_ORDER_LIMIT variable, the order is approved automatically. See Section 8.10.8.1, "Create the "belowLimit" Rule". |
| `overLimit` | If an order's total price is greater than or equal to the value set in the AUTOMATED_ORDER_LIMIT variable *and* the customer is not a platinum customer, the order requires a manager's approval. See Section 8.10.8.2, "Create the "overLimit" Rule". |
| `platinumMember` | If the customer is a platinum customer, the order is approved automatically, regardless of the order amount. See Section 8.10.8.3, "Create the "platinumMember" Rule". |

### 8.10.8.1 Create the "belowLimit" Rule

The "belowLimit" rule states that if an order's total price is less than the value set in the AUTOMATED_ORDER_LIMIT variable, the order is approved automatically.

1. Click the **Rulesets** tab.
2. Click the **ApproveOrderRequired** ruleset on the left side. This displays the Ruleset page.

*Figure 8–114 Ruleset Page for the "ApproveOrderRequired" Ruleset*

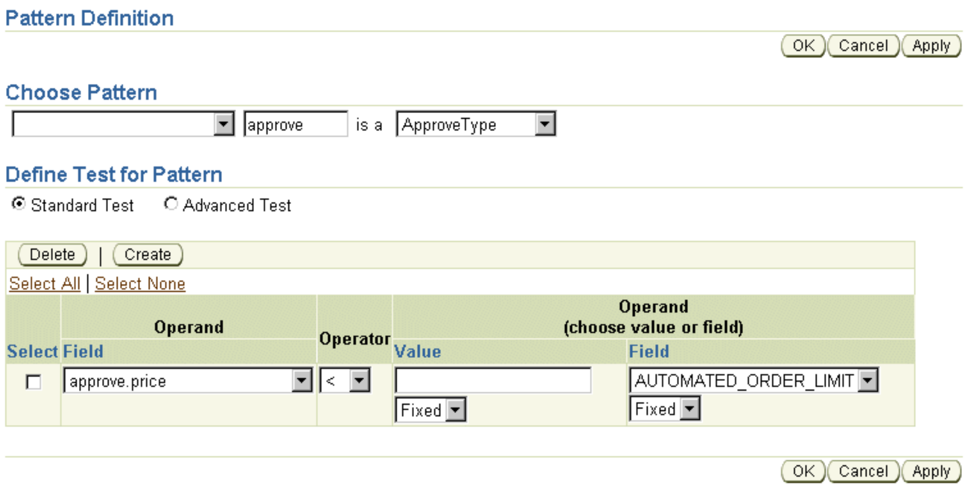


* Name: ApproveOrderRequired
Only letter, digit and underscore are allowed
Description:

3. In the Rules section, click **Create**. This displays the Rule page.
4. On the Rule page, enter **belowLimit** for the **Name**. Keep the default value for **Priority**.
5. In the "If" section, click **New Pattern**. This pops up the Pattern Definition window.
6. In the Pattern Definition window, in the Choose Pattern section:
   - Do not choose anything from the first field (that is, leave it empty).
   - Enter **approve** in the second field.
   - Select **ApproveType** from the dropdown.
7. In the Define Test for Pattern section, click **Create**. Then fill in the section as follows:
   - **Operand**: select **approve.price**.
   - **Operator**: select < (less than).
   - **Operand (choose Value or Field)**: select **AUTOMATED_ORDER_LIMIT** under **Field**. Select **Fixed** in the dropdown.

   The Pattern Definition window should look like this:

*Figure 8–115 Pattern Definition for "belowLimit" Rule*



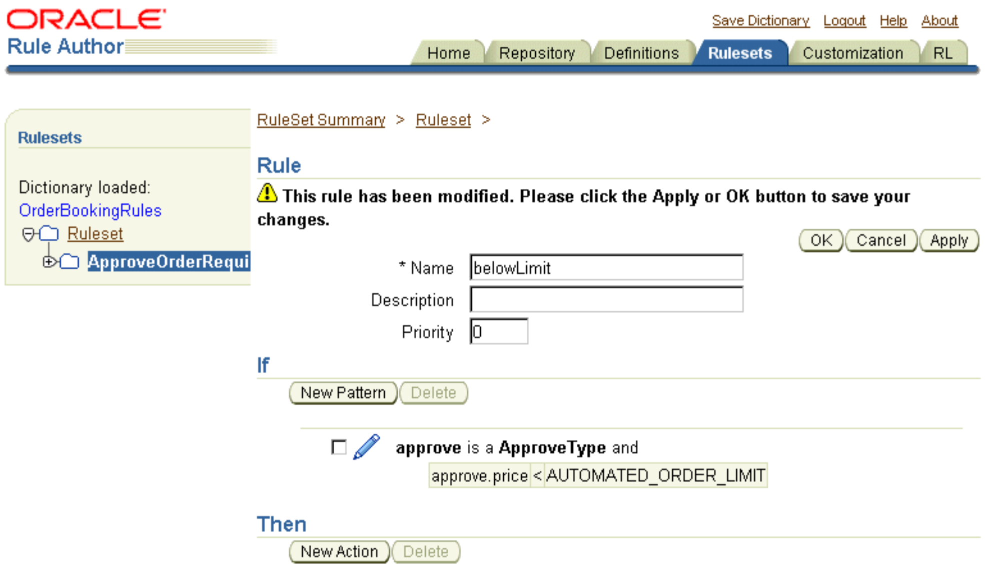
approve is a ApproveType

[✓ Standard Test] Advanced Test

| Select | Operand Field | Operator | Operand (choose value or field) Value | Operand (choose value or field) Field |
|---|---|---|---|---|
| ☐ | approve.price | < | Fixed | AUTOMATED_ORDER_LIMIT Fixed |

8. Click **Apply** in the Pattern Definition window. You should see a confirmation message at the top of the Pattern Definition window.
9. Click **OK** to return to the Rule page, which now looks like this:

*Figure 8–116 Rule Page for the "belowLimit" Rule*



Dictionary loaded: OrderBookingRules
Ruleset
ApproveOrderRequi

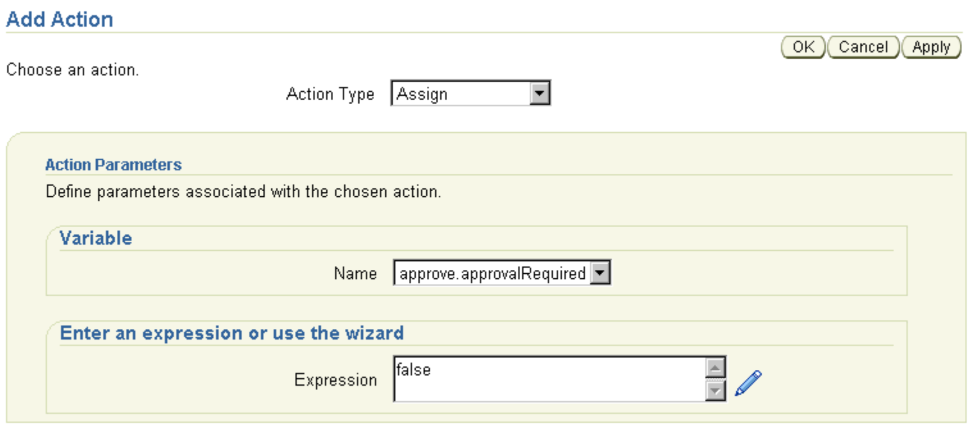
This rule has been modified. Please click the Apply or OK button to save your changes.

* Name: belowLimit
Description:
Priority: 0

approve is a ApproveType and
approve.price < AUTOMATED_ORDER_LIMIT

10. Click **Apply** on the Rule page. You should see a confirmation message at the top of the Rule page.
11. In the "Then" section of the Rule page, click **New Action**. This pops up the Add Action window.
12. In the Add Action window:
    - **Action Type**: select **Assign**.
    - **Name**: select **approve.approvalRequired**.
    - **Expression**: enter **false**.

***Figure 8–117 Add Action for the "belowLimit" Rule***


Add Action

Choose an action.

Action Type: Assign

Action Parameters

Define parameters associated with the chosen action.

Variable

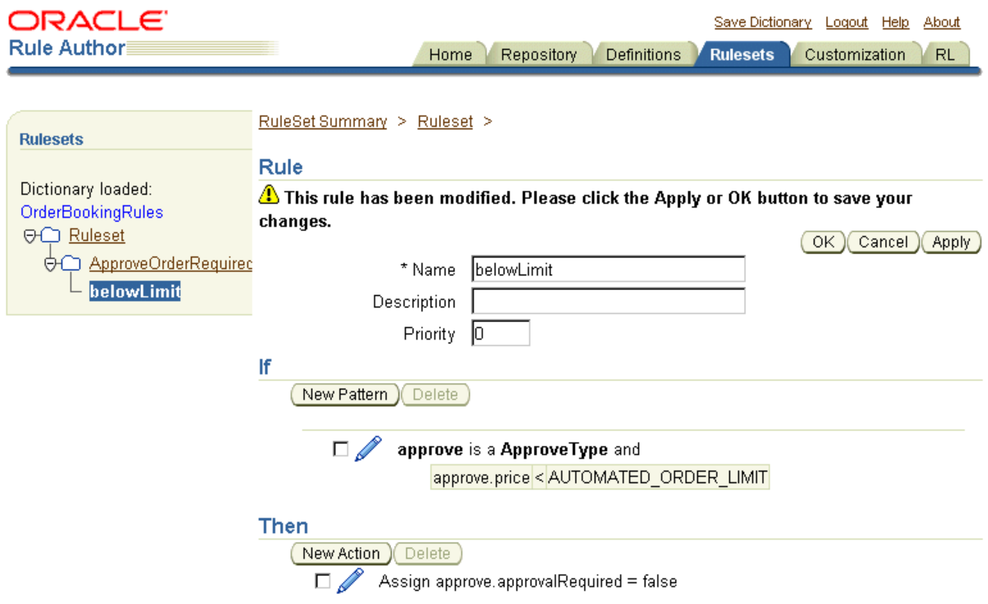
Name: approve.approvalRequired

Enter an expression or use the wizard

Expression: false

13. Click **Apply**.
14. Click **OK** to return to the Rule page, which now looks like this:

***Figure 8–118 Rule Page for the "belowLimit" Rule***



Dictionary loaded: OrderBookingRules
Ruleset
ApproveOrderRequired
belowLimit

RuleSet Summary > Ruleset >

Rule

This rule has been modified. Please click the Apply or OK button to save your changes.

* Name: belowLimit

Description:

Priority: 0

If

approve is a ApproveType and
approve.price < AUTOMATED_ORDER_LIMIT

Then

Assign approve.approvalRequired = false

15. Click **Apply**.
16. Save your work. Click the **Save Dictionary** link at the top of the page, then click **Save** on the Save Dictionary page.

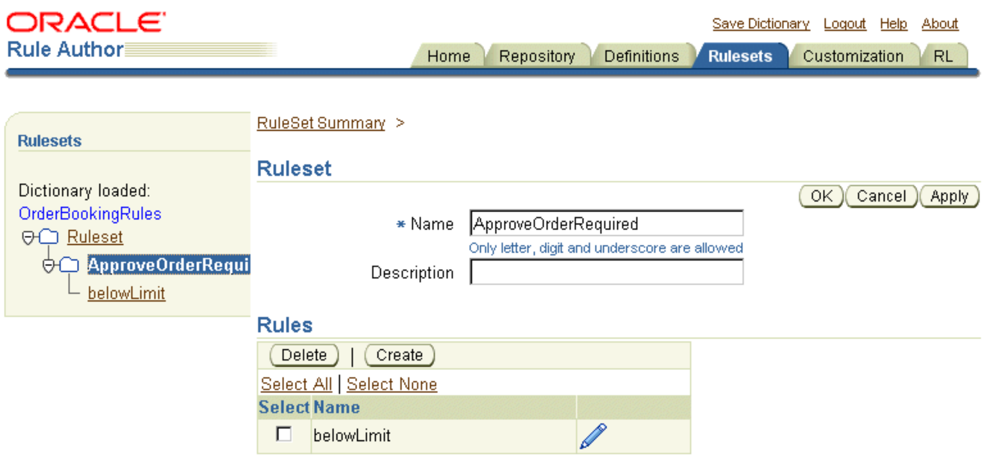
### 8.10.8.2 Create the "overLimit" Rule

The "overLimit" rule states that if an order's total price is greater than or equal to the value set in the AUTOMATED_ORDER_LIMIT variable *and* the customer is not a platinum customer, the order requires a manager's approval. If the customer is a platinum customer, then the order is approved automatically, regardless of the amount of the order.

1. Click the **Rulesets** tab.

2. Click the **ApproveOrderRequired** ruleset on the left side. This displays the Ruleset page. The "belowLimit" rule is already created.

***Figure 8–119 Ruleset Page for the "ApproveOrderRequired" Ruleset***



* Name: ApproveOrderRequired

Only letter, digit and underscore are allowed

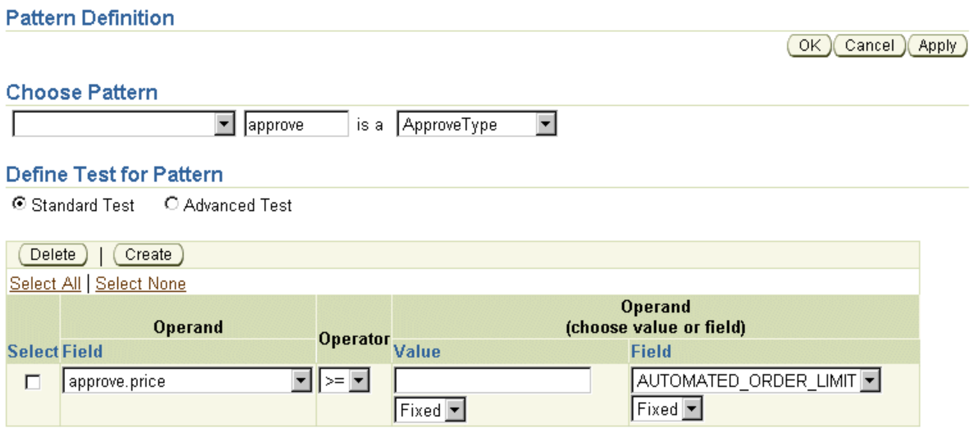
Description:

| Select | Name | |
|---|---|---|
| ☐ | belowLimit | |

3. In the Rules section, click **Create**. This displays the Rule page.
4. On the Rule page, enter **overLimit** for the **Name**. Keep the default value for **Priority**.
5. In the "If" section, click **New Pattern**. This pops up the Pattern Definition window.
6. In the Pattern Definition window, in the Choose Pattern section:
   - Do not choose anything from the first field (that is, leave it empty).
   - Enter **approve** in the second field.
   - Select **ApproveType** from the dropdown.
7. In the Define Test for Pattern section, click **Create**. Then fill in the section as follows.
   - **Operand**: select **approve.price**.
   - **Operator**: select **>=** (greater than or equal to).
   - **Operand (choose Value or Field)**: select **AUTOMATED_ORDER_LIMIT** under **Field**. Select **Fixed** in the dropdown.

   The Pattern Definition window should look like this:

*Figure 8–120 Pattern Definition for the "overLimit" Rule (part 1 of 2)*



Pattern Definition

OK | Cancel | Apply

Choose Pattern

approve is a ApproveType

Define Test for Pattern

[✓ Standard Test] Advanced Test

Delete | Create

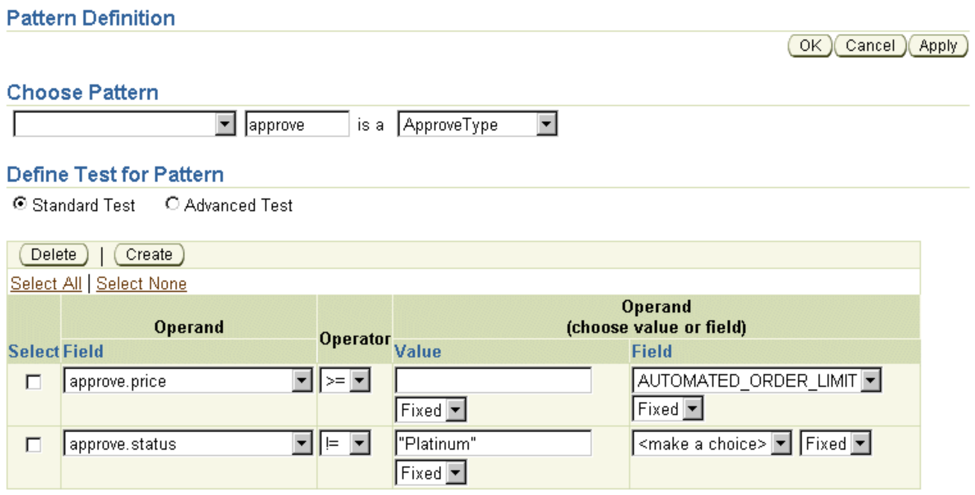
Select All | Select None

| Select | Operand Field | Operator | Operand (choose value or field) Value | Field |
|---|---|---|---|---|
| ☐ | approve.price | >= | Fixed | AUTOMATED_ORDER_LIMIT Fixed |

8. Click **Create** again to define the second test. Fill in the section as follows.
   - **Operand**: select **approve.status**.
   - **Operator**: select **!=** (not equal to).
   - **Operand (choose Value or Field)**: enter **"Platinum"** (include the double-quote characters) under **Value**. Select **Fixed** in the dropdown.

   The Pattern Definition window should look like this:

*Figure 8–121 Pattern Definition for the "overLimit" Rule (part 2 of 2)*



Pattern Definition

OK | Cancel | Apply

Choose Pattern

approve is a ApproveType

Define Test for Pattern

[✓ Standard Test] Advanced Test

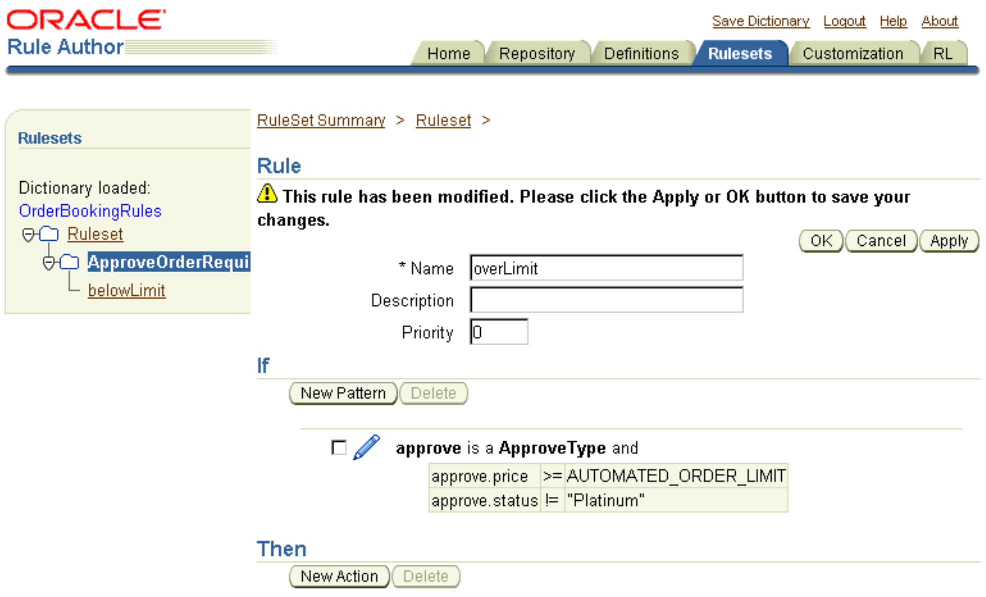
Delete | Create

Select All | Select None

| Select | Operand Field | Operator | Operand (choose value or field) Value | Field |
|---|---|---|---|---|
| ☐ | approve.price | >= | Fixed | AUTOMATED_ORDER_LIMIT Fixed |
| ☐ | approve.status | != | "Platinum" Fixed | <make a choice> Fixed |

9. Click **Apply** in the Pattern Definition window. You should see a confirmation message at the top of the Pattern Definition window.
10. Click **OK** to return to the Rule page.
11. The Rule page now looks like this:

***Figure 8–122 Rule Page for the "overLimit" Rule***



Dictionary loaded: OrderBookingRules

Rule

This rule has been modified. Please click the Apply or OK button to save your changes.

* Name: overLimit
Description:
Priority: 0

If

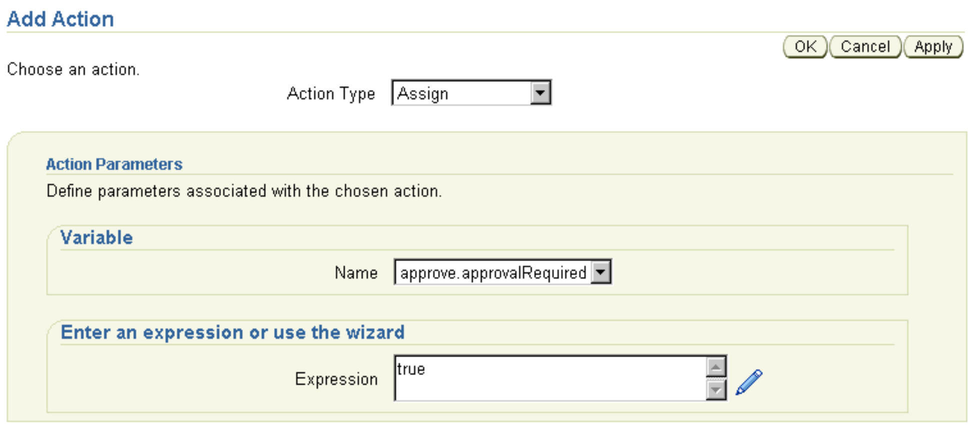
approve is a ApproveType and

| | | |
|---|---|---|
| approve.price | >= | AUTOMATED_ORDER_LIMIT |
| approve.status | != | "Platinum" |

Then

12. Click **Apply** on the Rule page. You should see a confirmation message at the top of the Rule page.
13. In the "Then" section of the Rule page, click **New Action**. This pops up the Add Action window.
14. In the Add Action window:
    - **Action Type**: select **Assign**.
    - **Name**: select **approve.approvalRequired**.
    - **Expression**: enter **true**.

***Figure 8–123 Add Action for the "overLimit" Rule***



Add Action

Choose an action.

Action Type: Assign

Action Parameters

Define parameters associated with the chosen action.

Variable

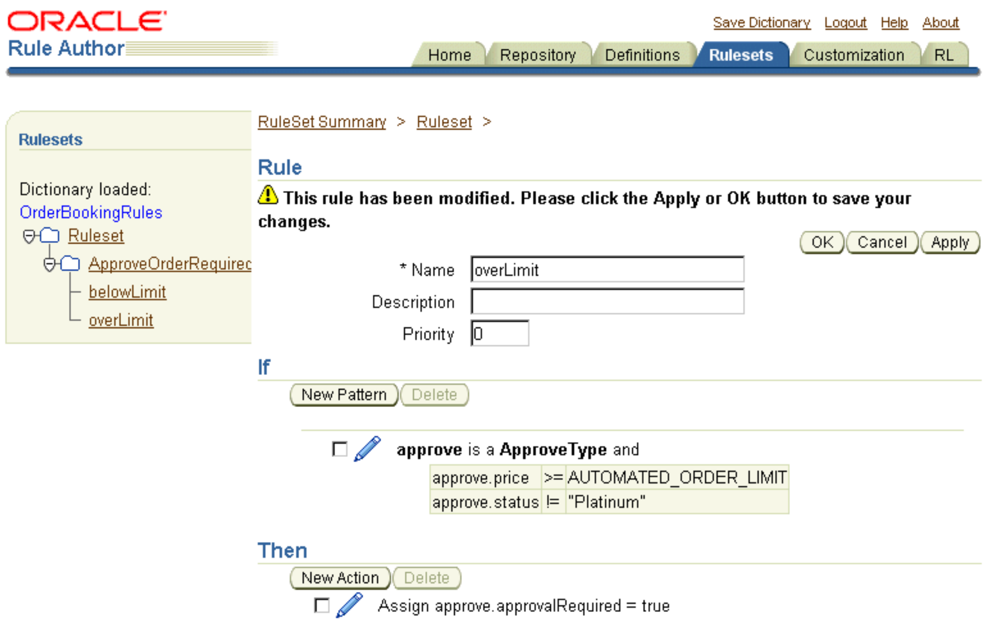
Name: approve.approvalRequired

Enter an expression or use the wizard

Expression: true

15. Click **Apply**.
16. Click **OK** to return to the Rule page, which now looks like this:

***Figure 8–124 Rule Page for the "overLimit" Rule***



Dictionary loaded:
OrderBookingRules
Ruleset
ApproveOrderRequirec
belowLimit
overLimit

Rule

This rule has been modified. Please click the Apply or OK button to save your changes.

|  |  |
|---|---|
| * Name | overLimit |
| Description |  |
| Priority | 0 |

approve is a ApproveType and

|  |  |  |
|---|---|---|
| approve.price | >= | AUTOMATED_ORDER_LIMIT |
| approve.status | != | "Platinum" |

Assign approve.approvalRequired = true

**17.** Click **Apply**.

**18.** Save your work. Click the **Save Dictionary** link at the top of the page, then click **Save** in the Save Dictionary page.

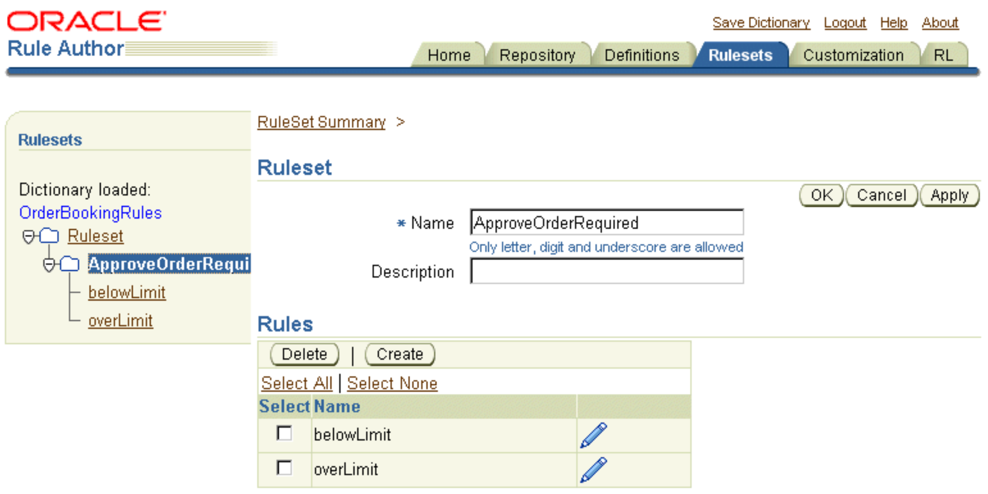
### 8.10.8.3 Create the "platinumMember" Rule

The "platinumMember" rule states that if a customer is a platinum customer, the order is approved automatically, regardless of the amount of the order.

**1.** Click the **Rulesets** tab.

**2.** Click the **ApproveOrderRequired** ruleset on the left side. This displays the Ruleset page. The "belowLimit" and "overLimit" rules are already created.

***Figure 8–125 Ruleset Page for the "ApproveOrderRequired" Ruleset***



Dictionary loaded:
OrderBookingRules
Ruleset
ApproveOrderRequi
belowLimit
overLimit

Ruleset

|  |  |
|---|---|
| * Name | ApproveOrderRequired |
|  | Only letter, digit and underscore are allowed |
| Description |  |

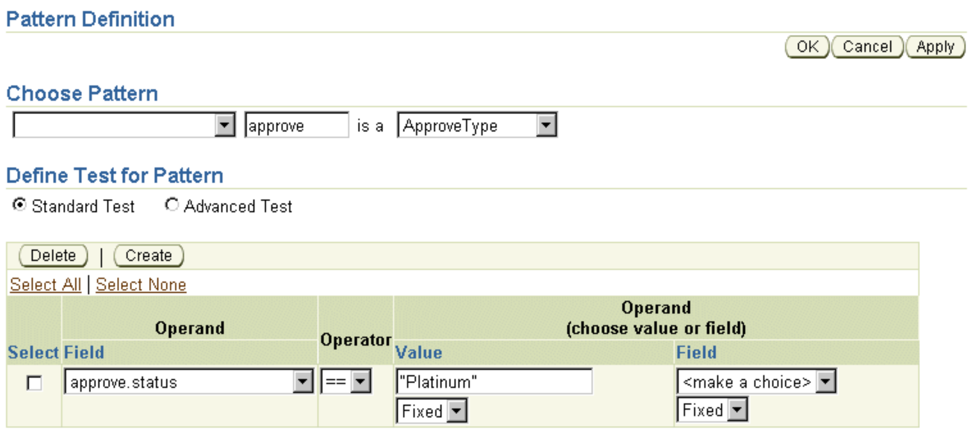
| Select | Name |  |
|---|---|---|
| ☐ | belowLimit | ✎ |
| ☐ | overLimit | ✎ |

**3.** In the Rules section, click **Create**. This displays the Rule page.

4. On the Rule page, enter **platinumMember** for the **Name**. Keep the default value for **Priority**.
5. In the "If" section, click **New Pattern**. This pops up the Pattern Definition window.
6. In the Pattern Definition window, in the Choose Pattern section:
   - Do not choose anything from the first field (that is, leave it empty).
   - Enter **approve** in the second field.
   - Select **ApproveType** from the dropdown.
7. In the Define Test for Pattern section, click **Create**. Then fill in the section as follows.
   - **Operand**: select **approve.status**.
   - **Operator**: select **==** (equal to).
   - **Operand (choose Value or Field)**: enter **"Platinum"** (include the double-quote characters) under **Value**. Select **Fixed** in the dropdown.

   The Pattern Definition window should look like this:

***Figure 8–126 Pattern Definition for the "platinumMember" Rule***



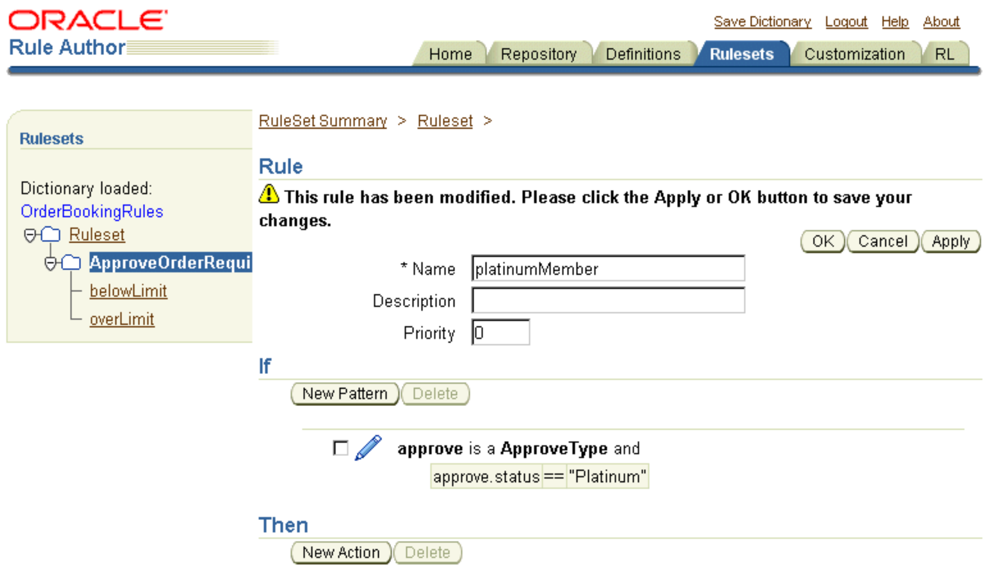
approve is a ApproveType

(● Standard Test) Advanced Test

| | Operand | | Operand (choose value or field) | |
|---|---|---|---|---|
| Select | Field | Operator | Value | Field |
| ☐ | approve.status | == | "Platinum" / Fixed | <make a choice> / Fixed |

8. Click **Apply** in the Pattern Definition window. You should see a confirmation message at the top of the Pattern Definition window.
9. Click **OK** to return to the Rule page.
10. The Rule page now looks like this:

***Figure 8–127 Rule Page for the "platinumMember" Rule***



Dictionary loaded: OrderBookingRules

- Ruleset
  - ApproveOrderRequi
    - belowLimit
    - overLimit

**Rule**

**This rule has been modified. Please click the Apply or OK button to save your changes.**

| | |
|---|---|
| * Name | platinumMember |
| Description | |
| Priority | 0 |

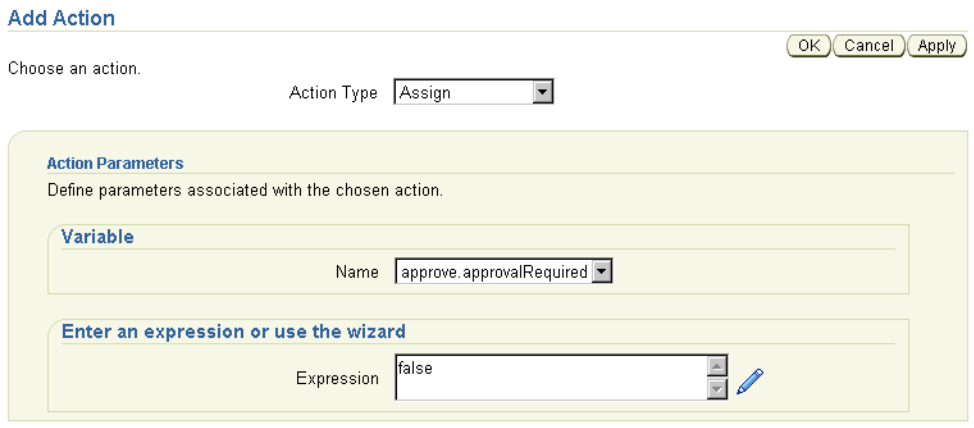
**If**

**approve** is a **ApproveType** and
approve.status == "Platinum"

**Then**

11. Click **Apply** on the Rule page. You should see a confirmation message at the top of the Rule page.
12. In the "Then" section of the Rule page, click **New Action**. This pops up the Add Action window.
13. In the Add Action window:
    - **Action Type**: select **Assign**.
    - **Name**: select **approve.approvalRequired**.
    - **Expression**: enter **false**.

***Figure 8–128 Add Action for the "platinumMember" Rule***



**Add Action**

Choose an action.

Action Type: Assign

**Action Parameters**

Define parameters associated with the chosen action.

**Variable**

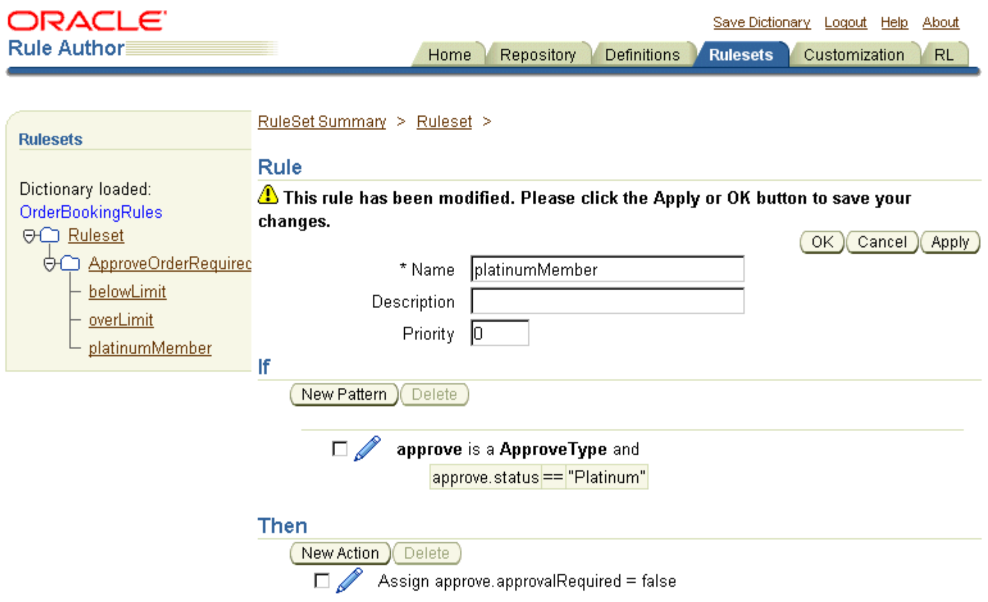
Name: approve.approvalRequired

**Enter an expression or use the wizard**

Expression: false

14. Click **Apply**.
15. Click **OK** to return to the Rule page, which now looks like this:

***Figure 8–129 Rule Page for the "platinumMember" Rule***



Dictionary loaded: OrderBookingRules
- Ruleset
  - ApproveOrderRequirec
    - belowLimit
    - overLimit
    - platinumMember

**Rule**

This rule has been modified. Please click the Apply or OK button to save your changes.

| | |
|---|---|
| * Name | platinumMember |
| Description | |
| Priority | 0 |

**If**

approve is a ApproveType and
approve.status == "Platinum"

**Then**

Assign approve.approvalRequired = false

**16.** Click **Apply**.

**17.** Save your work. Click the **Save Dictionary** link at the top of the page, then click **Save** on the Save Dictionary page.

## 8.10.9 Log out of Rule Author

Click the **Logout** link at the top of the page.

On the Logout Confirmation page, click **Save and Logout**.

## 8.10.10 Copy the Files to the JDeveloper Machine

This section is applicable only if you are running JDeveloper and Oracle Application Server on different machines. If you are running both on the same machine, then the files are already on the JDeveloper machine.

Copy the files generated by Rule Author from the Oracle Application Server machine to the JDeveloper machine:

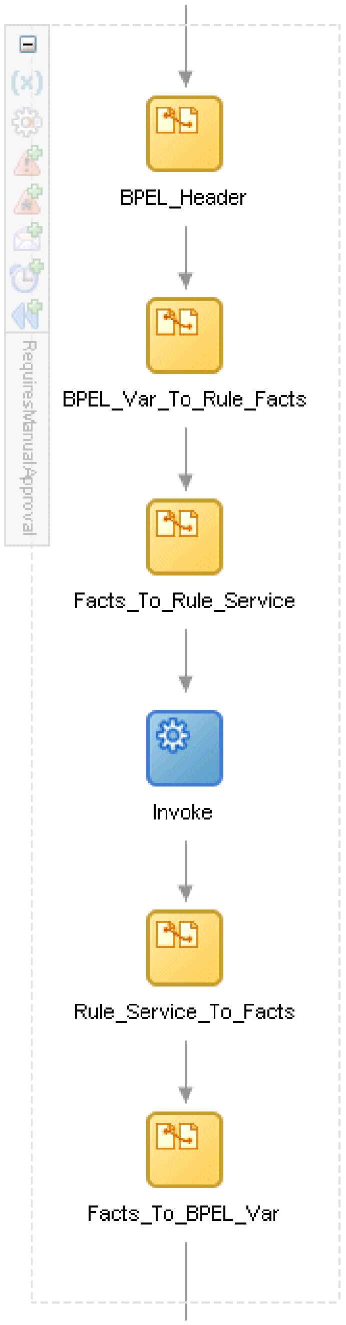
- Copy the `c:\rules\sample_repository` file to the *`SOADEMO`*`\SOAOrderBooking\bpel\rules\oracle` directory.
- Copy the files from `c:\rules\com\oracle\demos\orderbooking` to the *`SOADEMO`*`\SOAOrderBooking\bpel\rules\com\oracle\demos\orderbooking` directory.

## 8.11 Determine If an Order Requires Manual Approval ("RequiresManualApproval" Decide Activity)

This decide activity checks if an order requires to be approved by a manager. It determines this by checking the rules in the Oracle Business Rules repository. You created the rules in Section 8.10, "Set up Oracle Business Rules".

Figure 8–130 shows the activities in the "RequiresManualApproval" decide activity.

***Figure 8–130 Activities in the "RequiresManualApproval" Decide Activity***

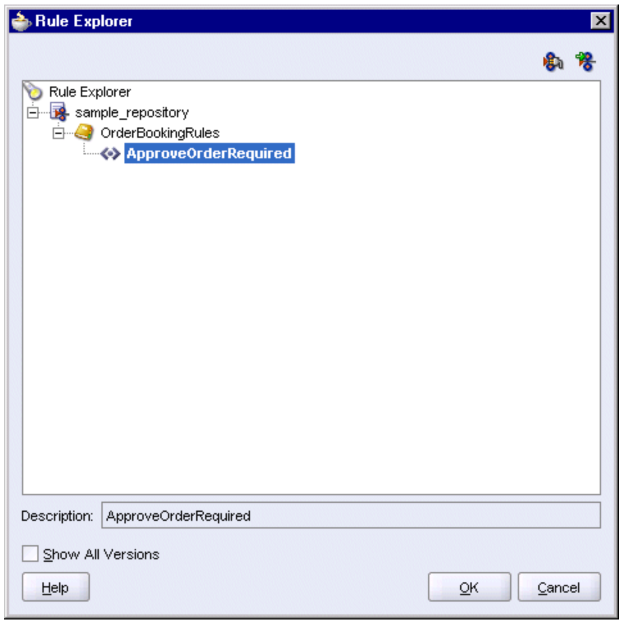


## 8.11.1 Create the Activities in the "RequiresManualApproval" Decide Activity

1. In the Component Palette, select **Process Activities** from the dropdown.
2. Drag the **Decide** icon from the Component Palette and drop it after the "CreditService" scope. This displays the Edit Decide dialog.
3. In the Edit Decide dialog, enter **RequiresManualApproval** in the **Name** field.

4. For the **Decision Service** field, click the wand icon. This launches the Decision Service wizard.
5. In Step 1, Select a Ruleset or Function:
   - **Service Name**: enter **DecisionService** (which is the default name).
   - **Namespace**: enter **http://www.globalcompany.com/ns/OrderBooking/DecisionService** (which is the default).
   - **Invocation Pattern**: select **Execute Ruleset**.
   - **Ruleset**: click the flashlight icon, which displays the Rule Explorer. In the Rule Explorer, you should see **sample_repository**. Expand it, then expand **OrderBookingRules** (which is the name of the dictionary), and select **ApproveOrderRequired** (which is the name of the ruleset).

***Figure 8–131 Rule Explorer***



Description: ApproveOrderRequired

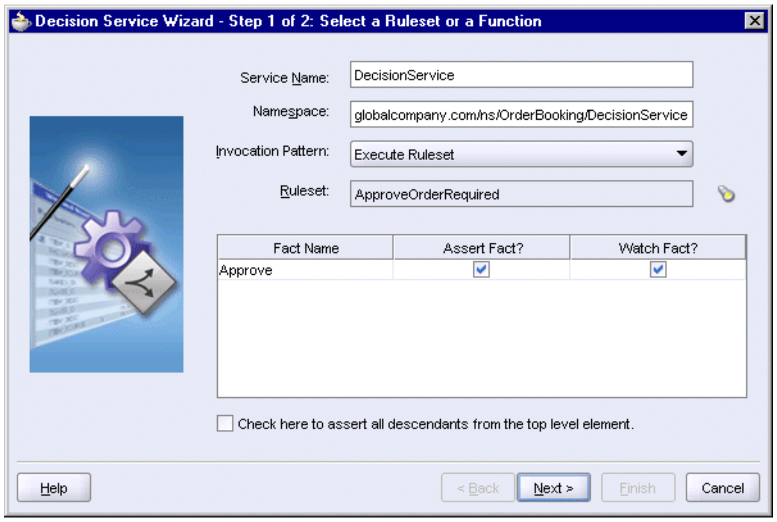
☐ Show All Versions

Click **OK** in the Rule Explorer.

6. Back in step 1 of the wizard, select **Assert Fact** and **Watch Fact** for **Approve**.

   **Check here to assert all descendants from the top level element**: do not select.

***Figure 8–132 Decision Service Wizard, Step 1, Select a Ruleset or Function***


Decision Service Wizard - Step 1 of 2: Select a Ruleset or a Function

Service Name: DecisionService
Namespace: globalcompany.com/ns/OrderBooking/DecisionService
Invocation Pattern: Execute Ruleset
Ruleset: ApproveOrderRequired

| Fact Name | Assert Fact? | Watch Fact? |
|---|---|---|
| Approve | ✓ | ✓ |

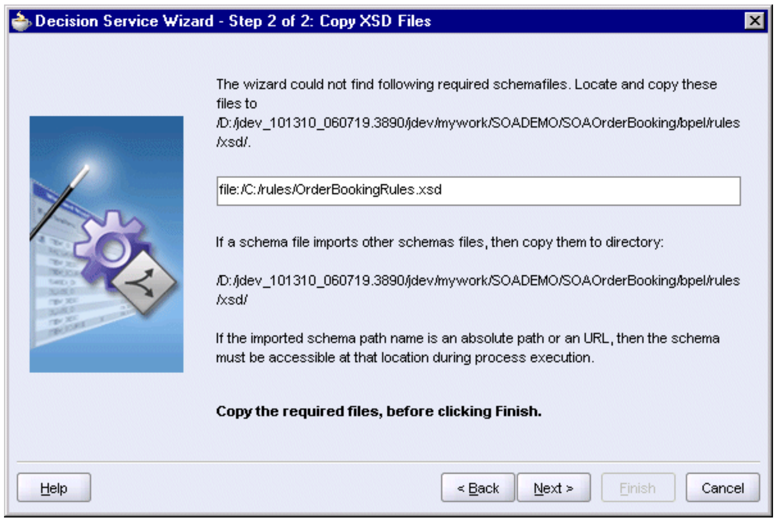
☐ Check here to assert all descendants from the top level element.

Help
< Back
Next >
Finish
Cancel

Click **Next**.

7. If the wizard complains about missing files, copy the files that it wants to the desired location. This screen is likely to appear if you are running JDeveloper and Oracle Application Server on separate machines and you copied the Oracle Business Rules repository from the Oracle Application Server machine to the JDeveloper machine.

***Figure 8–133 Decision Service Wizard, Step 2, Copy XSD Files***



The wizard could not find following required schemafiles. Locate and copy these files to /D:/jdev_101310_060719.3890/jdev/mywork/SOADEMO/SOAOrderBooking/bpel/rules/xsd/.

file:/C:/rules/OrderBookingRules.xsd

If a schema file imports other schemas files, then copy them to directory:

/D:/jdev_101310_060719.3890/jdev/mywork/SOADEMO/SOAOrderBooking/bpel/rules/xsd/

If the imported schema path name is an absolute path or an URL, then the schema must be accessible at that location during process execution.

**Copy the required files, before clicking Finish.**

Click **Next**.

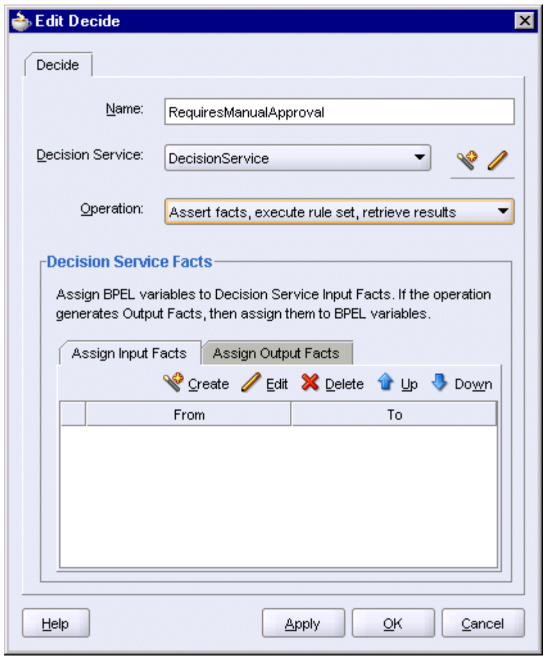
8. On the Finish page, click **Finish**.

9. Back to the Edit Decide dialog:

   - **Decision Service**: set to **DecisionService** automatically.
   - **Operation**: select **Assert facts, execute rule set, retrieve results**.

   The Edit Decide dialog now looks like this:

***Figure 8–134 Edit Decide Dialog***


Edit Decide
Decide
Name: RequiresManualApproval
Decision Service: DecisionService
Operation: Assert facts, execute rule set, retrieve results
Decision Service Facts
Assign BPEL variables to Decision Service Input Facts. If the operation generates Output Facts, then assign them to BPEL variables.
Assign Input Facts
Assign Output Facts
Create
Edit
Delete
Up
Down
From
To
Help
Apply
OK
Cancel

Click **OK**.

**10.** Select File > Save to save your work.

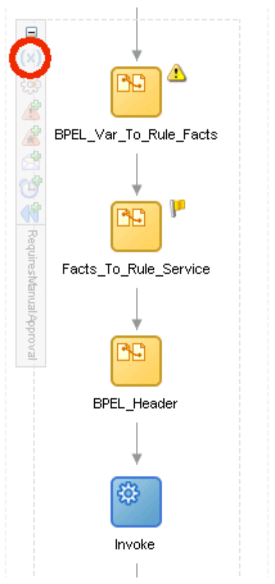
JDeveloper creates the following items:

- the `SOAOrderBooking\decisionservices` directory
- the "DecisionServicePL" partner link
- the following activities in the "RequiresManualApproval" decide activity (expand "RequiresManualApproval" to see the activities):
  - Assign activity: "BPEL_Var_To_Rule_Facts"
  - Assign activity: "Facts_To_Rule_Service"
  - Assign activity: "BPEL_Header"
  - Invoke activity: "Invoke"
  - Assign activity: "Rule_Service_To_Facts"
  - Assign activity: "Facts_To_BPEL_Var"

  If JDeveloper displays these activities in a somewhat random order, save and close the `SOAOrderBooking.bpel` file. Then reopen it.
- the following variables in the "RequiresManualApproval" decide activity:
  - `com_oracle_demos_orderbooking_Approve_i`
  - `com_oracle_demos_orderbooking_Approve_o`
  - `dsIn`
  - `dsOut`

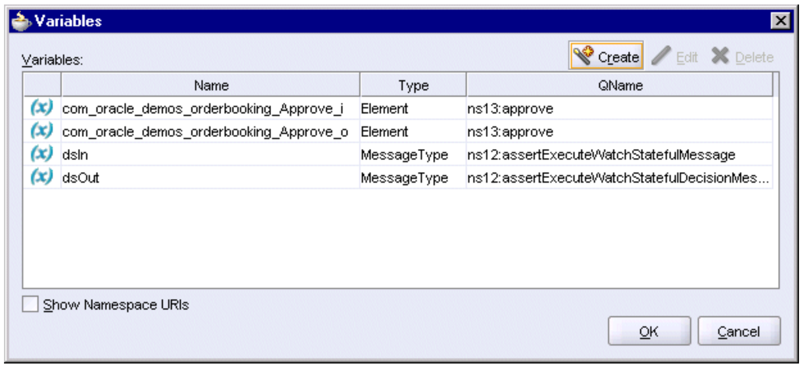
  To see these variables, click the **(x)** icon on the left side of the "RequiresManualApproval" decide activity (Figure 8–135). This displays the Variables dialog (Figure 8–136).

***Figure 8–135 The Red Circle Highlights the Variable Icon for the "RequiresManualApproval" Decide Activity***



You should see these variables:

***Figure 8–136 Variables Dialog***



| Name | Type | QName |
|---|---|---|
| com_oracle_demos_orderbooking_Approve_i | Element | ns13:approve |
| com_oracle_demos_orderbooking_Approve_o | Element | ns13:approve |
| dsIn | MessageType | ns12:assertExecuteWatchStatefulMessage |
| dsOut | MessageType | ns12:assertExecuteWatchStatefulDecisionMes... |

## 8.11.2 Copy Order Total and Customer Status Information ("BPEL_Var_To_Rule_Facts" Assign Activity)

The default "BPEL_Var_To_Rule_Facts" assign activity does not contain any operations. You have to define the operations yourself. For the SOA Order Booking application, you define two copy operations:

- Copy the order total price to the `com_oracle_demos_orderbooking_Approve_i` variable. Copy it to the `approve/price` element of the variable.
- Copy the status of the customer (retrieved from findCustomerById) to the `com_oracle_demos_orderbooking_Approve_i` variable. Copy it to the `approve/status` element of the variable.

1. Double-click the "BPEL_Var_To_Rule_Facts" activity to display the Assign dialog.
2. Click the Copy Operation tab. You will define two copy operations.
3. For the first copy operation, select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.

**a.** On the **To** side, set **Type** to **Expression**.

**b.** Click the XPath Expression Builder icon above the Expression box to display the Expression Builder dialog. You will use the Expression Builder to create the expression.

**c.** In the Expression Builder dialog, in the BPEL Variables box, select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns4:PurchaseOrder** > **ns4:OrderInfo** > **ns4:OrderPrice**.

The **Content Preview** box should show **bpws:getVariableData('inputVariable', 'payload', '/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:OrderInfo/ns4:OrderPrice')**.

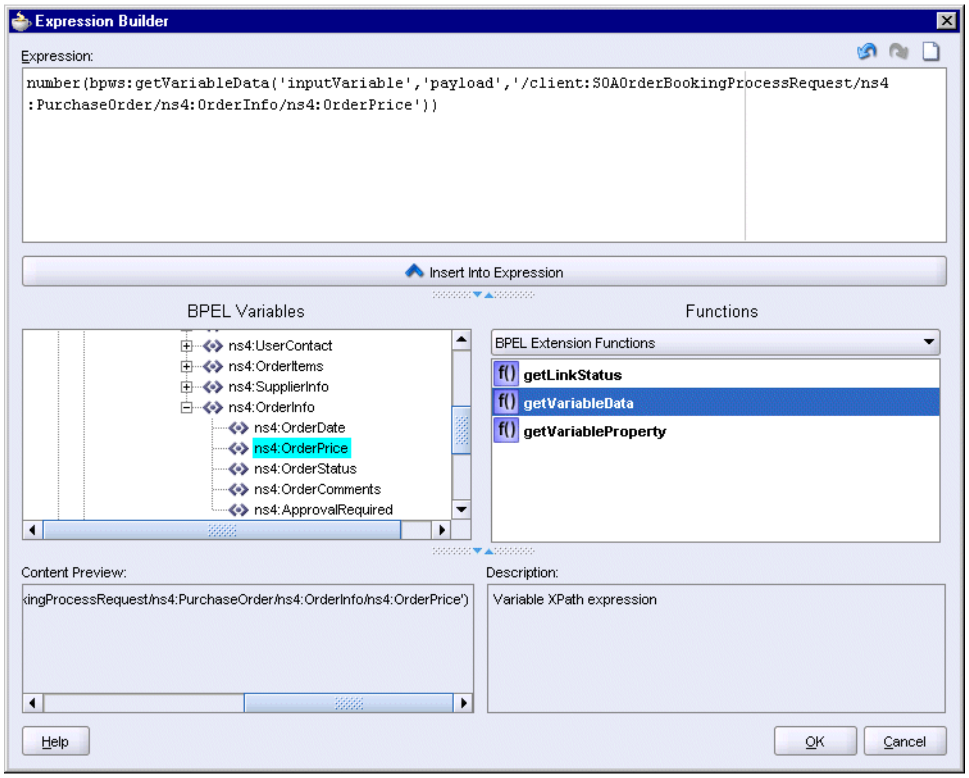
The `ns4` prefix maps to the "`http://www.globalcompany.com/ns/order`" namespace. It may be different on your system. If you want, you can scroll to the top of your `SOAOrderBooking.bpel` file (in source view) to verify the prefix.

**d.** Click **Insert Into Expression**. The Expression box should show the function with the three parameters.

**e.** In the Expression box, wrap the `number()` function around the entire `bpws:getVariableData` function. The value in the Expression box should look like this:

```
number(bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/
ns4:OrderInfo/ns4:OrderPrice'))
```

***Figure 8–137 Expression Builder Dialog***



```
number(bpws:getVariableData('inputVariable','payload','/client:SOAOrderBookingProcessRequest/ns4
:PurchaseOrder/ns4:OrderInfo/ns4:OrderPrice'))
```

kingProcessRequest/ns4:PurchaseOrder/ns4:OrderInfo/ns4:OrderPrice')

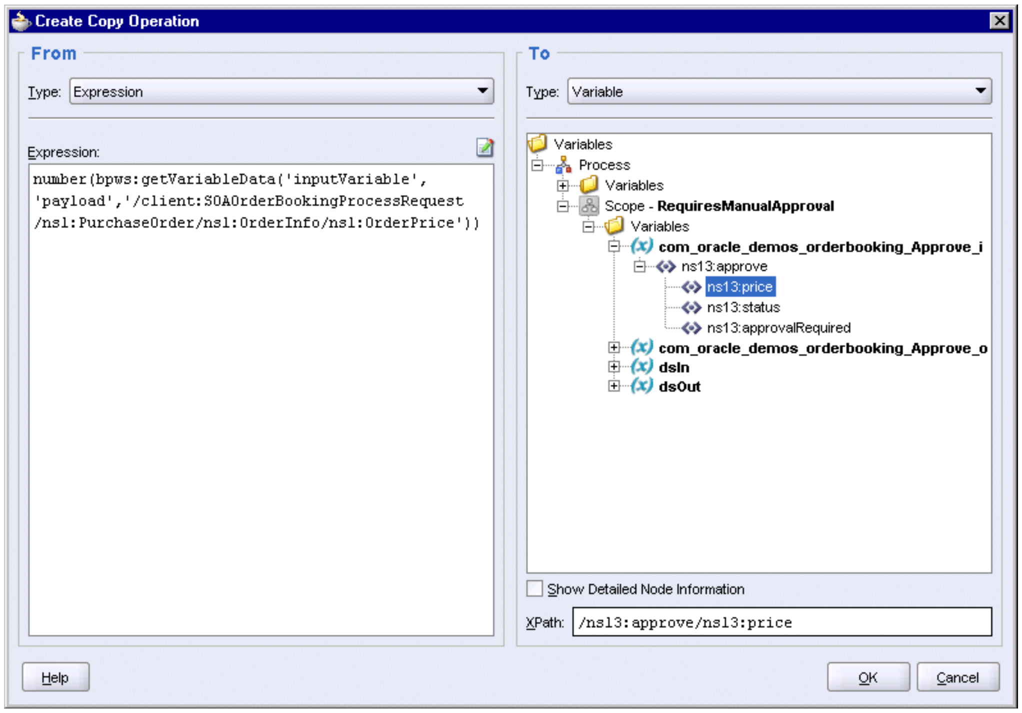
Variable XPath expression

f. Click **OK** in the Expression Builder dialog.

g. On the **From** side, set **Type** to **Variable**.

h. Select **Variables** > **Process** > **Scope - RequiresManualApproval** > **Variables** > **com_oracle_demos_orderbooking_Approve_i** > **ns13:approve** > **ns13:price**.

***Figure 8–138 Create Copy Operation Dialog***



Create Copy Operation

From

Type: Expression

Expression:

```
number(bpws:getVariableData('inputVariable',
'payload','/client:SOAOrderBookingProcessRequest
/ns1:PurchaseOrder/ns1:OrderInfo/ns1:OrderPrice'))
```

To

Type: Variable

```
Variables
  Process
    Variables
    Scope - RequiresManualApproval
      Variables
        com_oracle_demos_orderbooking_Approve_i
          ns13:approve
            ns13:price
            ns13:status
            ns13:approvalRequired
        com_oracle_demos_orderbooking_Approve_o
        dsIn
        dsOut
```

Show Detailed Node Information

XPath: /ns13:approve/ns13:price

i. Click **OK** in the Create Copy Operation dialog. This returns you to the Assign dialog.

4. Select **Copy Operation** from the **Create** dropdown again to create the second copy operation.

a. On the **To** side, set **Type** to **Expression**.

b. Click the XPath Expression Builder icon above the Expression box to display the Expression Builder dialog. You will use the Expression Builder to create the expression.

c. In the Expression Builder dialog, in the BPEL Variables box, select **Variables** > **Process** > **Variables** > **customerServiceResponse** > **parameters** > **ns8:findCustomerByIdResponse** > **ns8:return** > **ns8:status**.

The **Content Preview** box should show **bpws:getVariableData('customerServiceResponse','parameters','/ns8:findCustomerByIdResponse/ns8:return/ns8:status')**.

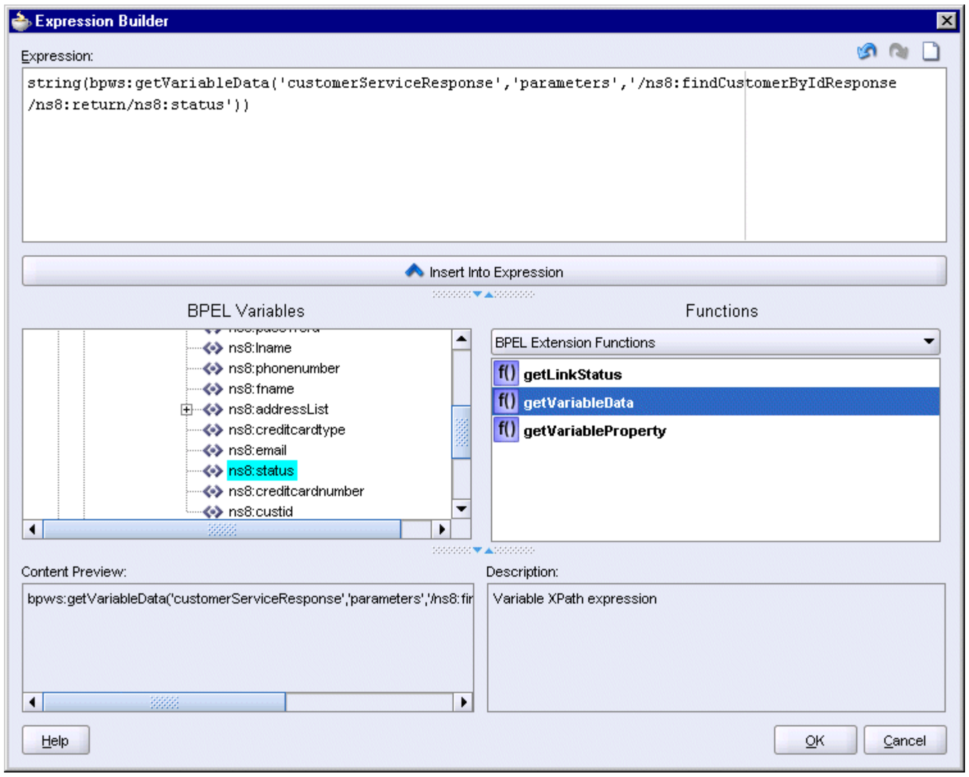
The `ns8` prefix maps to the "`http://www.globalcompany.com/ns/customer`" namespace. It may be different on your system. If you want, you can scroll to the top of your `SOAOrderBooking.bpel` file (in source view) to verify the prefix.

d. Click **Insert Into Expression**. The Expression box should show the function with the three parameters.

e. In the Expression box, wrap the `string()` function around the entire `bpws:getVariableData` function. The value in the Expression box should look like this:

```
string(bpws:getVariableData('customerServiceResponse','parameters',
'/ns8:findCustomerByIdResponse/ns8:return/ns8:status'))
```

***Figure 8–139 Expression Builder Dialog***



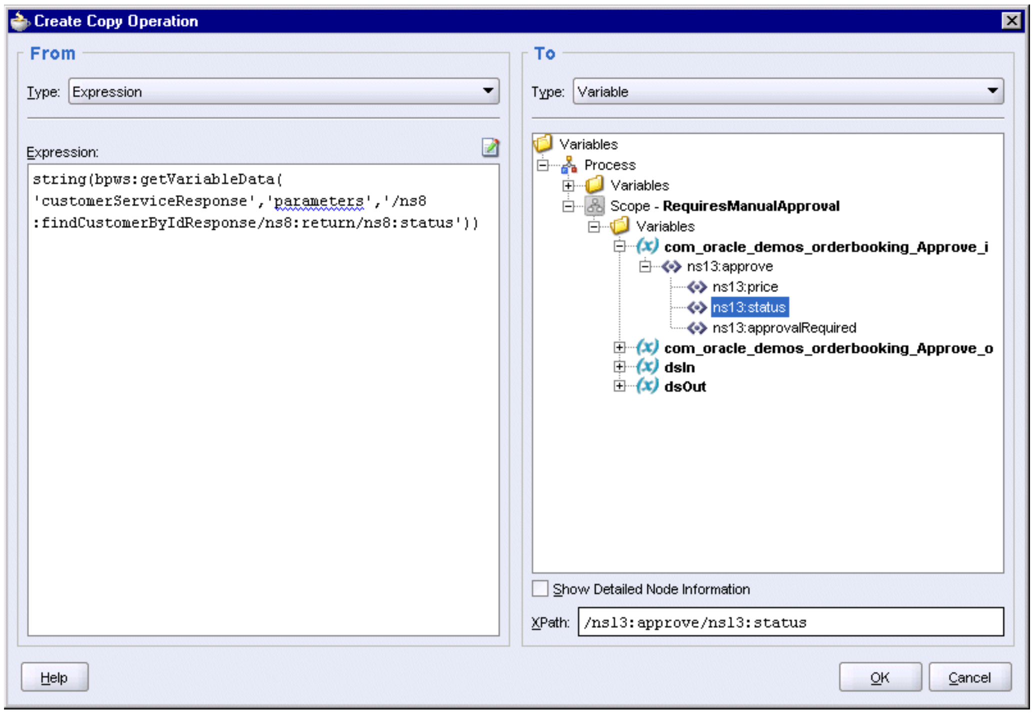
```
string(bpws:getVariableData('customerServiceResponse','parameters','/ns8:findCustomerByIdResponse
/ns8:return/ns8:status'))
```

f. Click **OK** in the Expression Builder dialog.

g. On the **From** side, set **Type** to **Variable**.

h. Select **Variables** > **Process** > **Scope - RequiresManualApproval** > **Variables** > **com_oracle_demos_orderbooking_Approve_i** > **ns13:approve** > **ns13:status**.

***Figure 8–140 Create Copy Operation Dialog***



```
string(bpws:getVariableData(
'customerServiceResponse','parameters','/ns8
:findCustomerByIdResponse/ns8:return/ns8:status'))
```

XPath: `/ns13:approve/ns13:status`

i. Click **OK** in the Create Copy Operation dialog.

5. Click **OK** in the Assign dialog.

6. Select File > Save to save your work.

### 8.11.3 Copy the ConversationId to the dsIn Variable ("BPEL_Header" Assign Activity)

The default "BPEL_Header" assign activity comes with seven copy operations. Add another copy operation to copy the conversation ID to the `dsIn` variable.

1. Double-click the "BPEL_Header" activity to display the Assign dialog.

2. Click the Copy Operation tab.

3. Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.

   a. On the **From** side, set **Type** to **Expression**.

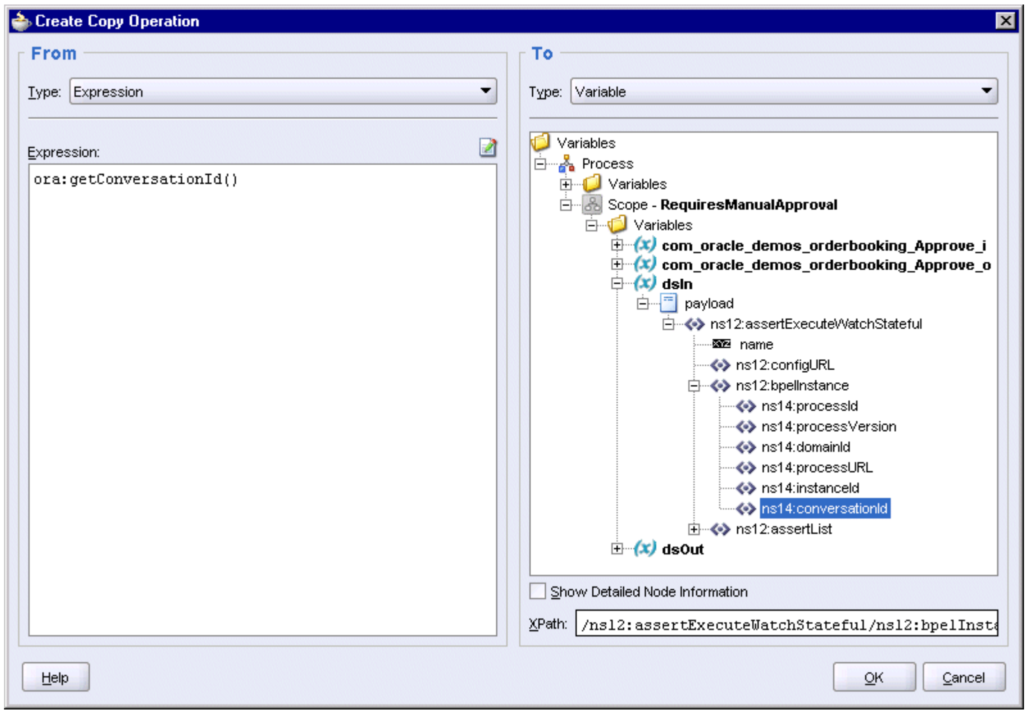
   b. Enter the following in the **Expression** box.

   ```
   ora:getConversationId()
   ```

   c. On the **To** side, set **Type** to **Variable**.

   d. Select **Variables** > **Process** > **Scope - RequiresManualApproval** > **Variables** > **dsIn** > **payload** > **ns12:assertExecuteWatchStateful** > **ns12:bpelInstance** > **ns14:conversationId**.

***Figure 8–141 Create Copy Operation Dialog***



```
ora:getConversationId()
```

```
/ns12:assertExecuteWatchStateful/ns12:bpelInst
```

e. Click **OK** in the Create Copy Operation dialog. This returns you to the Assign dialog.

4. Click **OK** in the Assign dialog.

5. Select File > Save to save your work.

### 8.11.4 Create the "requiresApproval" Process Variable

Create the `requiresApproval` variable in the SOAOrderBooking scope. This variable is created at this level so that any activity in this BPEL flow can access it.

This variable is used in the switch that you will create later in Section 8.12.2, "Set the Condition for the <case>".

1. Scroll to the top of the page and double-click the SOAOrderBooking scope. You can double-click the "SOAOrderBooking" text that is sideways. This displays the Process dialog.

2. In the Process dialog, click **Create** in the Variables tab. This displays the Create Variable dialog.

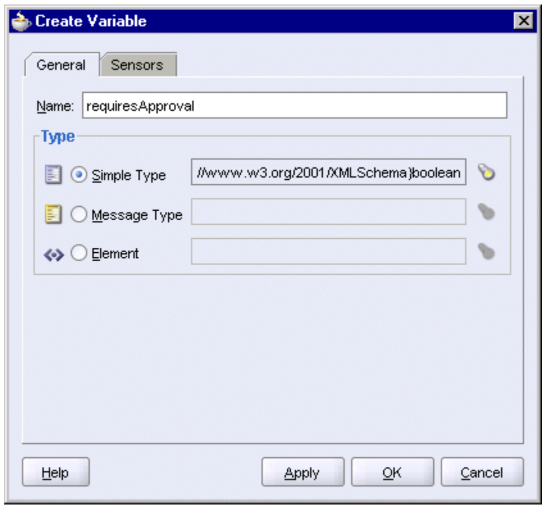
3. In the Create Variable dialog:

   - **Name**: enter **requiresApproval**.
   - **Type**: select **Simple Type**, and click the flashlight icon. This displays the Type Chooser dialog.

     In the Type Chooser, select **boolean** and click **OK**.

   The Create Variable dialog now looks like this:

*Figure 8–142 Create Variable Dialog for the "requiresApproval" Process Variable*



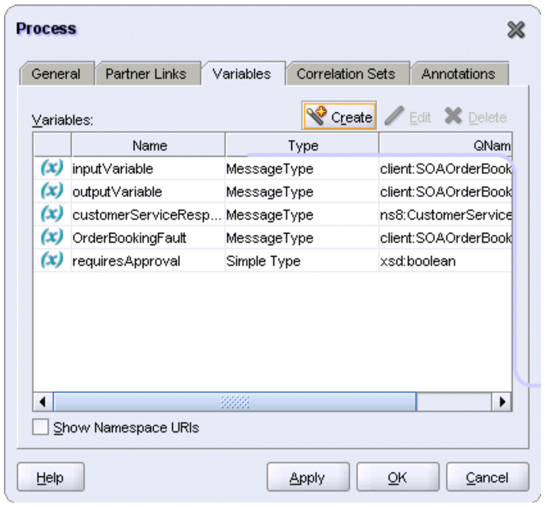
Name: requiresApproval

Type:

- (●) Simple Type: //www.w3.org/2001/XMLSchema}boolean
- ( ) Message Type
- ( ) Element

4. Click **OK** in the Create Variable dialog. The `requiresApproval` variable appears in the Process dialog.

*Figure 8–143 Process Dialog Showing the "requiresApproval" Variable*



Variables:

| Name | Type | QNam |
|---|---|---|
| inputVariable | MessageType | client:SOAOrderBook |
| outputVariable | MessageType | client:SOAOrderBook |
| customerServiceResp... | MessageType | ns8:CustomerService |
| OrderBookingFault | MessageType | client:SOAOrderBook |
| requiresApproval | Simple Type | xsd:boolean |

5. Click **OK** in the Process dialog.
6. Select File > Save to save your work.

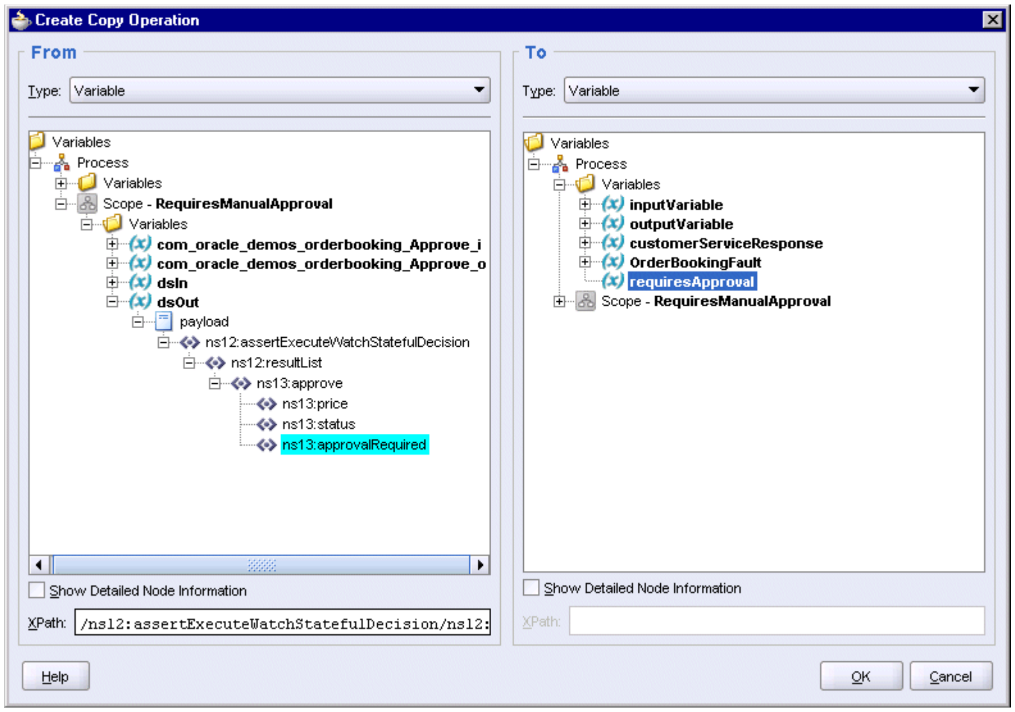
## 8.11.5 Copy the Result of the Decision Service to the requiresApproval Variable ("Facts_To_BPEL_Var" Assign Activity)

The default "Facts_To_BPEL_Var" assign activity does not come with any operations. Create a copy operation to copy the result returned by the "DecisionService" partner link to the `requiresApproval` process variable.

1. Double-click the "Facts_To_BPEL_Var" assign activity to display the Assign dialog.
2. Click the Copy Operation tab.
3. Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.

4. On the **From** side, set **Type** to **Variable**.
5. Select **Variables** > **Process** > **Scope - RequiresManualApproval** > **Variables** > **dsOut** > **payload** > **ns12:assertExecuteWatchStatefulDecision** > **ns12:resultList** > **ns13:approve** > **ns13:approvalRequired**.
6. On the **To** side, set **Type** to **Variable**.
7. Select **Variables** > **Process** > **Variables** > **requiresApproval**.

***Figure 8–144 Create Copy Operation Dialog***



Create Copy Operation

From

Type: Variable

```
Variables
  Process
    Variables
    Scope - RequiresManualApproval
      Variables
        com_oracle_demos_orderbooking_Approve_i
        com_oracle_demos_orderbooking_Approve_o
        dsIn
        dsOut
          payload
            ns12:assertExecuteWatchStatefulDecision
              ns12:resultList
                ns13:approve
                  ns13:price
                  ns13:status
                  ns13:approvalRequired
```

Show Detailed Node Information

XPath: /ns12:assertExecuteWatchStatefulDecision/ns12:

To

Type: Variable

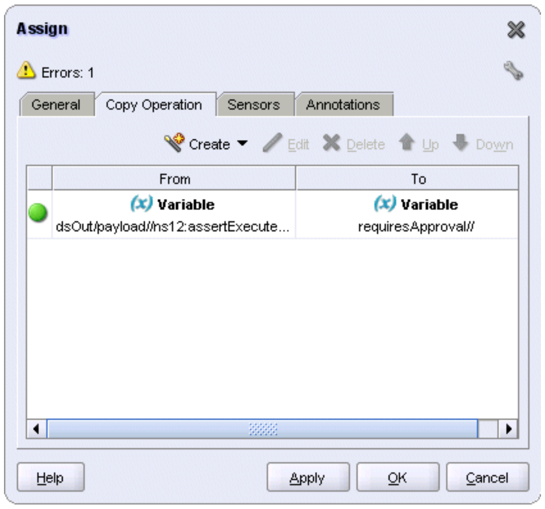
```
Variables
  Process
    Variables
      inputVariable
      outputVariable
      customerServiceResponse
      OrderBookingFault
      requiresApproval
    Scope - RequiresManualApproval
```

Show Detailed Node Information

XPath:

8. Click **OK** in the Create Copy Operation dialog.
9. You should see the copy operation in the Assign dialog. Click **OK**.

***Figure 8–145 Assign Dialog***



Assign

Errors: 1

| | From | To |
|---|---|---|
| ● | Variable<br>dsOut/payload//ns12:assertExecute... | Variable<br>requiresApproval// |

10. Select File > Save to save your work.

### 8.11.6 Minimize the "RequiresManualApproval" Decide Activity

Click the [-] icon to minimize the "RequiresManualApproval" decide activity.

## 8.12 Set Up a Form to Process Orders That Require Manual Approval ("requiresApproval" Switch)

For orders that require manual approval, the "requiresApproval" switch passes control to a human task activity. This enables a manager to approve or reject the orders.

The "requiresApproval" consists of a <case> branch only. It does not have an <otherwise> branch. For orders that do not require manual approval, this switch does not apply to them.

The <case> branch contains a human task activity and another switch activity (Figure 8–146).

***Figure 8–146 "requiresApproval" Switch Contains a Human Task and a Switch (Minimized View)***

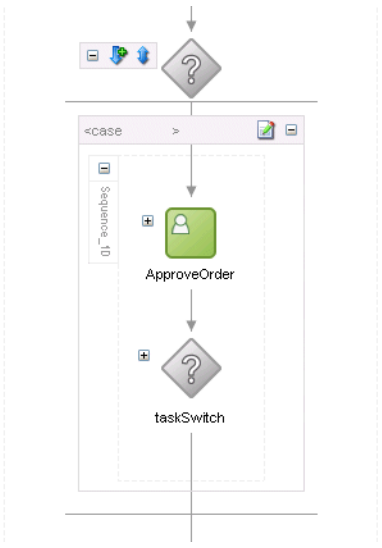
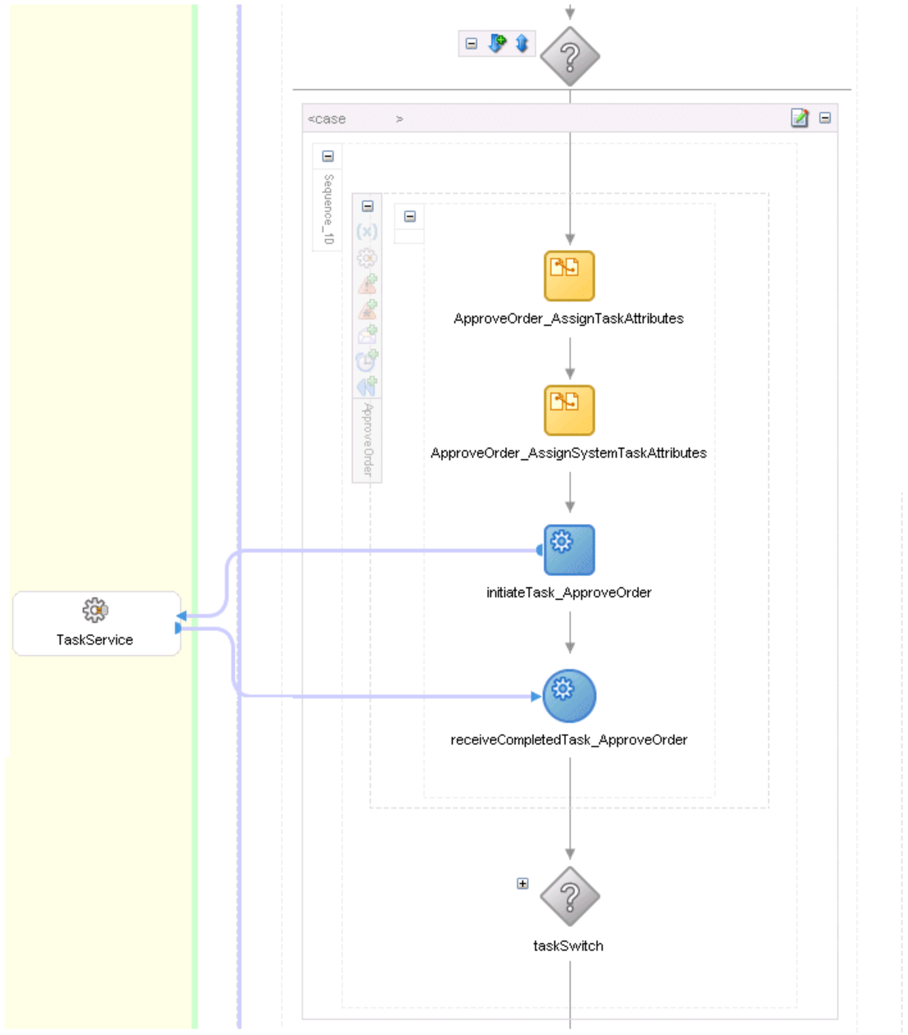


Figure 8–147 shows the human task activity expanded.

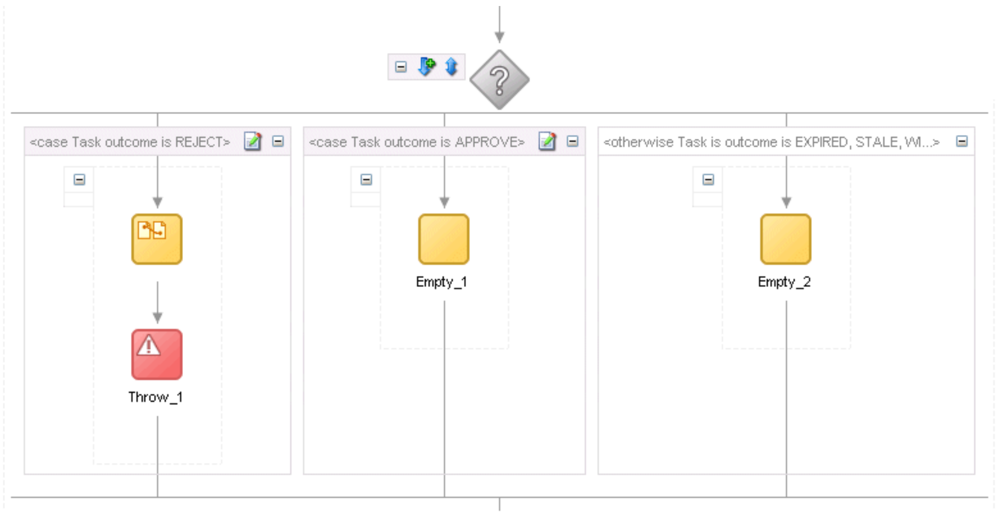
Figure 8–148 shows the switch activity expanded.

***Figure 8–147 <case> Branch for Switch Activity, Human Task Activity Expanded***



<case >
Sequence_10
ApproveOrder
ApproveOrder_AssignTaskAttributes
ApproveOrder_AssignSystemTaskAttributes
initiateTask_ApproveOrder
receiveCompletedTask_ApproveOrder
TaskService
taskSwitch

***Figure 8–148 Second Switch Expanded***



<case Task outcome is REJECT>
<case Task outcome is APPROVE>
<otherwise Task is outcome is EXPIRED, STALE, WI...>
Throw_1
Empty_1
Empty_2

### 8.12.1 Create the Switch

1. In the Component Palette, select **Process Activities** from the dropdown.
2. Drag the Switch icon from the Component Palette and drop it below the "RequiresManualApproval" decide activity.
3. Double-click the new switch activity and set its name to **requiresApproval** in the Switch dialog. Click **OK**.
4. Expand the switch activity.
5. Delete the <otherwise> box. For this switch, you only need to handle the case where an order requires manual approval.

### 8.12.2 Set the Condition for the <case>

1. Double-click the title bar of the <case> box to display the Switch Case dialog.
2. In the Switch Case dialog, click the XPath Expression Builder icon above the Expression box to display the Expression Builder dialog.
3. In the Expression Builder dialog, select **getVariableData** in the **Functions** box.

   The **Content Preview** box should show **bpws:getVariableData()**.
4. Add the first parameter to the function: In the BPEL Variables box, select **Variables** > **Process** > **Variables** > **requiresApproval**.

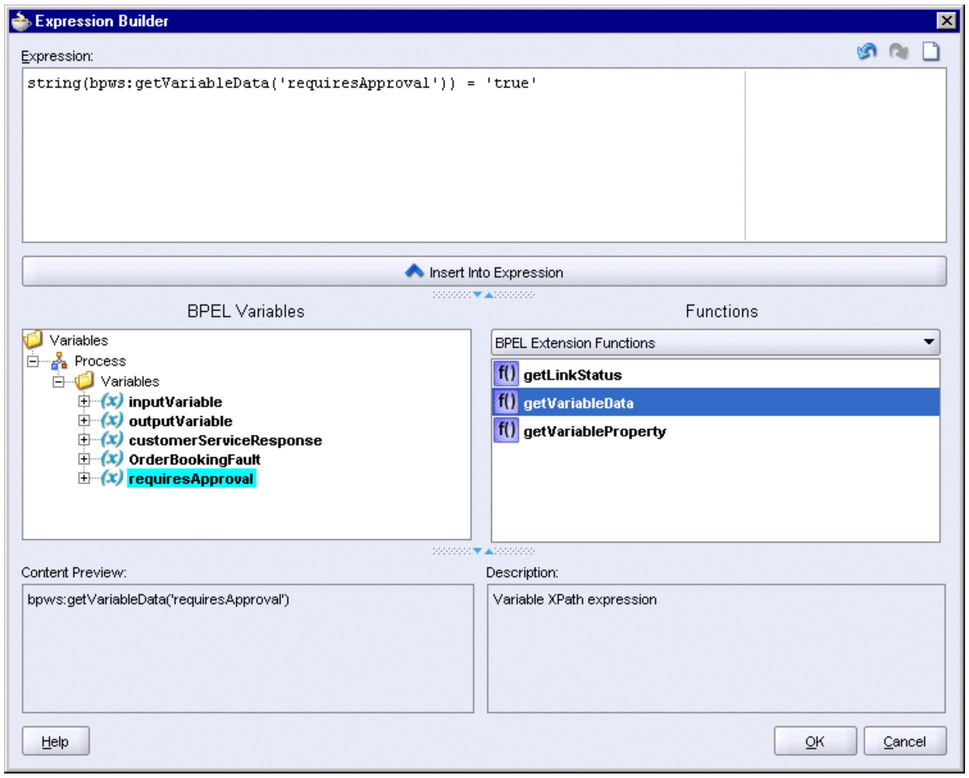
   `requiresApproval` is a process variable that you defined in Section 8.11.4, "Create the "requiresApproval" Process Variable".

   The **Content Preview** box should show **bpws:getVariableData('requiresApproval')**.
5. Click **Insert Into Expression**. The Expression box should show the function with the one parameter.
6. Append **='true'** to the expression in the Expression box so that the expression looks like this:

   ```
   bpws:getVariableData('requiresApproval')='true'
   ```
7. In the Expression box, wrap the `string()` function around the entire `bpws:getVariableData` function. The value in the Expression box should look like this:

   ```
   string(bpws:getVariableData('requiresApproval')) = 'true'
   ```

***Figure 8–149 Expression Builder Dialog Showing the Complete Expression for <case>***



```
string(bpws:getVariableData('requiresApproval')) = 'true'
```

Variables
- Process
  - Variables
    - inputVariable
    - outputVariable
    - customerServiceResponse
    - OrderBookingFault
    - requiresApproval

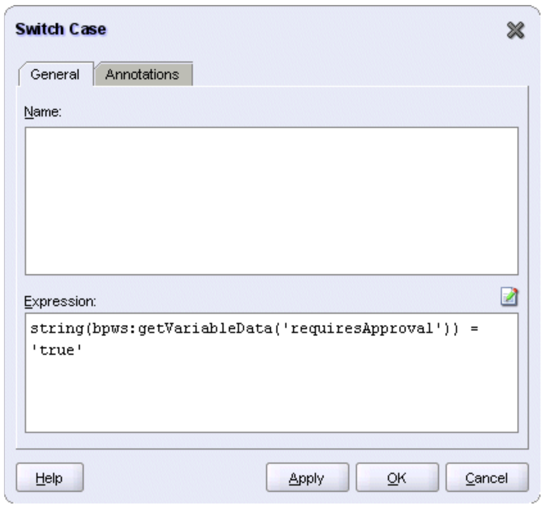
BPEL Extension Functions
- getLinkStatus
- getVariableData
- getVariableProperty

Content Preview: bpws:getVariableData('requiresApproval')

Description: Variable XPath expression

8. Click **OK** in the Expression Builder dialog. The Switch Case dialog now contains the expression:

***Figure 8–150 Switch Case Dialog***



Name:

Expression:

```
string(bpws:getVariableData('requiresApproval')) =
'true'
```

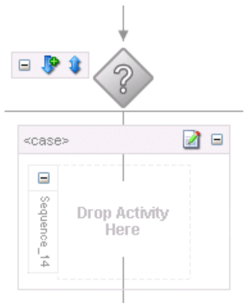
9. Click **OK** in the Switch Case dialog.
10. Select File > Save to save your work.

### 8.12.3 Create a Sequence in the <case> Branch

The <case> branch will contain two activities (a human task activity and a switch activity). This means that you need a sequence activity to be the container for these two activities.

Drag the Sequence icon from the Component Palette and drop it in the <case> box. The <case> box now looks like this:

***Figure 8–151 Sequence Activity in the <case> Branch***

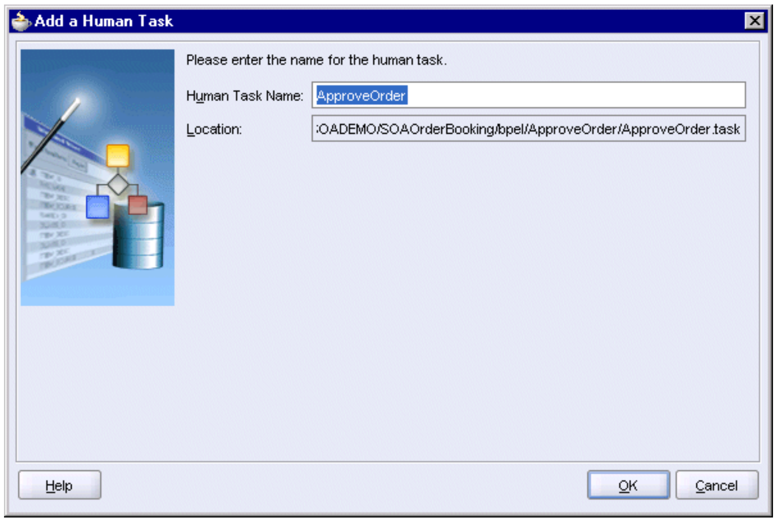


### 8.12.4 Create a Human Task

Create a human task activity in the <case> branch.

1. In the Component Palette, select **Process Activities** from the dropdown.
2. Drag the Human Task icon from the Component Palette and drop it in the Sequence area in the <case> box. This displays the Add a Human Task dialog.
3. In the Add a Human Task dialog, click the Create Task Definition icon (the second icon for the **Task Definition** field). This displays a different Add a Human Task dialog.
4. In the second Add a Human Task dialog, enter **ApproveOrder** for the **Human Task Name**. This sets the location to: `*SOADEMO*\SOAOrderBooking\bpel\ApproveOrder\ApproveOrder.task`.

***Figure 8–152 Add a Human Task Dialog***



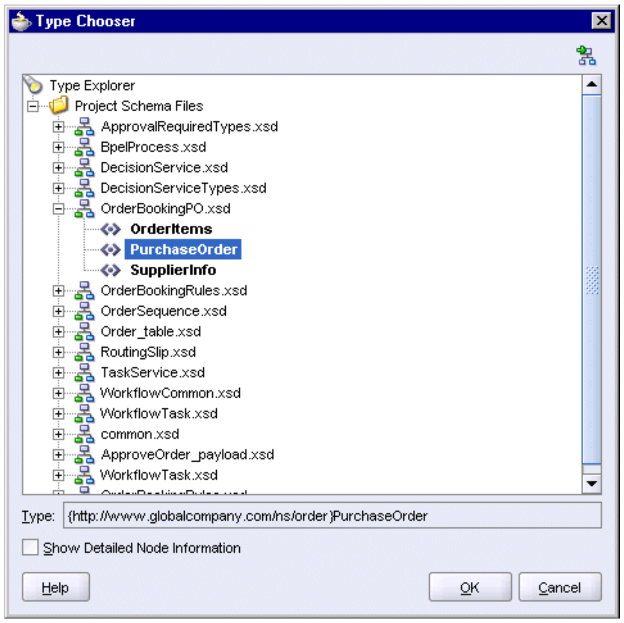
Please enter the name for the human task.

Human Task Name: ApproveOrder

Location: :OADEMO/SOAOrderBooking/bpel/ApproveOrder/ApproveOrder.task

5. Click **OK**. JDeveloper closes the Add a Human Task dialog and displays the ApproveOrder.task page.
6. In the ApproveOrder.task page, you can leave the **Title** empty.
7. For **Parameters**:
   a. Click the green + icon, which displays the Add Task Parameter dialog.
   b. In the Add Task Parameter dialog, select **Element** and click the flashlight icon, which displays the Type Chooser dialog. In the Type Chooser dialog, select **Type Explorer** > **Project Schema Files** > **OrderBookingPO.xsd** > **PurchaseOrder**.

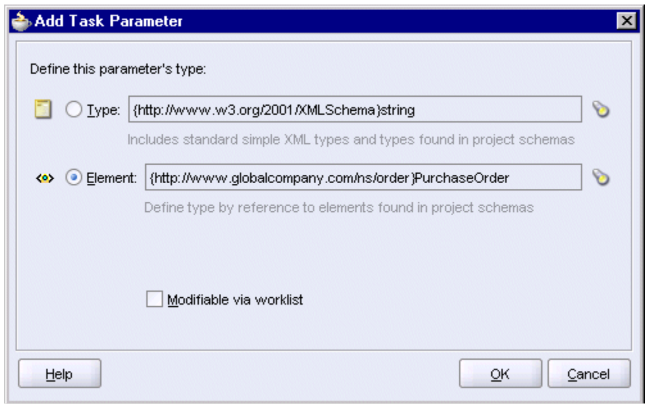
***Figure 8–153 Type Chooser Dialog for ApproveOrder.task Parameter***



Type: {http://www.globalcompany.com/ns/order}PurchaseOrder

Click **OK** in the Type Chooser dialog. The Add Task Parameter dialog now looks like this:

***Figure 8–154 Add Task Parameter Dialog***


Add Task Parameter
Define this parameter's type:
Includes standard simple XML types and types found in project schemas
Define type by reference to elements found in project schemas
Help
OK
Cancel

Type: {http://www.w3.org/2001/XMLSchema}string

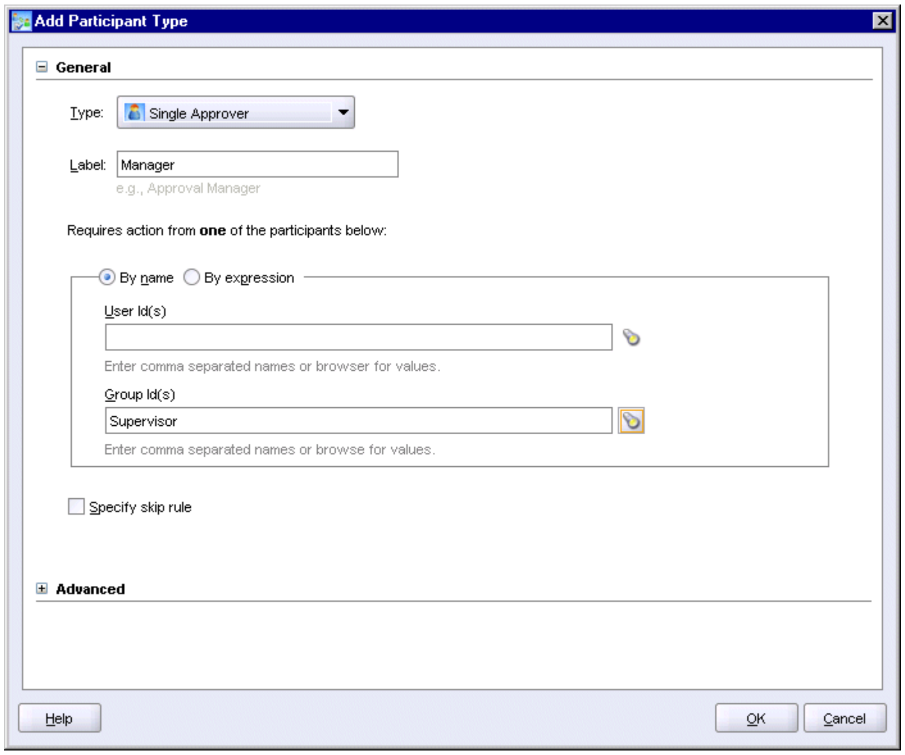
[✓ Element: {http://www.globalcompany.com/ns/order}PurchaseOrder]

Modifiable via worklist

   c. Click **OK** in the Add Task Parameter dialog.
8. For **Assignment and Routing Policy**:

a. Click the green + icon. This displays the Add Participant Type dialog.

***Figure 8–155 Add Participant Type Dialog***



Type: Single Approver

Label: Manager

e.g., Approval Manager

Requires action from **one** of the participants below:

[✓ By name] By expression

User Id(s)

Enter comma separated names or browser for values.

Group Id(s): Supervisor

Enter comma separated names or browse for values.

Specify skip rule

b. For **Type**, select **Single Approver**.

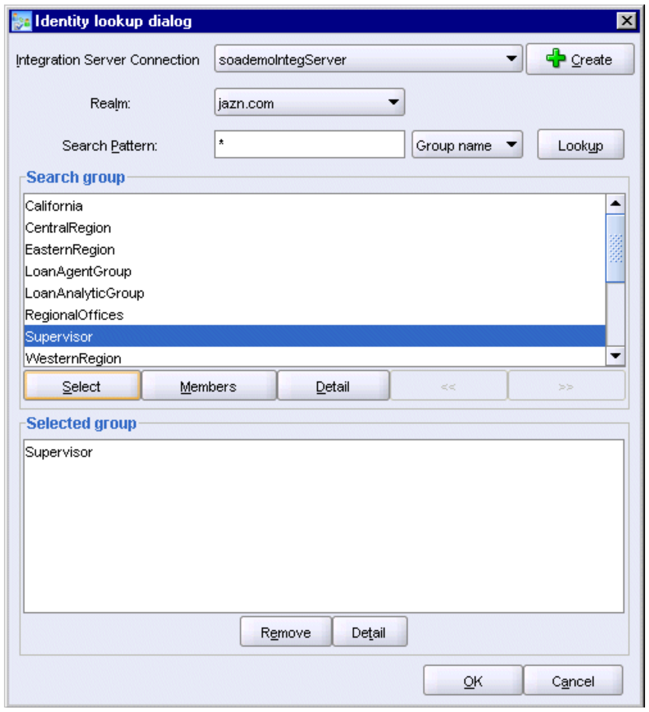
c. For **Label**, enter **Manager**.

d. Select **By Name**, and click the flashlight for **Group Id(s)** because you want to give the approve authority to a group. This displays the Identity Lookup dialog.

e. In the Identity Lookup dialog, click **Lookup**. This should produce a list of group names in the **Search Group** box.

f. Select **Supervisor** in the **Search Group** box and click **Select**. This moves the name to the **Selected Group** box.

*Figure 8–156 "Supervisor" Selected and Moved to the Selected Group Box*



Integration Server Connection: soademoIntegServer
Realm: jazn.com
Search Pattern: * Group name

Search group:
California
CentralRegion
EasternRegion
LoanAgentGroup
LoanAnalyticGroup
RegionalOffices
Supervisor
WesternRegion

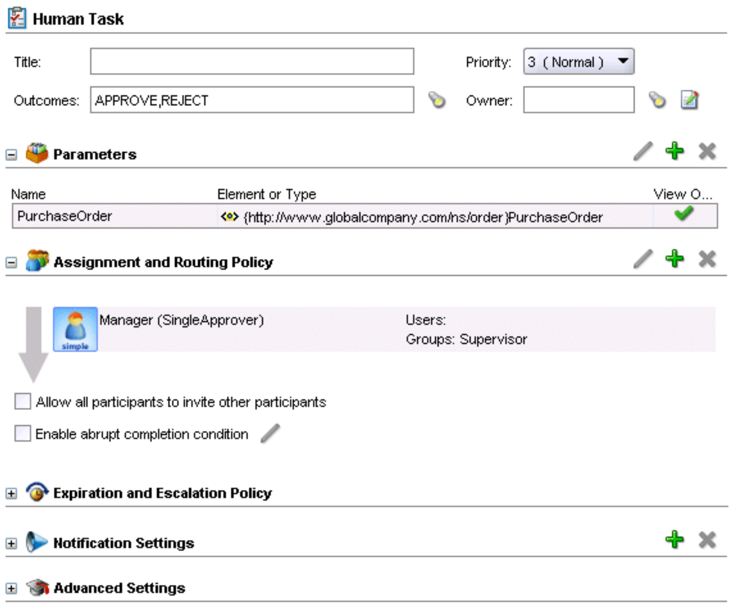
Selected group:
Supervisor

g. Click **OK** in the Identity Lookup dialog. "Supervisor" now appears in the Add Participant Type dialog (see Figure 8–155).

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

   The ApproveOrder.task page now looks like this:

*Figure 8–157 ApproveOrder.task Page, Completed*



Title:
Priority: 3 ( Normal )
Outcomes: APPROVE,REJECT
Owner:

| Name | Element or Type | View O... |
|---|---|---|
| PurchaseOrder | {http://www.globalcompany.com/ns/order}PurchaseOrder | ✓ |

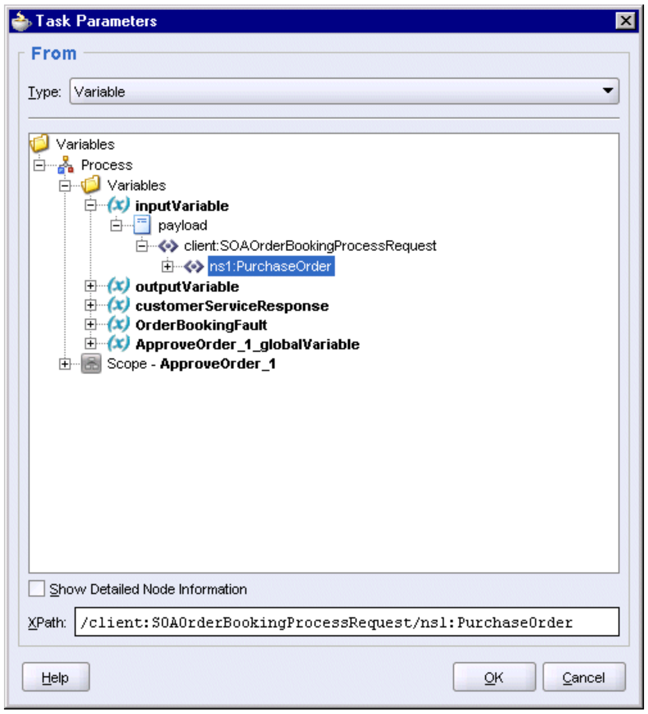
Manager (SingleApprover) Users:
Groups: Supervisor

☐ Allow all participants to invite other participants
☐ Enable abrupt completion condition

10. Select File > Save to save ApproveOrder.task.

11. Close ApproveOrder.task (select File > Close).
12. Back on the SOAOrderBooking.bpel main page, double-click the "ApproveOrder_1" human task activity. This displays the Human Task dialog.
13. For the Task Title field, enter **Approve Order**.
14. The **Task Parameters** column is filled in with "PurchaseOrder", but the **BPEL Variable** column is blank. Click the flashlight icon in the **BPEL Variable** column.
15. In the Task Parameters dialog, select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder**.

***Figure 8–158 Task Parameters Dialog***


Task Parameters

From

Type: Variable

- Variables
  - Process
    - Variables
      - inputVariable
        - payload
          - client:SOAOrderBookingProcessRequest
            - ns1:PurchaseOrder
      - outputVariable
      - customerServiceResponse
      - OrderBookingFault
      - ApproveOrder_1_globalVariable
    - Scope - ApproveOrder_1

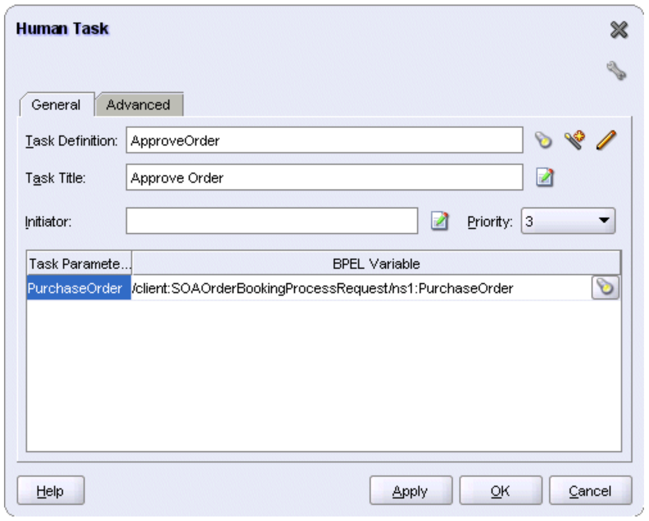
Show Detailed Node Information

XPath: /client:SOAOrderBookingProcessRequest/ns1:PurchaseOrder

Click **OK** in the Task Parameters dialog.

16. The Human Task dialog now looks like the following:

***Figure 8–159 Human Task Dialog, Completed***



Task Definition: ApproveOrder
Task Title: Approve Order
Initiator:
Priority: 3

| Task Paramete... | BPEL Variable |
|---|---|
| PurchaseOrder | /client:SOAOrderBookingProcessRequest/ns1:PurchaseOrder |

Click **OK** in the Human Task dialog.

JDeveloper creates the `*SOADEMO*\SOAOrderBooking\bpel\ApproveOrder` directory, and creates these files in it:

- `ApproveOrder.task`
- `ApproveOrder_payload.xsd`
- `WorkflowTask.xsd`

## 8.12.5 Create a Form for the Worklist Application

When a manager wants to see the orders that are waiting for approval, the manager logs into the Worklist application. You can access this application from the Start menu of the machine running Oracle Application Server: **Start** > **Programs** > **Oracle -** ***ORACLE_HOME_NAME*** > **Oracle BPEL Process Manager** > **Worklist Application**.

You need to create a form that the Worklist application can use. This form enables the Worklist application to display data specific to the SOA Order Booking application.

To create this form:

1. In the Application Navigator, right-click the **ApproveOrder** folder (located under **SOAOrderBooking** > **Integration Content**) and select **Auto Generate Simple Task Form**.
2. JDeveloper displays the `payload-body.jsp` file in the editor. You can close it without making any changes to it.

JDeveloper creates the following directory and files:

- `*SOADEMO*\SOAOrderBooking\bpel\ApproveOrder\ApproveOrder_Display.tform`
- `*SOADEMO*\SOAOrderBooking\public_html\`

## 8.12.6 Accept the Default Settings for the Remaining Human Task Activities

Expand the "ApproveOrder_1" human task activity to see the activities contained in this scope (see Figure 8–147). You can just accept the default settings for these activities.

## 8.13 Handle the Manager’s Response ("requiresApproval" Switch)

JDeveloper created a switch for you automatically after the human task activity. 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.

### 8.13.1 Handle the Reject Case

If the manager rejected the order, you want to perform these two activities:

- set the status item to a string saying that the order has been rejected, and
- create a throw activity

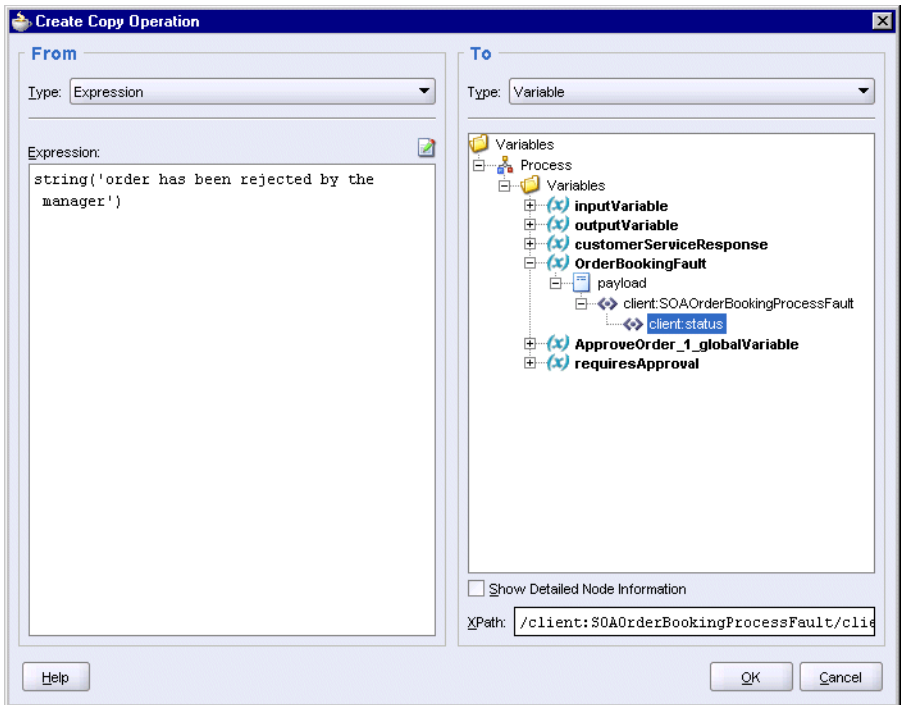
#### 8.13.1.1 Set the Status of the Order (Assign Activity)

1. Expand the switch.
2. For <case Task outcome is REJECT>, delete the default "CopyPayloadFromTask" assign activity. There are now no activities for the REJECT case.
3. In the Component Palette, select **Process Activities** from the dropdown.
4. Drag the Assign activity icon from the Component Palette and drop it in the REJECT case.
5. Double-click the new assign activity to display the Assign dialog.
6. In the Assign dialog, click the Copy Operation tab.
7. Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.
8. In the **From** side, set **Type** to **Expression**, and enter the following line in the Expression box:

   ```
   string('Order has been rejected by the manager')
   ```

9. In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **OrderBookingFault** > **payload** > **client:SOAOrderBookingProcessFault** > **client:status**.

***Figure 8–160 Create Copy Operation Dialog for the REJECT Case***

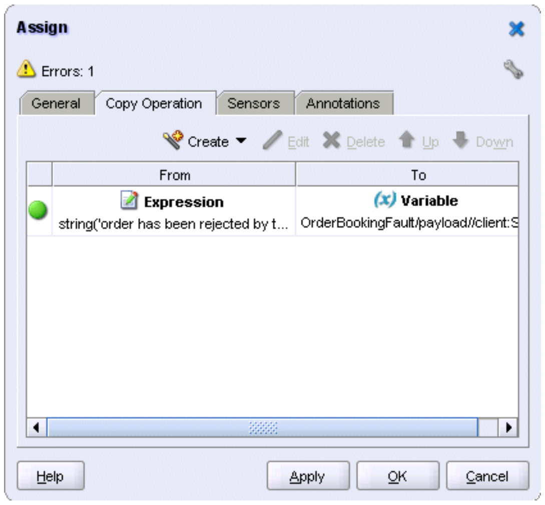


```
string('order has been rejected by the
 manager')
```

XPath: `/client:SOAOrderBookingProcessFault/clie`

10. Click **OK** in the Create Copy Operation dialog. You should see the copy operation in the Assign dialog.
11. Click **OK** in the Assign dialog.

***Figure 8–161 Assign Dialog Showing Copy Operation for the REJECT Case***



| | From | To |
|---|---|---|
| ● | Expression string('order has been rejected by t... | Variable OrderBookingFault/payload//client:S |

### 8.13.1.2 Create a Throw Activity

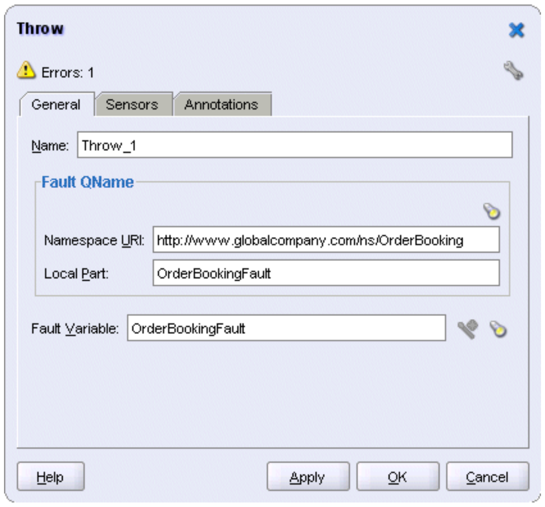
Create a throw activity to stop the flow from continuing.

1. Drag the Throw icon from the Component Palette and drop it below the previous assign activity.
2. Double-click the new throw activity to display the Throw dialog.

3. In the Throw dialog:

   - **Name**: enter **Throw_1** (keep the default name).
   - **Namespace URI**: enter **http://www.globalcompany.com/ns/OrderBooking**. You have to enter it manually.
   - **Local Part**: enter **OrderBookingFault**. You have to enter it manually.
   - **Fault Variable**: click the flashlight and select **OrderBookingFault**.

***Figure 8–162 Throw Dialog for the REJECT Case***



Name: Throw_1

Namespace URI: http://www.globalcompany.com/ns/OrderBooking

Local Part: OrderBookingFault

Fault Variable: OrderBookingFault

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

## 8.13.2 Handle the Approve Case

In the Approve case, delete the default assign activity and create an empty activity by dragging the Empty icon from the Component Palette to the APPROVE case. You only need the empty activity because nothing needs to happen here. The flow just needs to continue to the next step.

## 8.13.3 Handle the Expired Case

You handle the Expired, Stale, Withdrawn, or Errored case in the same manner as for the Approve case, that is, delete the default assign activity and replace it with an empty activity. This is acceptable because in the SOA Order Booking application, orders do not expire and users will not encounter this case.

## 8.13.4 Accept the Default Settings for Each Case

JDeveloper also set the conditions for each branch in the switch. To see the conditions, double-click the titlebar on each branch. You do not need to make any changes to the conditions.

## 8.13.5 Minimize the "requiresApproval" Switch

Click the [-] icon on the "requiresApproval" switch to minimize it.

## 8.14 Choose a Supplier ("SelectSupplier" Scope)

This scope sends the order information to the two suppliers, Select Manufacturer and Rapid Service, and the suppliers return their bids for the orders. The scope then chooses the supplier that provided the lower bid.

Figure 8–163 shows the activities in the "SelectSupplier" scope at a high level. The scope uses a flow activity to send the order information to the two suppliers in parallel. The flow contains two scopes, one for each supplier. After the suppliers have returned their bids, a switch activity selects the lower bid.

***Figure 8–163 Activities for the "SelectSupplier" Scope Shown at a High Level***

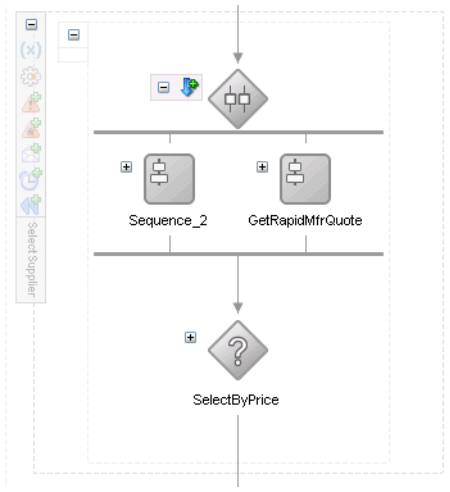
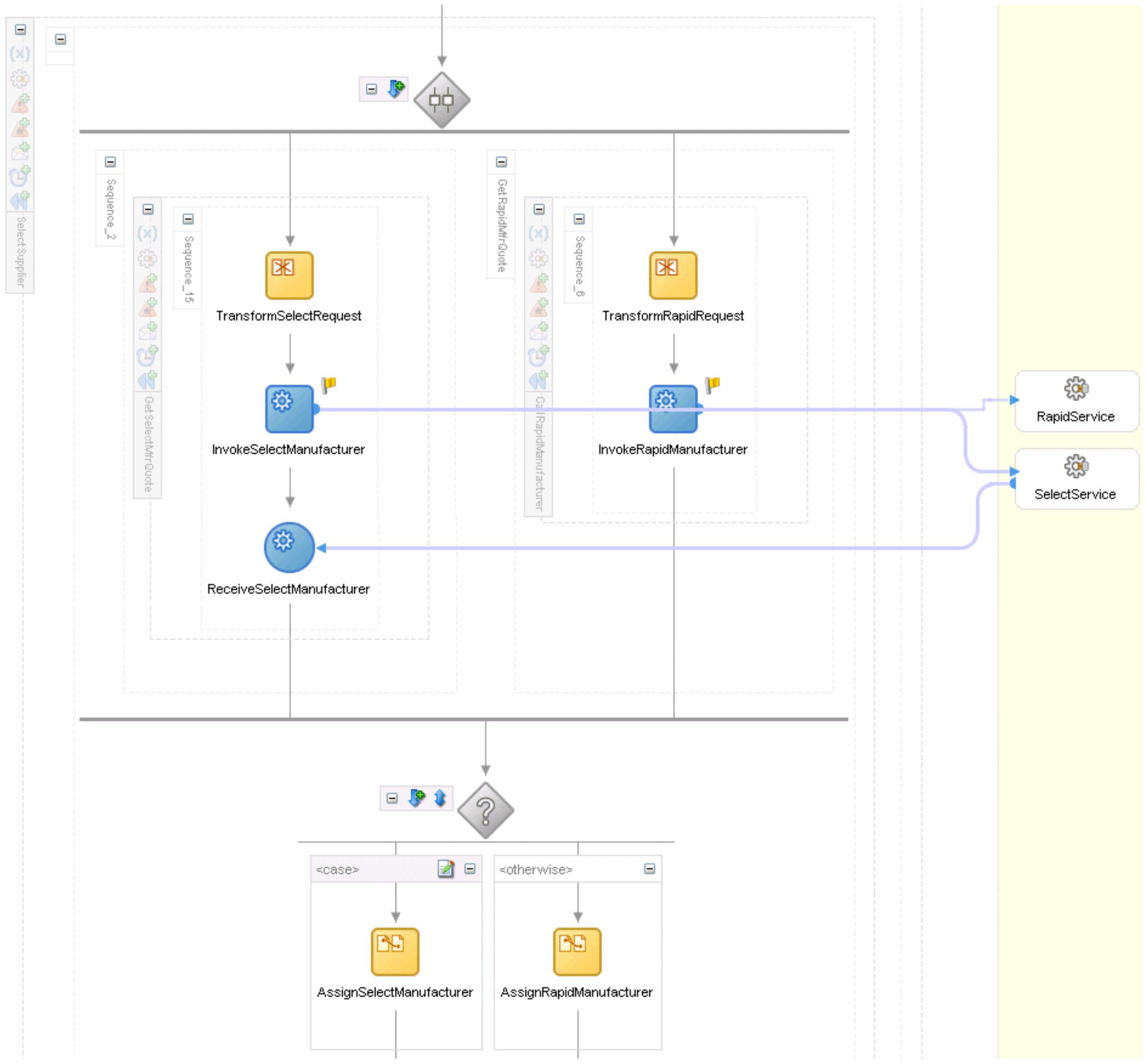


Figure 8–164 shows the activities in the flow, and also the switch activity after the flow.

The scope for Select Manufacturer includes a receive activity, which is not required for the scope for Rapid Service. This is because Select Manufacturer is invoked asynchronously. The receive activity is needed to receive the bid when Select Manufacturer returns it. Rapid Service is invoked synchronously; the invoke activity invokes the request and receives the response (that is, the bid value).

The switch activity has two branches: the <case> branch handles the case where SelectManufacturer returned the lower bid, and the <otherwise> branch handles the case where Rapid Service returned the lower bid.

*Figure 8–164 "SelectSupplier" Scope Showing Flow and Switch Activities*



Before you can create the scope, you need to:

- create and deploy the SelectManufacturer and RapidService services, which were described in Chapter 7, "Creating the SelectManufacturer Project" and Chapter 6, "Creating the RapidService Project".
- create partner links to SelectManufacturer and RapidService.

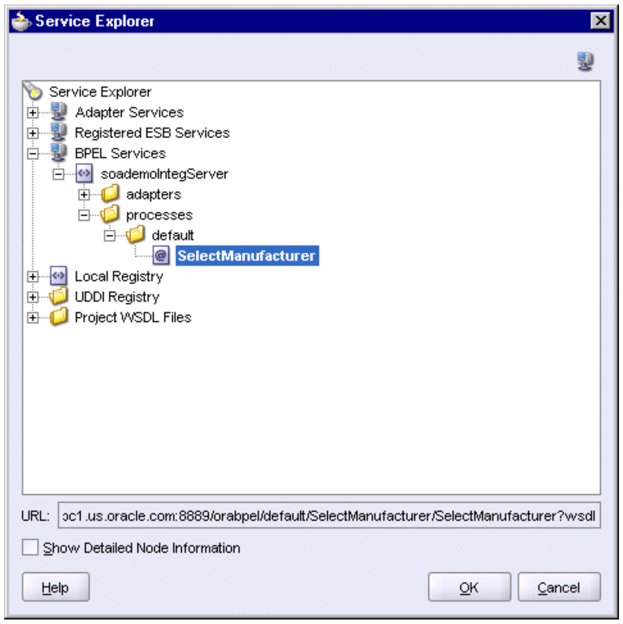
## 8.14.1 Create the "SelectManufacturer" Partner Link

1. In the Component Palette, select **Services** from the dropdown.
2. Drag the Partner Link icon from the Component Palette and drop it in a **Services** swimlane.
3. In the Create Partner Link dialog:
   - **Name**: enter **SelectService**.
   - **WSDL File**: click the service explorer (flashlight) icon (the second icon from the left). This displays the Service Explorer dialog.

In the Service Explorer dialog, select **Service Explorer** > **BPEL Services** > ***soaDemoIntgServer*** > **processes** > **default** > **SelectManufacturer**.

*soaDemoIntgServer* refers to your connection to the Integration Server where you deployed Select Manufacturer.

***Figure 8–165 Service Explorer Dialog for the "SelectService" Partner Link***



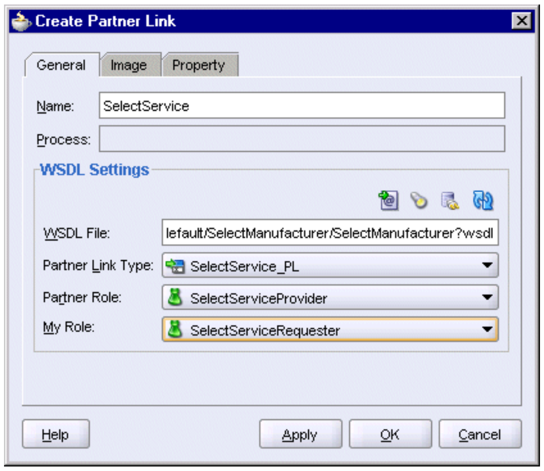
URL: ɔc1.us.oracle.com:8889/orabpel/default/SelectManufacturer/SelectManufacturer?wsdl

Click **OK** in the Service Explorer dialog.

- **Partner Link Type**: select **SelectService_PL** (automatically filled in for you).
- **Partner Role**: select **SelectServiceProvider**.
- **My Role**: select **SelectServiceRequester**.

The Create Partner Link dialog should look like this:

***Figure 8–166 Create Partner Link Dialog for the "SelectService" Partner Link***



Name: SelectService
Process:
WSDL File: lefault/SelectManufacturer/SelectManufacturer?wsdl
Partner Link Type: SelectService_PL
Partner Role: SelectServiceProvider
My Role: SelectServiceRequester

4. Click **OK** in the Create Partner Link dialog.
5. Select File > Save to save your work.

### 8.14.2 Create the "RapidService" Partner Link

1. Copy the following file from the `soademo_101310_prod.zip` file to the `SOAOrderBooking\bpel` directory.

   - `RapidService.wsdl`

   The WSDL file is located in the `SOAOrderBooking\bpel` directory in the `soademo_101310_prod.zip` file.

2. Verify the URL in the `RapidService.wsdl` file.

   a. Select File > Open and open the `RapidService.wsdl` file.

   b. Click the Source tab at the bottom of the editor to view the lines in the file.

   c. The `http://localhost:8888` reference in the file assumes that Oracle Application Server is running on the same machine as JDeveloper, and that Oracle Application Server is listening for requests on port 8888.

      If necessary, change `localhost` to the name of the machine running Oracle Application Server, and `8888` to the correct port used by your Oracle Application Server installation, for example: `mypc.mydomain.com:8889`.

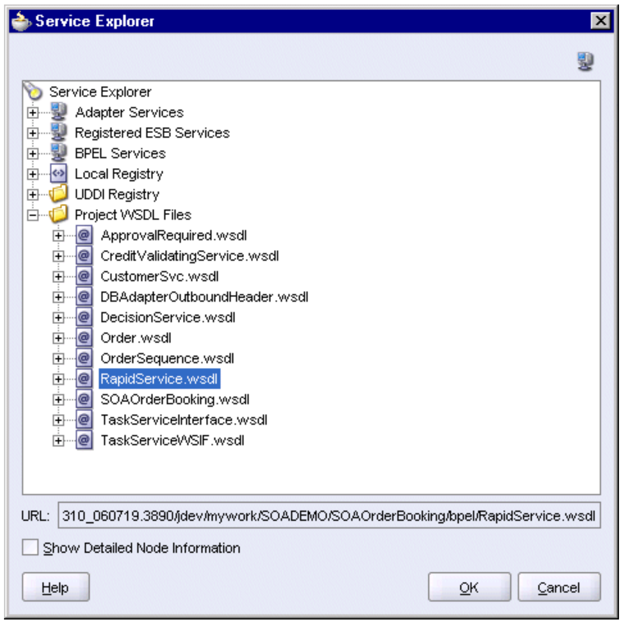
   d. If you edited the file, save the file and close it.

3. Drag the Partner Link icon from the Component Palette and drop it in a partner link area.

4. In the Create Partner Link dialog:

   - **Name**: enter **RapidService**.
   - **WSDL File**: click the Service Explorer icon (second icon from the left) to display the Service Explorer dialog. In the Service Explorer dialog, expand **Project WSDL Files** and select **RapidService.wsdl**.

***Figure 8–167 Service Explorer Dialog for the "RapidService" Partner Link***



URL: 310_060719.3890/jdev/mywork/SOADEMO/SOAOrderBooking/bpel/RapidService.wsdl

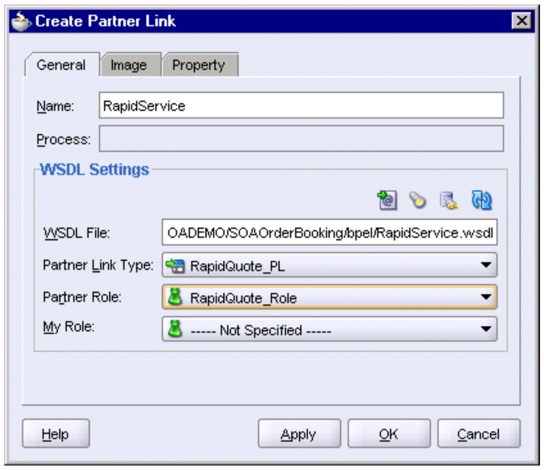
   Click **OK** in the Service Explorer.

   - **Partner Link Type**: select **RapidQuote_PL** (automatically filled in for you).

- **Partner Role**: select **RapidQuote_Role**.
- **My Role**: leave it blank.

The Create Partner Link dialog should look like this:

***Figure 8–168 Create Partner Link Dialog for RapidService***



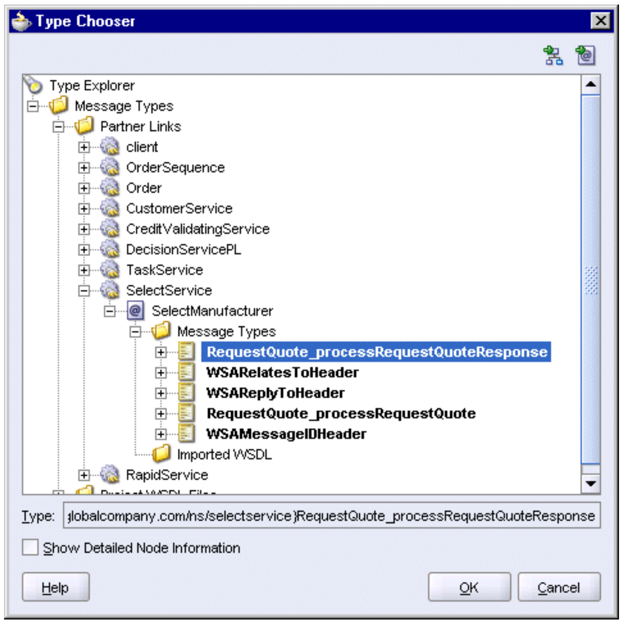
Name: RapidService
Process:
WSDL File: OADEMO/SOAOrderBooking/bpel/RapidService.wsdl
Partner Link Type: RapidQuote_PL
Partner Role: RapidQuote_Role
My Role: ----- Not Specified -----

5. Click **OK** in the Create Partner Link dialog.
6. Select File > Save to save your work.

## 8.14.3 Create the "SelectSupplier" Scope

1. In the Component Palette, select **Process Activities** from the dropdown.
2. Drag the Scope icon from the Component Palette and drop it below the "requiresApproval" switch activity.
3. Double-click the new scope to display the Scope dialog.
4. In the Scope dialog, in the General tab:
   - **Name**: enter **SelectSupplier**.
   - **Variable Access Serializable**: do not select.
5. Click the Variables tab. You need to create two variables for this scope.
6. In the Variables tab, click **Create** to create the first variable.
7. In the Create Variable dialog:
   - **Name**: enter **selectManufacturerResponse**.
   - Select **Message Type** and click the flashlight icon to display the Type Chooser. In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **SelectService** > **SelectManufacturer** > **Message Types** > **RequestQuote_ processRequestQuoteResponse**.

*Figure 8–169 Type Chooser Dialog for the "selectManufacturerResponse" Variable*



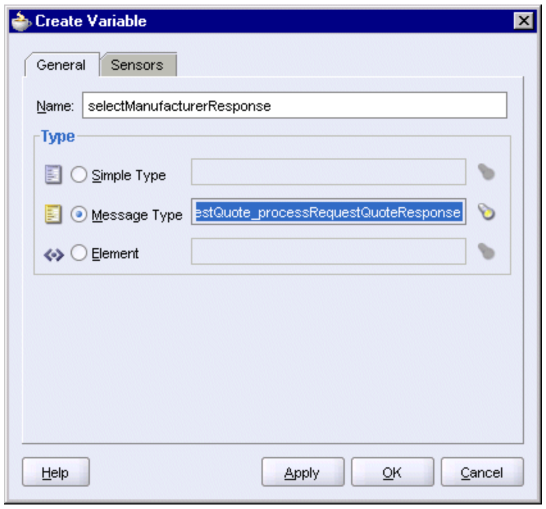
Type: {http://www.globalcompany.com/ns/selectservice}RequestQuote_processRequestQuoteResponse

Show Detailed Node Information

Click **OK** in the Type Chooser.

8. In the Create Variable dialog, the Message Type is set to `{http://www.globalcompany.com/ns/selectservice}RequestQuote_processRequestQuoteResponse`.

*Figure 8–170 Create Variable Dialog for the "selectManufacturerResponse" Variable*



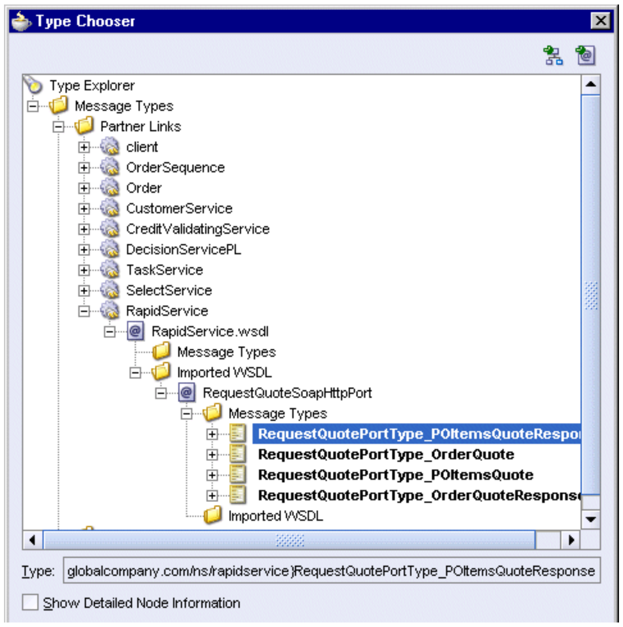
Name: selectManufacturerResponse

Message Type: estQuote_processRequestQuoteResponse

9. Click **OK** in the Create Variable dialog.
10. In the Variables tab, click **Create** again to create the second variable.
11. In the Create Variable dialog:
    - **Name**: enter **rapidManufacturerResponse**.
    - Select **Message Type** and click the flashlight icon to display the Type Chooser. In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **RapidService** > **RapidService.wsdl** > **Imported WSDL** >

**RequestQuoteSoapHttpPort** > **Message Types** > **RequestQuotePortType_POItemsQuoteResponse**.

*Figure 8–171 Type Chooser Dialog for the "rapidManufacturerResponse" Variable*


Type Chooser

Type Explorer
- Message Types
  - Partner Links
    - client
    - OrderSequence
    - Order
    - CustomerService
    - CreditValidatingService
    - DecisionServicePL
    - TaskService
    - SelectService
    - RapidService
      - RapidService.wsdl
        - Message Types
        - Imported WSDL
          - RequestQuoteSoapHttpPort
            - Message Types
              - RequestQuotePortType_POItemsQuoteRespo
              - RequestQuotePortType_OrderQuote
              - RequestQuotePortType_POItemsQuote
              - RequestQuotePortType_OrderQuoteRespons
            - Imported WSDL

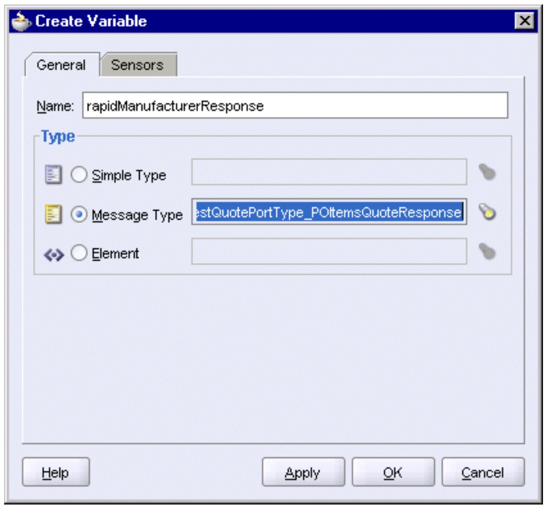
Type: globalcompany.com/ns/rapidservice}RequestQuotePortType_POItemsQuoteResponse

Show Detailed Node Information

Click **OK** in the Type Chooser.

12. In the Create Variable dialog, the Message Type is set to `{http://www.globalcompany.com/ns/rapidservice}RequestQuotePortType_POItemsQuoteResponse`.

*Figure 8–172 Create Variable Dialog for the "rapidManufacturerResponse" Variable*


Create Variable

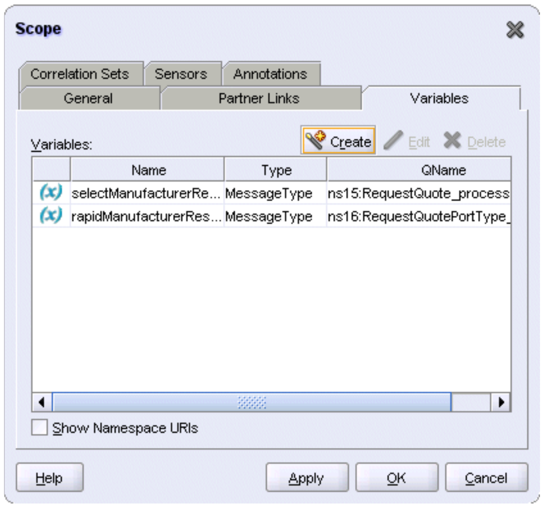
General | Sensors

Name: rapidManufacturerResponse

Type
- Simple Type
- [✓ Message Type] stQuotePortType_POItemsQuoteResponse
- Element

13. Click **OK** in the Create Variable dialog.
14. The variables appear in the Variables tab of the Scope dialog.

*Figure 8–173 Scope Dialog for the "SelectSupplier" Scope*



| Name | Type | QName |
|---|---|---|
| selectManufacturerRe... | MessageType | ns15:RequestQuote_process |
| rapidManufacturerRes... | MessageType | ns16:RequestQuotePortType_ |

Click **OK** in the Scope dialog.

## 8.14.4 Create a Flow Activity

You use a flow activity in order to send out requests to more than one supplier at the same time. In the case of this application, you send out requests to two suppliers: Select Manufacturer and Rapid Service.

1. Expand the new "SelectSupplier" scope.
2. Drag the Flow icon from the Component Palette and drop it into the new "SelectSupplier" scope.
3. Double-click the new flow instance and in the Flow dialog, set the name to **CallManufacturers**.

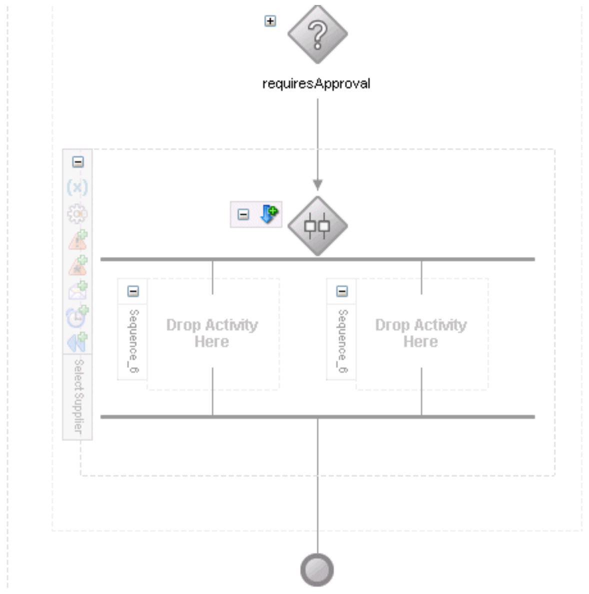
## 8.14.5 Set the Activities for Select Manufacturer

To get a quote from Select Manufacturer, you create these activities:

### 8.14.5.1 Create a Scope for SelectManufacturer

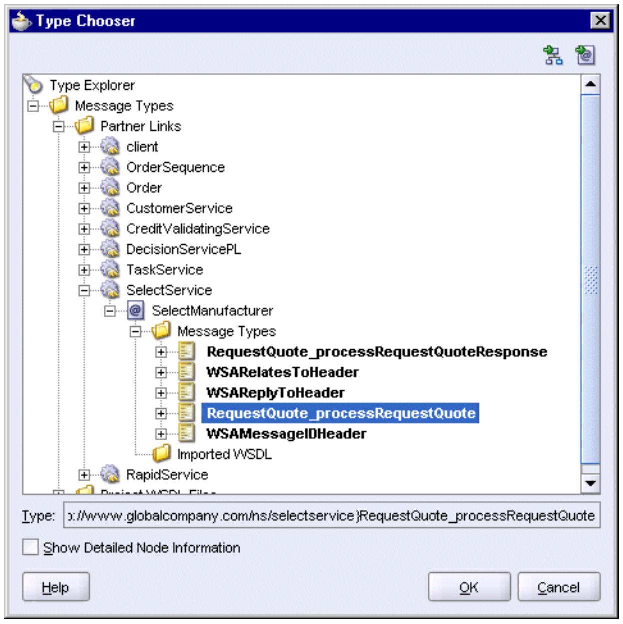
1. Expand the "CallManufacturers" flow. The flow has two parallel areas where you can define activities.

*Figure 8–174 Flow Activity in the SOAOrderBooking.bpel Page*



2. Drag the Scope icon from the Component Palette and drop it into the left side of the flow. The left side of the flow handles requests to and responses from Select Manufacturer.
3. Double-click the new scope instance. This displays the Scope dialog.
4. In the Scope dialog, in the General tab:
   - **Name**: enter **GetSelectMfrQuote**.
   - **Variable Access Serializable**: do not select.
5. Click the Variables tab. You need to create a variable for this scope.
6. In the Variables tab, click **Create**.
7. In the Create Variable dialog:
   - **Name**: enter **manufacturerRequest**.
   - Select **Message Type** and click the flashlight icon to display the Type Chooser. In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **SelectService** > **SelectManufacturer** > **Message Types** > **RequestQuote_processRequestQuote**.

***Figure 8–175   Type Chooser Dialog for the "manufacturerRequest" Variable***

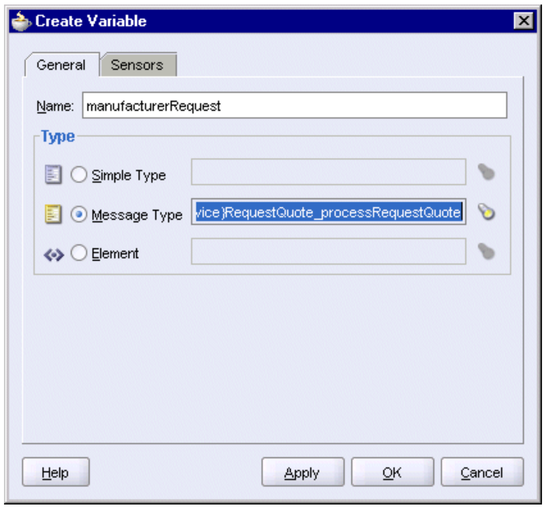


Type: ɔ://www.globalcompany.com/ns/selectservice}RequestQuote_processRequestQuote

Click **OK** in the Type Chooser.

8. In the Create Variable dialog, the Message Type is set to `{http://www.globalcompany.com/ns/selectservice}RequestQuote_processRequestQuote`.

***Figure 8–176   Create Variable Dialog for the "manufacturerRequest" Variable***

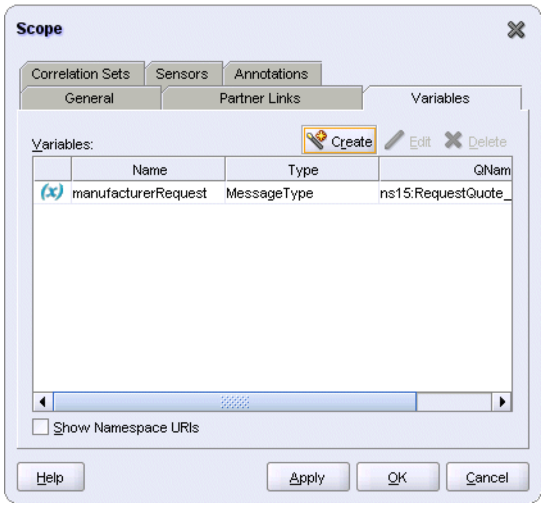


Name: manufacturerRequest

Message Type: vice}RequestQuote_processRequestQuote

9. Click **OK** in the Create Variable dialog.
10. The `manufacturerRequest` variable appears in the Variables tab of the Scope dialog.

*Figure 8–177 Scope Dialog for the "GetSelectMfrQuote" Scope*



| Name | Type | QNam |
|---|---|---|
| manufacturerRequest | MessageType | ns15:RequestQuote_ |

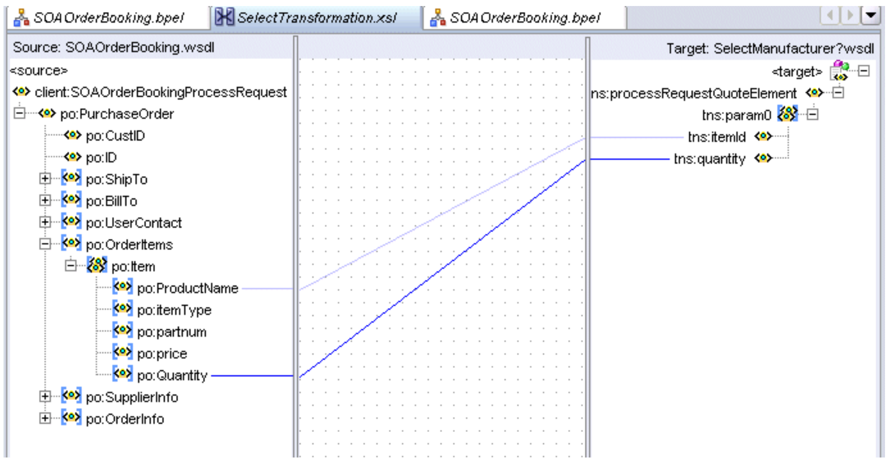
Click **OK** in the Scope dialog.

### 8.14.5.2 Create a Transform Activity ("TransformSelectRequest" Transform Activity)

1. Expand the "GetSelectMfrQuote" scope.
2. Drag the Transform icon from the Component Palette and drop it in the "GetSelectMfrQuote" scope.
3. Double-click the transform activity to display the Transform dialog.
4. In the General tab, set the name to **TransformSelectRequest**.
5. In the Transformation tab, set the **Source Variable** to **inputVariable**, and the **Source Part** to **payload**.

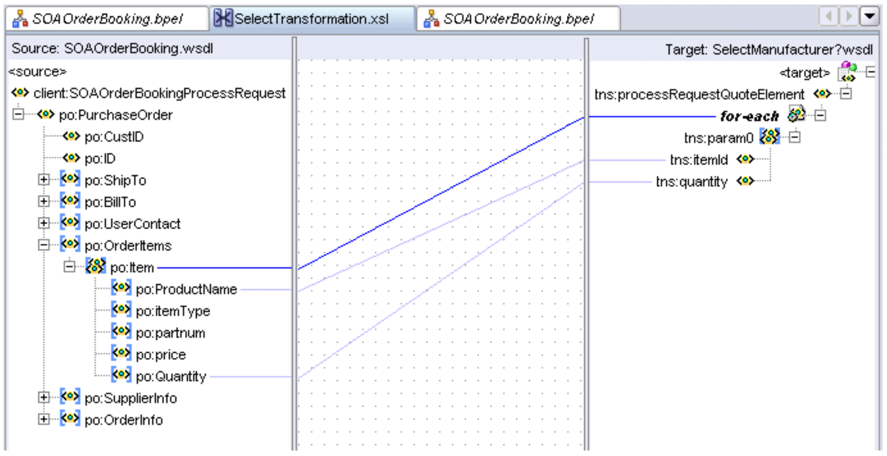
   Set the **Target Variable** to **manufacturerRequest** and the **Target Part** to **parameters**.
6. Set the **Mapper File** to **SelectTransformation.xsl**. This file does not exist yet; you will use the Data Mapper to generate it.
7. Click the Create Mapping icon (second icon from the left). This displays the Data Mapper, which you will use to generate the `SelectTransformation.xsl` file.
8. In the Data Mapper, on the Source (left) side, expand **po:PurchaseOrder** > **po:OrderItems** > **po:Item**.
9. On the Target (right) side, expand **tns:param0**.
10. Drag **po:ProductName** to **tns:itemId**.
11. Drag **po:Quantity** to **tns:quantity**. The Data Mapper should look like the following:

***Figure 8–178 Data Mapper for Select Manufacturer (Not Complete Yet)***



12. In the Component Palette for the Data Mapper, select **XSLT Constructs** from the dropdown.
13. Drag the for-each icon from the Component Palette and drop it on **tns:param0** on the target side. You want the for-each item to appear between **tns:processRequestQuoteElement** and **tns:param0**.
14. Drag **po:Item** to the **for-each** item on the target side. The Data Mapper should now look like this:

***Figure 8–179 Data Mapper for Select Manufacturer***



15. Select File > Save to save `SelectTransformation.xsl`. This file is created in the `SOAOrderBooking\bpel` directory.
16. Select File > Close to close the Data Mapper for `SelectTransformation.xsl`.
17. Select File > Save to save `SOAOrderBooking.bpel`.

### 8.14.5.3 Create an Invoke Activity

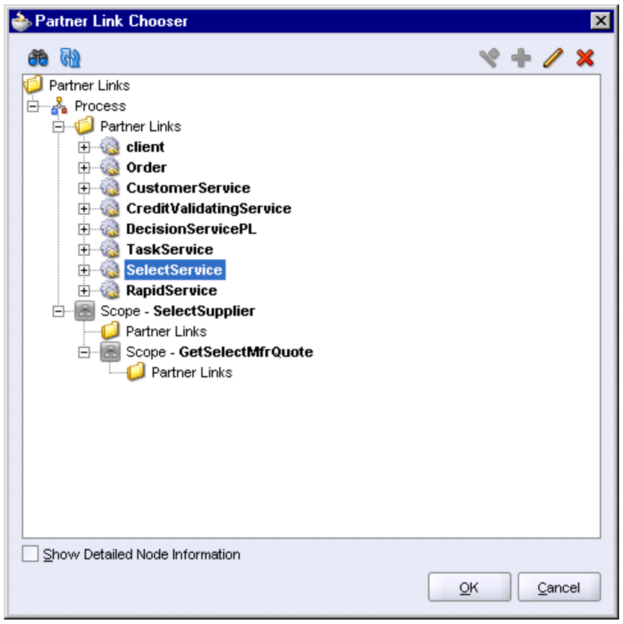
This invoke activity invokes the SelectManufacturer partner link.

1. Drag the Invoke icon from the Component Palette and drop it below the "TransformSelectRequest" transform activity.
2. Do one of the following to display the Invoke dialog:

- Drag one of the arrows on the side of the new invoke activity and drop it on the "SelectService" partner link. This associates the invoke activity with the partner link.
- Double-click the new invoke activity.

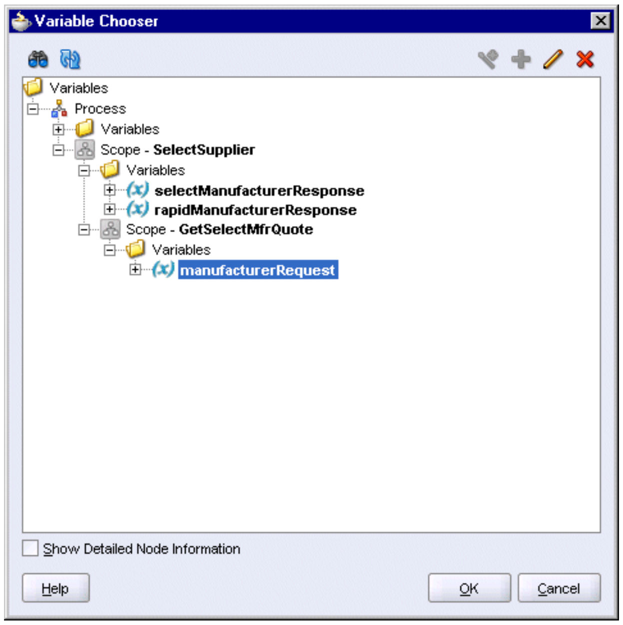
3. In the Invoke dialog, set the name of the invoke activity to **InvokeSelectManufacturer**.
4. If the **Partner Link** field is not set to **SelectService**, click the flashlight. In the Partner Link Chooser, select **SelectService** and click **OK**.

***Figure 8–180 Partner Link Chooser Dialog for the "InvokeSelectManufacturer" Invoke Activity***



5. For **Operation**, select **processRequestQuote**. This should be filled in automatically for you.
6. For **Input Variable**, click the Browse Variable icon, which displays the Variable Chooser dialog. In the dialog, select **Variables** > **Process** > **Scope - SelectSupplier** > **Scope - GetSelectMfrQuote** > **Variables** > **manufacturerRequest**.

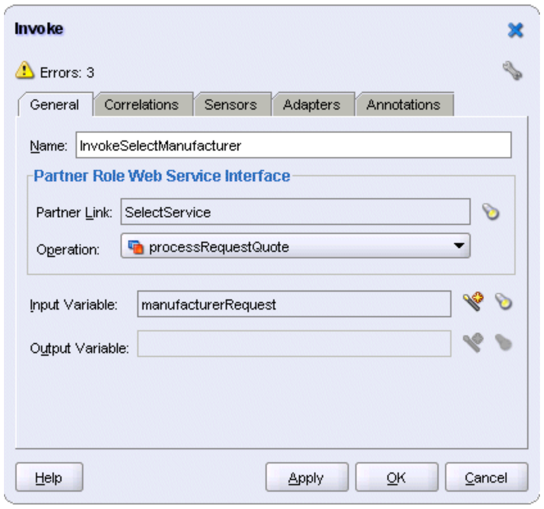
*Figure 8–181 Variable Chooser for the Input Variable for the "InvokeSelectManufacturer" Invoke Activity*



Click **OK** in the Variable Chooser.

7. The Invoke dialog looks like the following:

*Figure 8–182 Invoke Dialog for the "InvokeSelectManufacturer" Invoke Activity*



Name: InvokeSelectManufacturer

Partner Link: SelectService

Operation: processRequestQuote

Input Variable: manufacturerRequest

Output Variable:

Click **OK** in the Invoke dialog.

### 8.14.5.4 Create a Receive Activity

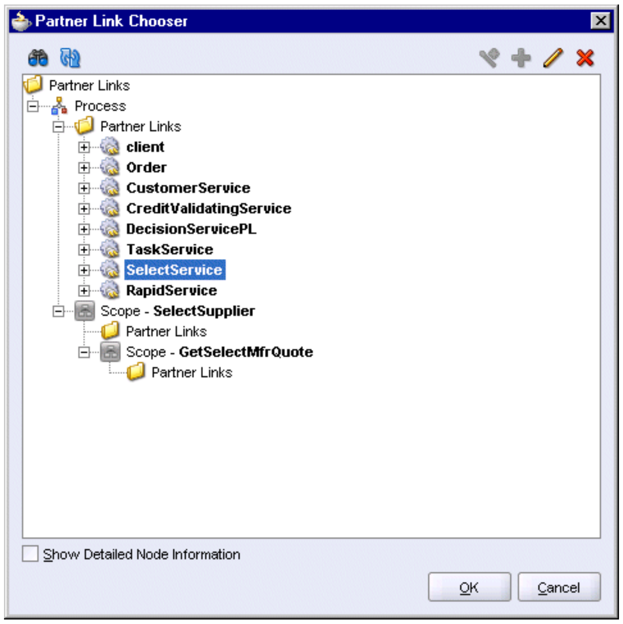
This receive activity receives the quote from the Select Manufacturer.

1. Drag the Receive icon from the Component Palette and drop it below the "InvokeSelectManufacturer" activity.
2. Do one of the following to display the Receive dialog:

- Drag one of the arrows on the side of the new receive activity and drop it on the "SelectService" partner link. This associates the receive activity with the partner link.
- Double-click the new receive activity.

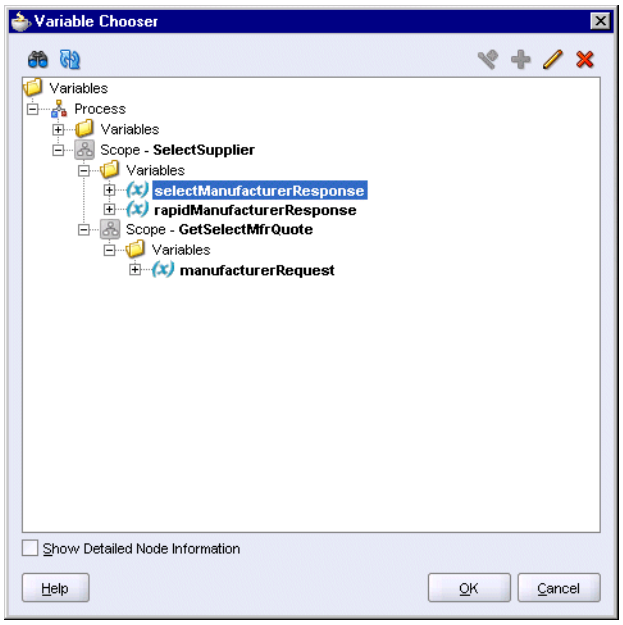
3. For **Name**, set it to **ReceiveSelectManufacturer**.
4. **Partner Link** should be set to **SelectService**. If not, click the flashlight icon, which displays the Partner Link Chooser. Select **SelectService** and click **OK**.

***Figure 8–183 Partner Link Chooser Dialog for the "ReceiveSelectManufacturer" Receive Activity***



5. For **Operation**, set it to **processRequestQuoteResponse**. This should be filled in automatically for you.
6. For **Variable**, click the Browse Variable icon, which displays the Variable Chooser. Select **Variables** > **Process** > **Scope - SelectSupplier** > **Variables** > **selectManufacturerResponse**.

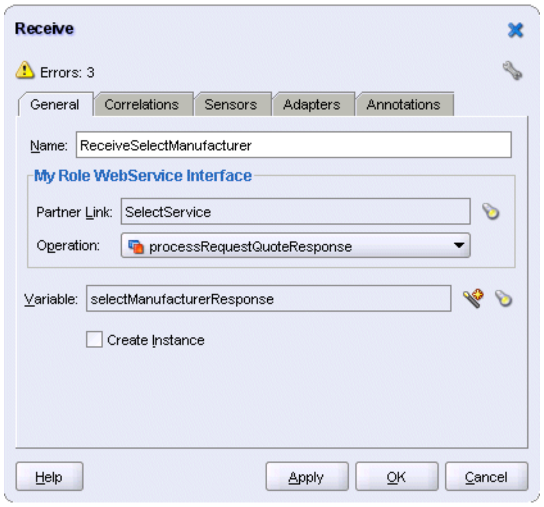
***Figure 8–184 Variable Chooser Dialog for the "ReceiveSelectManufacturer" Receive Activity***



Click **OK** in the Variable Chooser.

7. For the **Create Instance** option, do not select it.
8. The Receive dialog looks like Figure 8–185. Click **OK**.

***Figure 8–185 Receive Dialog***



Name: ReceiveSelectManufacturer

Partner Link: SelectService

Operation: processRequestQuoteResponse

Variable: selectManufacturerResponse

9. Select File > Save to save your work.

## 8.14.6 Set the Activities for Rapid Manufacturer

To get a quote from Rapid Manufacturer, you create these activities:

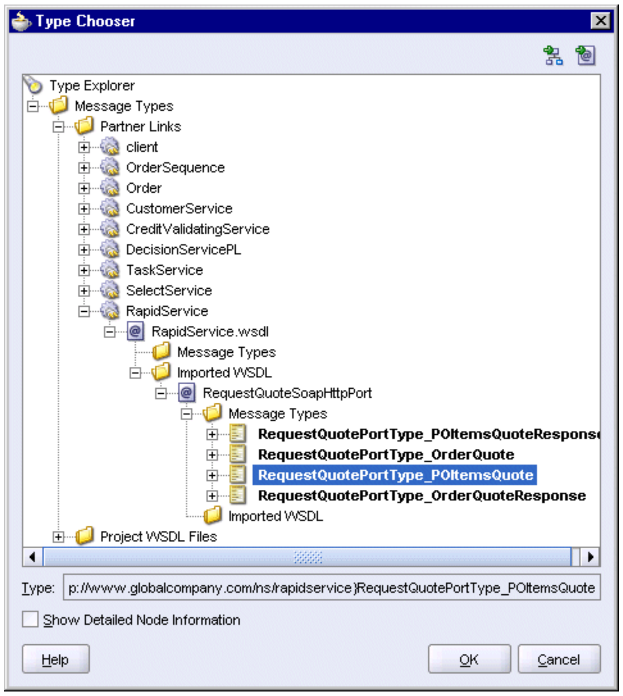
#### 8.14.6.1 Create a Scope for Rapid Manufacturer

You use the right side of the flow activity to define the activities for Rapid Manufacturer.

1. Drag the Scope icon from the Component Palette and drop it in the right side of the flow. You will define activities in this scope to handle requests to and responses from Rapid Manufacturer.
2. Double-click the new scope activity to display the Scope dialog.
3. In the General tab, set the name of the scope to **CallRapidManufacturer**.

   Do not select **Variable Access Serializable**.
4. In the Variables tab, click **Create**, which displays the Create Variable dialog.
5. In the Create Variable dialog, enter **manufacturerRequest** as the variable name.
6. Select **Message Type** and click the flashlight, which displays the Type Chooser. In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **RapidService** > **RapidService.wsdl** > **Imported WSDL** > **RequestQuoteSoapHttpPort** > **Message Types** > **RequestQuotePortType_ POItemsQuote**.

*Figure 8–186 Type Chooser Dialog for the "CallRapidManufacturer" Scope*

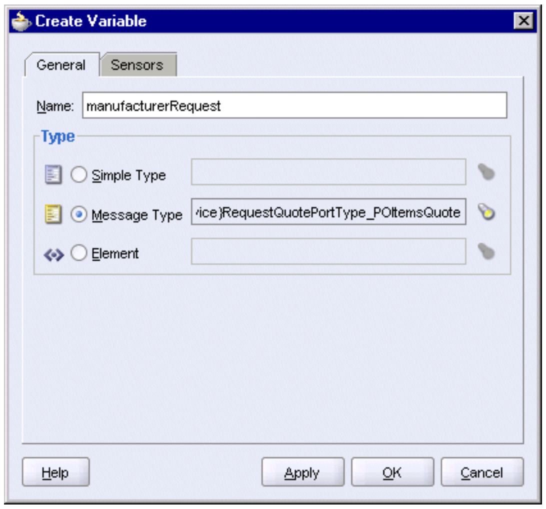


Type: p://www.globalcompany.com/ns/rapidservice}RequestQuotePortType_POItemsQuote

Click **OK** in the Type Chooser.

7. In the Create Variable dialog, the Message Type is set to `{http://www.globalcompany.com/ns/rapidservice}RequestQuotePortType_POItemsQuote`.

*Figure 8–187 Create Variable Dialog for the "CallRapidManufacturer" Scope*



Name: manufacturerRequest

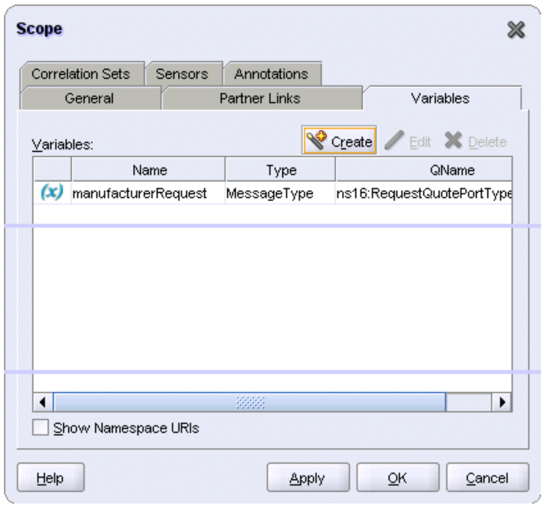
Simple Type

Message Type [✓] ice}RequestQuotePortType_POItemsQuote

Element

8. Click **OK** in the Create Variable dialog.
9. The `manufacturerRequest` variable appears in the Variables tab of the Scope dialog.

*Figure 8–188 Scope Dialog for the "CallRapidManufacturer" Scope*



| | Name | Type | QName |
|---|---|---|---|
| (x) | manufacturerRequest | MessageType | ns16:RequestQuotePortType |

Click **OK** in the Scope dialog.

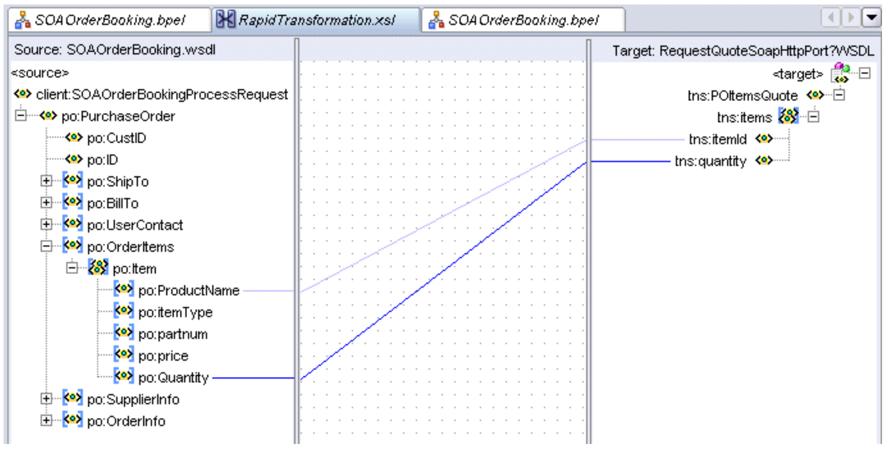
## 8.14.6.2 Create a Transform Activity ("TransformRapidRequest" Transform Activity)

1. Expand the "CallRapidManufacturer" scope.
2. Drag the Transform icon from the Component Palette and drop it in the "CallRapidManufacturer" scope.
3. Double-click the transform activity to display the Transform dialog.
4. In the General tab, set the name to **TransformRapidRequest**.
5. In the Transformation tab, set the **Source Variable** to **inputVariable**, and the **Source Part** to **payload**.

Set the **Target Variable** to **manufacturerRequest** and the **Target Part** to **parameters**.

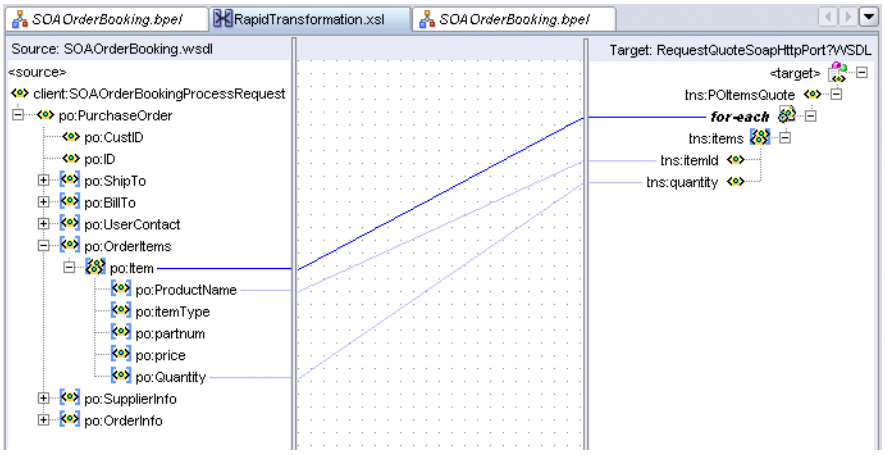
6. Set the **Mapper File** to **RapidTransformation.xsl**. This file does not exist yet; you will use the Data Mapper to generate it.
7. Click the Create Mapping icon (second icon from the left). This displays the Data Mapper, which you will use to generate the `RapidTransformation.xsl` file.
8. In the Data Mapper, on the Source (left) side, expand **po:PurchaseOrder** > **po:OrderItems** > **po:Item**.
9. On the Target (right) side, expand **tns:items**.
10. Drag **po:ProductName** to **tns:itemId**.
11. Drag **po:Quantity** to **tns:quantity**. The Data Mapper should look like the following:

***Figure 8–189 Data Mapper for Rapid Manufacturer (Not Complete Yet)***



12. In the Component Palette for the Data Mapper, select **XSLT Constructs** from the dropdown.
13. Drag the for-each icon from the Component Palette and drop it on **tns:items** on the target side. You want the for-each item to appear between **tns:POItemsQuote** and **tns:items**.
14. Drag **po:Item** to the **for-each** item on the target side. The Data Mapper should now look like this:

*Figure 8–190 Data Mapper for Rapid Manufacturer*



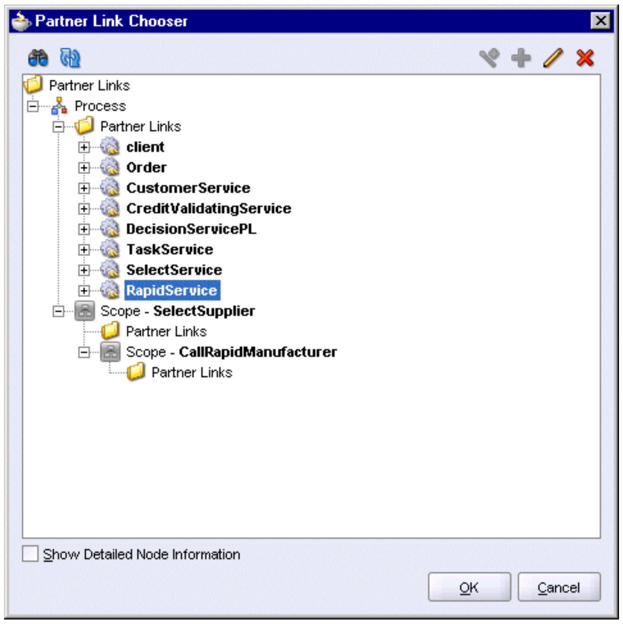
15. Select File > Save to save `RapidTransformation.xsl`. This file is created in the `SOAOrderBooking\bpel` directory.
16. Select File > Close to close the Data Mapper for `RapidTransformation.xsl`.
17. Select File > Save to save `SOAOrderBooking.bpel`.

#### 8.14.6.3 Create an Invoke Activity

This invoke activity invokes the RapidService partner link.

1. Drag the Invoke icon from the Component Palette and drop it below the "TransformRapidRequest" transform activity.
2. Do one of the following to display the Invoke dialog:
   - Drag one of the arrows on the side of the new invoke activity and drop it on the "RapidService" partner link. This associates the invoke activity with the partner link.
   - Double-click the new invoke activity.
3. In the Invoke dialog, set the name of the invoke activity to **InvokeRapidManufacturer**.
4. The Partner Link field should be set to **RapidService**. If not, click the flashlight and in the Partner Link Chooser, select **RapidService** and click **OK**.

*Figure 8–191 Partner Link Chooser Dialog for the "InvokeRapidManufacturer" Activity*


Partner Link Chooser

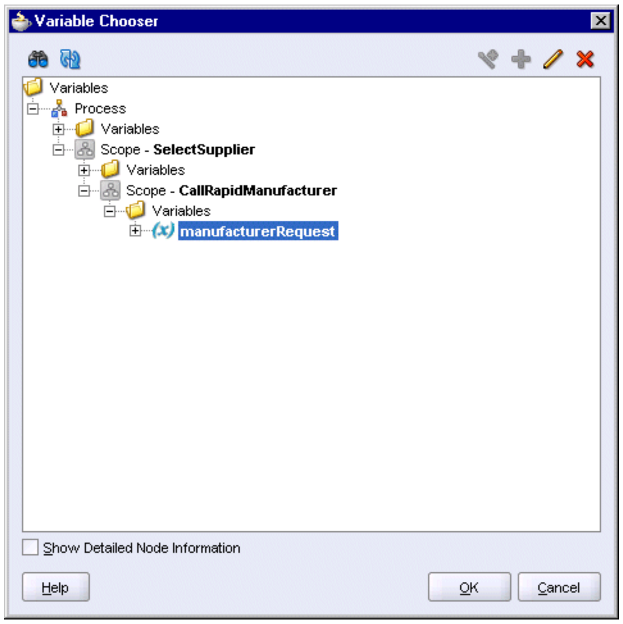
Partner Links
Process
Partner Links
client
Order
CustomerService
CreditValidatingService
DecisionServicePL
TaskService
SelectService
RapidService
Scope - SelectSupplier
Partner Links
Scope - CallRapidManufacturer
Partner Links

Show Detailed Node Information

5. For **Operation**, select **POItemsQuote**. This should be filled in automatically for you.

6. For **Input Variable**, click the Browse Variable icon, which displays the Variable Chooser dialog. In the dialog, select **Variables** > **Process** > **Scope - SelectSupplier** > **Scope - CallRapidManufacturer** > **Variables** > **manufacturerRequest**.

*Figure 8–192 Variable Chooser Dialog for the Input Variable for the "InvokeRapidManufacturer" Activity*


Variable Chooser

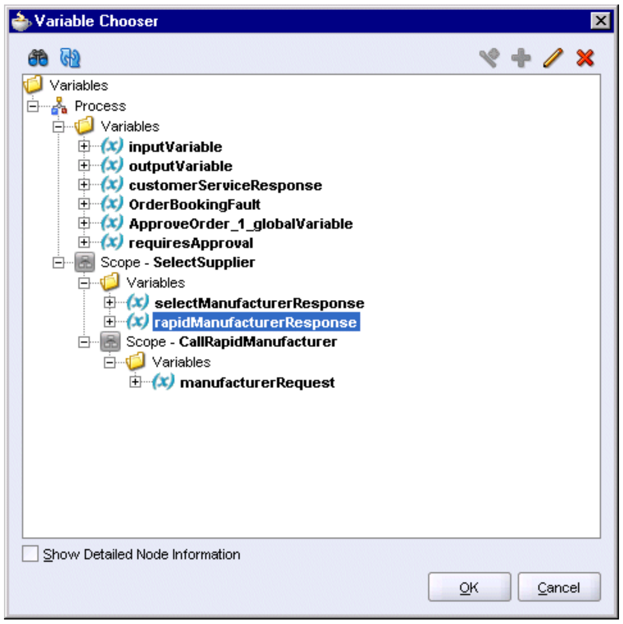
Variables
Process
Variables
Scope - SelectSupplier
Variables
Scope - CallRapidManufacturer
Variables
manufacturerRequest

Show Detailed Node Information

Click **OK** in the Variable Chooser.

7. For **Output Variable**, click the Browse Variable icon, which displays the Variable Chooser dialog. In the dialog, select **Variables** > **Process** > **Scope - SelectSupplier** > **Variables** > **rapidManufacturerResponse**.

***Figure 8–193 Variable Chooser Dialog for the Output Variable for the "InvokeRapidManufacturer" Activity***


Variable Chooser

Variables
- Process
  - Variables
    - inputVariable
    - outputVariable
    - customerServiceResponse
    - OrderBookingFault
    - ApproveOrder_1_globalVariable
    - requiresApproval
  - Scope - SelectSupplier
    - Variables
      - selectManufacturerResponse
      - rapidManufacturerResponse
    - Scope - CallRapidManufacturer
      - Variables
        - manufacturerRequest

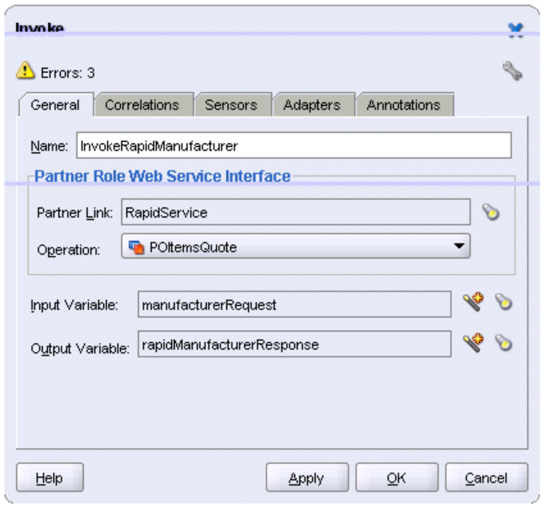
Show Detailed Node Information

OK Cancel

Click **OK** in the Variable Chooser.

8. The Invoke dialog looks like the following:

***Figure 8–194 Invoke Dialog for the "InvokeRapidManufacturer" Activity***


Invoke

Errors: 3

General | Correlations | Sensors | Adapters | Annotations

Name: InvokeRapidManufacturer

Partner Role Web Service Interface

Partner Link: RapidService

Operation: POItemsQuote

Input Variable: manufacturerRequest

Output Variable: rapidManufacturerResponse

Help Apply OK Cancel

Click **OK** in the Invoke dialog.

9. Select File > Save to save your work.

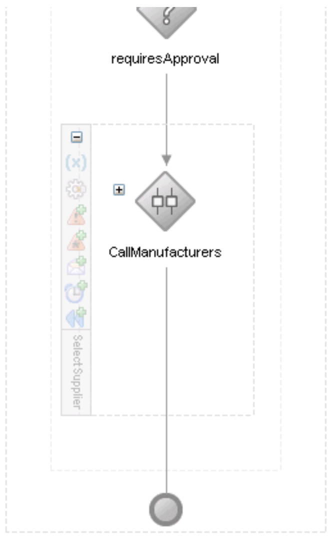
### 8.14.7 Create a Switch to Pick the Lower-Priced Quote

Create a switch so that you can pick the manufacturer that responded with the lower-priced quote.

#### 8.14.7.1 Create the Switch

1. Minimize the flow activity in the "SelectSupplier" scope. (But do not minimize the scope.) The page should look like this:

***Figure 8–195 Minimize Only the Flow Activity***



2. Drag the Switch icon from the Component Palette and drop it below the "CallManufacturers" flow activity, but still within the "SelectSupplier" scope.
3. Double-click the switch to display the Switch dialog.
4. In the Switch dialog, set the name to **SelectByPrice** and click **OK**.

#### 8.14.7.2 Set the Condition for the Switch

For this switch activity, you just need to specify the condition for the <case> branch. For the <otherwise> branch, you do not have to set a condition. If the condition in the <case> branch is not met, then the activities in the <otherwise> branch are executed.

1. Expand the switch activity.
2. Double-click the titlebar of the <case> box to display the Switch Case dialog.
3. The <case> branch handles the case where Select Manufacturer returns a lower price than Rapid Service. In the Expression area, enter the following line:

```
number(bpws:getVariableData('selectManufacturerResponse','parameters',
'/ns15:processRequestQuoteResponseElement/ns15:return/ns15:supplierPrice')) <
number(bpws:getVariableData('rapidManufacturerResponse','parameters',
'/ns16:POItemsQuoteResponse/ns30:return/ns30:supplierPrice'))
```

   You may need to replace the prefixes for the namespaces, as follows:

   - *ns15* is the prefix for `http://www.globalcompany.com/ns/selectservice`.
   - *ns16* is the prefix for `http://www.globalcompany.com/ns/rapidservice`.

- *ns30* is the prefix for `http://rapidservice.soademo.org/types/`.

You can also use the Expression Builder to create the condition:

**a.** In the Switch Case dialog, click the XPath Expression Builder icon above the Expression box.

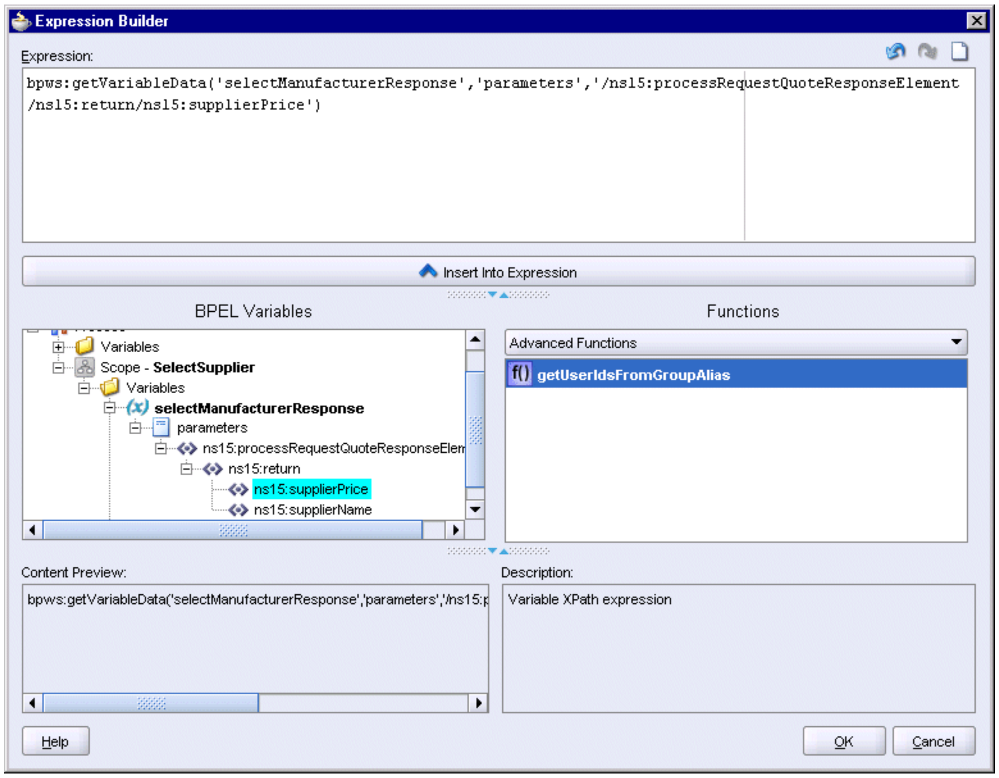
**b.** In the Expression Builder dialog, select **Variables** > **Process** > **Scope - SelectSupplier** > **Variables** > **selectManufacturerResponse** > **parameters** > **ns15:processRequestQuoteResponseElement** > **ns15:return** > **ns15:supplierPrice**.

The Content Preview box in the dialog shows the `bpws:getVariableData` function with parameters to get the `supplierPrice` data.

**c.** Click **Insert Into Expression**.

The Expression Builder dialog should now look like this:

***Figure 8–196   Expression Builder Dialog***



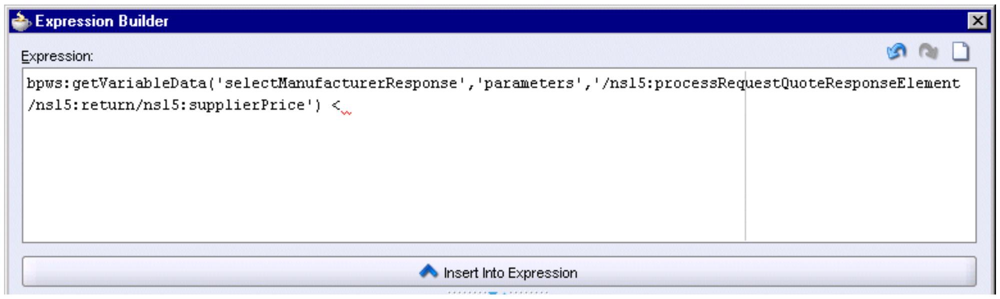
```
bpws:getVariableData('selectManufacturerResponse','parameters','/ns15:processRequestQuoteResponseElement
/ns15:return/ns15:supplierPrice')
```

Content Preview: bpws:getVariableData('selectManufacturerResponse','parameters','/ns15:p

Description: Variable XPath expression

**d.** In the Expression Builder dialog, in the Expression box, type a < (less than) character. Figure 8–197 shows the Expression box in the Expression Builder dialog.

***Figure 8–197 Expression Builder Showing the First Half of the Condition***



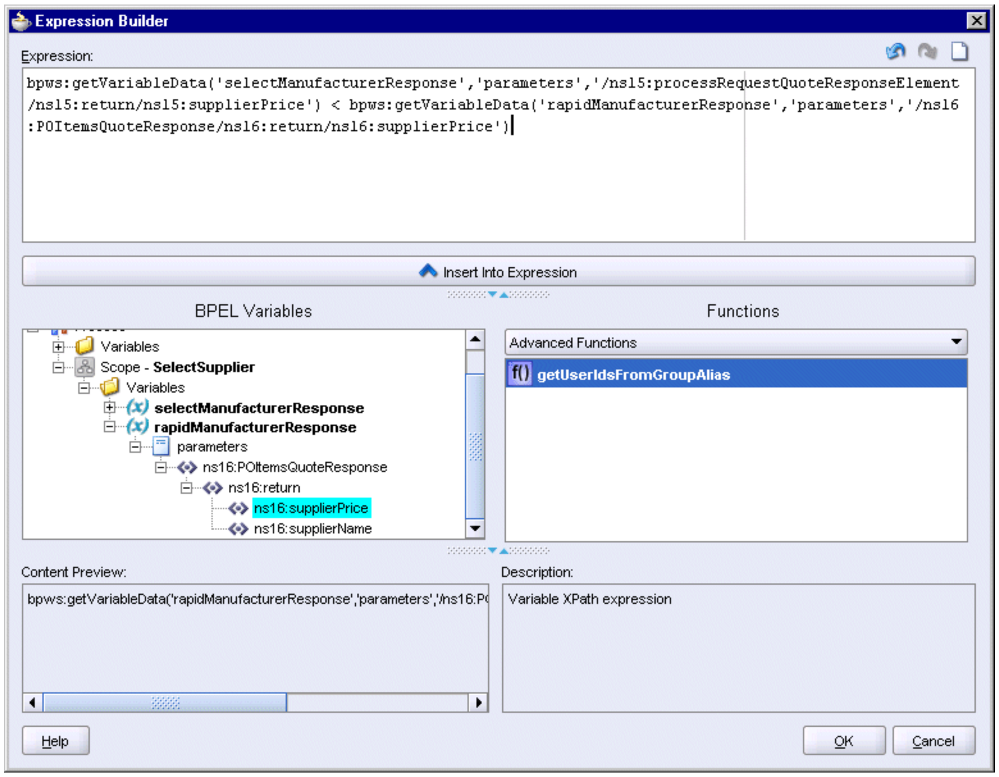
```
bpws:getVariableData('selectManufacturerResponse','parameters','/ns15:processRequestQuoteResponseElement
/ns15:return/ns15:supplierPrice') <
```

e. In the Expression Builder dialog, select **Variables** > **Process** > **Scope - SelectSupplier** > **Variables** > **rapidManufacturerResponse** > **parameters** > **ns16:POItemsQuoteResponse** > **ns16:return** > **ns16:supplierPrice**.

f. Click **Insert Into Expression**.

The Expression Builder dialog should now look like this:

***Figure 8–198 Expression Builder Dialog Showing Both Parts of the Condition***



```
bpws:getVariableData('selectManufacturerResponse','parameters','/ns15:processRequestQuoteResponseElement
/ns15:return/ns15:supplierPrice') < bpws:getVariableData('rapidManufacturerResponse','parameters','/ns16
:POItemsQuoteResponse/ns16:return/ns16:supplierPrice')
```

Content Preview: bpws:getVariableData('rapidManufacturerResponse','parameters','/ns16:P

Description: Variable XPath expression

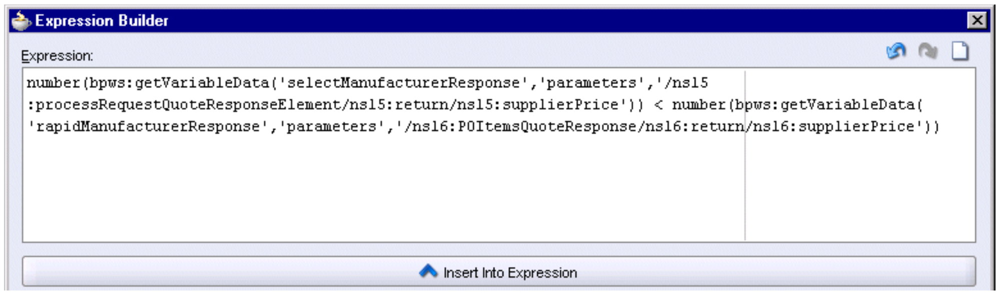
g. Wrap each `bpws:getVariableData` function with the `number` function, so that the expression looks like this:

```
number(bpws:getVariableData(....)) < number(bpws:getVariableData(....))
```

You have to manually type in **number(** before the `bpws:getVariableData` function and the closing parenthesis **)** after the function.

The final expression should look like this:

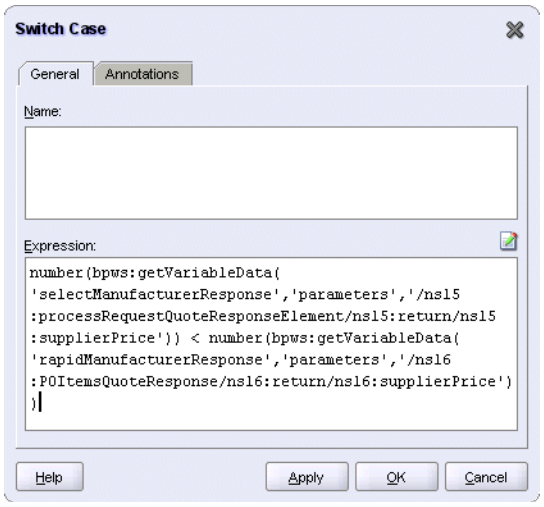
***Figure 8–199 Expression Builder Dialog Showing the Final Expression***



```
number(bpws:getVariableData('selectManufacturerResponse','parameters','/ns15
:processRequestQuoteResponseElement/ns15:return/ns15:supplierPrice')) < number(bpws:getVariableData(
'rapidManufacturerResponse','parameters','/ns16:POItemsQuoteResponse/ns16:return/ns16:supplierPrice'))
```

**h.** Click **OK** in the Expression Builder dialog.

***Figure 8–200 Switch Case Dialog for <case>***



```
number(bpws:getVariableData(
'selectManufacturerResponse','parameters','/ns15
:processRequestQuoteResponseElement/ns15:return/ns15
:supplierPrice')) < number(bpws:getVariableData(
'rapidManufacturerResponse','parameters','/ns16
:POItemsQuoteResponse/ns16:return/ns16:supplierPrice')
)
```

4. Click **OK** in the Switch Case dialog.

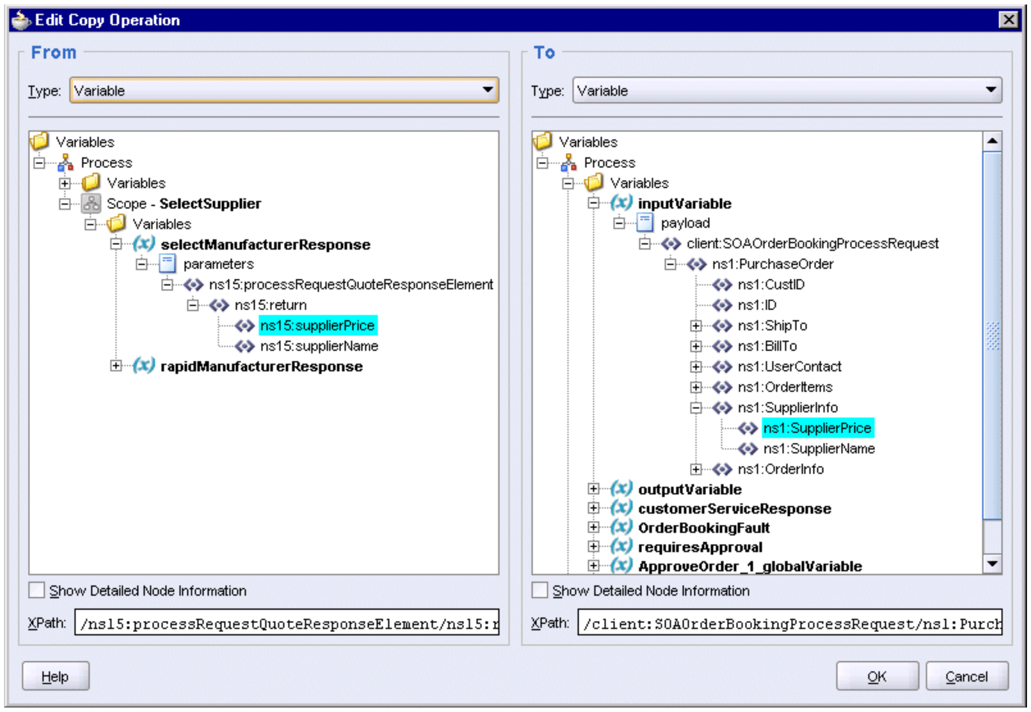
### 8.14.7.3 Set the Activities for Select Manufacturer

Define the activities for Select Manufacturer if it bid the lower quote. In this case, assign the bid value to the `supplierPrice` field of `inputVariable`.

1. Drag the Assign activity icon from the Component Palette and drop it in the <case> box.
2. Double-click the new assign activity to display the Assign dialog.
3. In the Assign dialog, click the General tab, and set the **Name** to **AssignSelectManufacturer**.
4. Still in the Assign dialog, click the Copy Operation tab. You will create two copy operations.
5. Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.
   - In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - SelectSupplier** > **Variables** > **selectManufacturerResponse** > **parameters** > **ns15:processRequestQuoteResponseElement** > **ns15:return** > **ns15:supplierPrice**.

- In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder** > **ns1:SupplierInfo** > **ns1:SupplierPrice**.

***Figure 8–201 Create Copy Operation Dialog for the "AssignSelectManufacturer" Activity, First Copy Operation***


Edit Copy Operation

From

Type: Variable

```
Variables
  Process
    Variables
    Scope - SelectSupplier
      Variables
        selectManufacturerResponse
          parameters
            ns15:processRequestQuoteResponseElement
              ns15:return
                ns15:supplierPrice
                ns15:supplierName
        rapidManufacturerResponse
```

Show Detailed Node Information

XPath: /ns15:processRequestQuoteResponseElement/ns15:r

To

Type: Variable

```
Variables
  Process
    Variables
      inputVariable
        payload
          client:SOAOrderBookingProcessRequest
            ns1:PurchaseOrder
              ns1:CustID
              ns1:ID
              ns1:ShipTo
              ns1:BillTo
              ns1:UserContact
              ns1:OrderItems
              ns1:SupplierInfo
                ns1:SupplierPrice
                ns1:SupplierName
              ns1:OrderInfo
      outputVariable
      customerServiceResponse
      OrderBookingFault
      requiresApproval
      ApproveOrder_1_globalVariable
```

Show Detailed Node Information

XPath: /client:SOAOrderBookingProcessRequest/ns1:Purch

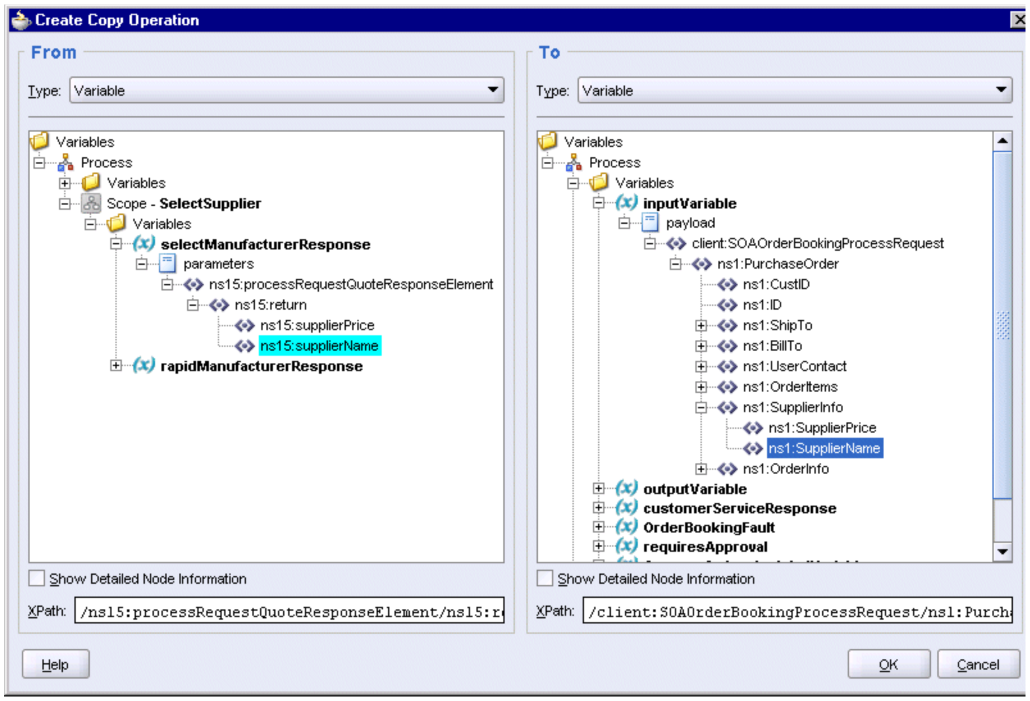
Click **OK** in the Create Copy Operation dialog.

6. Select **Copy Operation** from the **Create** dropdown again to create the second copy operation. This displays the Create Copy Operation dialog.

   - In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - SelectSupplier** > **Variables** > **selectManufacturerResponse** > **parameters** > **ns15:processRequestQuoteResponseElement** > **ns15:return** > **ns15:supplierName**.

   - In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder** > **ns1:SupplierInfo** > **ns1:SupplierName**.

*Figure 8–202 Create Copy Operation Dialog for the "AssignSelectManufacturer" Activity, Second Copy Operation*


Create Copy Operation

From
Type: Variable
Variables
Process
Variables
Scope - **SelectSupplier**
Variables
**selectManufacturerResponse**
parameters
ns15:processRequestQuoteResponseElement
ns15:return
ns15:supplierPrice
ns15:supplierName
**rapidManufacturerResponse**
Show Detailed Node Information
XPath: /ns15:processRequestQuoteResponseElement/ns15:r

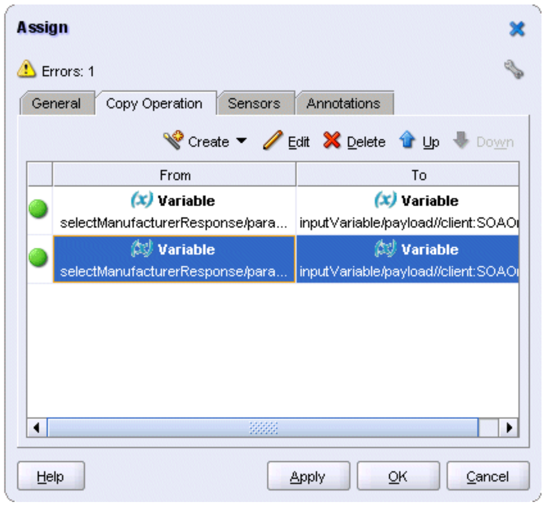
To
Type: Variable
Variables
Process
Variables
**inputVariable**
payload
client:SOAOrderBookingProcessRequest
ns1:PurchaseOrder
ns1:CustID
ns1:ID
ns1:ShipTo
ns1:BillTo
ns1:UserContact
ns1:OrderItems
ns1:SupplierInfo
ns1:SupplierPrice
ns1:SupplierName
ns1:OrderInfo
**outputVariable**
**customerServiceResponse**
**OrderBookingFault**
**requiresApproval**
Show Detailed Node Information
XPath: /client:SOAOrderBookingProcessRequest/ns1:Purch

Help OK Cancel

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

7. You should see two copy operations in the Assign dialog. Click **OK**.

*Figure 8–203 Assign Dialog for the "AssignSelectManufacturer" Activity*


**Assign**
Errors: 1
General | Copy Operation | Sensors | Annotations
Create Edit Delete Up Down

| | From | To |
|---|---|---|
| ● | **Variable** selectManufacturerResponse/para... | **Variable** inputVariable/payload//client:SOAO |
| ● | **Variable** selectManufacturerResponse/para... | **Variable** inputVariable/payload//client:SOAO |

Help Apply OK Cancel

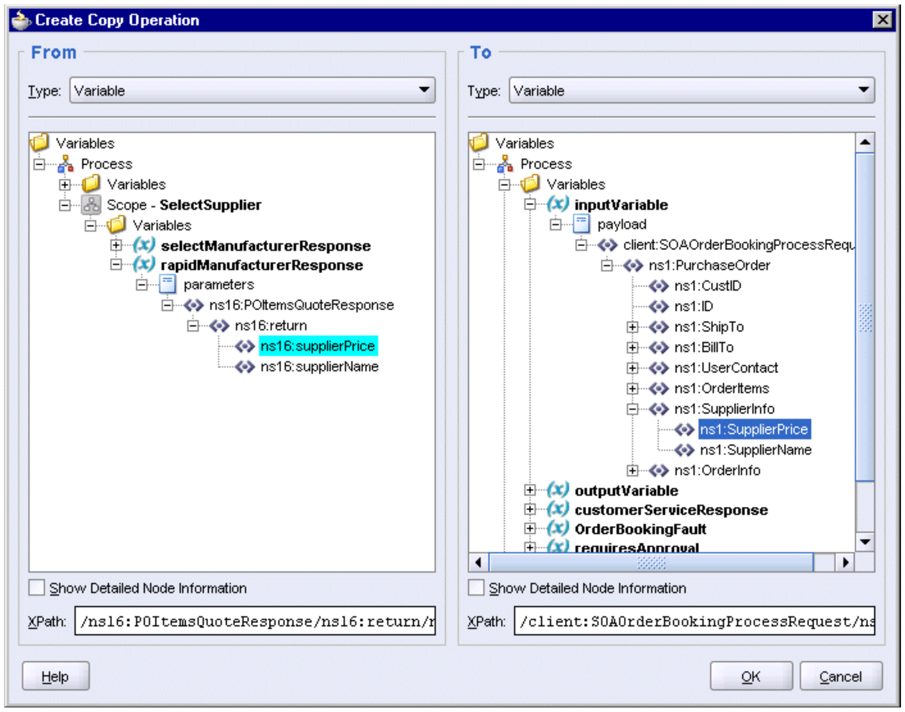
### 8.14.7.4 Set the Activities for Rapid Distributor

Define the activities for Rapid Manufacturer if it bid the lower quote. In this case, assign the bid value to the `supplierPrice` field of `inputVariable`.

1. Drag the Assign activity icon from the Component Palette and drop it in the <otherwise> box.
2. Double-click the new assign activity to display the Assign dialog.

3. In the Assign dialog, click the General tab, and set the **Name** to **AssignRapidManufacturer**.
4. Still in the Assign dialog, click the Copy Operation tab. You will create two copy operations.
5. Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.
   - In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - SelectSupplier** > **Variables** > **rapidManufacturerResponse** > **parameters** > **ns16:POItemsQuoteResponse** > **ns16:return** > **ns16:supplierPrice**.
   - In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder** > **ns1:SupplierInfo** > **ns1:SupplierPrice**.

***Figure 8–204 Create Copy Operation Dialog for the "AssignRapidManufacturer" Activity, First Copy Operation***


Create Copy Operation

From

Type: Variable

```
Variables
  Process
    Variables
    Scope - SelectSupplier
      Variables
        selectManufacturerResponse
        rapidManufacturerResponse
          parameters
            ns16:POItemsQuoteResponse
              ns16:return
                ns16:supplierPrice
                ns16:supplierName
```

Show Detailed Node Information

XPath: /ns16:POItemsQuoteResponse/ns16:return/r

To

Type: Variable

```
Variables
  Process
    Variables
      inputVariable
        payload
          client:SOAOrderBookingProcessRequ
            ns1:PurchaseOrder
              ns1:CustID
              ns1:ID
              ns1:ShipTo
              ns1:BillTo
              ns1:UserContact
              ns1:OrderItems
              ns1:SupplierInfo
                ns1:SupplierPrice
                ns1:SupplierName
              ns1:OrderInfo
      outputVariable
      customerServiceResponse
      OrderBookingFault
      requiresApproval
```

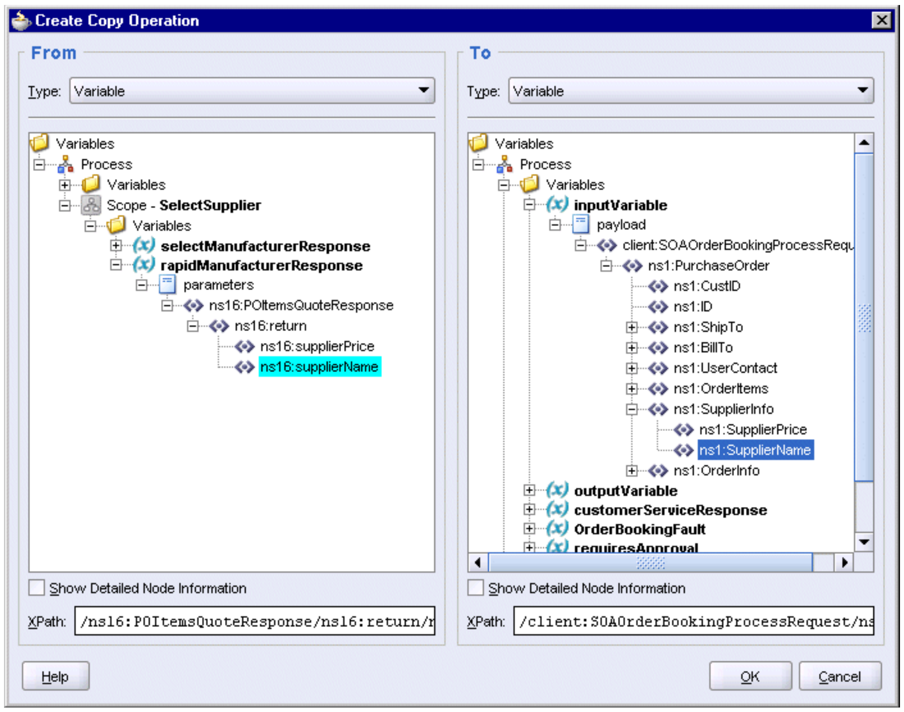
Show Detailed Node Information

XPath: /client:SOAOrderBookingProcessRequest/ns

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

6. Select **Copy Operation** from the **Create** dropdown again to create the second copy operation. This displays the Create Copy Operation dialog.
   - In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - SelectSupplier** > **Variables** > **rapidManufacturerResponse** > **parameters** > **ns16:POItemsQuoteResponse** > **ns16:return** > **ns16:supplierName**.
   - In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder** > **ns1:SupplierInfo** > **ns1:SupplierName**.

***Figure 8–205 Create Copy Operation Dialog for the "AssignRapidManufacturer" Activity, Second Copy Operation***



From — Type: Variable

- Variables
  - Process
    - Variables
    - Scope - **SelectSupplier**
      - Variables
        - **selectManufacturerResponse**
        - **rapidManufacturerResponse**
          - parameters
            - ns16:POItemsQuoteResponse
              - ns16:return
                - ns16:supplierPrice
                - ns16:supplierName

Show Detailed Node Information

XPath: /ns16:POItemsQuoteResponse/ns16:return/r

To — Type: Variable

- Variables
  - Process
    - Variables
      - **inputVariable**
        - payload
          - client:SOAOrderBookingProcessRequ
            - ns1:PurchaseOrder
              - ns1:CustID
              - ns1:ID
              - ns1:ShipTo
              - ns1:BillTo
              - ns1:UserContact
              - ns1:OrderItems
              - ns1:SupplierInfo
                - ns1:SupplierPrice
                - ns1:SupplierName
              - ns1:OrderInfo
      - **outputVariable**
      - **customerServiceResponse**
      - **OrderBookingFault**
      - **requiresApproval**

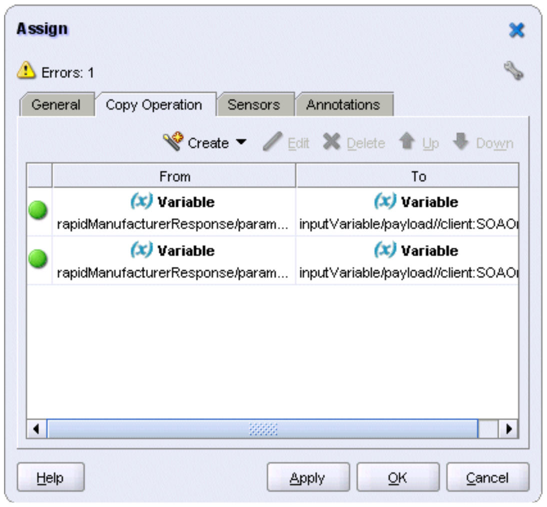
Show Detailed Node Information

XPath: /client:SOAOrderBookingProcessRequest/ns

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

7. You should see two copy operations in the Assign dialog. Click **OK**.

***Figure 8–206 Assign Dialog for the "AssignRapidManufacturer" Activity***



Errors: 1

| | From | To |
|---|---|---|
| ● | **Variable** rapidManufacturerResponse/param... | **Variable** inputVariable/payload//client:SOAO |
| ● | **Variable** rapidManufacturerResponse/param... | **Variable** inputVariable/payload//client:SOAO |

8. Select File > Save to save your work.

## 8.14.8 Minimize the "SelectSupplier" Scope

Click the [-] icon on the "SelectSupplier" scope to minimize it.

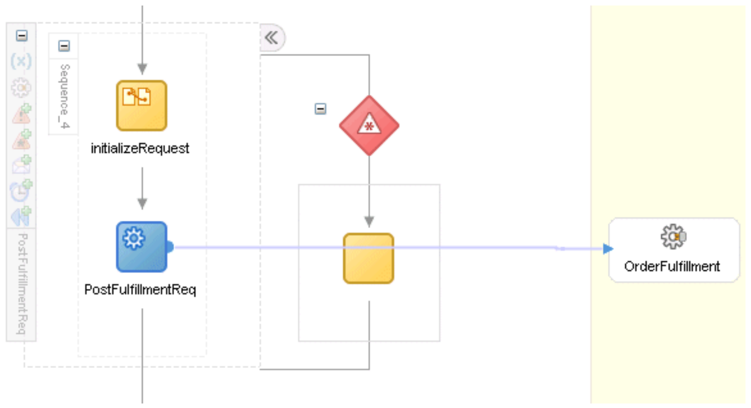
## 8.15 Determine the Shipping Method ("PostFulfillmentReq" Scope)

This scope invokes the FulfillmentESB project, which determines how an order is to be shipped. For orders $500 and over, Fedex is the shipment method. For orders less than $500, USPS is the shipment method. These rules are defined in the FulfillmentESB project, described in Chapter 4, "Creating the FulfillmentESB Project".

Before you can create the "PostFulfillmentReq" scope, the "FulfillmentESB" project must be registered with Oracle Application Server.

Figure 8–207 shows the activities in the "PostFulfillmentReq" scope.

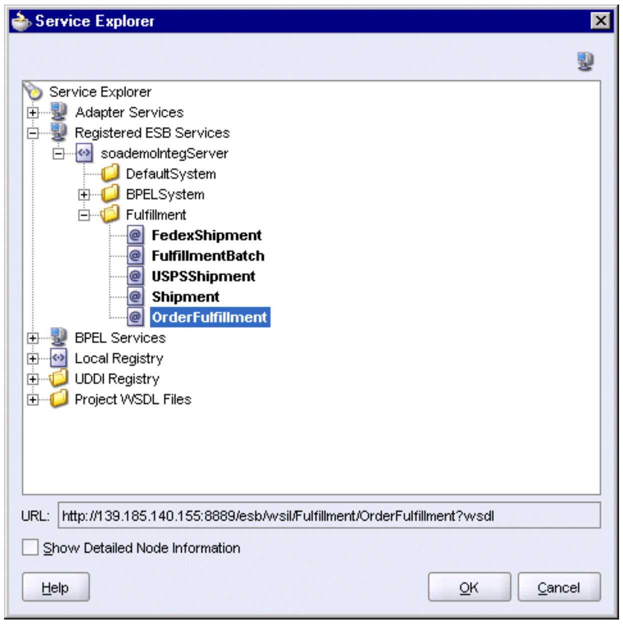
***Figure 8–207 Activities in the "PostFulfillmentReq" Scope***



### 8.15.1 Create the "OrderFulfillment" Partner Link

1. In the Component Palette, select **Services** from the dropdown.
2. Drag the Partner Link icon from the Component Palette and drop it in a **Services** swimlane. This displays the Create Partner Link dialog.
3. For **Name**, enter **OrderFulfillment**.
4. For **WSDL File**, click the Service Explorer icon (second icon from the left) to display the Service Explorer dialog. In the Service Explorer dialog, select **Service Explorer** > **Registered ESB Services** > ***soademoIntegServer*** > **Fulfillment** > **OrderFulfillment**. *soademoIntegServer* refers to the name of the Integration Server connection.

*Figure 8–208 Service Explorer for the "OrderFulfillment" Partner Link*



URL: http://139.185.140.155:8889/esb/wsil/Fulfillment/OrderFulfillment?wsdl

Click **OK** in the Service Explorer.

5. Back in the Create Partner Link dialog, if you get a `java.net.UnknownHostException` error:

   - Check that the proxy settings are set correctly. To view the proxy settings in JDeveloper, select Tools > Preferences. In the Preferences dialog, select **Web Browser and Proxy** on the left side.
   - If the proxy settings are correct, replace the IP address in the URL with the hostname. For example:

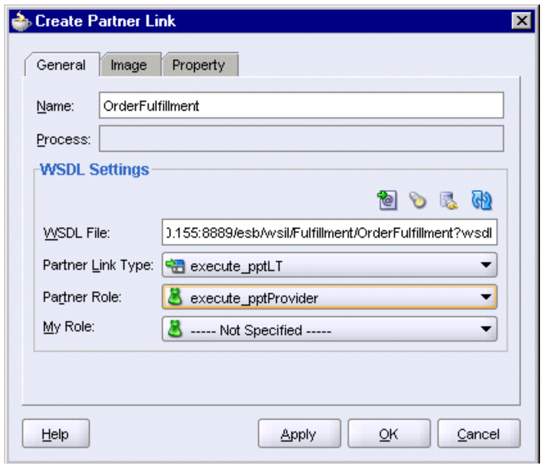
     http://pc1.mydomain.com:8888/esb/wsil/Fulfillment/OrderFulfillment?wsdl

     Press the Tab key after you have entered the hostname.

6. For **Partner Link Type**, select **execute_pptLT**. This should be filled in for you automatically.
7. For **Partner Role**, select **execute_pptProvider**.
8. For **My Role**, leave blank.

   The Create Partner Link dialog should look like this:

***Figure 8–209 Create Partner Link Dialog for the "OrderFulfillment" Partner Link***



Name: OrderFulfillment
Process:
WSDL File: ).155:8889/esb/wsil/Fulfillment/OrderFulfillment?wsdl
Partner Link Type: execute_pptLT
Partner Role: execute_pptProvider
My Role: ----- Not Specified -----

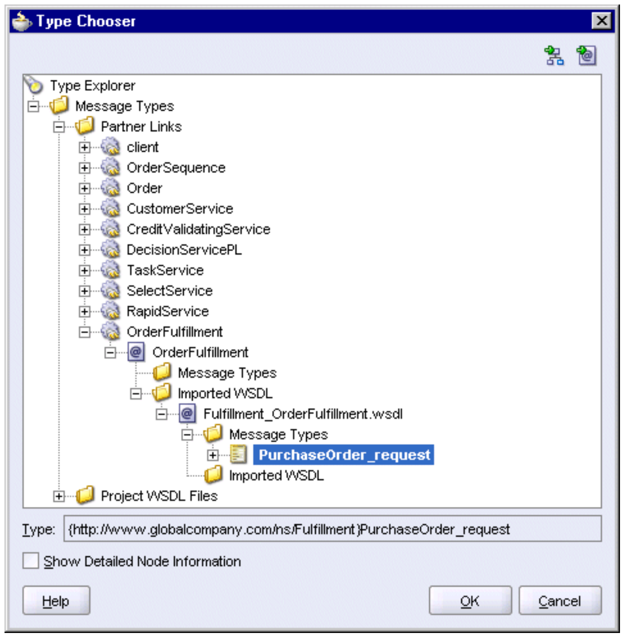
9. Click **OK** in the Create Partner Link dialog.

### 8.15.2 Create the "PostFulfillmentReq" Scope

1. In the Component Palette, select **Process Activities** from the dropdown.
2. Drag the Scope icon from the Component Palette and drop it below the "SelectSupplier" scope.
3. Double-click the new scope to display the Scope dialog.
4. In the General tab:
   - **Name**: enter **PostFulfillmentReq**.
   - **Variable Access Serializable**: do not select.
5. Click the Variables tab. You need to create one variable for this scope.
6. In the Variables tab, click **Create**.
7. In the Create Variable dialog:
   - **Name**: enter **orderFulfillmentRequest**.
   - Select **Message Type** and click the flashlight icon to display the Type Chooser.

     In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **OrderFulfillment** > **Imported WSDL** > **Fulfillment_OrderFulfillment.wsdl** > **Message Types** > **PurchaseOrder_request**.

***Figure 8–210 Type Chooser Dialog for the "PostFulfillmentReq" Scope***

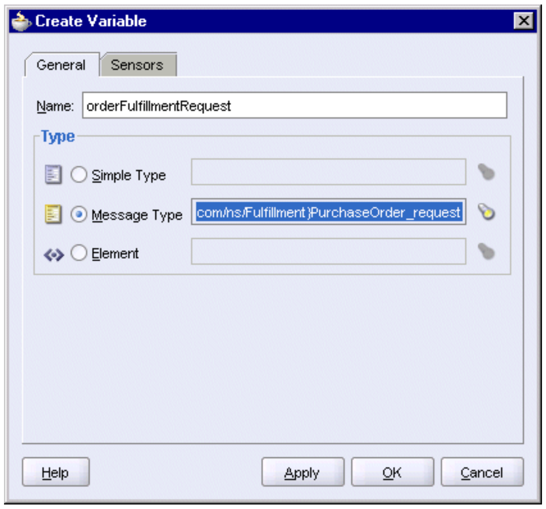


Type: {http://www.globalcompany.com/ns/Fulfillment}PurchaseOrder_request

Click **OK** in the Type Chooser.

8. In the Create Variable dialog, the Message Type is set to `{http://www.globalcompany.com/ns/Fulfillment}PurchaseOrder_request`.

***Figure 8–211 Create Variable Dialog for the "PostFulfillmentReq" Scope***

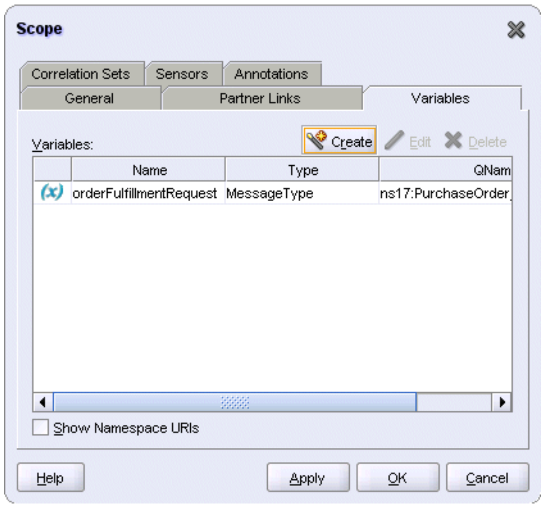


Name: orderFulfillmentRequest

Message Type: com/ns/Fulfillment}PurchaseOrder_request

9. Click **OK** in the Create Variable dialog.
10. The `orderFulfillmentRequest` variable appears in the Variables tab of the Scope dialog.

*Figure 8–212 Scope Dialog for the "PostFulfillmentReq" Scope*



| | Name | Type | QNam |
|---|---|---|---|
| (x) | orderFulfillmentRequest | MessageType | ns17:PurchaseOrder |

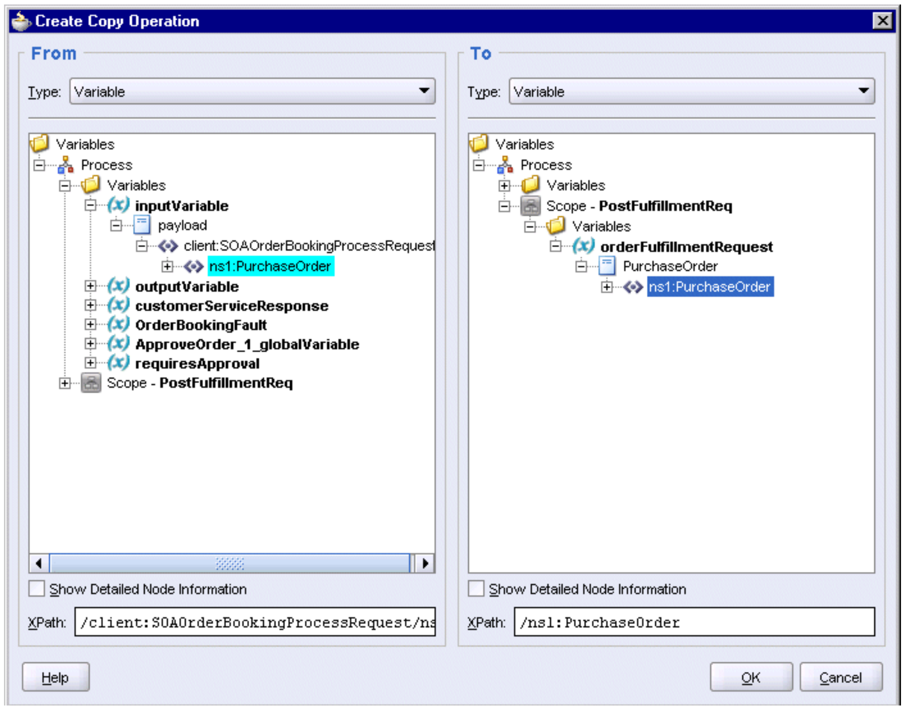
Click **OK** in the Scope dialog.

11. Select File > Save to save your work.

## 8.15.3 Copy Order Information to Scope Variable ("initializeRequest" Assign Activity)

1. Expand the "PostFulfillmentReq" scope.
2. Drag the Assign activity icon from the Component Palette and drop it in the "PostFulfillmentReq" scope.
3. Double-click the new assign activity to display the Assign dialog.
4. In the Assign dialog, click the General tab, and set the **Name** to **initializeRequest**.
5. Still in the Assign dialog, click the Copy Operation tab. You will create a copy operation.
6. Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.
   - In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder**.
   - In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - PostFulfillmentReq** > **Variables** > **orderFulfillmentRequest** > **PurchaseOrder** > **ns1:PurchaseOrder**.

***Figure 8–213 Create Copy Operation Dialog for the "initializeRequest" Activity***



Type: Variable

XPath: /client:SOAOrderBookingProcessRequest/ns

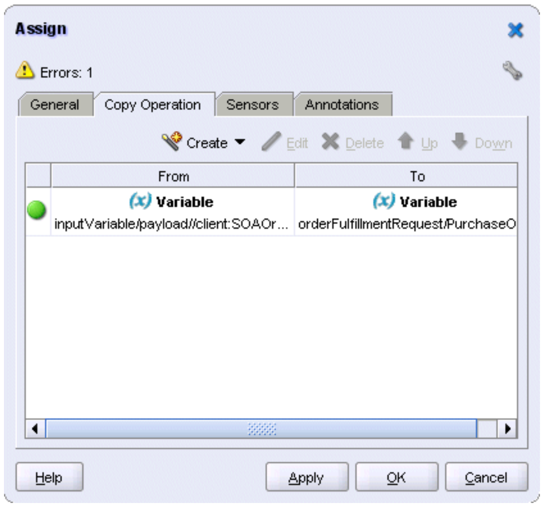
Type: Variable

XPath: /ns1:PurchaseOrder

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

7. You should see the copy operation in the Assign dialog. Click **OK**.

***Figure 8–214 Assign Dialog for the "initializeRequest" Activity***



| | From | To |
|---|---|---|
| ● | Variable inputVariable/payload//client:SOAOr... | Variable orderFulfillmentRequest/PurchaseO |

**************************************************************************************************

## 8.15.4 Invoke OrderFulfillmentESB ("PostFulfillmentReq" Invoke Activity)

1. Drag the Invoke icon from the Component Palette and drop it below the "initializeRequest" assign activity.

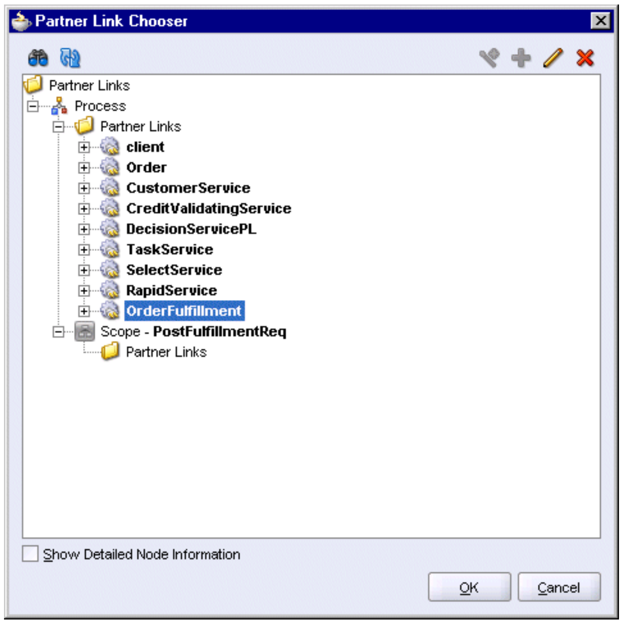
2. Do one of the following to display the Invoke dialog:

- Drag one of the arrows on the side of the new invoke activity and drop it on the "OrderFulfillment" partner link. This associates the invoke activity with the partner link.
- Double-click the new invoke activity.

3. In the Invoke dialog, set these values:

   - **Name**: enter **PostFulfillmentReq**.
   - **Partner Link**: should be set to **OrderFulfillment**. If not, click the flashlight and select **OrderFulfillment** from the Partner Link Chooser.

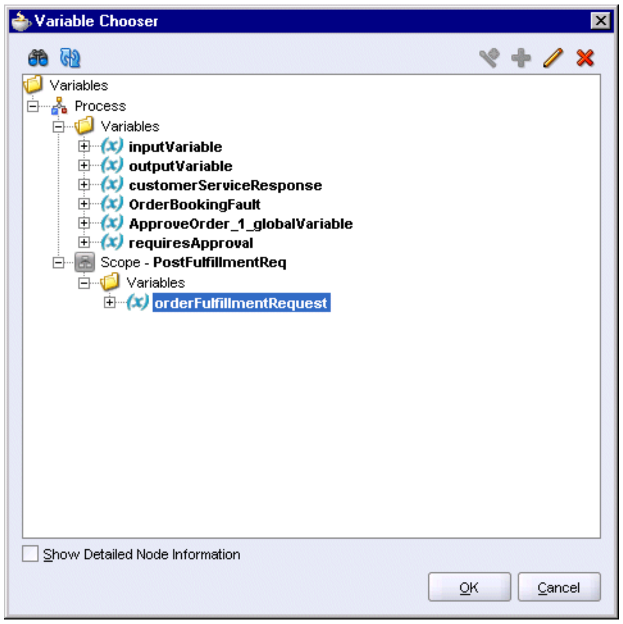
***Figure 8–215 Partner Link Chooser Dialog for the "PostFulfillmentReq" Invoke Activity***



Click **OK** in the Partner Link Chooser.

   - **Operation**: select **execute** (should be filled in for you automatically).
   - **Input Variable**: click the Browse Variables icon (the second icon from the left) and select **Variables** > **Process** > **Scope - PostFulfillmentReq** > **Variables** > **orderFulfillmentRequest**.

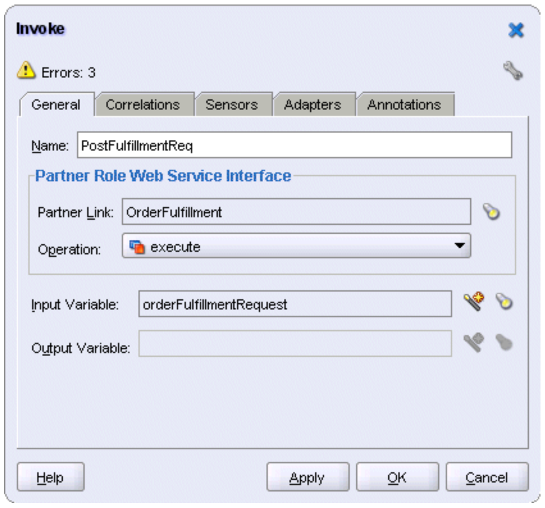
*Figure 8–216 Variable Chooser Dialog for the Input Variable for the "PostFulfillmentReq" Invoke Activity*



Click **OK** in the Variable Chooser.

The Invoke dialog should look like this:

*Figure 8–217 Invoke Dialog for the "PostFulfillmentReq" Invoke Activity*



Name: PostFulfillmentReq
Partner Link: OrderFulfillment
Operation: execute
Input Variable: orderFulfillmentRequest
Output Variable:

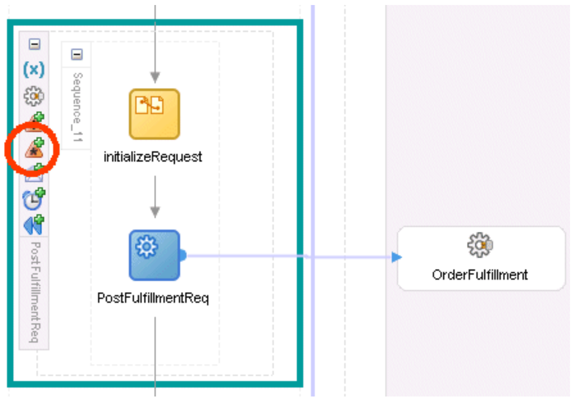
4. Click **OK** in the Invoke dialog.
5. Select File > Save to save your work.

## 8.15.5 Create a Catch-All Branch for the Scope

Create a catch-all branch to catch all exceptions.

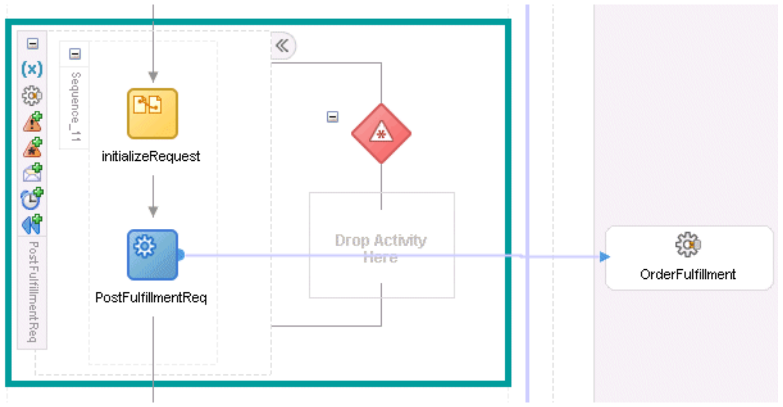
1. Click the "Add CatchAll Branch" icon on the side of the "PostFulfillmentReq" scope.

***Figure 8–218 CatchAll Icon on the Side of the "PostFulfillmentReq" Scope***



This displays a catchall branch off the side of the scope.

***Figure 8–219 Catchall Branch off the Side of the "PostFulfillmentReq" Scope***



2. Expand the catch-all branch.
3. Drag the Empty icon from the Component Palette and drop it in the catchall branch. The catch just catches the exceptions without processing them.
4. Select File > Save to save your work.

### 8.15.6 Minimize the "PostFulfillmentReq" Scope

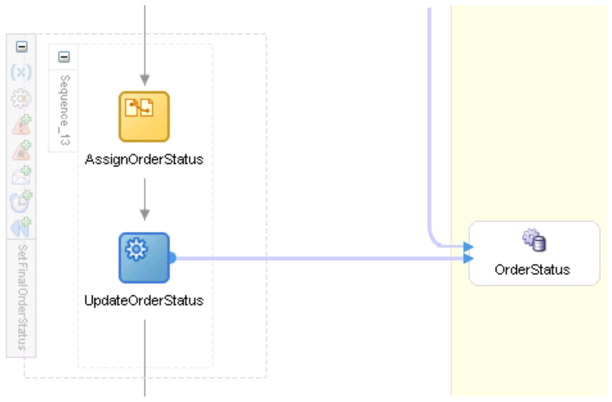
Click the [-] on the "PostFulfillmentReq" scope to minimize it.

## 8.16 Set the Order Status to "Completed" ("SetFinalOrderStatus" Scope)

This scope uses a database adapter to update the order status in the database.

Figure 8–220 shows the activities in the scope.

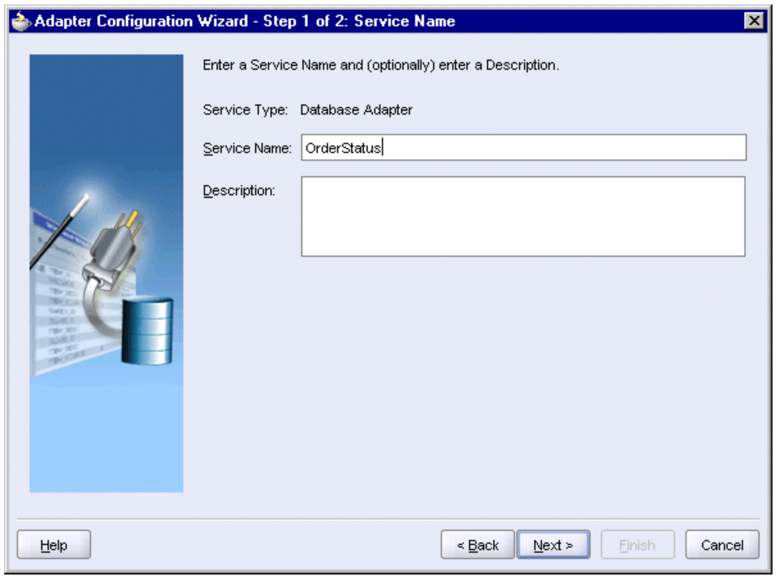
***Figure 8–220 Activities in the "SetFinalOrderStatus" Scope***



### 8.16.1 Create the "OrderStatus" Database Adapter

1. In the Component Palette, select **Services** from the dropdown.
2. Drag the Database Adapter icon from the Component Palette and drop it in a **Services** swimlane. This starts the Adapter Configuration Wizard. Click **Next** to start.
3. In Step 1, Service Name, set the **Service Name** to **OrderStatus**. Leave Description blank.

***Figure 8–221 Adapter Configuration Wizard: Step 1, Service Name***



Enter a Service Name and (optionally) enter a Description.

Service Type: Database Adapter

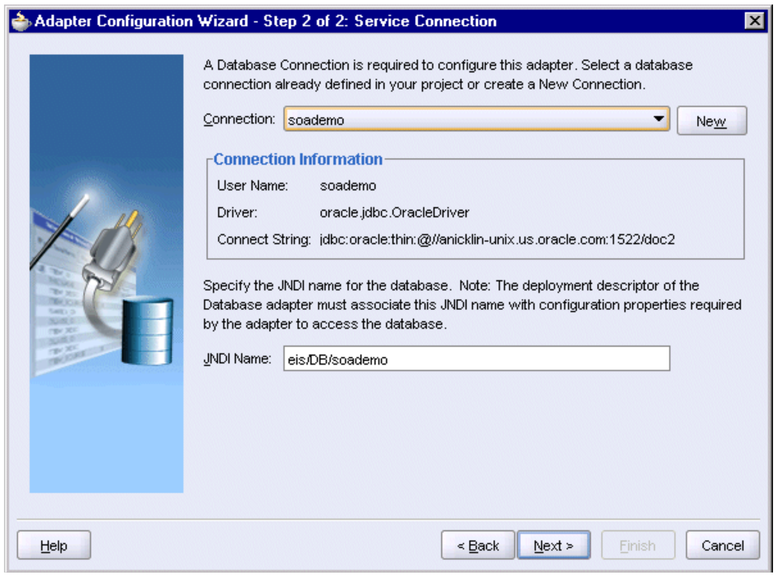
Service Name: OrderStatus

Description:

Click **Next**.

4. In Step 2, Service Connection, for **Connection**, select the name of the database connection. The JNDI Name should be set automatically to **eis/DB/soademo**.

***Figure 8–222 Adapter Configuration WIzard: Step 2, Service Connection***


Adapter Configuration Wizard - Step 2 of 2: Service Connection

A Database Connection is required to configure this adapter. Select a database connection already defined in your project or create a New Connection.

Connection: soademo

Connection Information

User Name: soademo

Driver: oracle.jdbc.OracleDriver

Connect String: jdbc:oracle:thin:@//anicklin-unix.us.oracle.com:1522/doc2

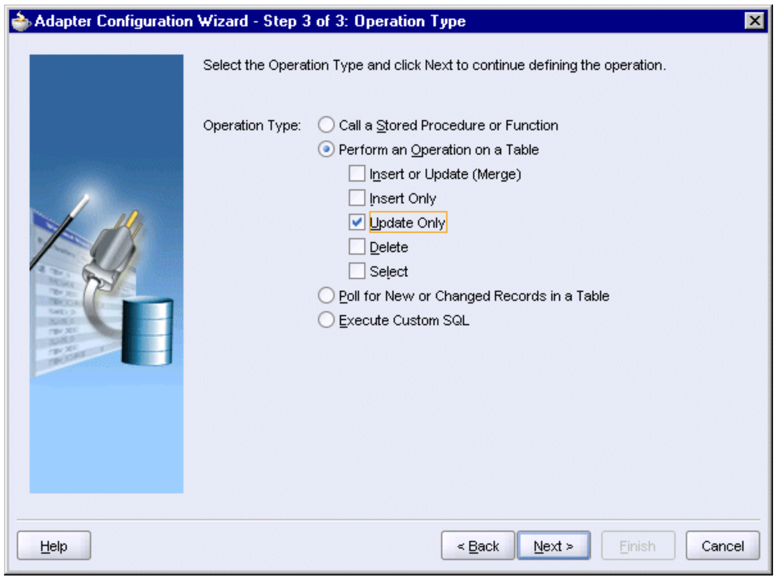
Specify the JNDI name for the database. Note: The deployment descriptor of the Database adapter must associate this JNDI name with configuration properties required by the adapter to access the database.

JNDI Name: eis/DB/soademo

Click **Next**.

5. In Step 3, Operation Type, select **Perform an Operation on a Table** and select **Update Only**.

***Figure 8–223 Adapter Configuration WIzard: Step 3, Operation Type***


Adapter Configuration Wizard - Step 3 of 3: Operation Type

Select the Operation Type and click Next to continue defining the operation.

Operation Type:
- Call a Stored Procedure or Function
- [✓ Perform an Operation on a Table]
  - Insert or Update (Merge)
  - Insert Only
  - [✓ Update Only]
  - Delete
  - Select
- Poll for New or Changed Records in a Table
- Execute Custom SQL

Click **Next**.

6. In Select Table, click **Import Tables**. This displays the Import Tables dialog.

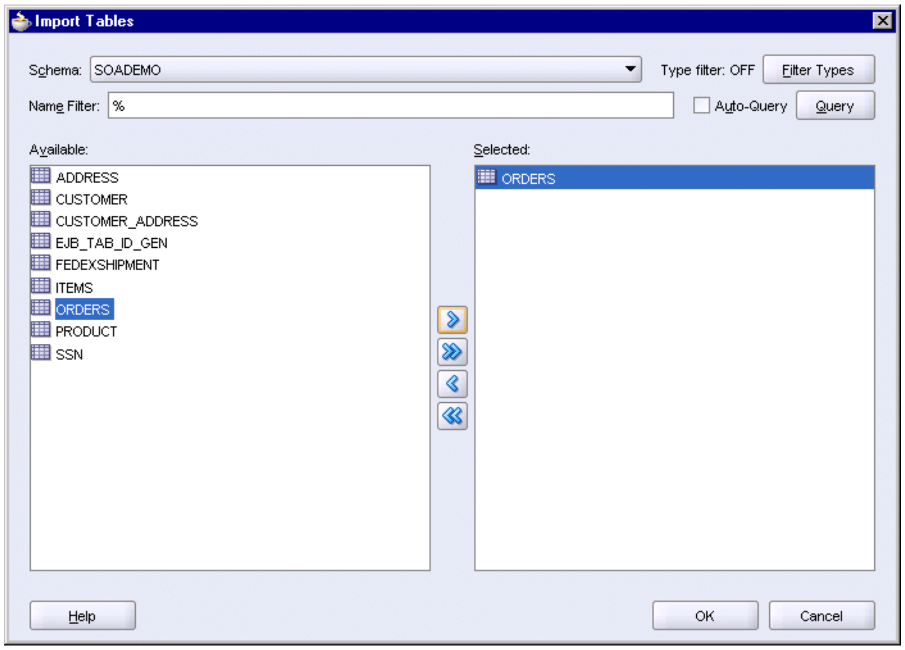
7. In the Import Tables dialog:

   - **Schema**: select **SOADEMO**.
   - **Name Filter**: enter %.

   Click **Query**.

Select the **ORDERS** table on the left side and click the right arrow to move it to the Selected box.

***Figure 8–224 Adapter Configuration WIzard: Import Tables***


Import Tables

Schema: SOADEMO
Type filter: OFF
Name Filter: %
Auto-Query

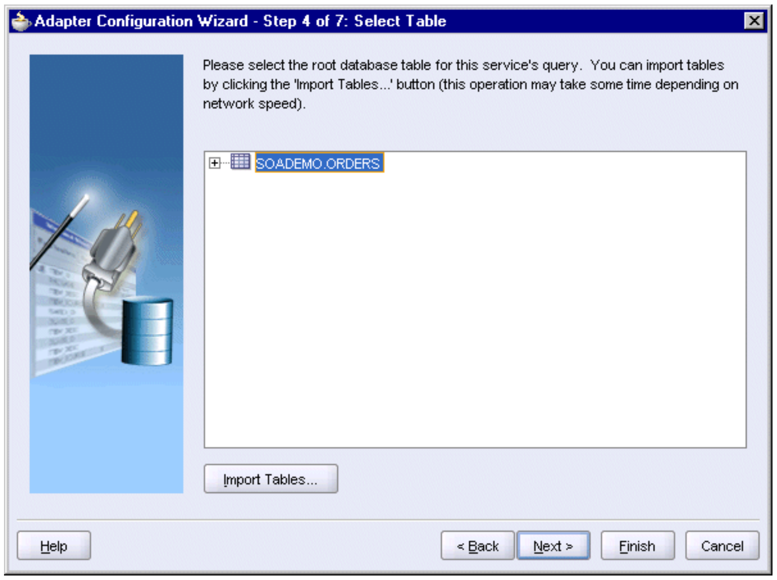
Available:
ADDRESS
CUSTOMER
CUSTOMER_ADDRESS
EJB_TAB_ID_GEN
FEDEXSHIPMENT
ITEMS
ORDERS
PRODUCT
SSN

Selected:
ORDERS

Click **OK** in the Import Tables dialog.

8. Back in the Select Table page, select **SOADEMO.ORDERS**.

***Figure 8–225 Adapter Configuration WIzard: Step 4, Select Table***


Adapter Configuration Wizard - Step 4 of 7: Select Table

Please select the root database table for this service's query. You can import tables by clicking the 'Import Tables...' button (this operation may take some time depending on network speed).

SOADEMO.ORDERS

Click **Finish** to accept the defaults for the remaining screens.

The wizard creates the following files:

- `SOAOrderBooking\bpel\OrderStatus.wsdl`
- `SOAOrderBooking\bpel\OrderStatus_table.xsd`

- `SOAOrderBooking\bpel\OrderStatus_toplink_mappings.xml`
- `SOAOrderBooking\src\OrderStatus\Orders.java`
- `SOAOrderBooking\toplink\OrderStatus\OrderStatus.mwp`

9. Oracle JDeveloper now displays the Partner Link dialog with some fields already filled in for you:

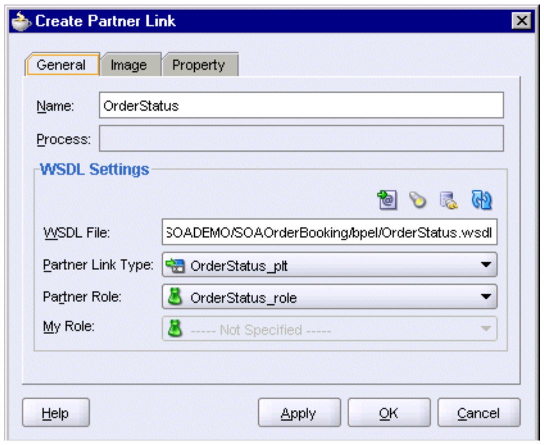
   **Name**: **OrderStatus**

   **WSDL File**: **SOAOrderBooking/bpel/OrderStatus.wsdl**

   **Partner Link Type**: **OrderStatus_plt**

   **Partner Role**: **OrderStatus_role**

*Figure 8–226 Create Partner Link Dialog for the "OrderStatus" Database Adapter*



Name: OrderStatus
Process:
WSDL File: SOADEMO/SOAOrderBooking/bpel/OrderStatus.wsdl
Partner Link Type: OrderStatus_plt
Partner Role: OrderStatus_role
My Role: ----- Not Specified -----

   Click **OK**.

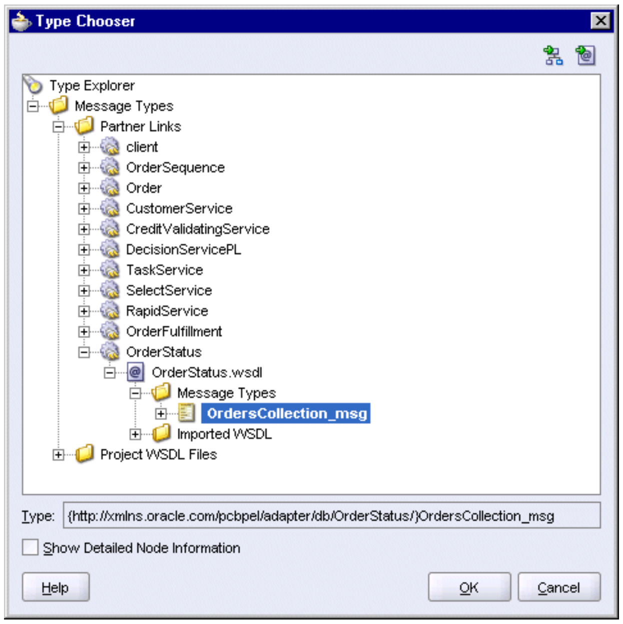
10. Select File > Save to save your work.

### 8.16.2 Create the "SetFinalOrderStatus" Scope

1. In the Component Palette, select **Process Activities** from the dropdown.
2. Drag the Scope icon from the Component Palette and drop it below the "PostFulfillmentReq" scope.
3. Double-click the new scope to display the Scope dialog.
4. In the General tab:
   - **Name**: enter **SetFinalOrderStatus**.
   - **Variable Access Serializable**: do not select.
5. Click the Variables tab. You need to create one variable for this scope.
6. In the Variables tab, click **Create**.
7. In the Create Variable dialog:
   - **Name**: enter **orderStatusRequest**.
   - Select **Message Type** and click the flashlight icon to display the Type Chooser.

     In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **OrderStatus** > **OrderStatus.wsdl** > **Message Types** > **OrdersCollection_msg**.

***Figure 8–227 Type Chooser Dialog for the "orderStatusRequest" Variable in the "SetFinalOrderStatus" Scope***


Type Chooser

Type Explorer
- Message Types
  - Partner Links
    - client
    - OrderSequence
    - Order
    - CustomerService
    - CreditValidatingService
    - DecisionServicePL
    - TaskService
    - SelectService
    - RapidService
    - OrderFulfillment
    - OrderStatus
      - OrderStatus.wsdl
        - Message Types
          - OrdersCollection_msg
        - Imported WSDL
  - Project WSDL Files

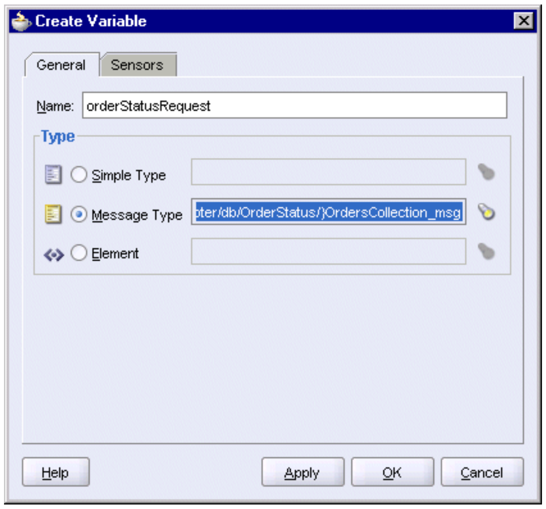
Type: {http://xmlns.oracle.com/pcbpel/adapter/db/OrderStatus/}OrdersCollection_msg

Show Detailed Node Information

Click **OK** in the Type Chooser.

8. In the Create Variable dialog, the Message Type is set to `{http://xmlns.oracle.com/pcbpel/adapter/db/OrderStatus/}OrdersCollection_msg`.

***Figure 8–228 Create Variable Dialog for the "orderStatusRequest" Variable in the "SetFinalOrderStatus" Scope***


Create Variable

General | Sensors

Name: orderStatusRequest

Type

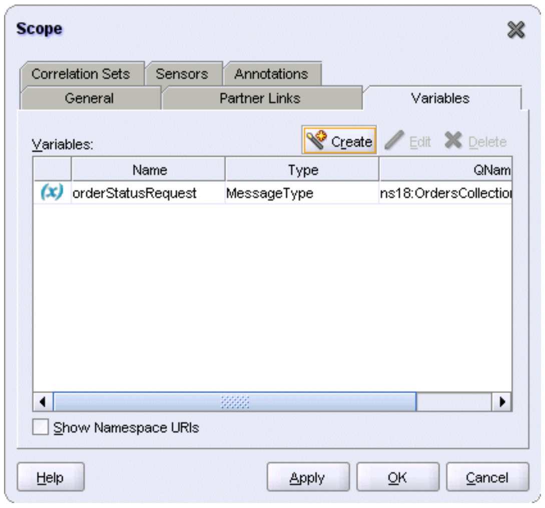
Simple Type:

Message Type: pter/db/OrderStatus/}OrdersCollection_msg

Element:

9. Click **OK** in the Create Variable dialog.
10. The `orderStatusRequest` variable appears in the Variables tab of the Scope dialog.

***Figure 8–229 Scope Dialog for the "SetFinalOrderStatus" Scope***



Variables:

| Name | Type | QNam |
|---|---|---|
| orderStatusRequest | MessageType | ns18:OrdersCollectio |

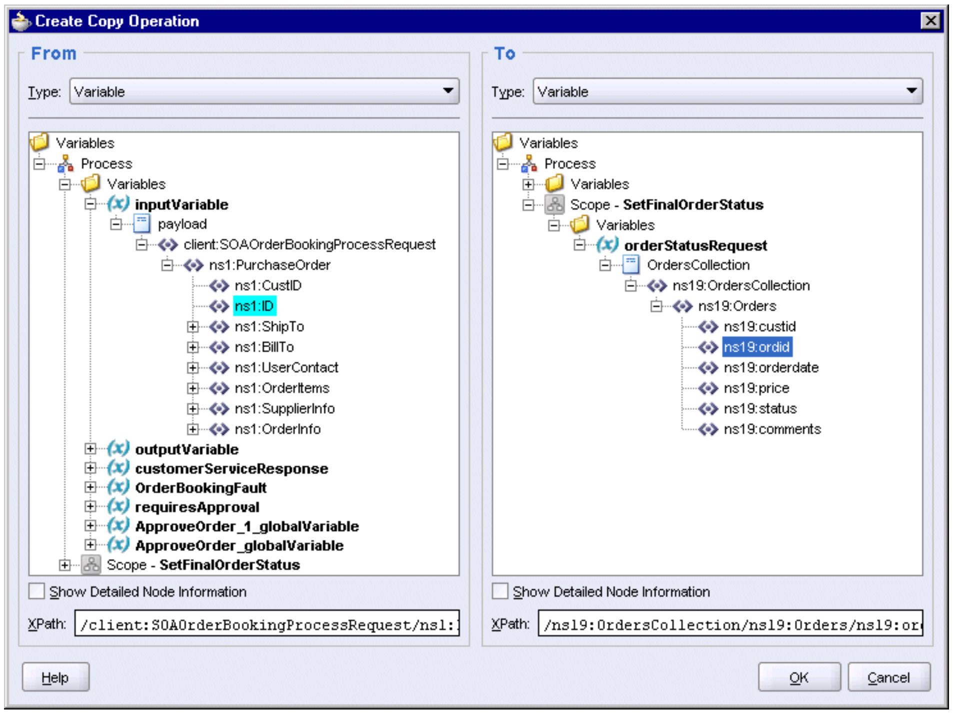
Click **OK** in the Scope dialog.

11. Select File > Save to save your work.

## 8.16.3 Prepare the Order ID and Status ("AssignOrderStatus" Assign Activity)

1. Expand the "SetFinalOrderStatus" scope.
2. Drag the Assign activity icon from the Component Palette and drop it in the "SetFinalOrderStatus" scope.
3. Double-click the new assign activity to display the Assign dialog.
4. In the Assign dialog, click the General tab, and set the **Name** to **AssignOrderStatus**.
5. Still in the Assign dialog, click the Copy Operation tab. You will create two copy operations.
6. Create the first copy operation: Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.
   - In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder** > **ns1:ID**.
   - In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - SetFinalOrderStatus** > **Variables** > **orderStatusRequest** > **OrdersCollection** > **ns19:OrdersCollection** > **ns19:Orders** > **ns19:ordid**.

***Figure 8–230 Create Copy Operation Dialog for the "AssignOrderStatus" Activity, First Copy Operation***



Create Copy Operation

From

Type: Variable

```
Variables
  Process
    Variables
      inputVariable
        payload
          client:SOAOrderBookingProcessRequest
            ns1:PurchaseOrder
              ns1:CustID
              ns1:ID
              ns1:ShipTo
              ns1:BillTo
              ns1:UserContact
              ns1:OrderItems
              ns1:SupplierInfo
              ns1:OrderInfo
      outputVariable
      customerServiceResponse
      OrderBookingFault
      requiresApproval
      ApproveOrder_1_globalVariable
      ApproveOrder_globalVariable
    Scope - SetFinalOrderStatus
```

Show Detailed Node Information

XPath: /client:SOAOrderBookingProcessRequest/ns1:

To

Type: Variable

```
Variables
  Process
    Variables
    Scope - SetFinalOrderStatus
      Variables
        orderStatusRequest
          OrdersCollection
            ns19:OrdersCollection
              ns19:Orders
                ns19:custid
                ns19:ordid
                ns19:orderdate
                ns19:price
                ns19:status
                ns19:comments
```

Show Detailed Node Information

XPath: /ns19:OrdersCollection/ns19:Orders/ns19:or

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

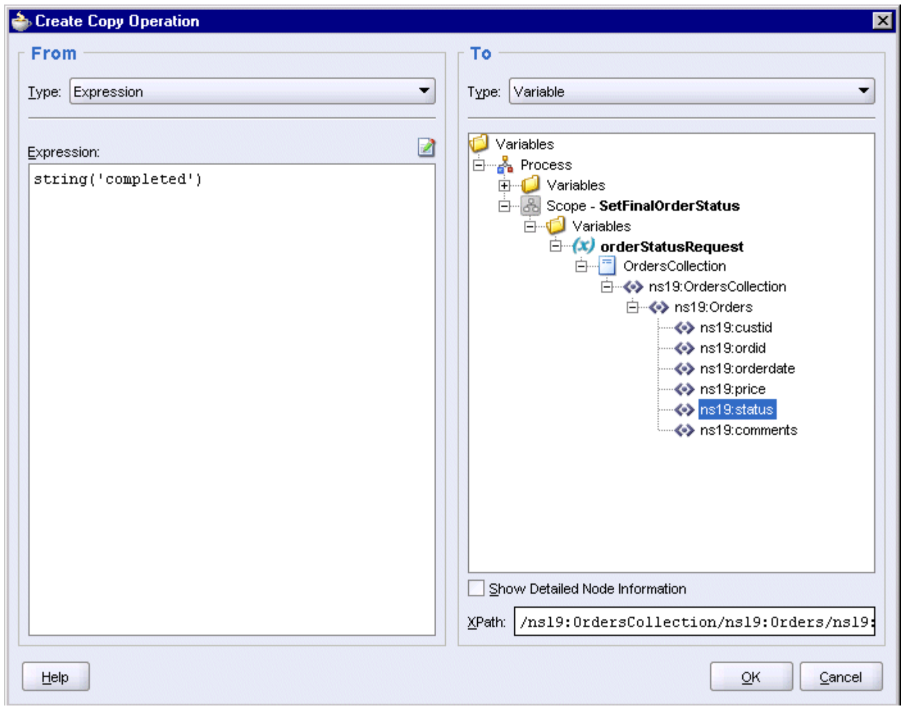
7. Create the second copy operation: Select **Copy Operation** from the **Create** dropdown again. This displays the Create Copy Operation dialog.

   - In the **From** side, set **Type** to **Expression**, and enter the following line in the Expression box:

     ```
     string('completed')
     ```

   - In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - SetFinalOrderStatus** > **Variables** > **orderStatusRequest** > **OrdersCollection** > **ns19:OrdersCollection** > **ns19:Orders** > **ns19:status**.

***Figure 8–231 Create Copy Operation Dialog for the "AssignOrderStatus" Activity, Second Copy Operation***


Create Copy Operation

From

Type: Expression

Expression:

```
string('completed')
```

To

Type: Variable

```
Variables
  Process
    Variables
    Scope - SetFinalOrderStatus
      Variables
        orderStatusRequest
          OrdersCollection
            ns19:OrdersCollection
              ns19:Orders
                ns19:custid
                ns19:ordid
                ns19:orderdate
                ns19:price
                ns19:status
                ns19:comments
```

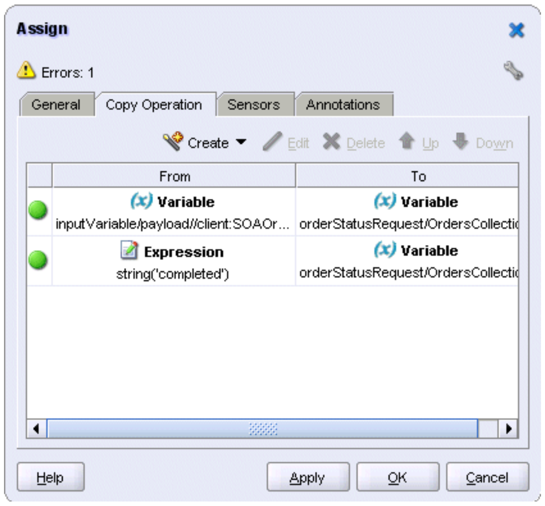
Show Detailed Node Information

XPath: /ns19:OrdersCollection/ns19:Orders/ns19:

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

8. You should see the copy operations in the Assign dialog. Click **OK**.

***Figure 8–232 Assign Dialog for the "AssignOrderStatus" Activity***


Assign

Errors: 1

| | From | To |
|---|---|---|
| ● | Variable<br>inputVariable/payload//client:SOAOr... | Variable<br>orderStatusRequest/OrdersCollectic |
| ● | Expression<br>string('completed') | Variable<br>orderStatusRequest/OrdersCollectic |

## 8.16.4 Update the Order Status in the Database ("UpdateOrderStatus" Invoke Activity)

Create the "UpdateOrderStatus" invoke activity to update the order status in the ORDERS table in the database.

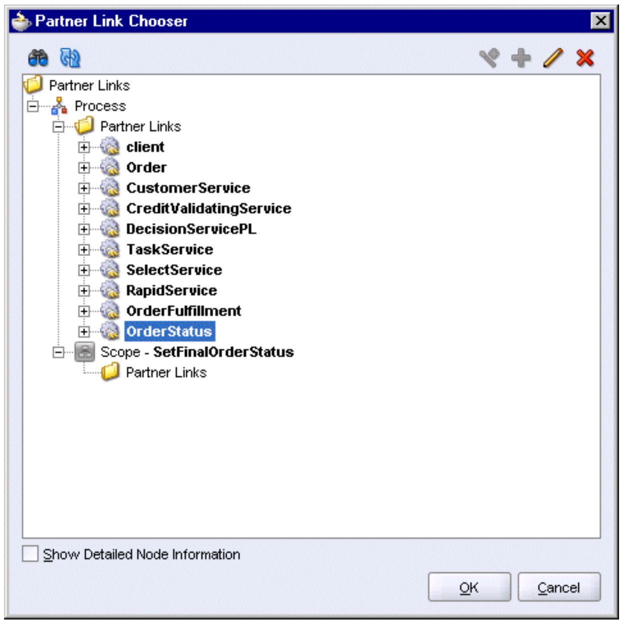
1. Drag the Invoke icon from the Component Palette and drop it below the "AssignOrderStatus" assign activity.

2. Do one of the following to display the Invoke dialog:

- Drag one of the arrows on the side of the new invoke activity and drop it on the "OrderStatus" database adapter. This associates the invoke activity with the database adapter.
- Double-click the new invoke activity.

3. In the Invoke dialog, set these values:
   - **Name**: enter **UpdateOrderStatus**.
   - **Partner Link**: should be set to **OrderStatus**. If not, click the flashlight and select **OrderStatus** from the Partner Link Chooser.

***Figure 8–233 Partner Link Chooser Dialog for the "UpdateOrderStatus" Invoke Activity***


Partner Link Chooser

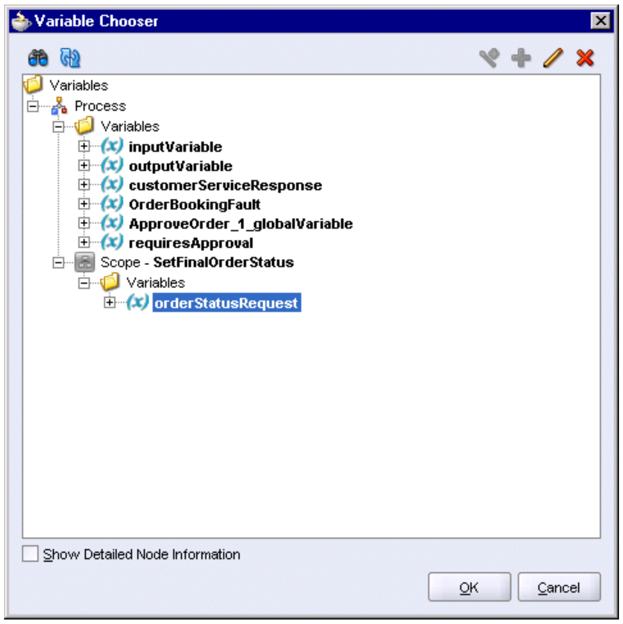
Partner Links
- Process
  - Partner Links
    - client
    - Order
    - CustomerService
    - CreditValidatingService
    - DecisionServicePL
    - TaskService
    - SelectService
    - RapidService
    - OrderFulfillment
    - OrderStatus
  - Scope - SetFinalOrderStatus
    - Partner Links

Show Detailed Node Information

Click **OK** in the Partner Link Chooser.

- **Operation**: select **update**.
- **Input Variable**: click the Browse Variables icon (the second icon from the left) and select **Variables** > **Process** > **Scope - SetFinalOrderStatus** > **Variables** > **orderStatusRequest**.

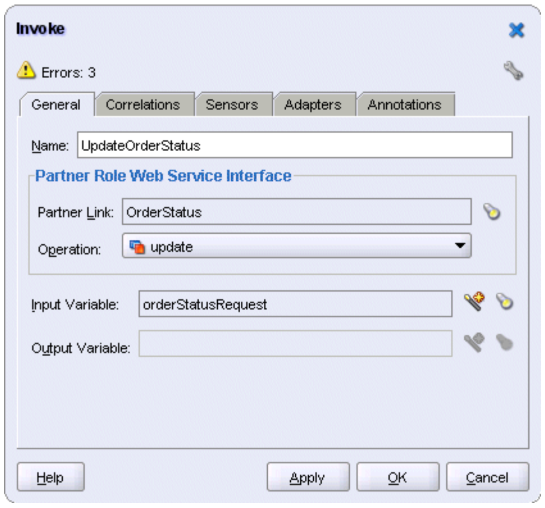
***Figure 8–234 Variable Chooser Dialog for the Input Variable in the "UpdateOrderStatus" Invoke Activity***



Click **OK** in the Variable Chooser.

The Invoke dialog should look like this:

***Figure 8–235 Invoke Dialog for the "UpdateOrderStatus" Invoke Activity***



Name: UpdateOrderStatus

Partner Link: OrderStatus

Operation: update

Input Variable: orderStatusRequest

Output Variable:

4. Click **OK** in the Invoke dialog.
5. Select File > Save to save your work.

### 8.16.5 Minimize the "SetFinalOrderStatus" Scope

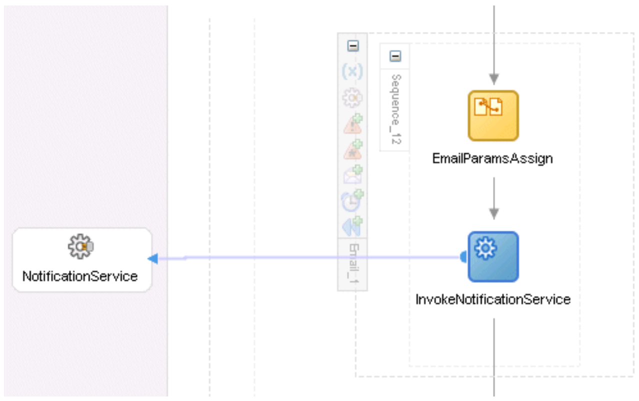
Click the [-] on the "SetFinalOrderStatus" scope to minimize it.

## 8.17 Send an Email Notification to the Customer ("NotifyCustomer" Scope)

This scope uses the notification service to send an email to the customer when the order is fulfilled.

Figure 8–236 shows the activities in the "NotifyCustomer" scope.

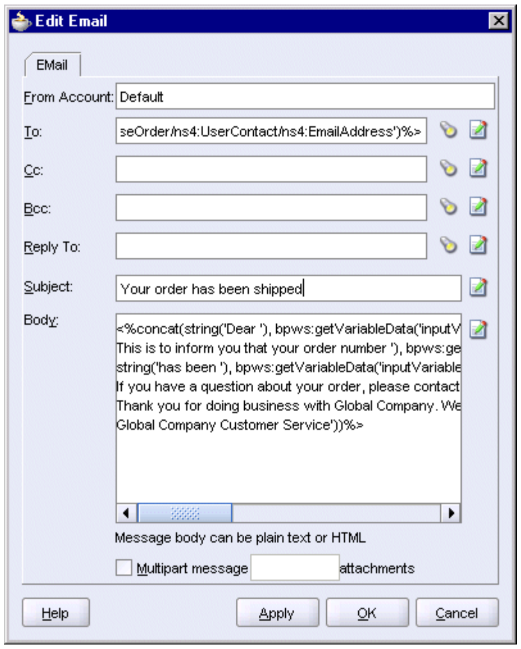
***Figure 8–236 Activities in the "NotifyCustomer" Scope***



### 8.17.1 Create the Notification Scope

1. Drag the Email icon from the Component Palette and drop it below the "SetFinalOrderStatus" scope. This displays the Edit Email dialog.
2. In the Edit Email dialog, enter any information you want for the email fields. Figure 8–237 shows an example.

***Figure 8–237 Edit Email Dialog***



From Account: Default

To: seOrder/ns4:UserContact/ns4:EmailAddress')%>

Cc:

Bcc:

Reply To:

Subject: Your order has been shipped

Body:
<%concat(string('Dear '), bpws:getVariableData('inputV
This is to inform you that your order number '), bpws:ge
string('has been '), bpws:getVariableData('inputVariable
If you have a question about your order, please contact
Thank you for doing business with Global Company. We
Global Company Customer Service'))%>

Message body can be plain text or HTML

☐ Multipart message attachments

For most of the fields, you can click the XPath Expression Builder icon to display the Expression Builder. This enables you to customize the data for the field.

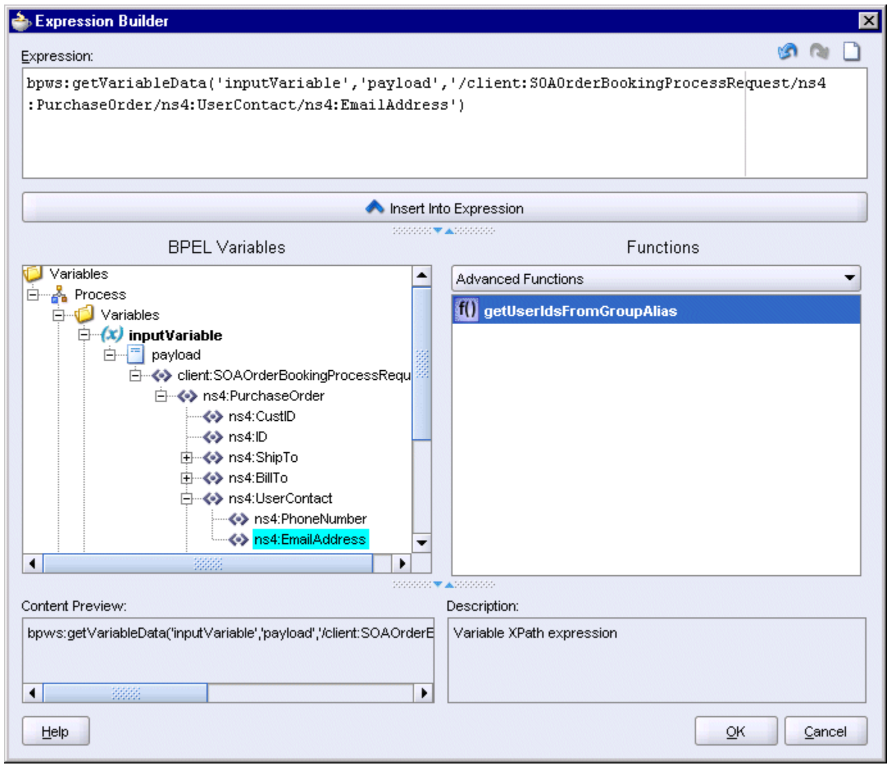
Example 1: Entering the customer's email address in the **To** field:

**a.** In the **To** field, click the XPath Expression Builder icon (the icon on the right).

**b.** In the Expression Builder dialog, select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns4:PurchaseOrder** > **ns4:UserContact** > **ns4:EmailAddress**.

**c.** Click **Insert Into Expression**. The dialog should look like this:

***Figure 8–238 Expression Builder Dialog Showing the EmailAddress Field***



Expression Builder

Expression:

```
bpws:getVariableData('inputVariable','payload','/client:SOAOrderBookingProcessRequest/ns4
:PurchaseOrder/ns4:UserContact/ns4:EmailAddress')
```

Insert Into Expression

BPEL Variables

```
Variables
  Process
    Variables
      inputVariable
        payload
          client:SOAOrderBookingProcessRequ
            ns4:PurchaseOrder
              ns4:CustID
              ns4:ID
              ns4:ShipTo
              ns4:BillTo
              ns4:UserContact
                ns4:PhoneNumber
                ns4:EmailAddress
```

Functions

Advanced Functions

getUserIdsFromGroupAlias

Content Preview:

bpws:getVariableData('inputVariable','payload','/client:SOAOrderE

Description:

Variable XPath expression

**d.** Click **OK**.

Example 2: Including the customer name, order ID, and order status in the **Body** of the email. The text that you want to enter looks like this:

```
Dear *firstName*

This is to inform you that your order number, *orderID*, has been
*orderStatus*
If you have a question about your order, please contact customer service or
send an email to customerservice@globalcompany.com

Thank you for doing business with Global Company. We appreciate your business!
Global Company Customer Service
```

*firstName*, *orderID*, and *orderStatus* are placeholders for data that are to be retrieved dynamically.

**a.** Click the XPath Expression Builder icon for **Body**.

**b.** You will use the `concat` function to concatenate the pieces of the body text.

Start by entering the following line in the Expression box:

```
concat(string('Dear '), )
```

c. Place the insertion point before the last closing parenthesis.

d. Add the variable for first name: select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns4:PurchaseOrder** > **ns4:ShipTo** > **ns4:Name** > **ns4:First**.

e. Click **Insert Into Expression**. The expression now looks like this:

```
concat(string('Dear '), bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:ShipTo/
ns4:Name/ns4:First'))
```

f. Add the next part of the message, up to order ID: place the insertion point before the last closing parenthesis, and type in the next part of the message, shown in bold:

```
concat(string('Dear '), bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:ShipTo/
ns4:Name/ns4:First'), string('This is to inform you that your order number
'), )
```

You cannot insert line breaks in the Expression box but you can insert line breaks in the Edit Email dialog.

g. Place the insertion point before the last closing parenthesis.

h. Add the variable for the order ID: select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns4:PurchaseOrder** > **ns4:ID**.

i. Click **Insert Into Expression**. The expression now looks like this:

```
concat(string('Dear '), bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:ShipTo/
ns4:Name/ns4:First'), string('This is to inform you that your order
number '), bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:ID'))
```

j. Add the string "has been " to the message. The new part is shown in bold.

```
concat(string('Dear '), bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:ShipTo/
ns4:Name/ns4:First'), string('This is to inform you that your order
number '), bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:ID')
, string('has been '), )
```

k. Place the insertion point before the last closing parenthesis.

l. Add the variable for the order status: select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns4:PurchaseOrder** > **ns4:OrderInfo** > **ns4:OrderStatus**.

m. Click **Insert Into Expression**. The expression now looks like this:

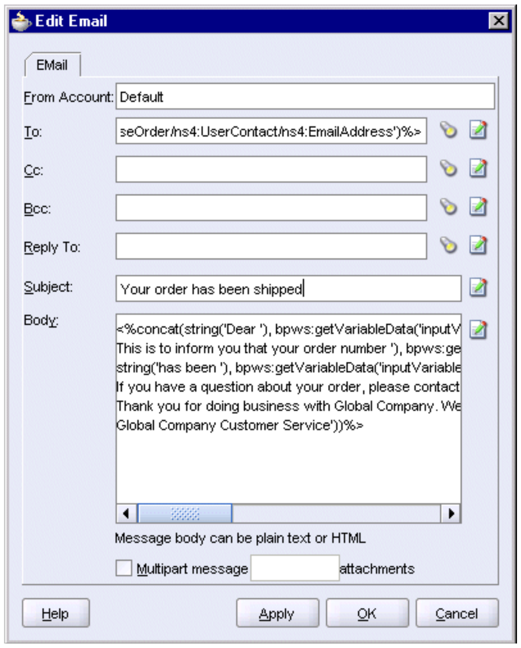
```
concat(string('Dear '), bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:ShipTo/
ns4:Name/ns4:First'), string('This is to inform you that your order
number '), bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:ID')
, string('has been '), bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:OrderInfo/
ns4:OrderStatus'))
```

n. Add the final part of the message, shown in bold:

```
concat(string('Dear '), bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:ShipTo/
ns4:Name/ns4:First'), string('This is to inform you that your order
number '), bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:ID')
, string('has been '), bpws:getVariableData('inputVariable','payload',
'/client:SOAOrderBookingProcessRequest/ns4:PurchaseOrder/ns4:OrderInfo/
ns4:OrderStatus'), string('If you have a question about your order, please
contact customer service or send an email to
customerservice@globalcompany.com
Thank you for doing business with Global Company. We appreciate your
business!
Global Company Customer Service'))
```

o. Click **OK** in the Expression Builder. The Edit Email dialog now looks like the following. Line breaks have been added to the body text to make it easier to read.

***Figure 8–239 Edit Email Dialog***



From Account: Default
To: seOrder/ns4:UserContact/ns4:EmailAddress')%>
Cc:
Bcc:
Reply To:
Subject: Your order has been shipped
Body:
<%concat(string('Dear '), bpws:getVariableData('inputV
This is to inform you that your order number '), bpws:ge
string('has been '), bpws:getVariableData('inputVariable
If you have a question about your order, please contact
Thank you for doing business with Global Company. We
Global Company Customer Service'))%>
Message body can be plain text or HTML
Multipart message attachments

3. Click **OK** in the Edit Email dialog.

4. Select File > Save to save your work.

If you expand the "Email_1" activity, you can see that it contains two activities: an assign activity and an invoke activity. You do not have to edit these activities.

The assign activity, "EmailParamsAssign", contains the information that you provided in the Edit Email dialog.

The invoke activity, "InvokeNotificationService", calls on the notification service to send the emails.

### 8.17.2 Minimize the "Email_1" Scope

Click the [-] on the "Email_1" scope to minimize it.

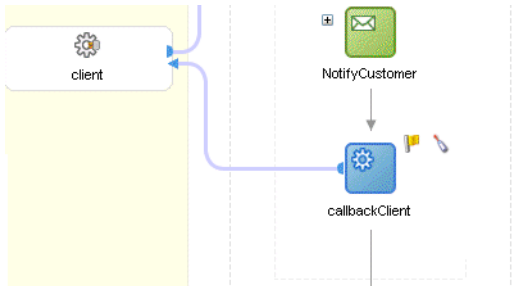
### 8.17.3 Rename the "Email_1" Scope

To rename the "Email_1" scope, right-click the minimized scope and select **Rename**. Then type the new name, **NotifyCustomer**, and press Return.

## 8.18 Call Back the Client ("callbackClient" Invoke Activity)

This invoke activity returns status to the client.

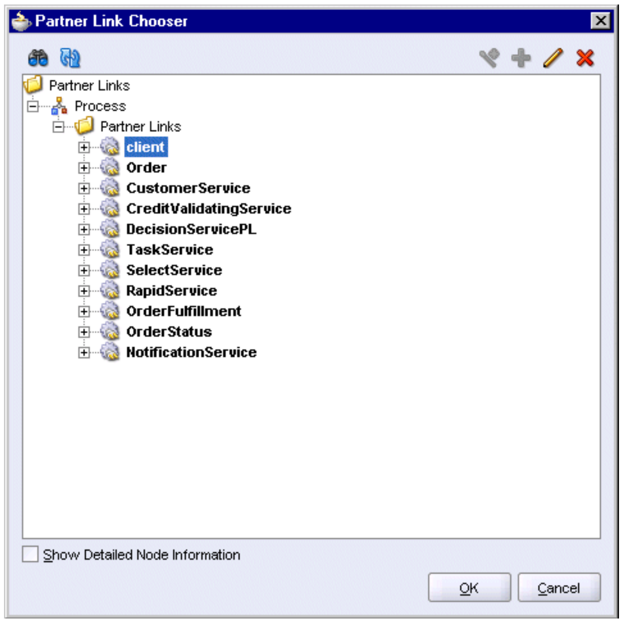
***Figure 8–240 "callbackClient" Invoke Activity***



### 8.18.1 Create the Invoke Activity

1. Drag the Invoke icon from the Component Palette and drop it below the "NotifyCustomer" (which is the "Email_1" scope) scope.
2. Do one of the following to display the Invoke dialog:
   - Drag one of the arrows on the side of the new invoke activity and drop it on the "client" partner link. This associates the invoke activity with the partner link.
   - Double-click the new invoke activity.
3. In the Invoke dialog, set these values:
   - **Name**: enter **callbackClient**.
   - **Partner Link**: should be set to **client**. If not, click the flashlight and select **client** from the Partner Link Chooser.

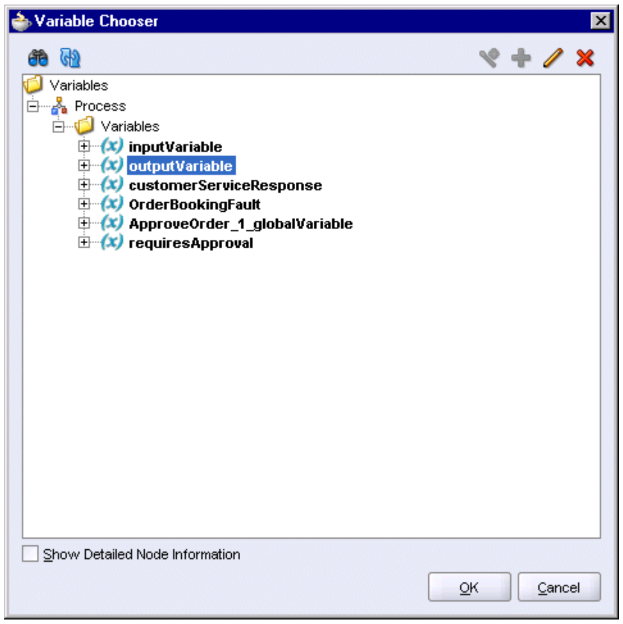
***Figure 8–241 Partner Link Chooser Dialog for the "callbackClient" Invoke Activity***



Click **OK** in the Partner Link Chooser.

- **Operation**: select **onResult** (this should be filled in automatically for you).
- **Input Variable**: click the Browse Variables icon (the second icon from the left) and select **outputVariable**.

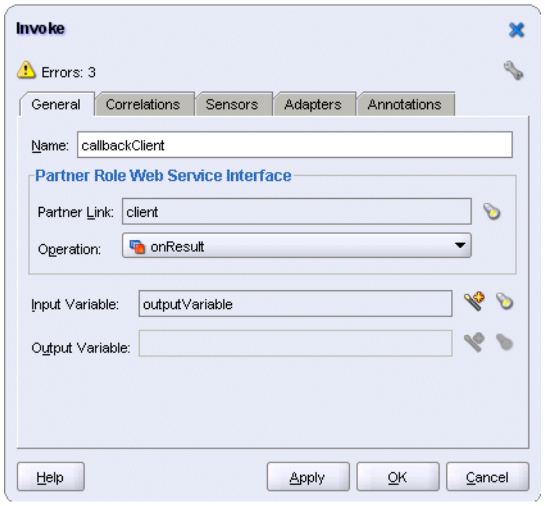
***Figure 8–242 Variable Chooser Dialog for the Input Variable in the "callbackClient" Invoke Activity***



Click **OK** in the Variable Chooser.

The Invoke dialog should look like this:

***Figure 8–243 Invoke Dialog for the "callbackClient" Invoke Activity***



Name: callbackClient

Partner Link: client

Operation: onResult

Input Variable: outputVariable

Output Variable:

4. Select File > Save to save your work.

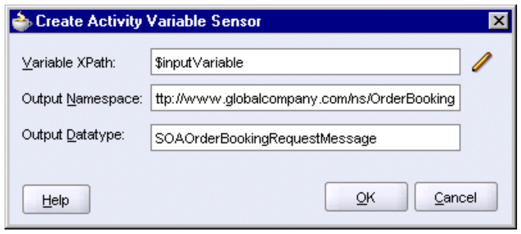
## 8.18.2 Add a Sensor

You can add a sensor to the "callbackClient" invoke activity to write information for completed orders to different destination types such as databases, files, or JMS.

Recall that you also created a sensor at the beginning of the project, for the "receiveInput" receive activity described in Section 8.6, "Receive Input from the Client (Receive Activity)".

1. Double-click the "callbackClient" invoke activity. This displays the Invoke dialog.
2. Click the **Sensors** tab in the Invoke dialog.
3. Click **Create** to create a new sensor. This displays the Create Activity Sensor dialog.
4. In the Create Activity Sensor dialog, set the **Name** to **InstanceCompleted**.
5. Set the **Evaluation Time** to **Completion**. This specifies when the sensor fires. Completion signifies that the sensor fires after this activity has run.
6. In the Activity Variable Sensors section, click **Create** to display the Create Activity Variable Sensor dialog.

***Figure 8–244 Create Activity Variable Sensor Dialog***



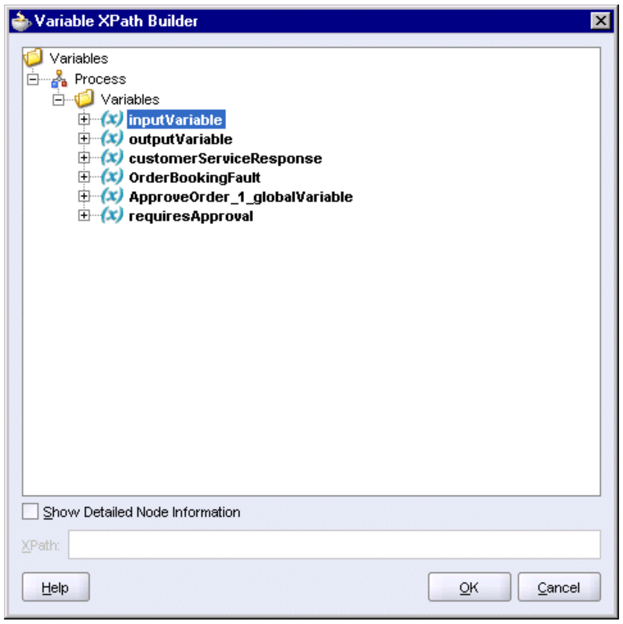
Variable XPath: $inputVariable

Output Namespace: ttp://www.globalcompany.com/ns/OrderBooking

Output Datatype: SOAOrderBookingRequestMessage

7. In the Create Activity Variable Sensor dialog, click the pencil icon for **Variable XPath**. This displays the Variable XPath Builder dialog.

*Figure 8–245 Variable XPath Builder Dialog*



8. Select **Variables** > **Process** > **Variables** > **inputVariable**.

9. Click **OK** in the Variable XPath Builder dialog. The Create Activity Variable Sensor dialog should be filled in with these values for you (see Figure 8–244):

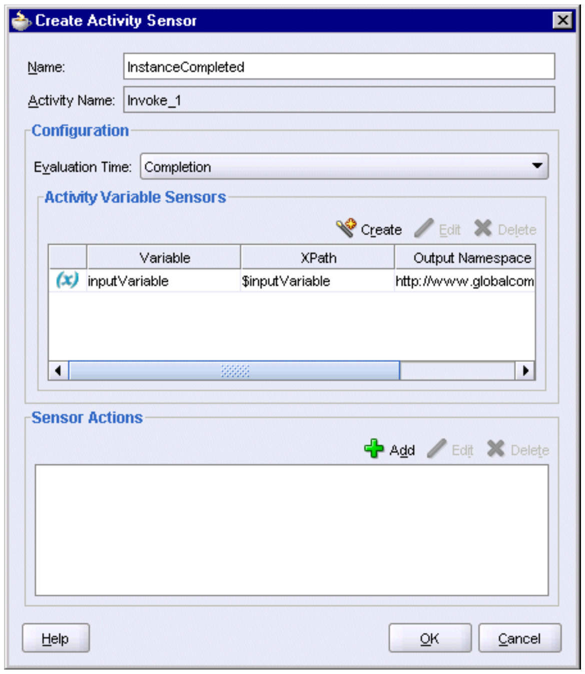
   **Variable XPath**: **$inputVariable**

   **Output Namespace**: **http://www.globalcompany.com/ns/OrderBooking**

   **Output Datatype**: **SOAOrderBookingRequestMessage**

10. Click **OK** in the Create Activity Variable Sensor dialog. This takes you back to the Create Activity Sensor dialog, which now looks like this.

***Figure 8–246 Create Activity Sensor Dialog***

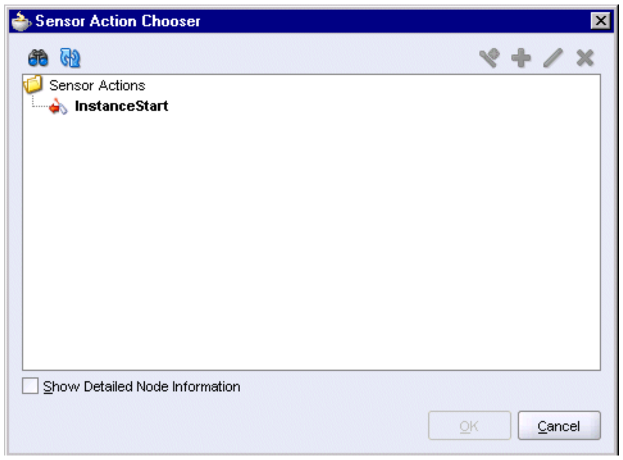


Name: InstanceCompleted
Activity Name: Invoke_1
Evaluation Time: Completion

| | Variable | XPath | Output Namespace |
|---|---|---|---|
| (x) | inputVariable | $inputVariable | http://www.globalcom |

11. In the Create Activity Sensor dialog, click the **Add** icon in the Sensor Actions section. This displays the Sensor Action Chooser dialog. It shows an existing sensor called `InstanceStart`, which you created in Section 8.6.2, "Create a Sensor for the Receive Activity".

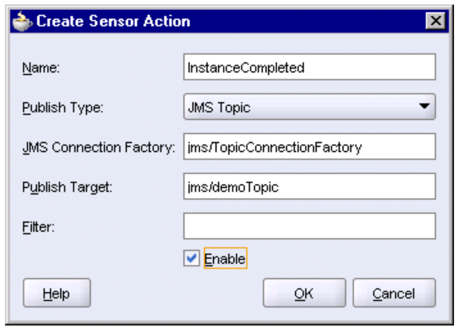
***Figure 8–247 Sensor Action Chooser Dialog***



12. In the Sensor Action Chooser dialog, select **Sensor Actions** and select **Sensor Action** from the wand icon. This displays the Create Sensor Action dialog.
13. In the Create Sensor Action dialog:
    - **Name**: enter **InstanceCompleted**.
    - **Publish Type**: select **JMS Topic**.
    - **JMS Connection Factory**: enter **jms/TopicConnectionFactory**.
    - **Publish Target**: enter **jms/demoTopic**.

– **Filter**: leave blank.
– **Enable**: select this option.

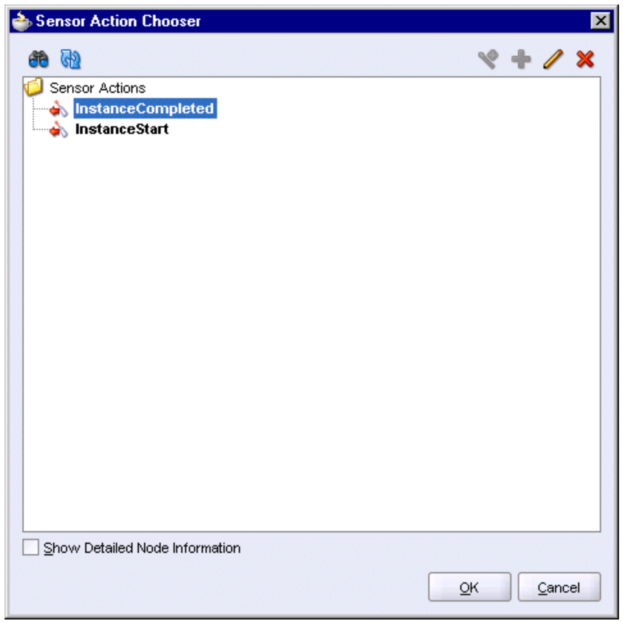
*Figure 8–248 Create Sensor Action Dialog*



Name: InstanceCompleted
Publish Type: JMS Topic
JMS Connection Factory: jms/TopicConnectionFactory
Publish Target: jms/demoTopic
Filter:
[✓] Enable

14. Click **OK** in the Create Sensor Action dialog. The Sensor Action Chooser dialog now shows the **InstanceCompleted** sensor action.

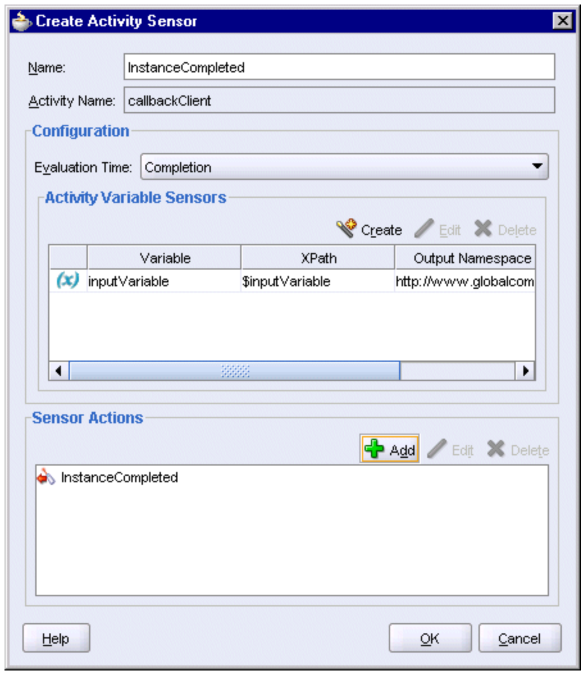
*Figure 8–249 Sensor Action Chooser Dialog*



Sensor Actions
InstanceCompleted
InstanceStart

15. Click **OK** in the Sensor Action Chooser. This takes you back to the Create Activity Sensor dialog, which now looks like this:

*Figure 8–250 Create Activity Sensor Dialog*



Name: InstanceCompleted

Activity Name: callbackClient

Configuration

Evaluation Time: Completion

Activity Variable Sensors

| | Variable | XPath | Output Namespace |
|---|---|---|---|
| (x) | inputVariable | $inputVariable | http://www.globalcom |

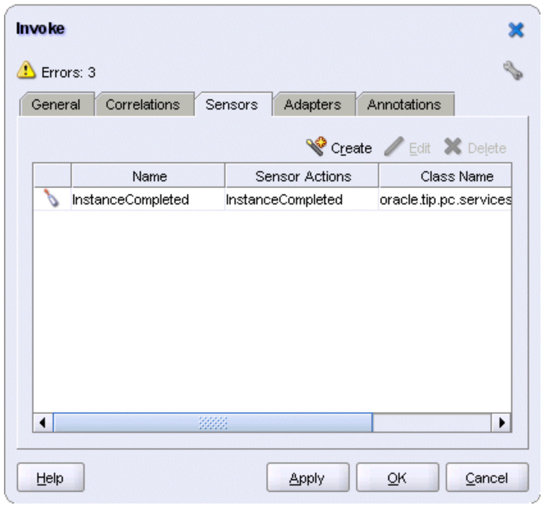
Sensor Actions

InstanceCompleted

16. Click **OK** in the Create Activity Sensor dialog.

    In the Invoke dialog, the Sensors tab now looks like this:

*Figure 8–251 Invoke Dialog, Sensors Tab*



Errors: 3

| | Name | Sensor Actions | Class Name |
|---|---|---|---|
| | InstanceCompleted | InstanceCompleted | oracle.tip.pc.services |

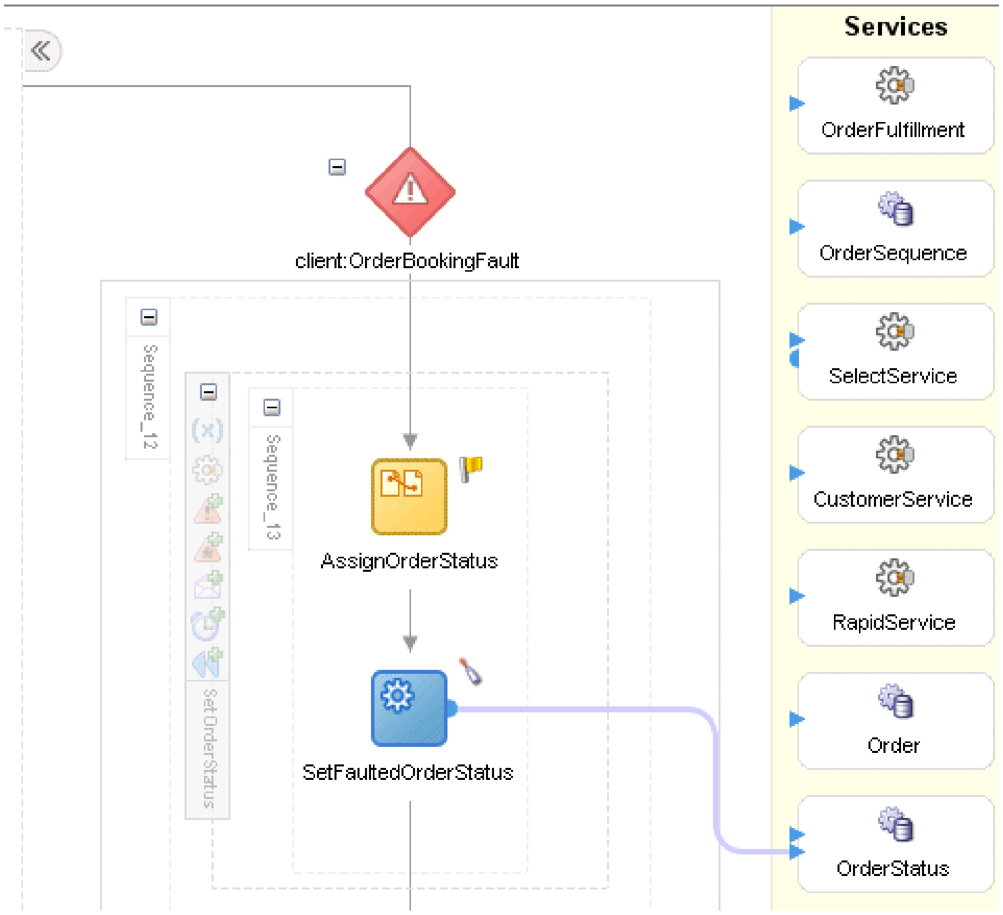
17. Click **OK** in the Invoke dialog.
18. Select File > Save to save your work.

## 8.19 Add a Catch Branch to the Project

Add a catch branch to the project as a whole so that you can update the order status in the database in case an error occurs anywhere in the project.

Figure 8–252 shows the activity in the catch.

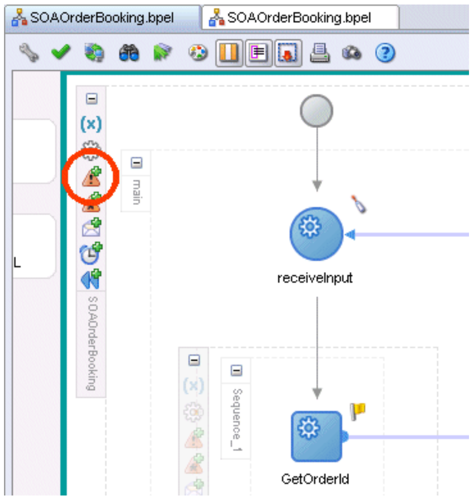
*Figure 8–252 Activities in the "client:OrderBookingFault" Catch*



## 8.19.1 Add a "client:OrderBookingFault" Catch

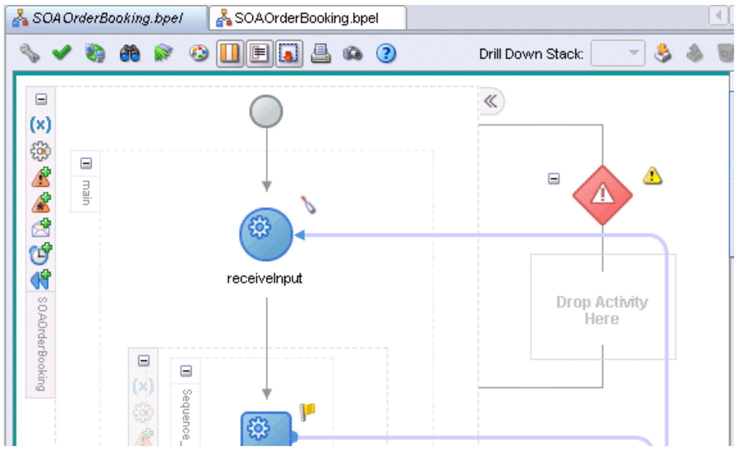
1. Click the triangular icon with an exclamation point at the "SOAOrderBooking" scope to add a catch branch to the project. Adding it at this level enables all activities in the project to use this catch.

***Figure 8–253 "Add Catch Branch" Icon at the SOAOrderBooking Scope***



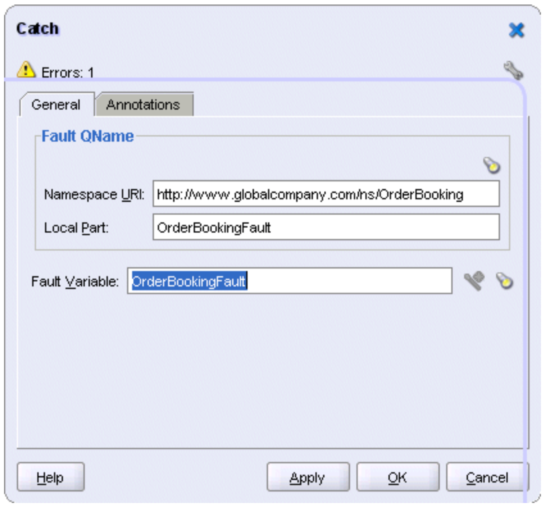
2. Scroll to the right to see the new catch branch, and expand it. The new branch does not have any activity in it.

***Figure 8–254 New Catch Branch***



3. Double-click the catch icon to display the Catch dialog.
4. In the Catch dialog;
   - **Namespace URI**: enter **http://www.globalcompany.com/ns/OrderBooking**.
   - **Local Part**: enter **OrderBookingFault**.
   - **Fault Variable**: enter **OrderBookingFault**.

*Figure 8–255 Catch Dialog*


Catch

Errors: 1

General | Annotations

Fault QName

Namespace URI: http://www.globalcompany.com/ns/OrderBooking

Local Part: OrderBookingFault

Fault Variable: OrderBookingFault

5. Click **OK** in the Catch dialog.

## 8.19.2 Create a Sequence

1. Expand the catch area, if you have not already done so.
2. Drag the Sequence icon from the Component Palette and drop it in the catch area.

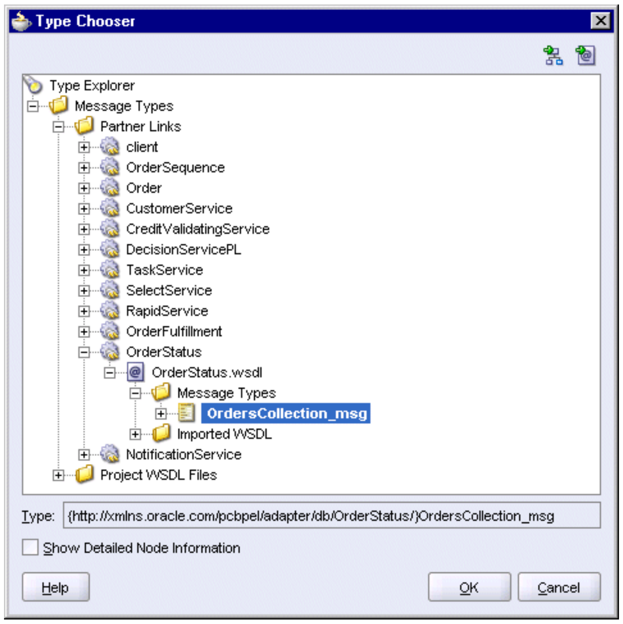
This creates a sequence in the catch area.

## 8.19.3 Create a Scope

Create a scope in the catch area because you need to define a variable for the activities in the catch area.

1. Drag the Scope icon from the Component Palette and drop it in the catch area.
2. Double-click the new scope to display the Scope dialog.
3. In the Scope dialog, in the General tab:
   - **Name**: enter **SetOrderStatus**.
   - **Variable Access Serializable**: do not select.
4. Click the Variables tab. You need to create a variable for this scope.
5. In the Variables tab, click **Create**.
6. In the Create Variable dialog:
   - **Name**: enter **orderStatusRequest**.
   - Select **Message Type** and click the flashlight icon to display the Type Chooser. In the Type Chooser, select **Type Explorer** > **Message Types** > **Partner Links** > **OrderStatus** > **OrderStatus.wsdl** > **Message Types** > **OrdersColllection_msg**.

***Figure 8–256 Type Chooser Dialog for orderStatusRequest Variable***

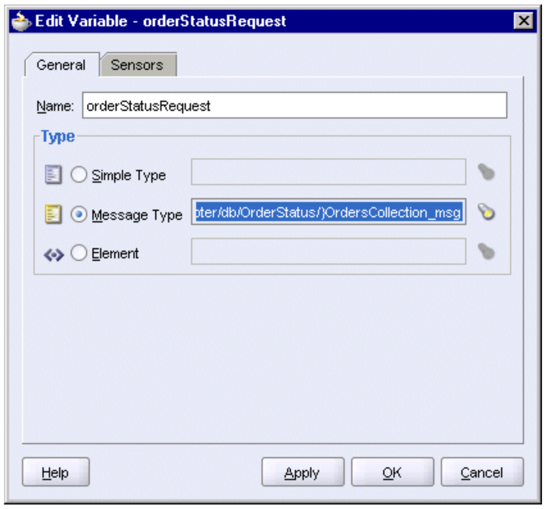


Type: {http://xmlns.oracle.com/pcbpel/adapter/db/OrderStatus/}OrdersCollection_msg

Click **OK** in the Type Chooser.

7. In the Create Variable dialog, the Message Type is set to `{http://xmlns.oracle.com/pcbpel/adapter/db/OrderStatus/}OrdersCollection_msg`.

***Figure 8–257 Create Variable Dialog for orderStatusRequest Variable***

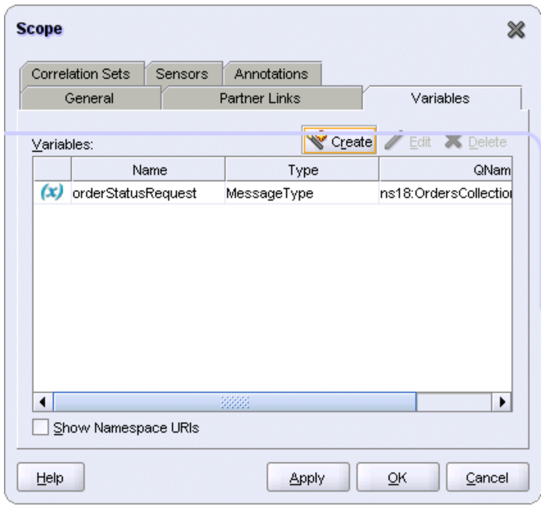


Name: orderStatusRequest

Message Type: pter/db/OrderStatus/}OrdersCollection_msg

8. Click **OK** in the Create Variable dialog.
9. The `orderStatusRequest` variable appears in the Variables tab of the Scope dialog.

***Figure 8–258 Scope Dialog for Catch, Variables Tab***



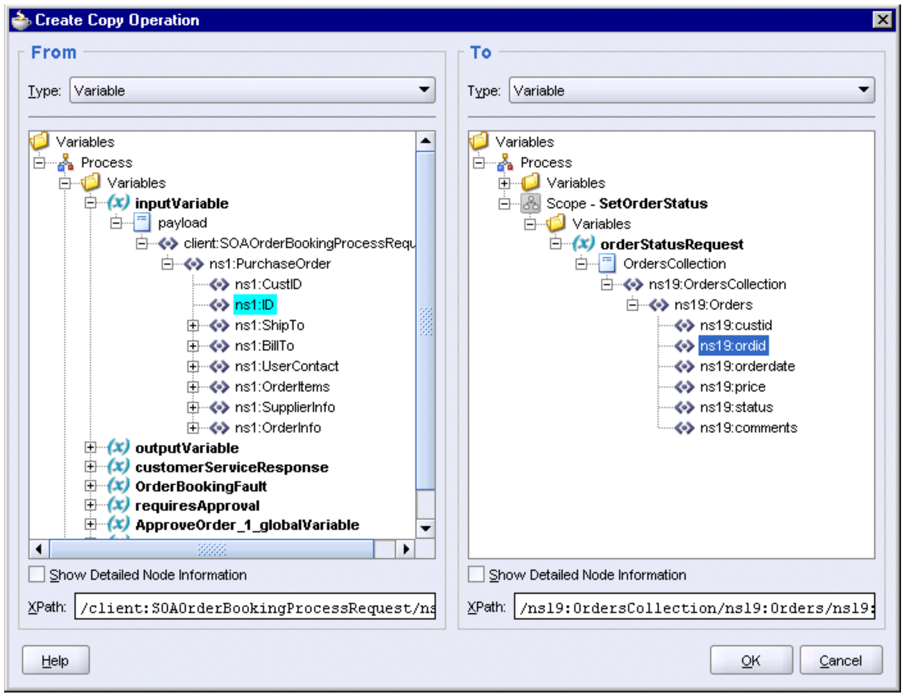
| Name | Type | QNam |
|---|---|---|
| orderStatusRequest | MessageType | ns18:OrdersCollectio |

Click **OK** in the Scope dialog.

## 8.19.4 Create the Assign Activity

1. Expand the "SetOrderStatus" scope.
2. Drag the Assign activity icon from the Component Palette and drop it in the "SetOrderStatus" scope.
3. Double-click the new assign activity to display the Assign dialog.
4. In the Assign dialog, click the General tab, and set the **Name** to **AssignOrderStatus**.
5. Still in the Assign dialog, click the Copy Operation tab. You will create three copy operations.
6. Create the first copy operation: Select **Copy Operation** from the **Create** dropdown. This displays the Create Copy Operation dialog.
   - In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **inputVariable** > **payload** > **client:SOAOrderBookingProcessRequest** > **ns1:PurchaseOrder** > **ns1:ID**.
   - In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - SetOrderStatus** > **Variables** > **orderStatusRequest** > **OrdersCollection** > **ns19:OrdersCollection** > **ns19:Orders** >**ns19:ordid**.

***Figure 8–259 Create Copy Operation Dialog for "AssignOrderStatus" Assign Activity, First Copy Operation***



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

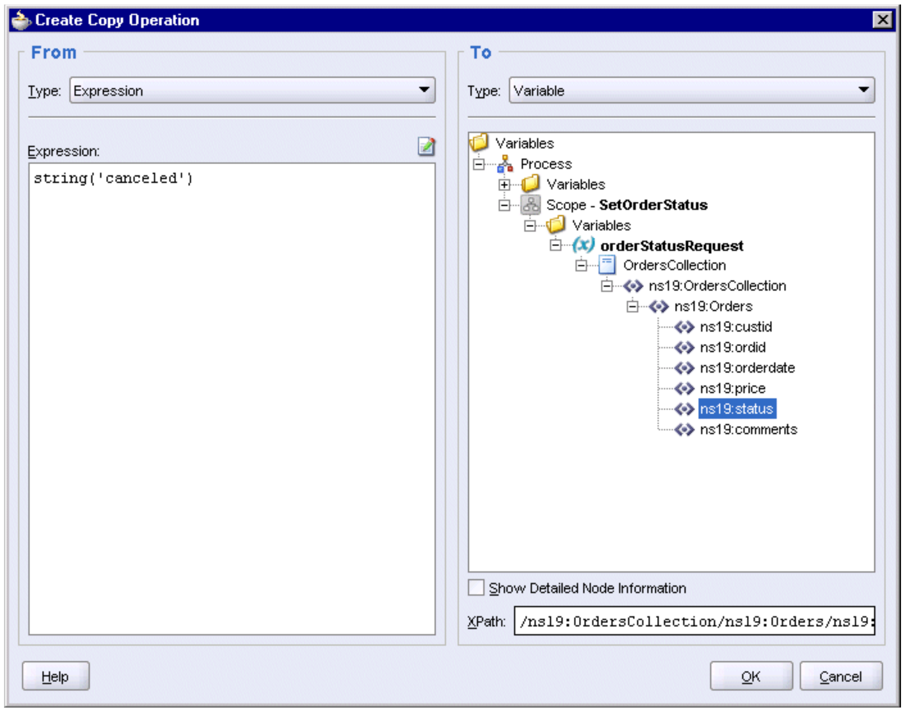
7. Create the second copy operation: Select **Copy Operation** from the **Create** dropdown again. This displays the Create Copy Operation dialog.

   - In the **From** side, set **Type** to **Expression**, and enter the following line in the Expression box:

     ```
     string('canceled')
     ```

   - In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - SetOrderStatus** > **Variables** > **orderStatusRequest** > **OrdersCollection** > **ns19:OrdersCollection** > **ns19:Orders** >**ns19:status**.

*Figure 8–260 Create Copy Operation Dialog for "AssignOrderStatus" Assign Activity, Second Copy Operation*



```
string('canceled')
```

```
/ns19:OrdersCollection/ns19:Orders/ns19:
```

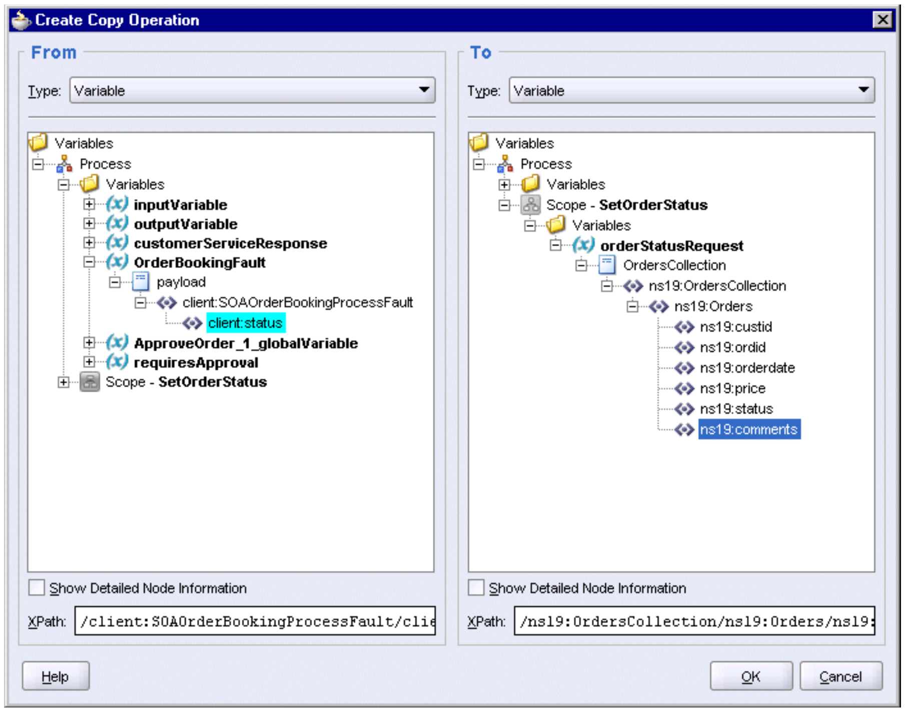
Click **OK** in the Create Copy Operation dialog.

8. Create the third copy operation: Select **Copy Operation** from the **Create** dropdown again. This displays the Create Copy Operation dialog.

   – In the **From** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Variables** > **OrderBookingFault** > **payload** > **client:SOAOrderBookingProcessFault** > **client:status**.

   – In the **To** side, set **Type** to **Variable**, and select **Variables** > **Process** > **Scope - SetOrderStatus** > **Variables** > **orderStatusRequest** > **OrdersCollection** > **ns19:OrdersCollection** > **ns19:Orders** >**ns19:comments**.

*Figure 8–261 Create Copy Operation Dialog for "AssignOrderStatus" Assign Activity, Third Copy Operation*



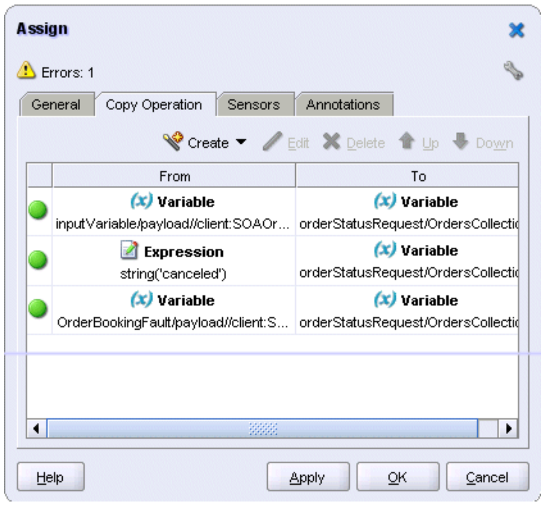
XPath: /client:SOAOrderBookingProcessFault/clie

XPath: /ns19:OrdersCollection/ns19:Orders/ns19:

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

9. You should see the three copy operations in the Assign dialog. Click **OK**.

*Figure 8–262 Assign Dialog for "AssignOrderStatus" Activity*



| | From | To |
|---|---|---|
| ● | Variable inputVariable/payload//client:SOAOr... | Variable orderStatusRequest/OrdersCollecti |
| ● | Expression string('canceled') | Variable orderStatusRequest/OrdersCollecti |
| ● | Variable OrderBookingFault/payload//client:S... | Variable orderStatusRequest/OrdersCollecti |

10. Select File > Save to save your work.

### 8.19.5 Create the Invoke Activity

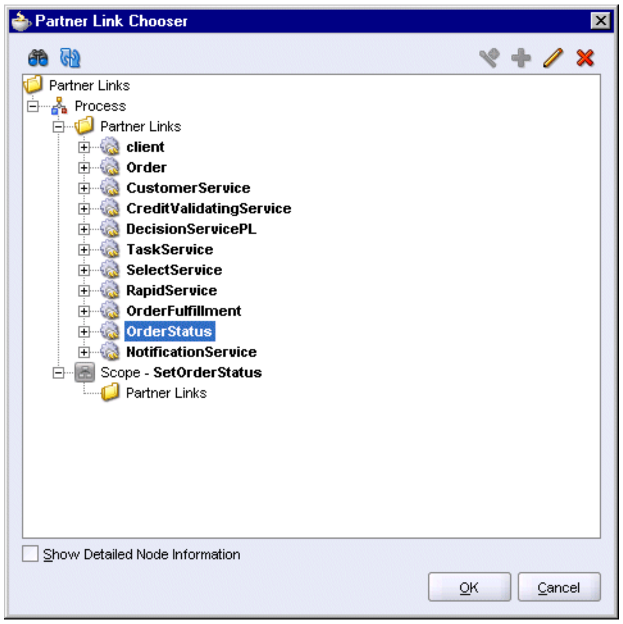
1. Drag the Invoke icon from the Component Palette and drop it below the "AssignOrderStatus" assign activity in the catch area.

2. Do one of the following to display the Invoke dialog:

- Drag one of the arrows on the side of the new invoke activity and drop it on the "OrderStatus" database adapter. This associates the invoke activity with the database adapter.
- Double-click the new invoke activity.

3. In the Invoke dialog, set these values:
   - **Name**: enter **SetFaultedOrderStatus**.
   - **Partner Link**: should be set to **OrderStatus**. If not, click the flashlight and select **OrderStatus** from the Partner Link Chooser.

***Figure 8–263 Partner Link Chooser Dialog for the "SetFaultedOrderStatus" Invoke Activity***


Partner Link Chooser

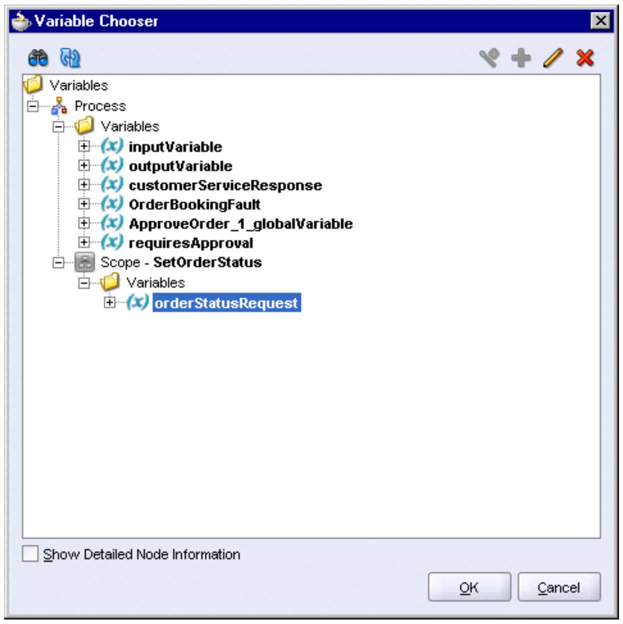
Partner Links
- Process
  - Partner Links
    - client
    - Order
    - CustomerService
    - CreditValidatingService
    - DecisionServicePL
    - TaskService
    - SelectService
    - RapidService
    - OrderFulfillment
    - OrderStatus
    - NotificationService
  - Scope - SetOrderStatus
    - Partner Links

Show Detailed Node Information

Click **OK** in the Partner Link Chooser.

- **Operation**: select **update**.
- **Input Variable**: click the Browse Variables icon (the second icon from the left) and select **Variables** > **Process** > **Scope - SetOrderStatus** > **Variables** > **orderStatusRequest**.

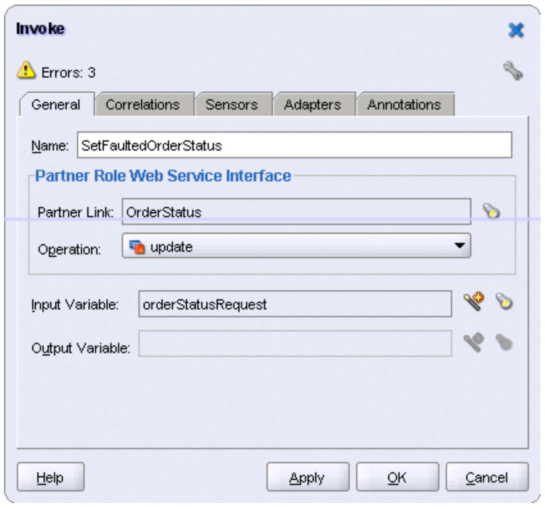
***Figure 8–264 Variable Chooser Dialog for the Input Variable in the "SetFaultedOrderStatus" Invoke Activity***



Click **OK** in the Variable Chooser.

The Invoke dialog should look like this:

***Figure 8–265 Invoke Dialog for the "SetFaultedOrderStatus" Invoke Activity***



Name: SetFaultedOrderStatus

Partner Link: OrderStatus

Operation: update

Input Variable: orderStatusRequest

Output Variable:

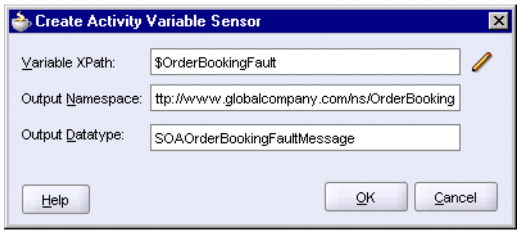
4. Click **OK** in the Invoke dialog.
5. Select File > Save to save your work.

## 8.19.6 Create a Sensor in the Invoke Activity

Create a sensor in the "SetFaultedOrderStatus" invoke activity to write order information for orders that did not complete for any reason to different destinations such as databases, files, or JMS. In this case, you write to a JMS topic.

1. Double-click the "SetFaultedOrderStatus" invoke activity to display the Invoke dialog.
2. Click the **Sensors** tab in the Invoke dialog.
3. Click **Create** to create a new sensor. This displays the Create Activity Sensor dialog.
4. In the Create Activity Sensor dialog, set the **Name** to **InstanceFaulted**.
5. Set the **Evaluation Time** to **Completion**. This specifies when the sensor fires. Completion signifies that the sensor fires after this activity has run.
6. In the Activity Variable Sensors section, click **Create** to display the Create Activity Variable Sensor dialog.

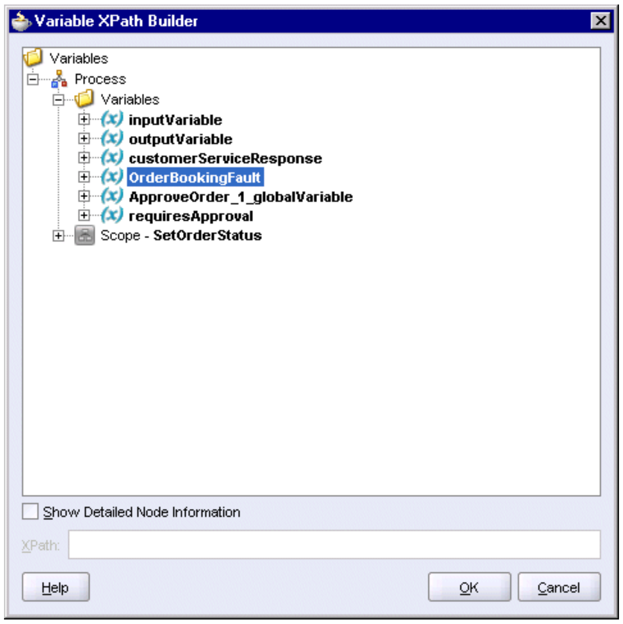
***Figure 8–266 Create Activity Variable Sensor Dialog***



Variable XPath: $OrderBookingFault
Output Namespace: ttp://www.globalcompany.com/ns/OrderBooking
Output Datatype: SOAOrderBookingFaultMessage

7. In the Create Activity Variable Sensor dialog, click the pencil icon for **Variable XPath**. This displays the Variable XPath Builder dialog.

***Figure 8–267 Variable XPath Builder Dialog***



8. Select **Variables** > **Process** > **Variables** > **OrderBookingFault**.
9. Click **OK** in the Variable XPath Builder. The Create Activity Variable Sensor dialog should be filled in with these values for you (see Figure 8–266):

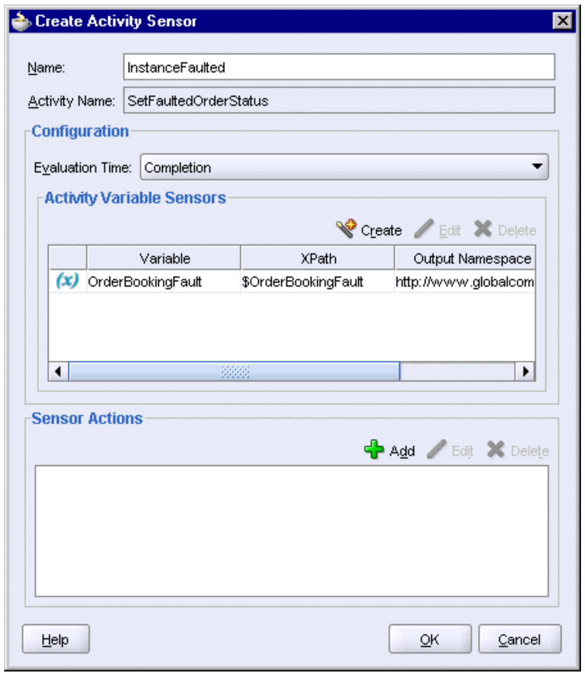
   **Variable XPath**: **$OrderBookingFault**

   **Output Namespace**: **http://www.globalcompany.com/ns/OrderBooking**

**Output Datatype**: **SOAOrderBookingFaultMessage**

10. Click **OK** in the Create Activity Variable Sensor dialog. This takes you back to the Create Activity Sensor dialog, which now looks like this.

***Figure 8–268 Create Activity Sensor Dialog***



Create Activity Sensor

Name: InstanceFaulted

Activity Name: SetFaultedOrderStatus

Configuration

Evaluation Time: Completion

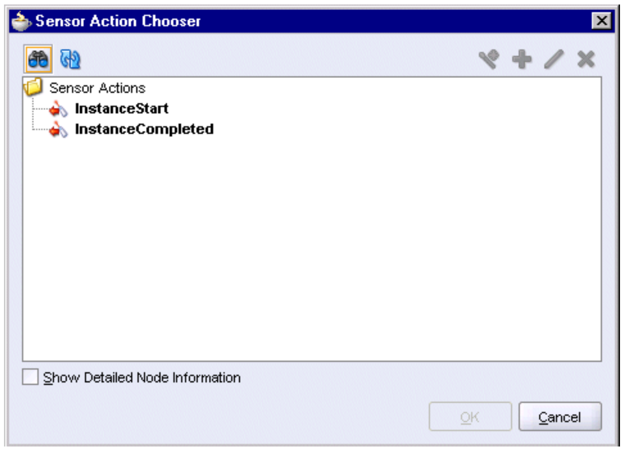
Activity Variable Sensors

| | Variable | XPath | Output Namespace |
|---|---|---|---|
| (x) | OrderBookingFault | $OrderBookingFault | http://www.globalcom |

Sensor Actions

11. In the Create Activity Sensor dialog, click the **Add** icon in the Sensor Actions section. This displays the Sensor Action Chooser dialog. It shows existing sensors called `InstanceStart` and `InstanceCompleted`, which you created in Section 8.6.2, "Create a Sensor for the Receive Activity" and Section 8.18.2, "Add a Sensor".

***Figure 8–269 Sensor Action Chooser Dialog***



Sensor Action Chooser

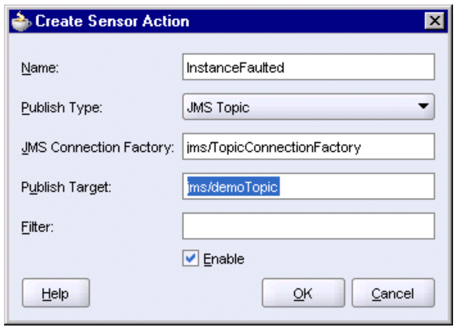
Sensor Actions
- InstanceStart
- InstanceCompleted

12. In the Sensor Action Chooser dialog, select **Sensor Actions** and select **Sensor Action** from the wand icon. This displays the Create Sensor Action dialog.

13. In the Create Sensor Action dialog:

- **Name**: enter **InstanceFaulted**.
- **Publish Type**: select **JMS Topic**.
- **JMS Connection Factory**: enter **jms/TopicConnectionFactory**.
- **Publish Target**: enter **jms/demoTopic**.
- **Filter**: leave blank.
- **Enable**: select this option.

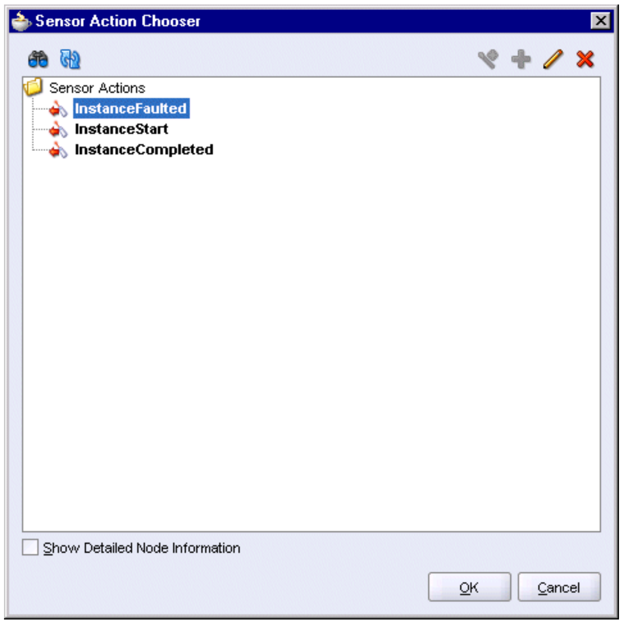
***Figure 8–270 Create Sensor Action Dialog***



Name: InstanceFaulted
Publish Type: JMS Topic
JMS Connection Factory: jms/TopicConnectionFactory
Publish Target: jms/demoTopic
Filter:
[✓] Enable

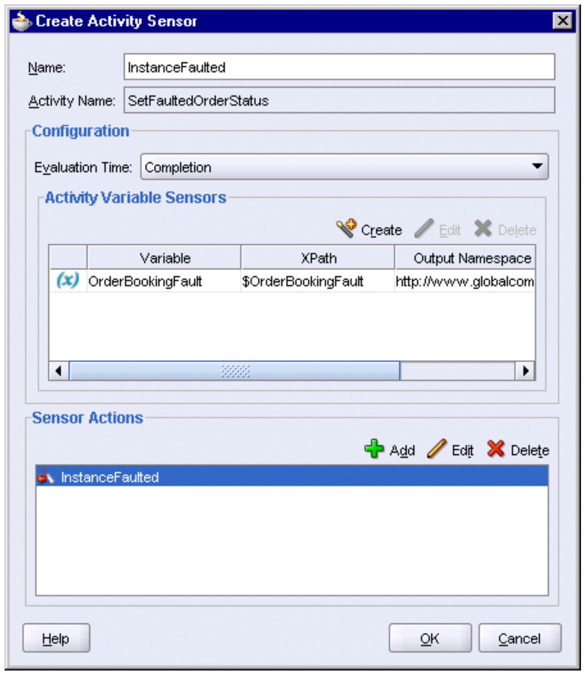
14. Click **OK** in the Create Sensor Action dialog. The Sensor Action Chooser dialog now shows the **InstanceFaulted** sensor action.

***Figure 8–271 Sensor Action Chooser Dialog***



15. Click **OK** in the Sensor Action Chooser. This takes you back to the Create Activity Sensor dialog, which now looks like this:

*Figure 8–272 Create Activity Sensor Dialog*



Name: InstanceFaulted

Activity Name: SetFaultedOrderStatus

Evaluation Time: Completion

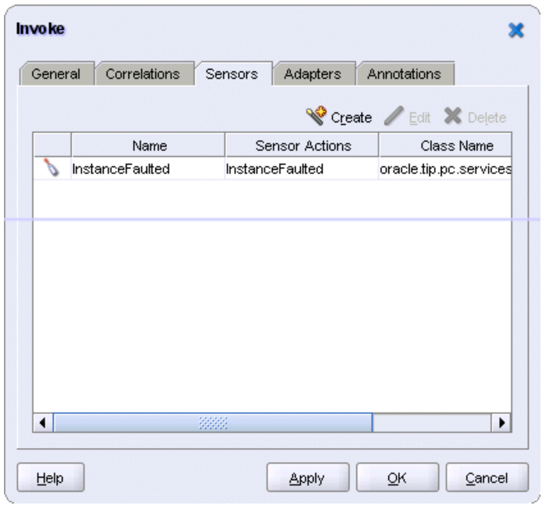
| Variable | XPath | Output Namespace |
|---|---|---|
| OrderBookingFault | $OrderBookingFault | http://www.globalcom |

Sensor Actions: InstanceFaulted

16. Click **OK** in the Create Activity Sensor dialog.

    In the Invoke dialog, the Sensors tab now looks like this:

*Figure 8–273 Invoke Dialog, Sensors Tab*



| Name | Sensor Actions | Class Name |
|---|---|---|
| InstanceFaulted | InstanceFaulted | oracle.tip.pc.services |

17. Click **OK** in the Invoke dialog.
18. Select File > Save to save your work.

## 8.20 Deploy the Project

1. Double-click **build.properties**, located under **SOAOrderBooking** > **Resources** in the Application Navigator. This file defines values that are used by `build.xml` when you deploy the BPEL project.

2. Uncomment (by removing the # character) these lines in the `build.properties` file:

```
platform=ias_10g
domain=default
rev=1.0
admin.user=oc4jadmin
admin.password=welcome99
http.hostname=myAppServerMachine.mydomain.com
http.port=8888
j2ee.hostname=myAppServerMachine.mydomain.com
rmi.port=23793
opmn.requestport=6005
oc4jinstancename=home
```

3. Edit the values as necessary. The values in bold italics are the typical values you need to modify.

   To determine the value for `rmi.port`, run:

   ```
   ORACLE_HOME\opmn\bin\opmnctl status -l
   ```

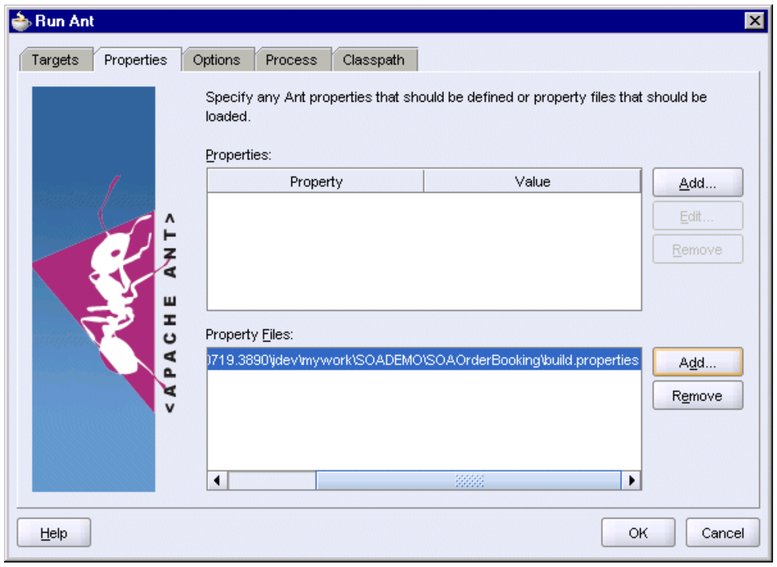
   *ORACLE_HOME* specifies the Oracle home for Oracle Application Server.

   To determine the value for `opmn.requestport`, see step 6 on page 2-11.

4. Select File > Save to save your changes to `build.properties`.
5. Right-click **build.xml**, and select **Run Ant**.
6. In the Run Ant dialog, click the Properties tab.
7. In the **Property Files** section, click **Add**. In the Add Ant Property File dialog, select the `build.properties` file in the `SOAOrderBooking` directory and click **Open**.

   The Run Ant dialog should look like this:

***Figure 8–274 Run Ant Dialog, Properties Tab, With build.properties File Loaded***



Specify any Ant properties that should be defined or property files that should be loaded.

Properties:

Property Files:

0719.3890\jdev\mywork\SOADEMO\SOAOrderBooking\build.properties

8. Click **OK**. JDeveloper runs Ant to compile and deploy the project. If you get errors, see the next section, Section 8.20.1, "Deploying Using Ant from the Developer Prompt".

### 8.20.1 Deploying Using Ant from the Developer Prompt

If you get errors, check that the values you entered in the `build.properties` file are correct.

If the values are correct, but you still get errors, you can run `ant` from the Developer Prompt to deploy the project:

1. Select **Start** > **Programs** > **Oracle -** *instanceName* > **Oracle BPEL Process Manager** > **Developer Prompt**. This displays a shell window configured for Oracle BPEL Process Manager.

   Note that you must run `ant` from the Developer Prompt shell window to deploy the SOAOrderBooking project. Running `ant` from a regular operating system shell for deploying the project is not supported.

2. In the Developer Prompt window, change directory to the *`SOADEMO`*`\SOAOrderBooking` directory, where *`SOADEMO`* refers to the directory where you created the SOA Order Booking application.

   ```
   > cd SOADEMO
   > cd SOAOrderBooking
   ```

   If you are running JDeveloper and Oracle Application Server on separate machines, you can copy the `SOAOrderBooking` directory from the JDeveloper machine to the Oracle Application Server machine. You can place it anywhere on the Oracle Application Server machine. In the Developer Prompt, you can just navigate to that directory.

3. Run `ant`.

   ```
   > ant
   ```

### 8.20.2 Viewing SOAOrderBooking in the Oracle BPEL Control

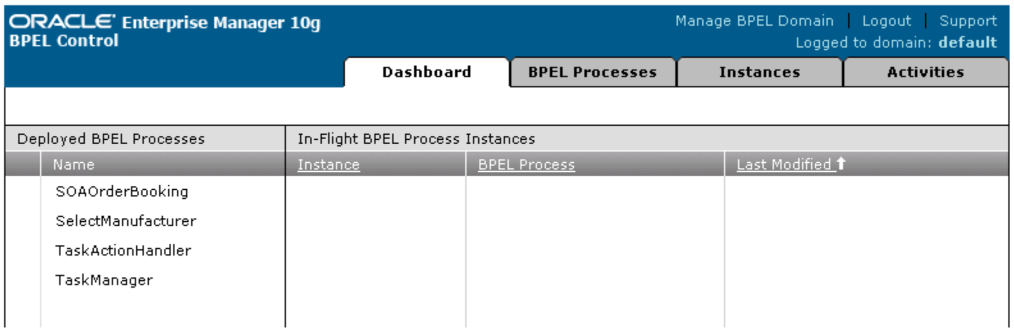
After deployment, SOAOrderBooking appears in the Oracle BPEL Control. Enter the following URL in a browser to bring up the Oracle BPEL Control:

`http://`*`hostname`*`:`*`port`*`/BPELConsole`

Log in as the `oc4jadmin` user.

SOAOrderBooking appears in the Dashboard tab of the Oracle BPEL Control:

***Figure 8–275 Oracle BPEL Control Showing SOAOrderBooking***


ORACLE Enterprise Manager 10g
BPEL Control
Manage BPEL Domain | Logout | Support
Logged to domain: default
Dashboard
BPEL Processes
Instances
Activities

| Deployed BPEL Processes | In-Flight BPEL Process Instances | | |
|---|---|---|---|
| Name | Instance | BPEL Process | Last Modified ⬆ |
| SOAOrderBooking | | | |
| SelectManufacturer | | | |
| TaskActionHandler | | | |
| TaskManager | | | |

If you want to look at the WSDL for the SOAOrderBooking project, you can enter the following URL in a browser:

```
http://hostname:port/orabpel/default/SOAOrderBooking/1.0/SOAOrderBo
oking?wsdl
```

9

# Creating the OrderBookingESB Project

This chapter describes how to create the OrderBookingESB project. It contains these sections:

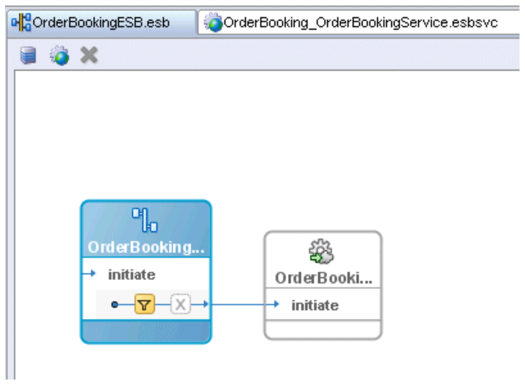
## 9.1 About the OrderBookingESB Project

The OrderBookingESB project is the entry point to the SOA Order Booking application. The SOADemo-Client application invokes the OrderBookingESB project when a customer clicks the **Place Order** button.

The OrderBookingESB project invokes the SOAOrderBooking project, which is a BPEL project that defines the main flow of the SOA Order Booking application.

The OrderBookingESB project is an ESB project. In JDeveloper, it looks like the following:

***Figure 9–1 OrderBookingESB Project in JDeveloper***



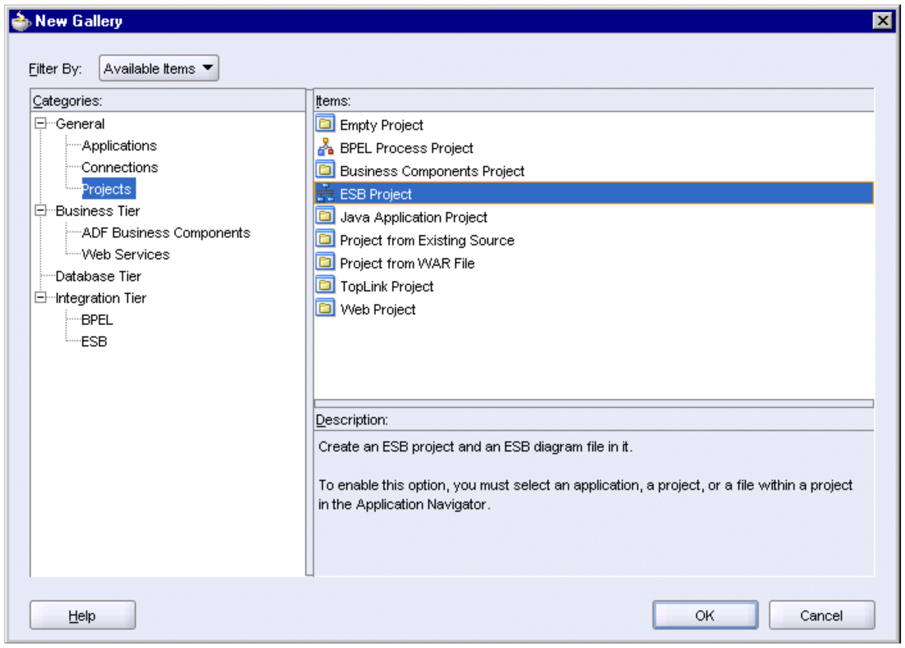
The OrderBookingESB project consists of:

- OrderBookingService routing service
- OrderBookingProcess external service

## 9.2 Create a New Project for OrderBookingESB

1. Right-click the SOADEMO application, and select **New Project**.
2. In the New Gallery, in the Categories section, expand **General** and select **Projects**. In the Items section, select **ESB Project**.

*Figure 9–2 New Gallery for OrderBookingESB Project*



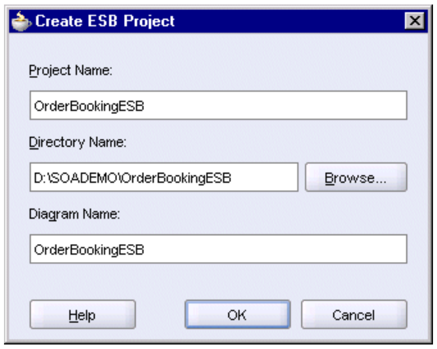
Create an ESB project and an ESB diagram file in it.

To enable this option, you must select an application, a project, or a file within a project in the Application Navigator.

Click **OK**.

3. In the Create ESB Project dialog, enter **OrderBookingESB** in the **Project Name** field. Accept the defaults for the other fields.

*Figure 9–3 Create ESB Project Dialog for OrderBookingESB*



Project Name: OrderBookingESB

Directory Name: D:\SOADEMO\OrderBookingESB

Diagram Name: OrderBookingESB

Click **OK**.

JDeveloper displays a blank page for the `OrderBookingESB.esb` file. In the Application Navigator, this file is located under **OrderBookingESB** > **Resources**.

## 9.3 Create a System Called "OrderBooking"

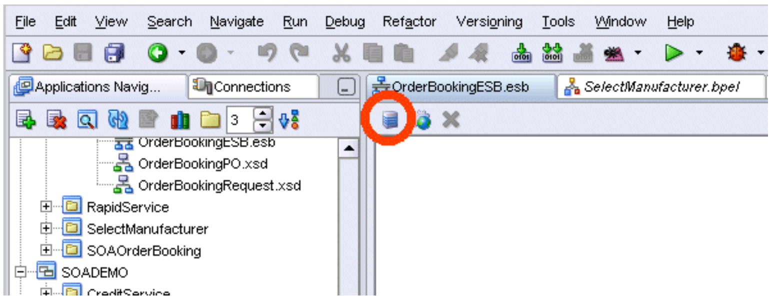
Similar to the "Fulfillment" system that you created for the FulfillmentESB project (covered in Section 4.3, "Create a System Called "Fulfillment""), for the OrderBookingESB project you create a system called "OrderBooking". You can then set all the activities in the OrderBookingESB project to belong to this system.

If you do not create a system, JDeveloper places the activities in a system called "DefaultSystem".

To create a system called "OrderBooking":

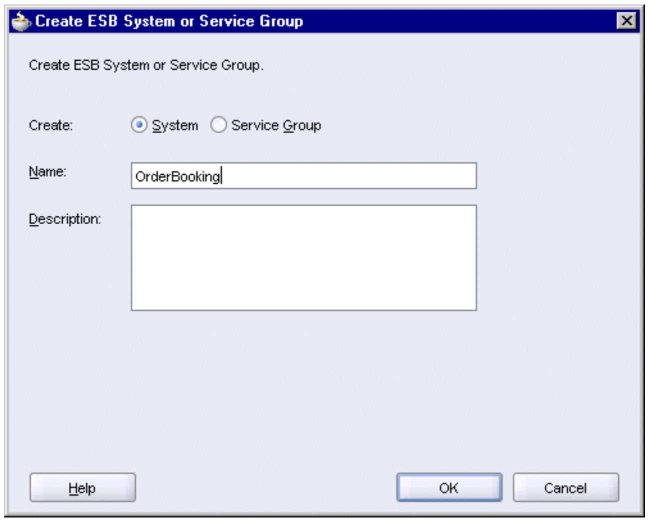
1. In the empty `OrderBookingESB.esb` page, click the **Create System/Group** icon, located at the top of the page.

***Figure 9–4 Create System/Group Icon at the Top of the OrderBookingESB.esb Page***



2. In the Create ESB System or Service Group dialog:
   - **System**: select this option.
   - **Name**: enter **OrderBooking**.
   - **Description**: leave blank or enter a brief description.

***Figure 9–5 Create ESB System or Service Group Dialog for the "OrderBooking" System***


Create ESB System or Service Group

Create ESB System or Service Group.

Create: [✓ System] Service Group

Name: OrderBooking

Description:

3. Click **OK**. In the Application Navigator, you should see an **OrderBooking.esbsys** file under **OrderBookingESB** > **Resources**.

## 9.4 Create the "OrderBookingService" Routing Service

1. Copy the following files from the `soademo_101310_preview.zip` file to the `OrderBookingESB` directory:

   - `OrderBookingRequest.xsd`
   - `OrderBookingPO.xsd`

   In the `soademo_101310_preview.zip` file, these xsd files are located in the `OrderBookingESB` directory.

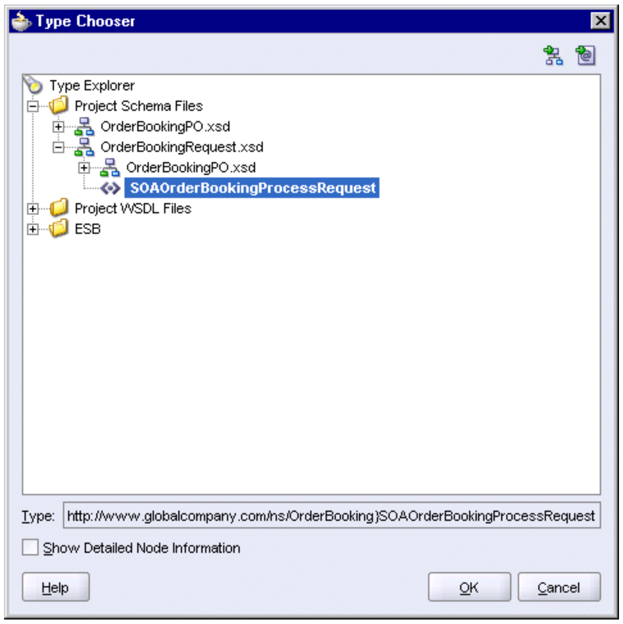
2. Select View > Component Palette to display the Component Palette. In the dropdown for the Component Palette, select **ESB Services**.

3. Drag the Routing Service icon from the Component Palette and drop it anywhere on the OrderBookingESB.esb page.

4. In the Create Routing Service dialog:

   - **Name**: enter **OrderBookingService**.
   - **System/Group**: set to **OrderBooking**.
   - **Generate WSDL From Schemas**: select this option.
   - **Schema Location**: click **Browse**, which displays the Type Chooser dialog. In the dialog, select **Project Schema Files** > **OrderBookingRequest.xsd** > **SOAOrderBookingProcessRequest**.

***Figure 9–6 Type Chooser Dialog for OrderBooking Routing Service***



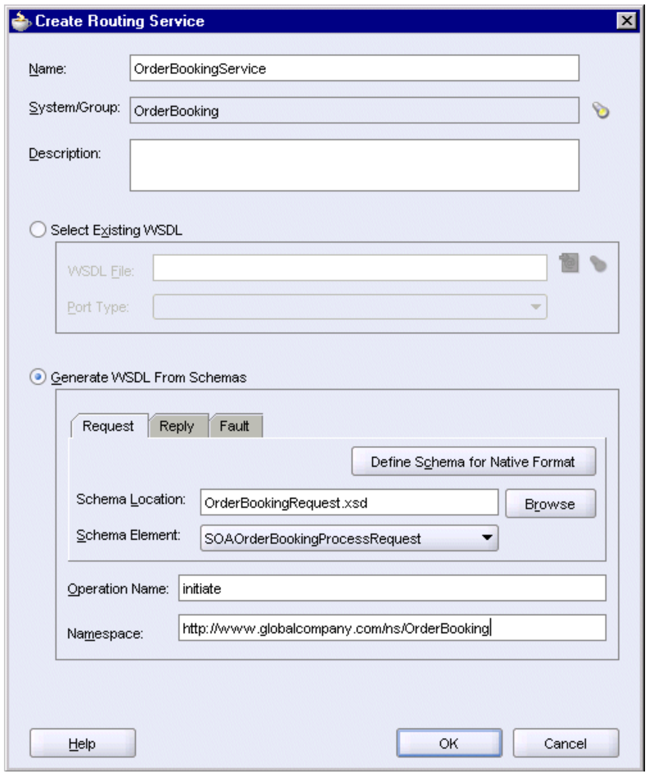
Type: http://www.globalcompany.com/ns/OrderBooking}SOAOrderBookingProcessRequest

   Click **OK** in the Type Chooser dialog. **Schema Location** should be set to **OrderBookingRequest.xsd**.

   - **Schema Element**: should be set to **SOAOrderBookingProcessRequest**.
   - **Operation Name**: enter **initiate**.

- **Namespace**: enter **http://www.globalcompany.com/ns/OrderBooking**.

*Figure 9–7 Create Routing Service Dialog for OrderBookingService*



Create Routing Service

Name: OrderBookingService

System/Group: OrderBooking

Description:

( ) Select Existing WSDL

WSDL File:

Port Type:

(●) Generate WSDL From Schemas

Schema Location: OrderBookingRequest.xsd

Schema Element: SOAOrderBookingProcessRequest

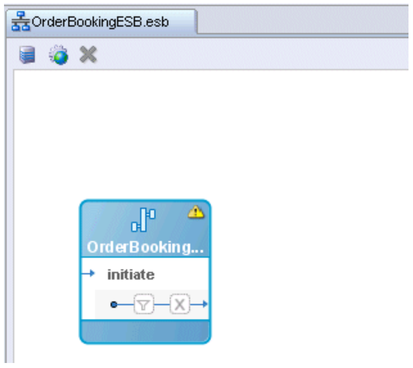
Operation Name: initiate

Namespace: http://www.globalcompany.com/ns/OrderBooking

5. Click **OK** in the Create Routing Service dialog.

The OrderBookingESB.esb page now looks like this:

*Figure 9–8 OrderBookingESB.esb Page Showing the OrderBookingService Routing Service*



JDeveloper also creates a WSDL file for you: `OrderBooking_OrderBookingService.wsdl` in the `OrderBookingESB` directory.

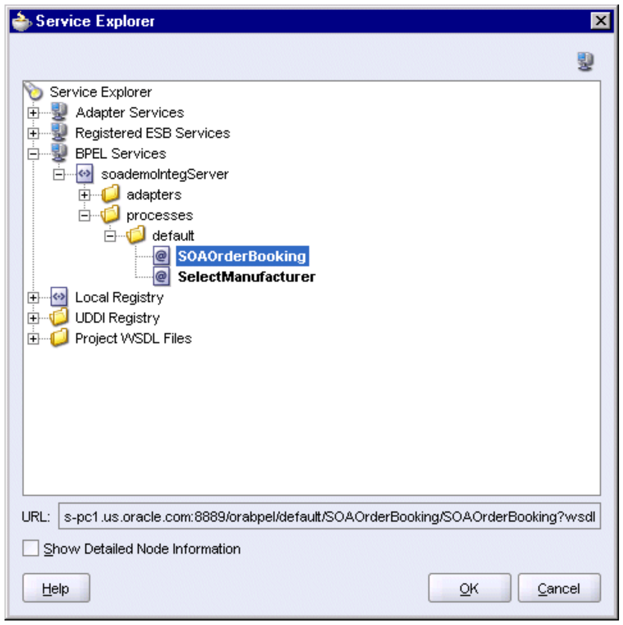
## 9.5 Invoke the SOAOrderBooking Process ("OrderBookingProcess" External Service)

This is the service that invokes the SOAOrderBooking process.

1. Select **ESB Services** from the dropdown in the Component Palette.
2. Drag the SOAP Service icon from the Component Palette and drop it to the right of the "OrderBookingService" routing service.
3. In the Create SOAP Invocation Service dialog:
   - **Name**: enter **OrderBookingProcess**.
   - **System/Group**: set to **OrderBooking**.
   - **WSDL File**: Click the Service Explorer (flashlight) icon and in the Service Explorer dialog, select **Service Explorer** > **BPEL Services** > ***soaIntegrationServer*** > **processes** > **default** > **SOAOrderBooking**.

     *soaIntegrationServer* refers to the name of your Integration Server connection.

***Figure 9–9 Service Explorer Dialog***

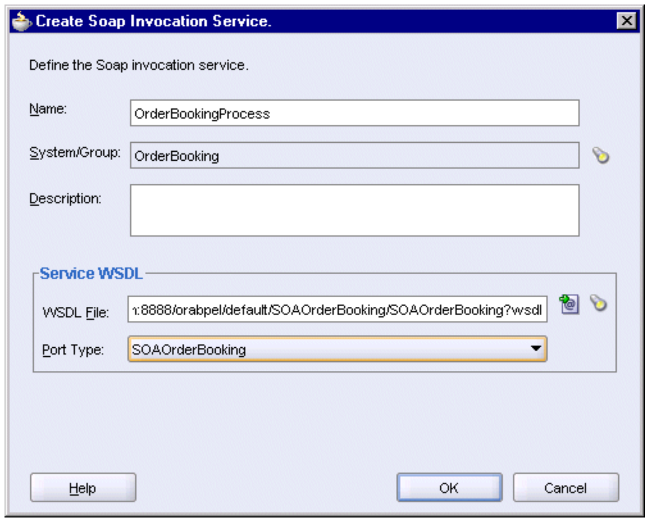


URL: s-pc1.us.oracle.com:8889/orabpel/default/SOAOrderBooking/SOAOrderBooking?wsdl

     Click **OK** in the Service Explorer.
   - **Port Type**: select **SOAOrderBooking**.

   The Create SOAP Invocation Service dialog should look like this:

***Figure 9–10 Create SOAP Invocation Service Dialog for OrderBookingProcess***



Define the Soap invocation service.

Name: OrderBookingProcess

System/Group: OrderBooking

Description:

Service WSDL

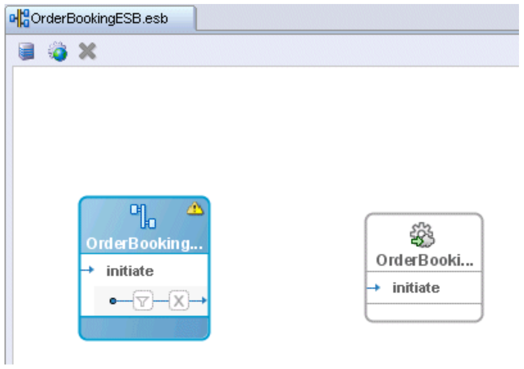
WSDL File: :8888/orabpel/default/SOAOrderBooking/SOAOrderBooking?wsdl

Port Type: SOAOrderBooking

4. Click **OK** in the Create SOAP Invocation Service dialog.

You should see two activities in the OrderBookingESB.esb page:

***Figure 9–11 OrderBookingESB.esb Page with OrderBookingService Routing Service and OrderBookingProcess External Service***

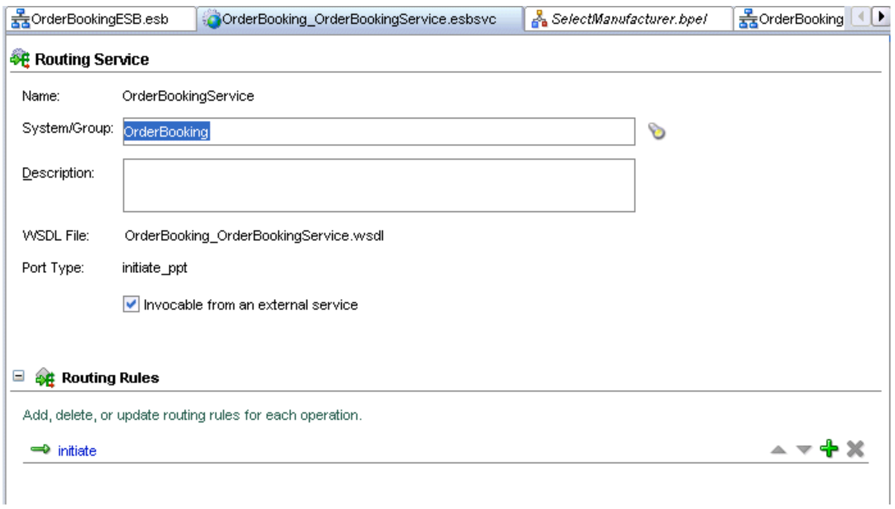


## 9.6 Set up Routing Rules for OrderBookingService

Set up routing rules so that requests can go from OrderBookingService to OrderBookingProcess.

1. Double-click OrderBookingService in the top section of the icon. This displays the page for the `OrderBooking_OrderBookingService.esbsvc` file.
2. In the Routing Rules section, click the [+] to expand the section.
3. In the Routing Rules section, click the green + icon. You may have to scroll to the right to see the icon.

***Figure 9–12 Routing Rules***



Routing Service

Name: OrderBookingService

System/Group: OrderBooking

Description:

WSDL File: OrderBooking_OrderBookingService.wsdl

Port Type: initiate_ppt

☑ Invocable from an external service

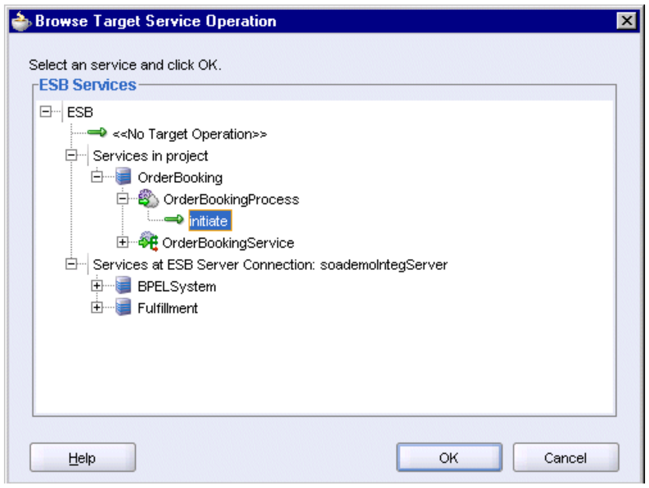
Routing Rules

Add, delete, or update routing rules for each operation.

initiate

4. In the Browse Target Service Operation dialog, select **ESB** > **Services in project** > **OrderBooking** > **OrderBookingProcess** > **initiate**.

***Figure 9–13 Browse Target Service Operation Dialog***



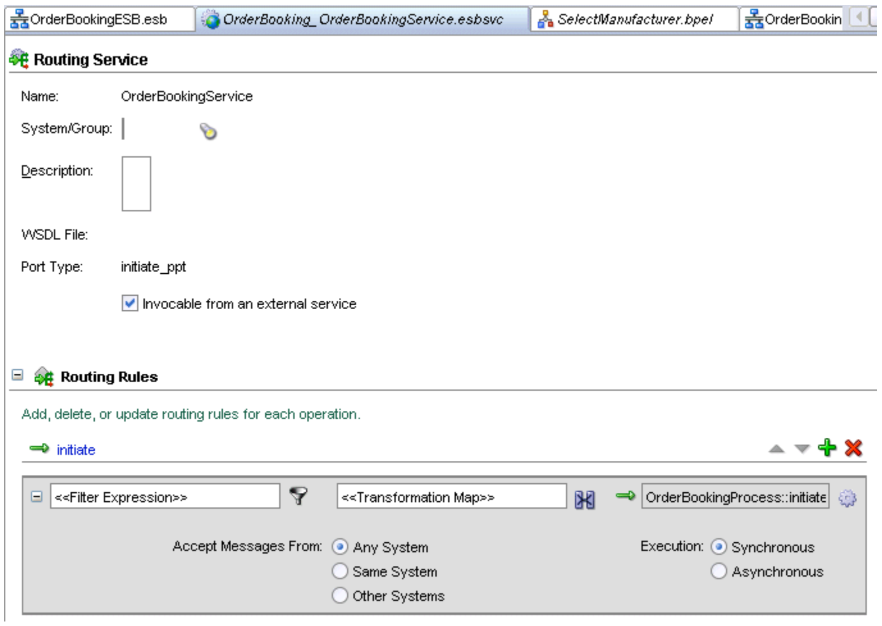
Select an service and click OK.

ESB Services

```
ESB
    <<No Target Operation>>
    Services in project
        OrderBooking
            OrderBookingProcess
                initiate
            OrderBookingService
    Services at ESB Server Connection: soademoIntegServer
        BPELSystem
        Fulfillment
```

Click **OK** in the Browse Target Service Operation dialog. This returns you to the Routing Rules section, which should show "OrderBookingProcess::initiate" in the last column.

***Figure 9–14 Routing Rules Showing the Link from OrderBookingService to OrderBookingProcess***



Routing Service

Name: OrderBookingService

System/Group:

Description:

WSDL File:

Port Type: initiate_ppt

[✓] Invocable from an external service

Routing Rules

Add, delete, or update routing rules for each operation.

initiate

<<Filter Expression>> <<Transformation Map>> OrderBookingProcess::initiate

Accept Messages From: [● Any System] Same System Other Systems

Execution: [● Synchronous] Asynchronous

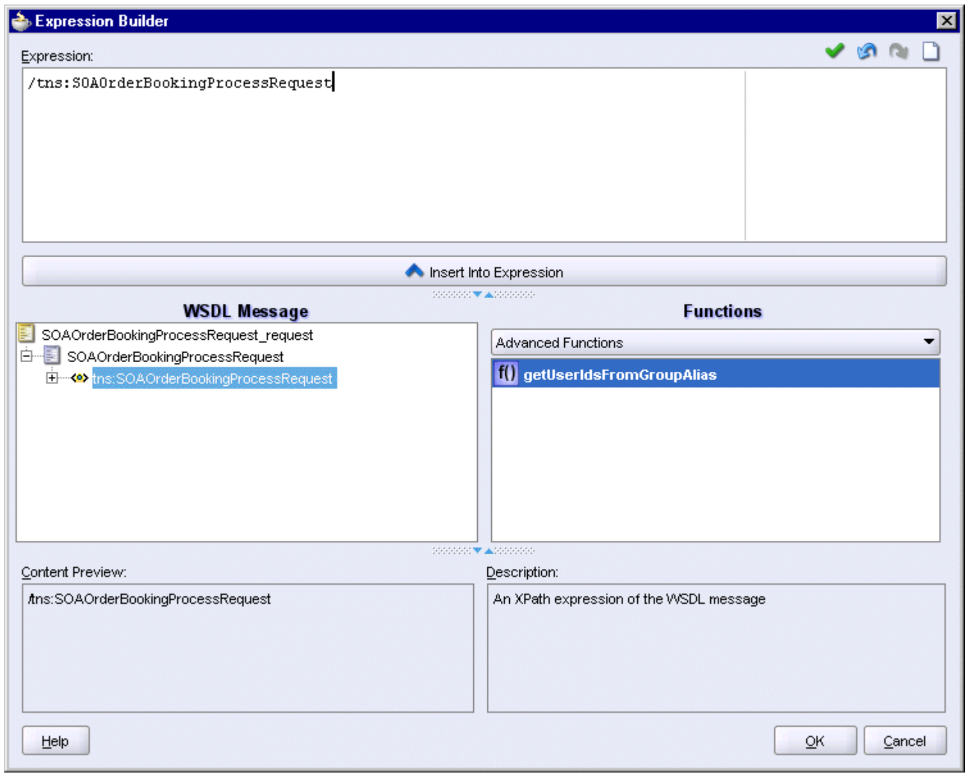
5. In the Routing Rules section, click the filter icon.

6. In the Expression Builder, in the WSDL Message section, select **SOAOrderBookingProcessRequest_request** > **SOAOrderBookingProcessRequest** > **tns:SOAOrderBookingProcessRequest**.

   Click **Insert Into Expression**. In the Expression box, you should see:

   ```
   /tns:SOAOrderBookingProcessRequest
   ```

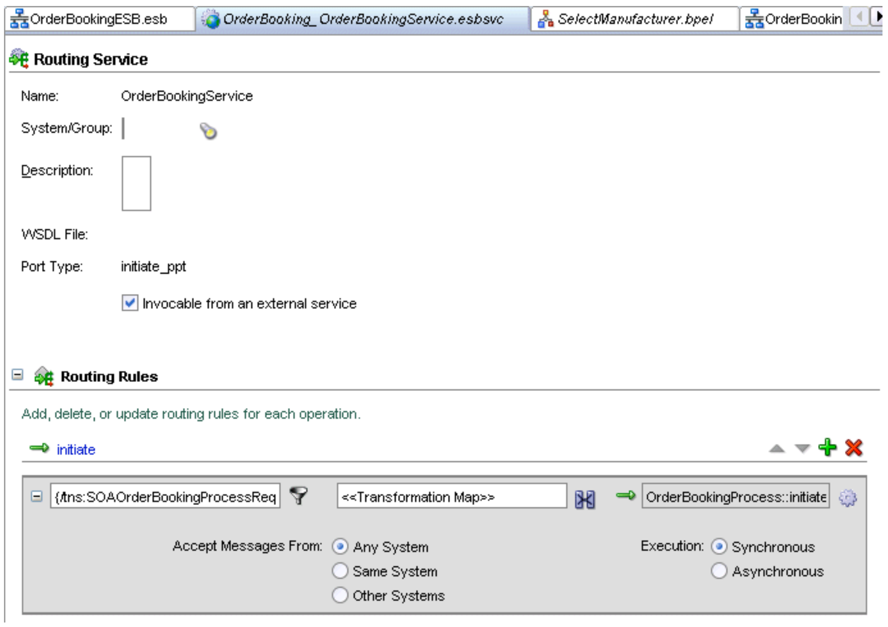
***Figure 9–15 Expression Builder Dialog***


Expression Builder
Expression:
/tns:SOAOrderBookingProcessRequest
Insert Into Expression
WSDL Message
SOAOrderBookingProcessRequest_request
SOAOrderBookingProcessRequest
tns:SOAOrderBookingProcessRequest
Functions
Advanced Functions
getUserIdsFromGroupAlias
Content Preview:
/tns:SOAOrderBookingProcessRequest
Description:
An XPath expression of the WSDL message
Help
OK
Cancel

Click **OK** in the Expression Builder.

The routing rule now includes a filter, which simply passes the order information to the OrderBookingProcess activity. The routing rule section now looks like this, with the filter information in the first column.

***Figure 9–16 Routing Rule Showing the Filter***

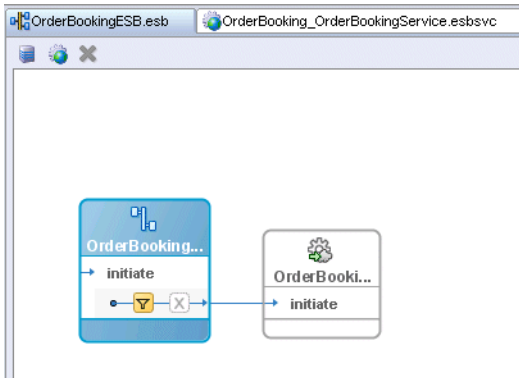

OrderBookingESB.esb
OrderBooking_OrderBookingService.esbsvc
SelectManufacturer.bpel
OrderBookin
Routing Service
Name: OrderBookingService
System/Group:
Description:
WSDL File:
Port Type: initiate_ppt
Invocable from an external service
Routing Rules
Add, delete, or update routing rules for each operation.
initiate
{/tns:SOAOrderBookingProcessReq
<<Transformation Map>>
OrderBookingProcess::initiate
Accept Messages From: Any System / Same System / Other Systems
Execution: Synchronous / Asynchronous

7. Select File > Save to save `OrderBooking_OrderBookingService.esbsvc`.

8. Click the OrderBookingESB.esb tab.

   On the OrderBookingESB.esb page, you should see a line connecting the two activities:

***Figure 9–17 Final OrderBookingESB.esb Page***



## 9.7 Save All Files in the OrderBookingESB Project

Browse through the OrderBookingESB files in the Application Navigator to ensure that all the files are saved. If you see a file in italics, select the file and save it.

## 9.8 Register the OrderBookingESB Project

In the Application Navigator, right-click the OrderBookingESB project and select **Register with ESB** > ***SoademoIntegServer***, where ***SoademoIntegServer*** is the name of the connection to the integration server.

You can view the services that you created in the OrderBookingESB project in the ESB Console. To do this, enter the URL of the Oracle ESB Console in a browser:

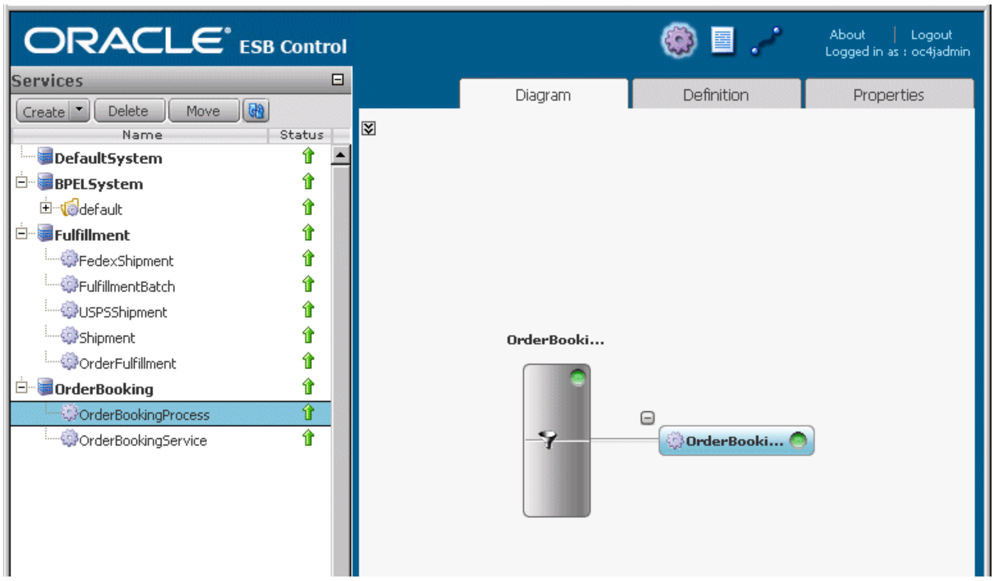
`http://`*`host`*`:`*`port`*`/esb/esb/EsbConsole.html`

*host* specifies the name of the machine running Oracle Application Server, and *port* specifies the HTTP port at which Oracle HTTP Server or OC4J is listening.

Log in as the `oc4jadmin` user.

The services are grouped under **OrderBooking**, which is the name of the system that you created in Section 9.3, "Create a System Called "OrderBooking"".

***Figure 9–18   Oracle ESB Console Showing the Services in the OrderBooking System***



************************************************************************************************

# 10 Interfacing the Client Application with the SOA Order Booking Application

The focus of this chapter is how to get a client application such as the SOADemo-Client application to interface with the projects in the SOA Order Booking application.

This chapter does not cover how to create the client application in detail because the client application uses the standard ADF technology, which is covered in detail in the *ADF Developer's Guide* and *ADF Tutorial*.

This chapter includes the following topics:

## 10.1 About the SOADemo-Client Application

The SOADemo-Client application is a Web-based application that customers use to place orders with Global Company. When a customer logs into the application, he or she can browse products, place products into the shopping cart, and submit the order. For details on the pages in the SOADemo-Client application, see the *Oracle SOA Suite Quick Start Guide*.

The SOADemo-Client application uses ADF technology to simplify the application development process and to make the application easier to maintain. You can use JDeveloper to create ADF applications.

The SOADemo-Client application makes calls to these services provided by the SOA Order Booking application:

- CustomerService. In the login process, the client application uses the "find customer by email" service provided by CustomerService to validate the customer's login ID and password.
- CustomerService. The SOADemo-Client application provides a **Register** button that enables new customers to add themselves to the database. The **Register** button invokes the "add new customer" service provided by CustomerService.
- OrderBookingESB. When the customer submits an order, it invokes the OrderBookingESB project. The OrderBookingESB project in turn invokes the SOAOrderBooking BPEL process, which is the main flow for the SOA Order Booking application.

For the SOADemo-Client application to be able to invoke services provided by CustomerService and OrderBookingESB, you have to generate web service proxies for the services. In the code for the client, you call methods in the web service proxy, which then invokes the corresponding methods in CustomerService or OrderBookingESB. You can use JDeveloper to generate web service proxies.

## 10.2 Invoking Services from CustomerService

This section describes how to generate a web service proxy for CustomerService, and how to call it from the client application.

- Section 10.2.1, "Generate a Web Service Proxy for CustomerService"
- Section 10.2.2, "Build the Files"
- Section 10.2.3, "Write Code to Invoke the Web Service Proxy for CustomerService"

### 10.2.1 Generate a Web Service Proxy for CustomerService

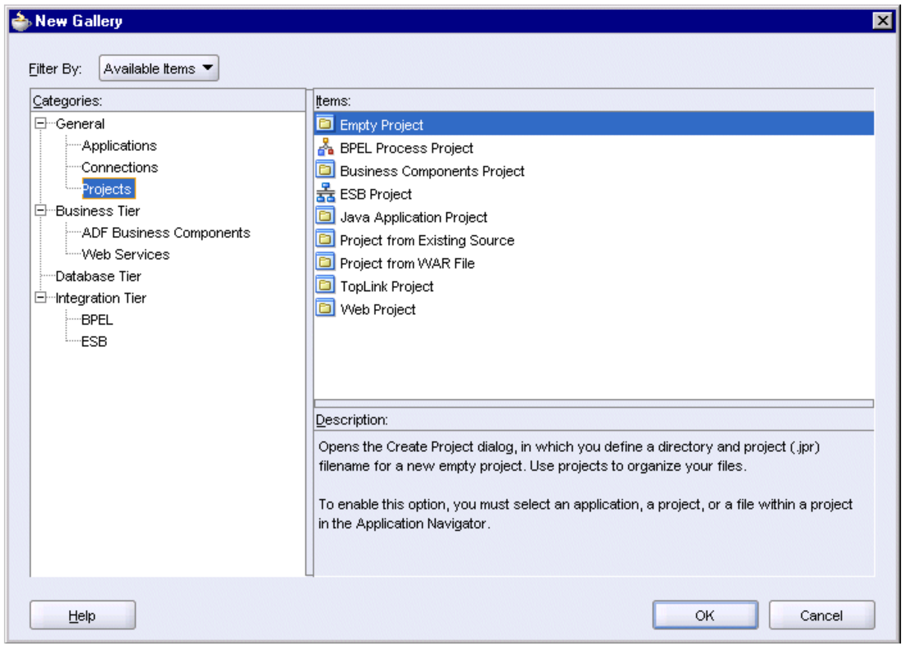
To generate web service proxy for CustomerService, you create a project for it in the client application. The following procedure starts by creating an empty project, then invokes the Create Web Service Proxy wizard to create the proxy for CustomerService.

1. Create a project in your client application to contain the web service proxy for CustomerService. Begin by creating an empty project:

   a. Right-click the client application, and select **New Project**.

   b. In the New Gallery, in the Categories section, expand **General** and select **Projects**. In the Items section, select **Empty Project**.

***Figure 10–1 New Gallery for Creating an Empty Project***



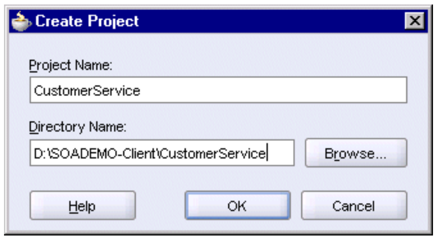
Opens the Create Project dialog, in which you define a directory and project (.jpr) filename for a new empty project. Use projects to organize your files.

To enable this option, you must select an application, a project, or a file within a project in the Application Navigator.

   Click **OK**.

   c. In the Create Project dialog, enter **CustomerService** in the **Project Name** field.

***Figure 10–2 Create Project Dialog for the CustomerService Web Service Proxy Project***

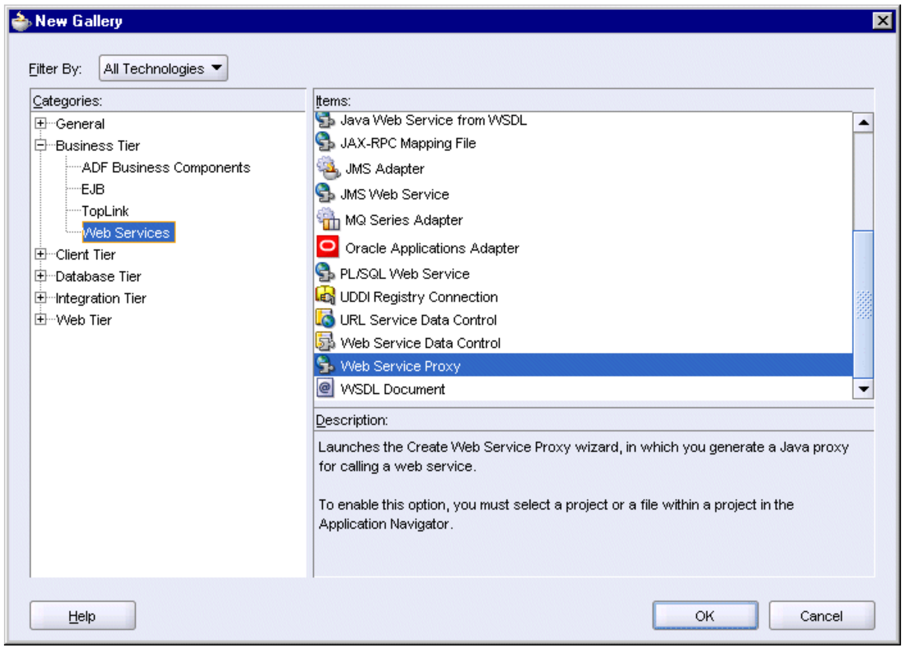


Click **OK**.

In the Application Navigator, you should see an empty CustomerService project located under the client application.

2. Right-click the CustomerService project, and select **New**. In the New Gallery, in the Categories section, expand **Business Tier** and select **Web Services**. In the Items section, select **Web Service Proxy**.

***Figure 10–3 New Gallery for Creating a Web Service Proxy***



Launches the Create Web Service Proxy wizard, in which you generate a Java proxy for calling a web service.

To enable this option, you must select a project or a file within a project in the Application Navigator.

Click **OK**. This launches the Create Web Service Proxy wizard. Click **Next** to continue.

3. In Step 1, Web Service Description:

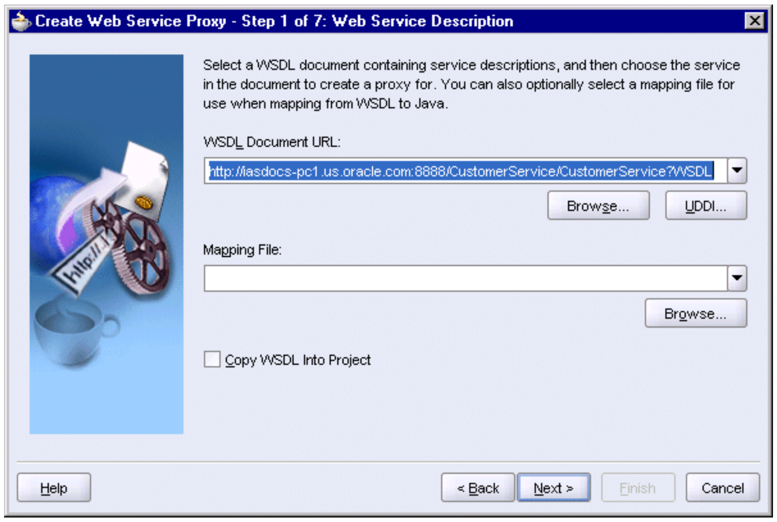
- **WSDL Document URL**: enter the following URL:

  `http://`*host*`:`*port*`/CustomerService/CustomerService?WSDL`

  *host* specifies the name of the machine running Oracle Application Server, and *port* specifies the HTTP at which Oracle HTTP Server or OC4J is listening.

- **Mapping File**: leave it blank.

*Figure 10–4 Create Web Service Proxy Wizard, Step 1: Web Service Description*


Create Web Service Proxy - Step 1 of 7: Web Service Description
Browse...
UDDI...
Browse...
Help
< Back
Next >
Finish
Cancel

Select a WSDL document containing service descriptions, and then choose the service in the document to create a proxy for. You can also optionally select a mapping file for use when mapping from WSDL to Java.

WSDL Document URL: http://iasdocs-pc1.us.oracle.com:8888/CustomerService/CustomerService?WSDL

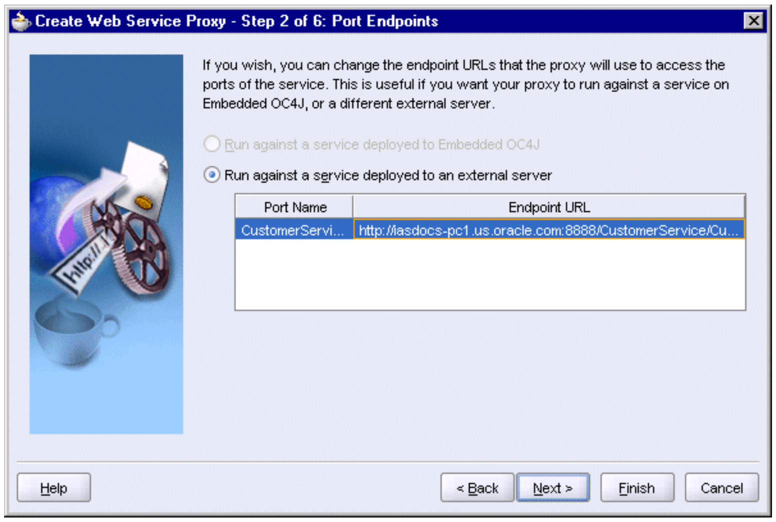
Mapping File:

[ ] Copy WSDL Into Project

Click **Next**. If nothing happens, click the **UDDI** button. This pops up another wizard. Click **Cancel** in that wizard. Now click **Next** again.

4. In Step 2, Port Endpoints, select **Run against a service deployed to an external server**, and click **Next**.

*Figure 10–5 Create Web Service Proxy Wizard, Step 2: Port Endpoints*



If you wish, you can change the endpoint URLs that the proxy will use to access the ports of the service. This is useful if you want your proxy to run against a service on Embedded OC4J, or a different external server.

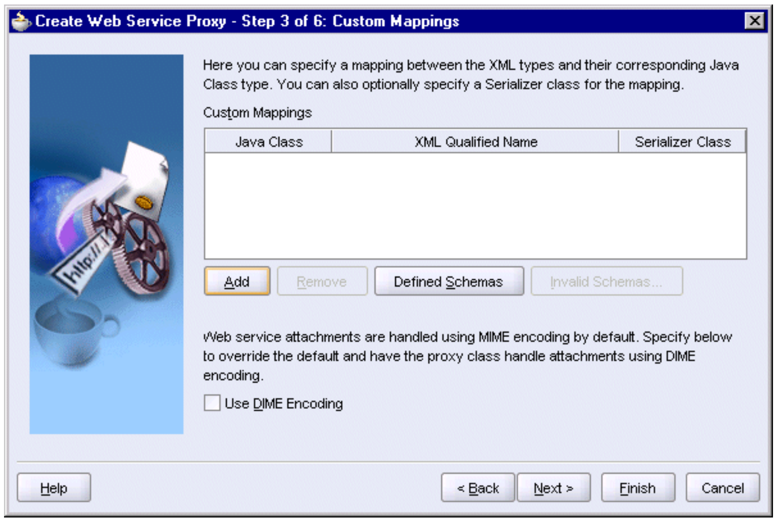
( ) Run against a service deployed to Embedded OC4J

(●) Run against a service deployed to an external server

| Port Name | Endpoint URL |
|---|---|
| CustomerServi... | http://iasdocs-pc1.us.oracle.com:8888/CustomerService/Cu... |

5. In Step 3, Custom Mappings, click **Next**.

***Figure 10–6 Create Web Service Proxy Wizard, Step 3, Custom Mappings***


Create Web Service Proxy - Step 3 of 6: Custom Mappings

Here you can specify a mapping between the XML types and their corresponding Java Class type. You can also optionally specify a Serializer class for the mapping.

Custom Mappings

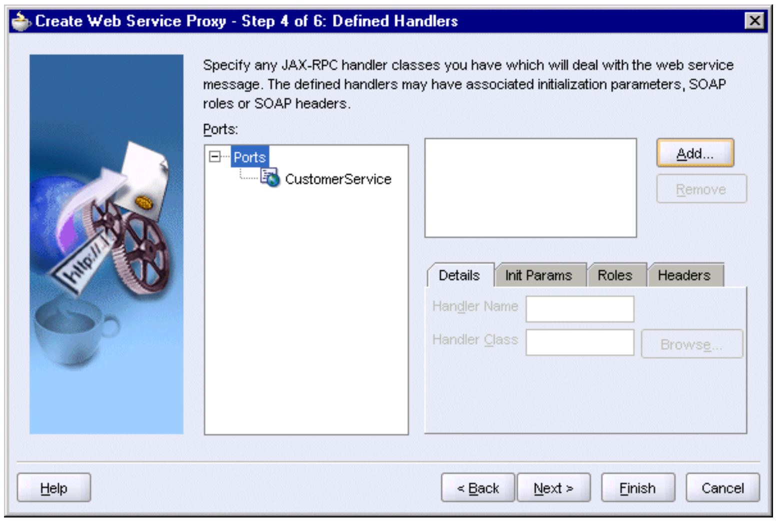
| Java Class | XML Qualified Name | Serializer Class |
|---|---|---|

Web service attachments are handled using MIME encoding by default. Specify below to override the default and have the proxy class handle attachments using DIME encoding.

☐ Use DIME Encoding

**6.** In Step 4, Defined Handlers, click **Next**.

***Figure 10–7 Create Web Service Proxy Wizard, Step 4, Defined Handlers***


Create Web Service Proxy - Step 4 of 6: Defined Handlers

Specify any JAX-RPC handler classes you have which will deal with the web service message. The defined handlers may have associated initialization parameters, SOAP roles or SOAP headers.

Ports:

Ports
CustomerService

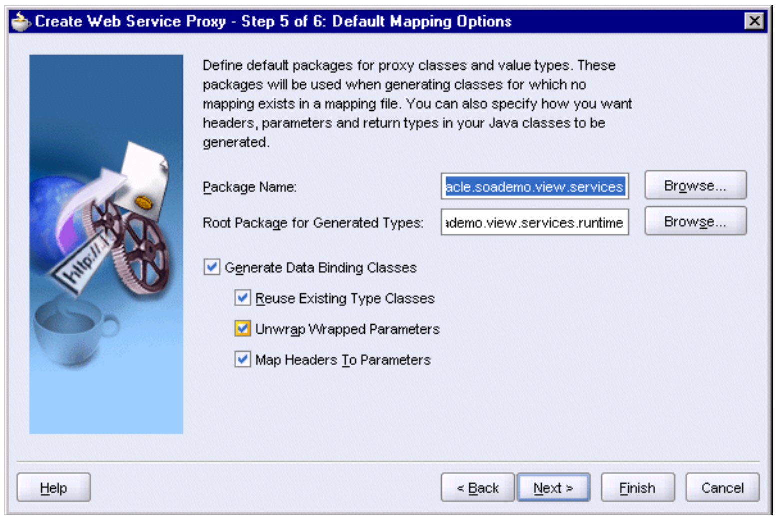
Handler Name

Handler Class

**7.** In Step 5, Default Mapping Options:

- **Package Name**: enter **oracle.soademo.view.services**.
- **Root Package for Generated Types**: enter **oracle.soademo.view.services.runtime**.
- Select all the options on the page:
  - **Generate Data Binding Classes**
  - **Reuse Existing Type Classes**
  - **Unwrap Wrapped Parameters**
  - **Map Headers to Parameters**

*Figure 10–8 Create Web Service Proxy Wizard, Step 5, Default Mapping Options*


Create Web Service Proxy - Step 5 of 6: Default Mapping Options

Define default packages for proxy classes and value types. These packages will be used when generating classes for which no mapping exists in a mapping file. You can also specify how you want headers, parameters and return types in your Java classes to be generated.

Package Name: acle.soademo.view.services

Root Package for Generated Types: ıdemo.view.services.runtime

[✓] Generate Data Binding Classes

[✓] Reuse Existing Type Classes

[✓] Unwrap Wrapped Parameters

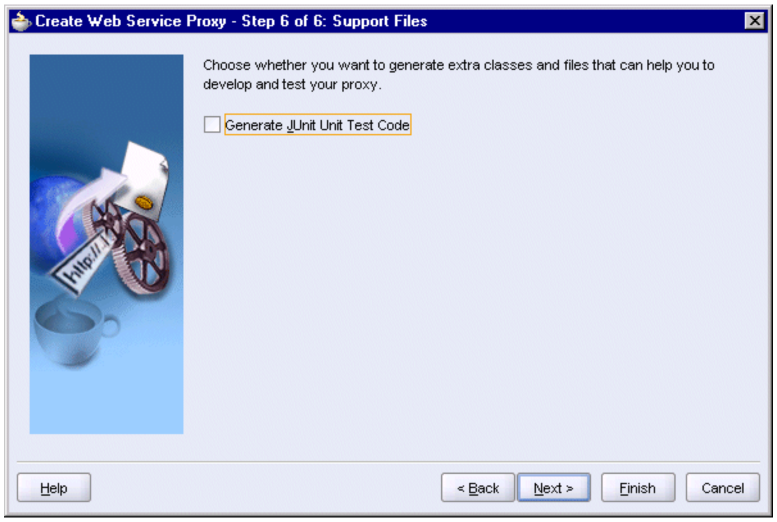
[✓] Map Headers To Parameters

Click **Next**.

8. In Step 6, Support Files, select **Generate JUnit Unit Test Code** only if you want to write test cases using JUnit. Note that to be able to compile the files that use JUnit classes, you need to download the JUnit library files from an external site (for example, `http://www.junit.org`).

   Click **Next**.

*Figure 10–9 Create Web Service Proxy Wizard, Step 6, Support Files*


Create Web Service Proxy - Step 6 of 6: Support Files

Choose whether you want to generate extra classes and files that can help you to develop and test your proxy.

[ ] Generate JUnit Unit Test Code

9. In the Finish step, click **Finish**.

JDeveloper creates the web service proxy files in `src` directory of the project.

## 10.2.2 Build the Files

1. If you selected **Generate JUnit Unit Test Code** in step 8 on page 10-6, then you need to download JUnit from an external site (for example, `http://www.junit.org`).

Add the JUnit jar file to the project before building the project. To add the jar file to the project, right-click the CustomerService project in the client and select **Project Properties**. In the Project Properties dialog, select **Libraries** on the left side, and click **Add Jar/Directory** on the right side. Select the JUnit jar file to add to the project.

2. Right-click the CustomerService project in the client and select **Rebuild**.

### 10.2.3 Write Code to Invoke the Web Service Proxy for CustomerService

The main web service proxy file for CustomerService is `src\oracle\soademo\view\services\CustomerServiceClient.java`. This file lists the methods provided by CustomerService. Your client application can call the methods in this class, and you deploy your client application with the web service proxy.

The SOADemo-Client application invokes the web service proxy for CustomerService in two places:

- Section 10.2.3.1, "Verifying the Login"
- Section 10.2.3.2, "Registering New Customers"

#### 10.2.3.1 Verifying the Login

In the SOADemo-Client application, when the customer clicks the **Login** button, it invokes the `login_action` method in `Login.java`, located in the `SOADEMO-CLIENT\UserInterface\src\oracle\soademo\view\backing` directory.

The `login_action` method calls the `findCustomerByEmail` method in `CustomerServiceClient` to verify the customer's login. The method is passed the email and password information entered by the customer on the login page. If the customer is found, it stores the customer information in the session and returns "success".

```
public String login_action() {
   String AUTH_USER = "Authorized_User";

   // Check credentials
   FacesContext ctx = FacesContext.getCurrentInstance();

   // Call Web service to check user credentials
   try {
      oracle.soademo.view.services.CustomerServiceClient myPort =
               new oracle.soademo.view.services.CustomerServiceClient();
      System.out.println("calling " + myPort.getEndpoint());

      // test adding new customer
      Customer newCust = null;
      newCust = myPort.findCustomerByEmail(emailId.getValue().toString(),
                                              pwd.getValue().toString());

      //Store customer info on session
      if (newCust != null)
         JSFUtils.storeOnSession(ctx, "custinfo", newCust);
      else {
         FacesMessage msg = new FacesMessage("Login Failed!");
         msg.setSeverity(msg.SEVERITY_ERROR);
         FacesContext.getCurrentInstance().addMessage(null, msg);
         return null;
         }
      } catch (Exception ex) {
         FacesMessage msg = new FacesMessage("Login Failed!");
         msg.setSeverity(msg.SEVERITY_ERROR);
         FacesContext.getCurrentInstance().addMessage(null, msg);
         //ex.printStackTrace();
         return null;
      }

      // Set CurrentUser mananged bean properties

      JSFUtils.setManagedBeanValue(ctx,"Current_User.loggedIn",true);
      JSFUtils.setManagedBeanValue(ctx,"Current_User.userid",
                                    emailId.getValue().toString());
      JSFUtils.storeOnSession(ctx, AUTH_USER, "Authorized_User");

      return "success";
   }
```

### 10.2.3.2 Registering New Customers

The Register page enables new customers to add themselves to the database. When the customer fills in the information and clicks the **Register** button on the page, it invokes the `register_action` method in `Register.java`, also located in the `SOADEMO-CLIENT\UserInterface\src\oracle\soademo\view\backing` directory.

The `register_action` method collects the customer information and invokes the `addNewCustomer` method on CustomerService.

```
public void register_action(ActionEvent ae) {
   String AUTH_USER = "Authorized_User";
   FacesContext ctx = FacesContext.getCurrentInstance();
   Customer newCust = new Customer();
   if (password.getValue().toString().equals(password_chk.getValue().toString()))
{
      // Call Web service to register new customer
      try {
         oracle.soademo.view.services.CustomerServiceClient myPort =
                       new oracle.soademo.view.services.CustomerServiceClient();
         System.out.println("calling " + myPort.getEndpoint());

         // Adding new customer info
         Address addr = new Address();

         newCust.setFname(fname.getValue().toString());
         newCust.setLname(lname.getValue().toString());
         newCust.setEmail(email.getValue().toString());
         newCust.setPhonenumber(phone.getValue().toString());
         newCust.setPassword(password.getValue().toString());

         addr.setStreet(street.getValue().toString());
         addr.setCity(city.getValue().toString());
         addr.setState(state.getValue().toString());
         addr.setZip(zip.getValue().toString());
         // For now set to US address
         addr.setCountry("USA");

         List addrList = new ArrayList();
         addrList.add(addr);
```

```
                newCust.setAddressList(addrList);
                myPort.addNewCustomer(newCust);

                // Generate successful registration message
                FacesContext.getCurrentInstance().addMessage(null,
                               new FacesMessage("Registration Successful!"));

             } catch (Exception ex) {
                FacesMessage msg = new FacesMessage("Registration Failed!");
                msg.setSeverity(msg.SEVERITY_ERROR);
                FacesContext.getCurrentInstance().addMessage(null, msg);
                FacesContext.getCurrentInstance().addMessage(null,
                                     new FacesMessage(ex.getMessage()));
                ex.printStackTrace();
             }

             //Store customer info on session
             JSFUtils.storeOnSession(ctx, "custinfo", newCust);
             // Set CurrentUser mananged bean properties
             JSFUtils.setManagedBeanValue(ctx,"Current_User.loggedIn",true);
             JSFUtils.setManagedBeanValue(ctx,"Current_User.userid",
                                             email.getValue().toString());
             JSFUtils.storeOnSession(ctx, AUTH_USER, "Authorized_User");
          } else {
             // Generate  password mismatch msg
             FacesMessage msg = new FacesMessage("Your password values do not match!");
             msg.setSeverity(msg.SEVERITY_ERROR);
             FacesContext.getCurrentInstance().addMessage(null, msg);
          }
       }
```

## 10.3 Invoking the OrderBookingESB Project

Creating the web service proxy for the OrderBookingESB project is slightly different from creating the proxy for CustomerService, because OrderBookingESB is an ESB project.

### 10.3.1 Retrieve the Concrete WSDL URL

Before you can run the Create Web Service Proxy wizard, you need the concrete URL that returns the WSDL for OrderBookingESB. You can do this using the ESB Console.

1. Access the ESB Console using the following URL:

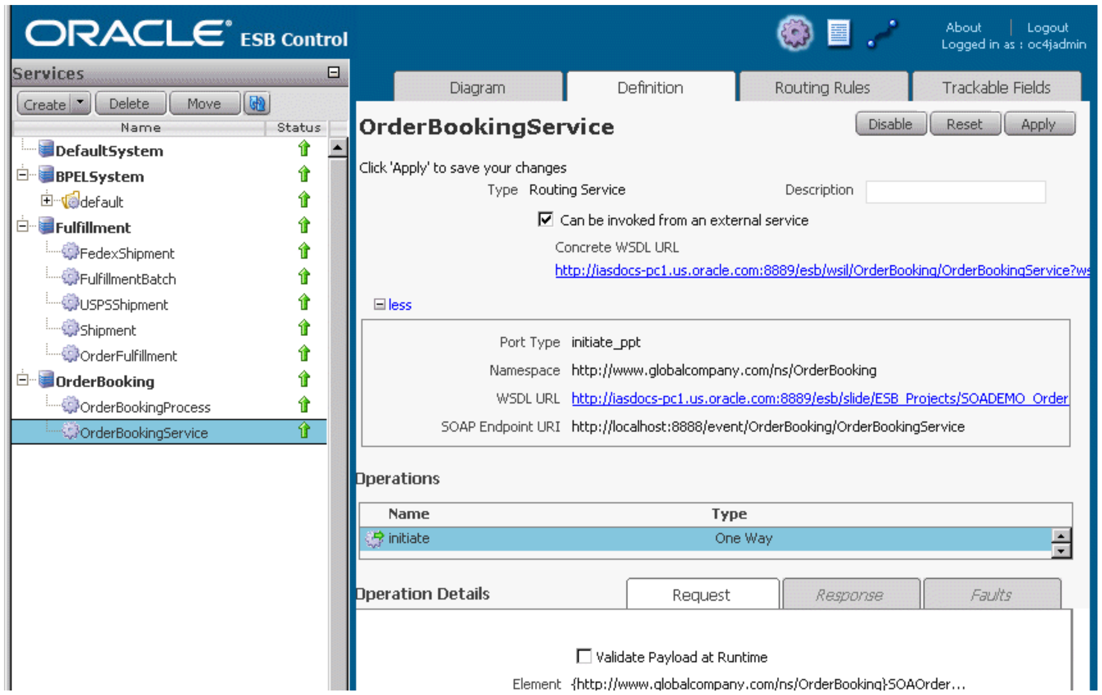
   `http://hostname:port/esb/esb/EsbConsole.html`

   *hostname* specifies the name of the machine running Oracle Application Server, and *port* specifies the HTTP port at which Oracle HTTP Server or OC4J is listening.

2. On the left side of the ESB Console, select **OrderBookingService**. This is the starting point for the OrderBookingESB project.

3. On the right side of the ESB Console, select the Definition tab. You should see a page that looks something like Figure 10–10:

*Figure 10–10 ESB Console Showing the Page for OrderBookingService, Definition Tab*



OrderBookingService

Click 'Apply' to save your changes

Type Routing Service

Description

☑ Can be invoked from an external service

Concrete WSDL URL

http://iasdocs-pc1.us.oracle.com:8889/esb/wsil/OrderBooking/OrderBookingService?ws

| | |
|---|---|
| Port Type | initiate_ppt |
| Namespace | http://www.globalcompany.com/ns/OrderBooking |
| WSDL URL | http://iasdocs-pc1.us.oracle.com:8889/esb/slide/ESB_Projects/SOADEMO_Order |
| SOAP Endpoint URI | http://localhost:8888/event/OrderBooking/OrderBookingService |

Operations

| Name | Type |
|---|---|
| initiate | One Way |

Operation Details

☐ Validate Payload at Runtime

Element {http://www.globalcompany.com/ns/OrderBooking}SOAOrder...

4. Copy the concrete URL so that you can paste it in the Create Web Service Proxy wizard. You can also click the URL if you want to see what the WSDL looks like.

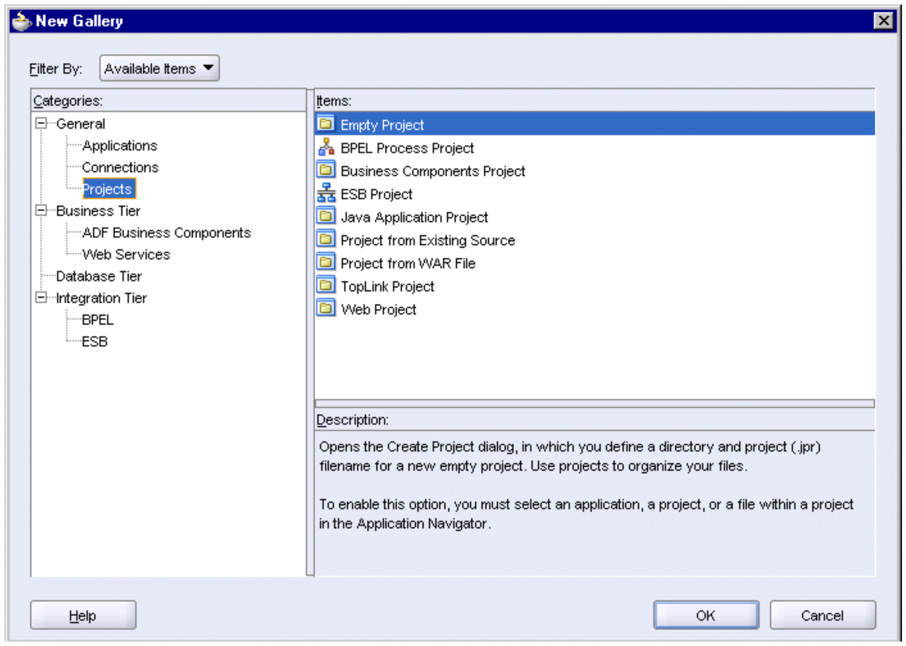
## 10.3.2 Create the Project in the Client and Create the Web Service Proxy

1. Create a project in your client application to contain the web service proxy for OrderBookingESB. Begin by creating an empty project in your client application:

   a. Right-click the client application, and select **New Project**.

   b. In the New Gallery, in the Categories section, expand **General** and select **Projects**. In the Items section, select **Empty Project**.

*Figure 10–11 New Gallery for Creating an Empty Project*



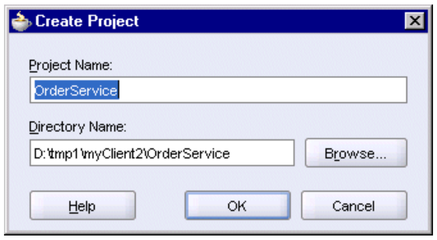
Opens the Create Project dialog, in which you define a directory and project (.jpr) filename for a new empty project. Use projects to organize your files.

To enable this option, you must select an application, a project, or a file within a project in the Application Navigator.

Click **OK**.

c. In the Create Project dialog, enter **OrderService** in the **Project Name** field.

*Figure 10–12 Create Project Dialog for the OrderService Web Service Proxy Project*



Project Name: OrderService

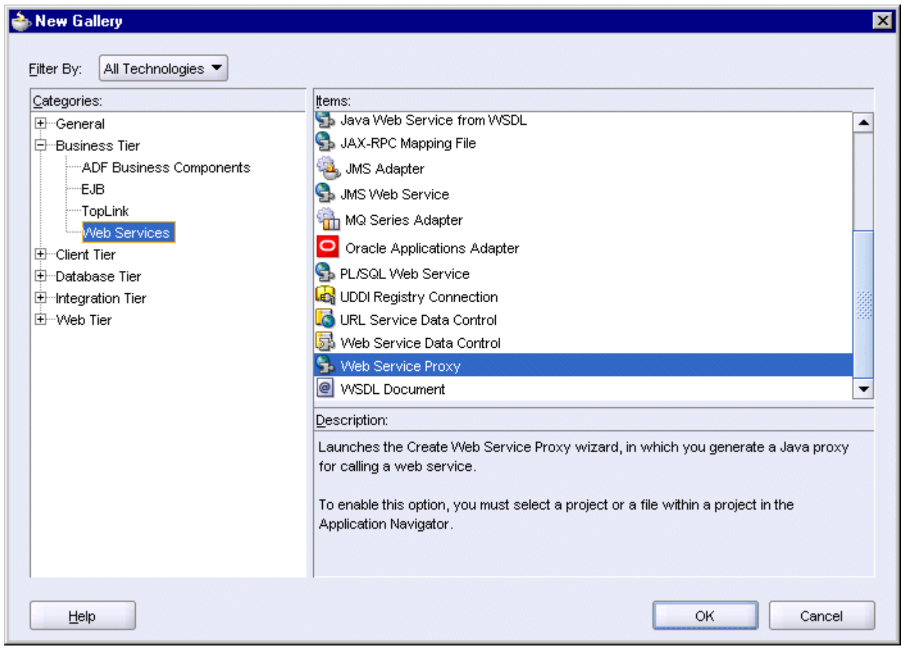
Directory Name: D:\tmp1\myClient2\OrderService

Click **OK**.

In the Application Navigator, you should see an empty OrderService project located under the client application.

2. Right-click the OrderService project, and select **New**. In the New Gallery, in the Categories section, expand **Business Tier** and select **Web Services**. In the Items section, select **Web Service Proxy**.

***Figure 10–13 New Gallery for Creating a Web Service Proxy***



Launches the Create Web Service Proxy wizard, in which you generate a Java proxy for calling a web service.

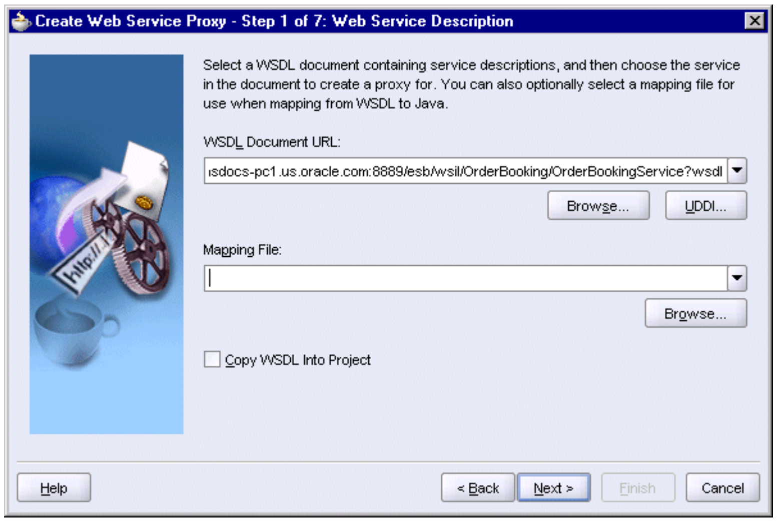
To enable this option, you must select a project or a file within a project in the Application Navigator.

Click **OK**. This launches the Create Web Service Proxy wizard. Click **Next** to continue.

3. In Step 1, Web Service Description:

   - **WSDL Document URL**: enter the URL for OrderBookingESB. Section 10.3.1, "Retrieve the Concrete WSDL URL" describes how to obtain this URL.
   - **Mapping File**: leave it blank.
   - **Copy WSDL Into Project**: do not select this option.

***Figure 10–14 Create Web Service Proxy Wizard, Step 1: Web Service Description***


Create Web Service Proxy - Step 1 of 7: Web Service Description
Browse...
UDDI...
Browse...
Help
< Back
Next >
Finish
Cancel

Select a WSDL document containing service descriptions, and then choose the service in the document to create a proxy for. You can also optionally select a mapping file for use when mapping from WSDL to Java.

WSDL Document URL: ısdocs-pc1.us.oracle.com:8889/esb/wsil/OrderBooking/OrderBookingService?wsdl

Mapping File:

☐ Copy WSDL Into Project

Click **Next**. If nothing happens, click the **UDDI** button. This pops up another wizard. Click **Cancel** in that wizard. Now click **Next** again.

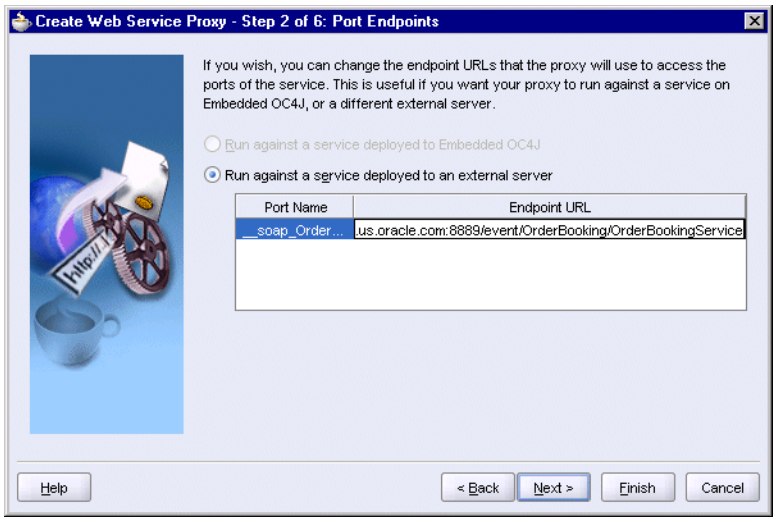
4. In Step 2, Port Endpoints, select **Run against a service deployed to an external server**.

   In **Endpoint URL**, edit the URL as follows:

   - Replace **localhost** with the name of the machine running the OrderBookingESB project.
   - Verify and correct the port number, if necessary.

   Click **Next**.

***Figure 10–15 Create Web Service Proxy Wizard, Step 2: Port Endpoints***



Create Web Service Proxy - Step 2 of 6: Port Endpoints

If you wish, you can change the endpoint URLs that the proxy will use to access the ports of the service. This is useful if you want your proxy to run against a service on Embedded OC4J, or a different external server.

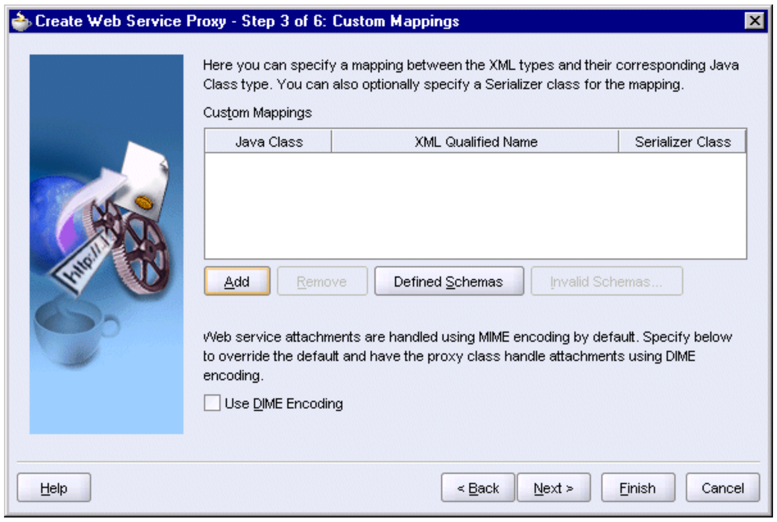
( ) Run against a service deployed to Embedded OC4J

(●) Run against a service deployed to an external server

| Port Name | Endpoint URL |
|---|---|
| __soap_Order... | us.oracle.com:8889/event/OrderBooking/OrderBookingService |

5. In Step 3, Custom Mappings, click **Next**.

***Figure 10–16 Create Web Service Proxy Wizard, Step 3, Custom Mappings***



Create Web Service Proxy - Step 3 of 6: Custom Mappings

Here you can specify a mapping between the XML types and their corresponding Java Class type. You can also optionally specify a Serializer class for the mapping.

Custom Mappings

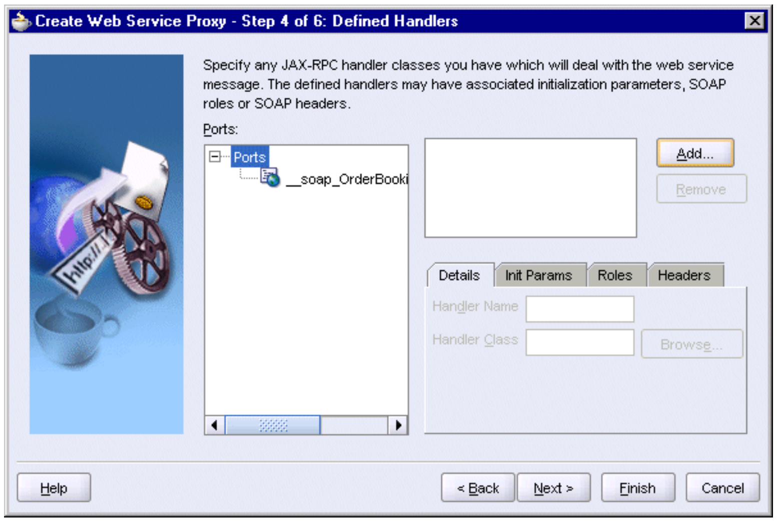
| Java Class | XML Qualified Name | Serializer Class |
|---|---|---|

Web service attachments are handled using MIME encoding by default. Specify below to override the default and have the proxy class handle attachments using DIME encoding.

[ ] Use DIME Encoding

6. In Step 4, Defined Handlers, click **Next**.

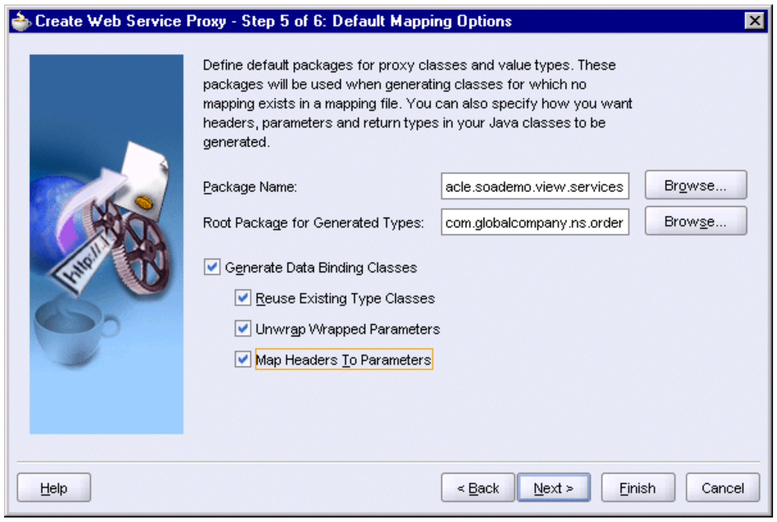
***Figure 10–17 Create Web Service Proxy Wizard, Step 4, Defined Handlers***



Specify any JAX-RPC handler classes you have which will deal with the web service message. The defined handlers may have associated initialization parameters, SOAP roles or SOAP headers.

7. In Step 5, Default Mapping Options:
   - **Package Name**: enter **oracle.soademo.view.services**.
   - **Root Package for Generated Types**: enter **com.globalcompany.ns.order**.
   - Select all the options on the page:
     – **Generate Data Binding Classes**
     – **Reuse Existing Type Classes**
     – **Unwrap Wrapped Parameters**
     – **Map Headers to Parameters**

***Figure 10–18 Create Web Service Proxy Wizard, Step 5, Default Mapping Options***


Create Web Service Proxy - Step 5 of 6: Default Mapping Options
Browse...
Browse...
Help
< Back
Next >
Finish
Cancel

Define default packages for proxy classes and value types. These packages will be used when generating classes for which no mapping exists in a mapping file. You can also specify how you want headers, parameters and return types in your Java classes to be generated.

Package Name: acle.soademo.view.services

Root Package for Generated Types: com.globalcompany.ns.order

☑ Generate Data Binding Classes

☑ Reuse Existing Type Classes

☑ Unwrap Wrapped Parameters

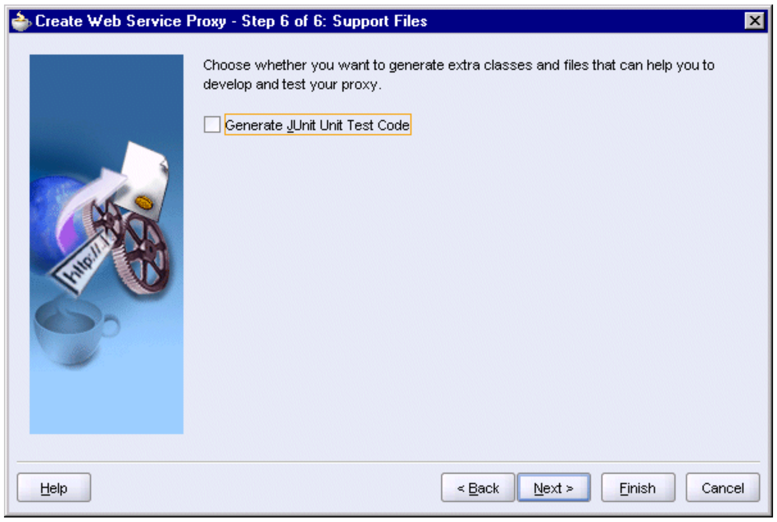
☑ Map Headers To Parameters

Click **Next**.

8. In Step 6, Support Files, select **Generate JUnit Unit Test Code** only if you want to write test cases using JUnit. Note that to be able to compile the files that use JUnit classes, you need to download the JUnit library files from an external site (such as `http://www.junit.org`).

Click **Next**.

***Figure 10–19 Create Web Service Proxy Wizard, Step 6, Support Files***



Choose whether you want to generate extra classes and files that can help you to develop and test your proxy.

☐ Generate JUnit Unit Test Code

9. In the Finish step, click **Finish**.

## 10.3.3 Build the Files

1. If you selected **Generate JUnit Unit Test Code** in step 8 on page 10-14, then you need to download JUnit from an external site (for example, `http://www.junit.org`).

   Add the JUnit jar file to the project before building the project. To add the jar file to the project, right-click the OrderService project in the client and select **Project Properties**. In the Project Properties dialog, select **Libraries** on the left side, and click **Add Jar/Directory** on the right side. Select the JUnit jar file to add to the project.

2. Right-click the OrderService project in the client and select **Rebuild**.

## 10.3.4 Write Code to Invoke the Web Service Proxy for OrderBookingESB

On the Shopping Cart page in the SOADemo-Client application, customers click the **Place Order** button to submit their order. This button invokes the `PlaceOrder_action` method in `ShoppingCart.java` (located in the `SOADEMO-CLIENT\UserInterface\src\oracle\soademo\view\backing` directory).

The `PlaceOrder_action` method:

- creates an instance of `__soap_initiate_pptClient`, which is the proxy for OrderBookingESB. This class was generated by the Web Service Proxy wizard.

  You should check the name of the generated file in your environment. The name of the class may be slightly different (for example, `__soap_OrderBookingService_initiate_pptClient.java`).

- gets the order information from the shopping cart
- gets the customer information from the session
- creates a purchase order and populates it with the order and customer information

- calls `initiate` on the proxy to invoke OrderBookingESB
- sets the shopping cart to empty.

The lines in bold show the places where the code invokes the web service proxy.

```
public String PlaceOrder_action() {
    // Place order
    FacesContext ctx = FacesContext.getCurrentInstance();

    // Get order items from Cart
    Cart cartBean = (Cart) JSFUtils.getManagedObject("Shopping_Cart");
    List CartItemList =  cartBean.getItemList();

    // Get Customer info from session
    Customer currentCustomer = (Customer) JSFUtils.getFromSession(ctx,
                                           "custinfo");

    try {
        oracle.soademo.view.services.__soap_initiate_pptClient myPort =
                    new oracle.soademo.view.services.__soap_initiate_pptClient();
        System.out.println("calling " + myPort.getEndpoint());

        PurchaseOrderType po = new PurchaseOrderType();

        // Customer ID
        po.setCustID(currentCustomer.getCustid());

        // Need to randomly set ID for now since WS won't auto-assign
        po.setID("" + (int)(Math.random() * 1000));

        // Order Info
        OrderInfoType order  = new OrderInfoType();
        order.setOrderPrice(cartBean.getOrderTotal());
        order.setOrderComments("This order was issued from the SOA Retail
                                                            Client.");
        Calendar caldate = Calendar.getInstance();
        order.setOrderDate(caldate);
        order.setOrderStatus("pending");

        po.setOrderInfo(order);

        // Order Items
        OrderItemsType oitems = new OrderItemsType();

        ItemType[] items = new ItemType[CartItemList.size()];

        for (int i = 0; i < CartItemList.size(); i++) {
            items[i] = (ItemType) CartItemList.get(i);
        }
        oitems.setItem(items);
        po.setOrderItems(oitems);

        // Supplier Info
        // For now hard code fictional Supplier
        SupplierInfoType supplier = new SupplierInfoType();
        supplier.setSupplierName("Express Deliveries");

        // Supplier has 10% discount
        supplier.setSupplierPrice(cartBean.getOrderTotal().
                             subtract(cartBean.getOrderTotal().movePointLeft(1)));
            po.setSupplierInfo(supplier);

            // Contact Info
            ContactType contact = new ContactType();
            contact.setEmailAddress(currentCustomer.getEmail());
            contact.setPhoneNumber(currentCustomer.getPhonenumber());
            po.setUserContact(contact);

            // Initiate Order
            myPort.initiate(po);
            System.out.println("Order submitted...");
        }
        catch (Exception ex) {
            ex.printStackTrace();
        }

        //  report success
        ctx.addMessage(null, new FacesMessage("Order Submitted!"));
        cartBean.EmptyCart();
        return "home";
    }
```

## 10.4 Deploying the Client Application

This section describes how to deploy the pre-built client application from the `soademo_101310_prod.zip` file.

To deploy the SOADEMO-Client application from the zip file:

1. In JDeveloper, open `SOADEMO-CLIENT\SOADEMO-CLIENT.jws`. This is the project file for the SOADEMO-Client application.
2. This step is required only if you meet any of these conditions:
   - You are running JDeveloper and Oracle Application Server on different machines.
   - Your Oracle Application Server installation is listening for HTTP requests on a port other than 8888.

   If you meet either or both of the conditions above, you need to perform these steps:

   **a.** Edit these files:

   – `SOADEMO-CLIENT\CustomerService\src\oracle\soademo\view\services\runtime\CustomerServiceSoapHttp_Stub.java`

     In JDeveloper, you can access this file from the Application Navigator as follows:

     i. In JDeveloper, select View > Structure to display the Structure window.

     ii. In the Application Navigator, select **SOADEMO-CLIENT** > **Customer-Service** > **Application Sources** > **oracle.soademo.view** > **services** > **Cus-tomerSvcProxy**.

     iii. Double-click **CustomerServiceSoapHttp_Stub.java** in the Structure window.

   – `SOADEMO-CLIENT\OrderService\src\oracle\soademo\view\services\runtime\__soap_initiate_ppt_Stub.java`

In JDeveloper, you can access this file from the Application Navigator as follows:

i. In JDeveloper, select View > Structure to display the Structure window.

ii. In the Application Navigator, select **SOADEMO-CLIENT** > **OrderService** > **Application Sources** > **oracle.soademo.view** > **services** > **Initiate_pptServiceProxy**.

iii. Double-click **__soap_initiate_ppt_Stub.java** in the Structure window.

Make the following changes in the files:

– Search for "localhost" and replace it with the fully qualified name (including the domain name) of the machine running Oracle Application Server.

– Search for "8888" and replace it with the HTTP port for your environment.

**b.** Delete (or rename) these files:

– `SOADEMO-CLIENT\UserInterface\deploy\soaui.war`

– `SOADEMO-CLIENT\UserInterface\deploy\soaui.ear`

**c.** Regenerate the files you just deleted.

i. Expand **SOADEMO-CLIENT** > **UserInterface** > **Resources**.

ii. Right-click **soaui.deploy** and select **Deploy to WAR File**.

iii. Right-click **soaui.deploy** and select **Deploy to EAR File**.

3. Expand **SOADEMO-CLIENT** > **Assembly** > **Application Sources**.
4. Right-click **SOADEMO.deploy** and select **Deploy To** > *ApplicationServerConnection*, where *ApplicationServerConnection* specifies the connection to your Oracle Application Server installation.
5. Click **OK** in the Configure Application dialog.