BEA WebLogic Process Integrator

Tutorial

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BEA WebLogic Process Integrator Tutorial

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Contents

About This Document

This document serves as a tutorial for the BEA WebLogic Process Integrator™ product. It steps you through the WebLogic Process Integrator Studio and Worklist applications, using a specific example to describe the process of defining and executing workflows.

This document is not a reference or a user guide and therefore does not cover all functions of the WebLogic Process Integrator product. For more information on any particular subject addressed in this document, refer to the *WebLogic Process Integrator Studio Guide* and the *WebLogic Process Integrator Worklist Guide*.

This document is organized as follows:

- Chapter 1, “Overview of the Example,” briefly describes the workflows in the example, illustrates how the workflows interact, and provides the main steps for defining and executing the workflow example.
- Chapter 2, “Defining the Order Processing Workflow,” provides procedures for creating and defining the Order Processing workflow, which processes the order through confirmation, inventor checking, and completion.
- Chapter 3, “Defining the Start Order Processing Workflow,” describes the Start Order Processing workflow, which is used to trigger the Order Processing workflow.
- Chapter 4, “Defining the ShipBill Workflow: An Exception Handling Example,” describes the Ship/Bill workflow, which handles the shipping and billing of the ordered item.
- Chapter 5, “Executing the Workflow Example,” provides procedures for manually executing the workflow example through the WebLogic Process Integrator worklist application.

What You Need to Know

This document is for users such as business analysts and workflow designers, who will use the WebLogic Process Integrator Studio to define and administer workflows. Chapter 5, “Executing the Workflow Example,” is for end users who will use the WebLogic Process Integrator Worklist to execute the workflow. This document assumes some familiarity with Java programming, XML documentation structure (XPath language structure), and business processes involved in the design of workflows.

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Related Information

The following BEA WebLogic Process Integrator documents contain information that is relevant to using this product:

- *BEA WebLogic Process Integrator Tutorial*
- *BEA WebLogic Process Integrator Worklist Guide*
- *BEA WebLogic Process Integrator Installation and Configuration Guide*
- *BEA WebLogic Process Integrator Javadoc*
- *BEA WebLogic Process Integrator Release Notes*

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In your e-mail message, please indicate which release of the BEA WebLogic Process Integrator documentation you are using.

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- Your name, e-mail address, phone number, and fax number
- Your company name and company address
- Your machine type and authorization codes

- The name and version of the product you are using
- A description of the problem and the content of pertinent error messages

Documentation Conventions

The following documentation conventions are used throughout this document.

Convention	Item
Ctrl+Tab	Indicates that you must press two or more keys simultaneously.
italics	Indicates emphasis or book titles.

`monospace text`	Indicates code samples, commands and their options, data structures and their members, data types, directories, and filenames and their extensions. Monospace text also indicates text that you must enter from the keyboard.
	Examples:
	`#include <iostream.h> void main ( ) the pointer psz`
	`chmod u+w *`
	`\tux\data\ap`
	`.doc`
	`tux.doc`
	`BITMAP`
	`float`

`monospace italic text`	Identifies variables in code. *Example*: `String` *`expr`*
UPPERCASE TEXT	Indicates device names, environment variables, and logical operators. *Examples*: LPT1 SIGNON OR

Convention	Item
`{ }`	Indicates a set of choices in a syntax line. The braces themselves should never be typed.
`[ ]`	Indicates optional items in a syntax line. The brackets themselves should never be typed. *Example*: `buildobjclient [-v] [-o name ] [-f file-list]... [-l file-list]...`
`|`	Separates mutually exclusive choices in a syntax line. The symbol itself should never be typed.
`...`	Indicates one of the following in a command line: ■ That an argument can be repeated several times in a command line. ■ That the statement omits additional optional arguments. ■ That you can enter additional parameters, values, or other information. The ellipsis itself should never be typed. *Example*: `buildobjclient [-v] [-o name ] [-f file-list]... [-l file-list]...`
. . .	Indicates the omission of items from a code example or from a syntax line. The vertical ellipsis itself should never be typed.

CHAPTER

1 Overview of the Example

The following sections provide an overview of the WebLogic Process Integrator workflow example:

- Description
- Main Steps

Description

The example presented in this document involves the following workflows:

- Order Processing Workflow
- Start Order Processing Workflow
- ShipBill Workflow

The example workflows interact by way of XML messaging and are supplied with the product on the WebLogic Process Integrator software CD and can be imported into your database. This document describes in detail how to define these workflows and in doing so describes the some of the main functions of WebLogic Process Integrator.

About the Example

The example derives the flow from the confirmation of the order through shipping the item to and billing the customer. The front end handling the order is abstracted for the purpose of this exercise into an XML document, which provides the ordering information to the Order Processing workflow. (In a live situation, the XML document would be generated by a front-end customer application.)

The order process is split into two workflows: Order Processing, which processes the order, and ShipBill, which handles the shipping and billing of the order. The third workflow, Start Order Processing, is a workflow that has been created for this example. Its function is simply to start the order process. For the purposes of this example, the Start Order Processing workflow takes the place of the customer application.

It is important to note that this example could have been implemented as one workflow interaction with explicit calls to application functions through the use of several actions and without necessarily using XML.

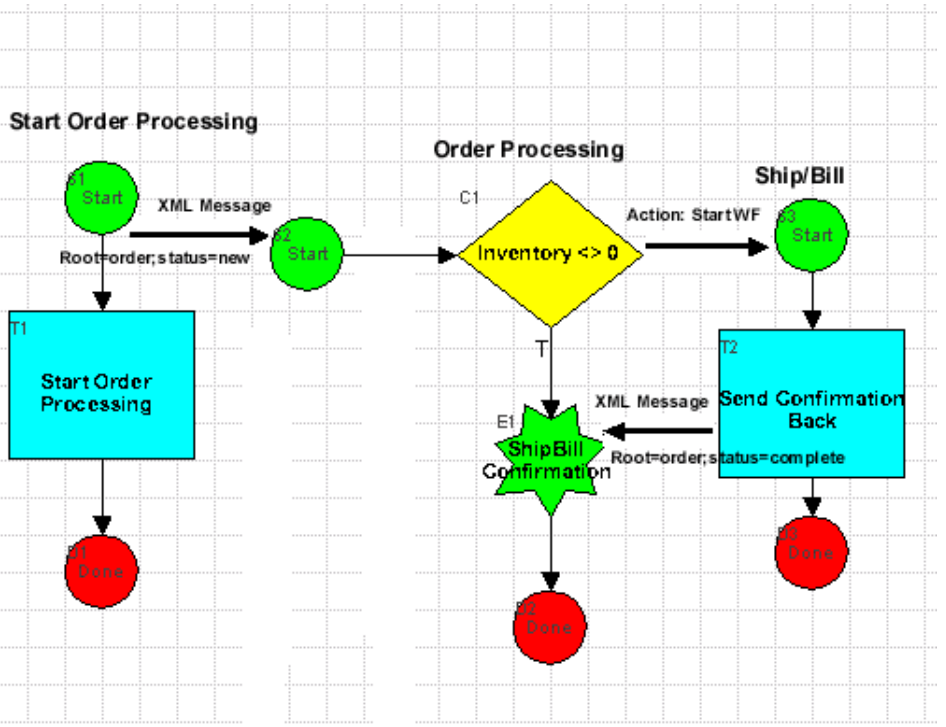
Example Workflows

The three workflows are as follows:

- Start Order Processing—this workflow contains a simple task, which creates the XML document, which in turn triggers the Order Processing workflow. In a "real" environment, this information could be captured by a front-end application and the information sent to the Process Integrator process engine through an XML document. In such a situation, a workflow would not simulate an application that sends an XML document representing the Order.
- Order Processing—this workflow takes the order and processes it through a first confirmation, inventory checking, and the completion of the order.
- ShipBill—this workflow handles the shipping and billing of the ordered item, and it is called by the Order Processing workflow. It therefore can be considered a sub-workflow to Order Processing.

The following diagram illustrates the interaction between the workflows defined in this tutorial.

Figure 1-1 Workflow Interaction



Important Terms

Before you get started with this tutorial, it is important to understand the following key terms:

- A workflow is a business process. Workflow automation is the automation of a business process, in whole or in part, during which information of any type is passed to the right participant at the right time according to a set of intelligent business rules that allow computers to perform most of the work while humans only have to deal with exceptions.
- A workflow template is a folder (or a container) in WebLogic Process Integrator Studio. This workflow template represents a workflow and is given a meaningful workflow name, such as Order Processing or Billing. The workflow template aggregates various definitions (or "versions") of its implementation; these are referred to as workflow template definitions. Further, a workflow template is responsible for controlling which organizations can use the "contained" workflow template definitions.
- A workflow template definition is a definition (or "version") of the workflow, distinguished by its Effective and Expiry dates. At run time, WebLogic Process Integrator starts an instance (or session) of a workflow template definition, selecting the most effective (or current and active) definition.

Main Steps

The main steps for defining and running the workflow example are as follows. These steps are described later in this document and in other documents.

1. Define business operations following the instructions provided in "Defining Business Operations" in Chapter 2, "Defining the Order Processing Workflow."

   Business operations are stored in the WebLogic Process Integrator database and are not included within the XML definition of the sample workflows provided in this document. The Order Processing and ShipBill workflows use the business operations to call methods on an EJB. If the business operations are not defined within your database, you receive a warning message when importing the workflows; this warning indicates that the system could not find the relevant business operation defined within the workflow template definition.

   The EJB used in this example and on which the defined business operations perform the method calls is `POBean`. This bean is automatically deployed when you start the WebLogic Process Integrator server.

2. Import the workflow template definitions for Start Order Processing and ShipBill using the procedure described in "Importing the Start Order Processing Workflow Template Definition" in Chapter 3, "Defining the Start Order Processing Workflow." The example discussed in this document involves three workflow template definitions, all of which are available in the following directory of the WebLogic Process Integrator CD:

   ```
   Drive:/wlprocessintegrator/studio/examples
   ```

   or for UNIX:

   ```
   \root\studio\examples
   ```

   You will follow the instructions provided in this guide to create and define the Order Processing workflow, so you do not need to import this workflow template definition. However, it is possible to import all three example workflows and read this document with the workflows already set up and available in your database.

3. Create three new workflow templates: Order Processing, Start Order Processing, and ShipBill. (See Chapter 2, “Defining the Order Processing Workflow,” Chapter 3, “Defining the Start Order Processing Workflow,” and Chapter 4, “Defining the ShipBill Workflow: An Exception Handling Example.”)

   The order in which you import the three workflows is important. You have to import them in the following order:

   - Start order Processing
   - ShipBill
   - Order Processing

4. Execute the workflows. (See Chapter 5, “Executing the Workflow Example.”)

2 Defining the Order Processing Workflow

The following sections describe how to create and define the Order Processing workflow:

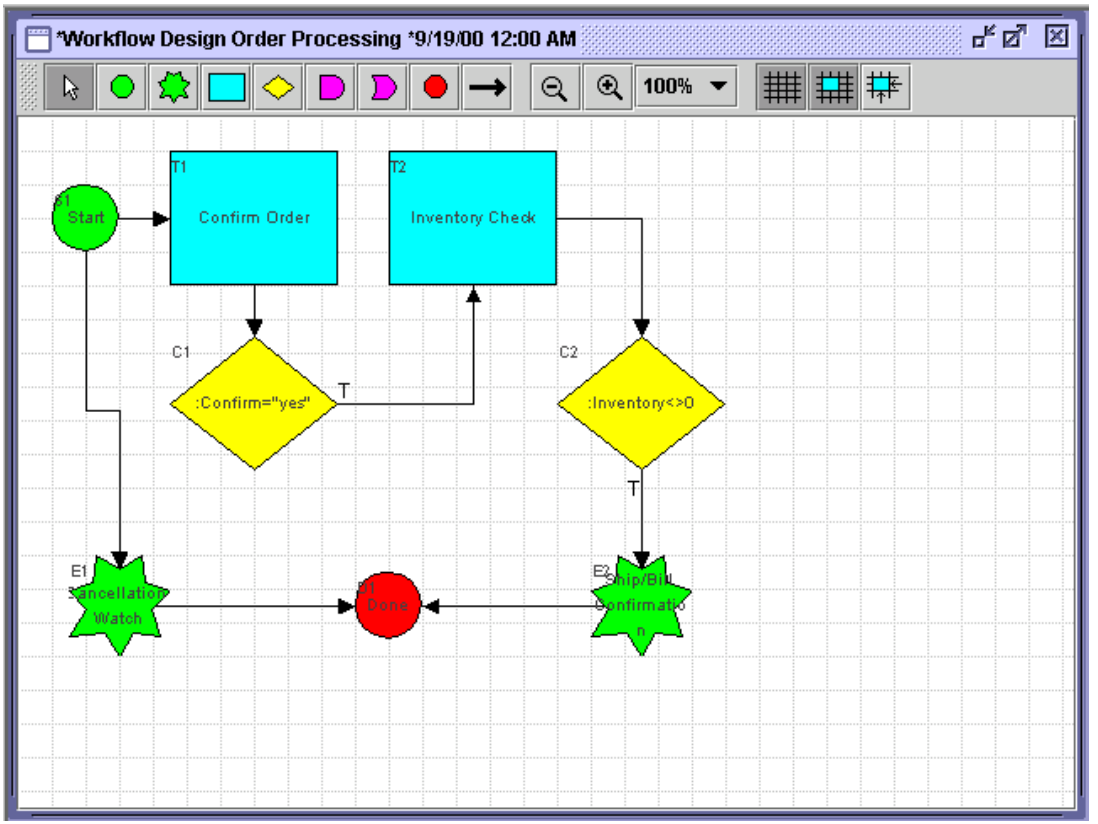
- Overview of the Order Processing Workflow
- Creating a New Workflow Template
- Creating a New Workflow Template Definition
- Drawing the Flow
- Defining Variables
- Defining Business Operations
- Defining Tasks
- Defining Decisions
- Defining Events
- Setting Up the Trigger
- Setting Up the Workflow Template Definition Processing Properties

Overview of the Order Processing Workflow

The following figure illustrates how the Order Processing workflow diagram should look after you define the entire workflow.

For details on the various workflow components represented by nodes in a workflow diagram, see Chapter 4, "Working with Workflow Components," in the *BEA WebLogic Process Integrator Studio Guide.*

Figure 2-1 Order Processing Workflow



The Order Processing workflow will contain the following nodes:

Table 2-1 Order Processing Workflow Nodes

Icon	Node	Definition
	Start	XML event coming from workflow: Start Order Processing.
	Task	Confirm Order ■ Task is assigned to user: joe upon activation. ■ Upon execution, the user is presented with a prompt from the WebLogic Process Integrator Worklist application to validate the order. ■ The result: Yes or No is stored in the variable :Confirm. ■ Task is marked done.
	Decision	Is order Confirmed? Does the variable Confirm= Yes? ■ If Yes, flow moves on to the next task. ■ If No, a cancellation XML message is sent.
	Task	Inventory Check ■ Upon activation, the inventory bean is called. ■ The bean returns a value to the variable :Inventory. ■ The task is marked done.
	Decision	Is stock available? Is variable Inventory greater than zero? ■ If yes, the workflow: ShipBill is started and the flow moves on to the next node: Event: ShipBill Confirmation. ■ If No: The workflow is terminated.

Icon	Node	Definition
	Event	ShipBill Confirmation When the XML document that confirms the shipping and billing comes back from the ShipBill workflow, the ShipBill Confirmation event is triggered, and the Order Processing workflow is completed.
	Event	Cancellation Watch A cancellation event is triggered by an XML message directing the order to be cancelled. When this event is triggered, the Done node is reached and the workflow is completed.
	Done	Workflow Completed

Creating a New Workflow Template

A workflow template is, in essence, a folder or a container for WebLogic Process Integrator workflow template definitions; each workflow template can hold one or more WebLogic Process Integrator workflow template definitions. Workflow template definitions are essentially different versions of a workflow.

WebLogic Process Integrator workflow template definitions are identified in the folder tree by an Effective and Expiry date; these are discussed in "Understanding Effective and Expiry Dates" of Chapter 3, "Defining and Maintaining Workflows" in the *BEA WebLogic Process Integrator Studio Guide*.

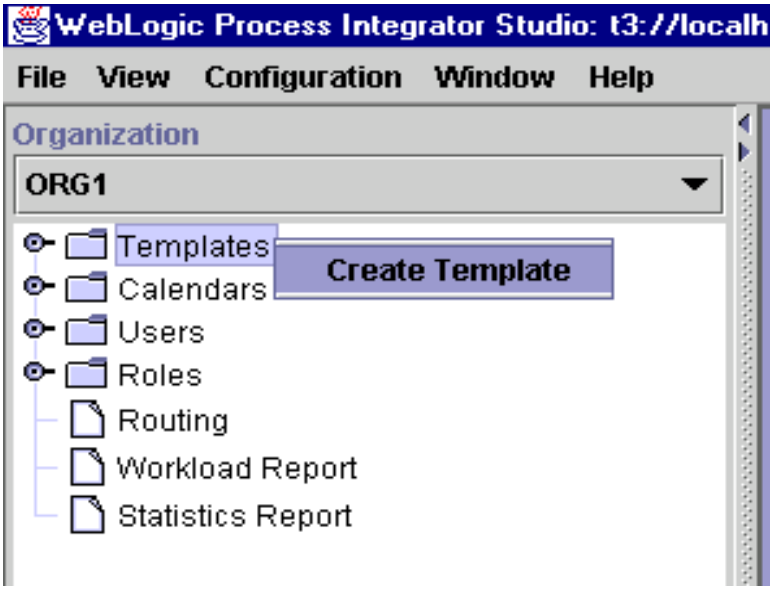
To create the Order Processing workflow template:

1. If you have not already done so, perform steps 1 and 2 in the "Important Terms" section of Chapter 1, "Overview of the Example."
2. Start WebLogic Process Integrator Studio by selecting Start > Programs > WebLogic Process Integrator Studio to display the WebLogic Process Integrator Logon dialog box.

Figure 2-2 Logon to WebLogic Process Integrator Dialog Box

3. Enter your user ID, password, and the name of the WebLogic Process Integrator server to which you will connect, and click OK.
4. In the WebLogic Process Integrator Studio main window, create a new template by right-clicking Template and choosing Create Template from the pop-up menu.

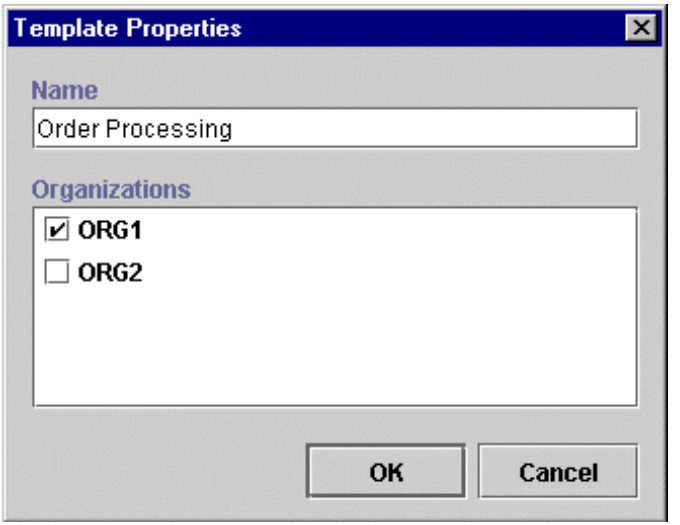
Figure 2-3 Create Template



5. In the dialog box that is displayed, enter Order Processing in the Name field and choose the organizations to which you want the template to belong: ORG1 in this example.

   The Order Processing workflow template will be added under the Templates folder.

Figure 2-4 Template Properties Dialog Box

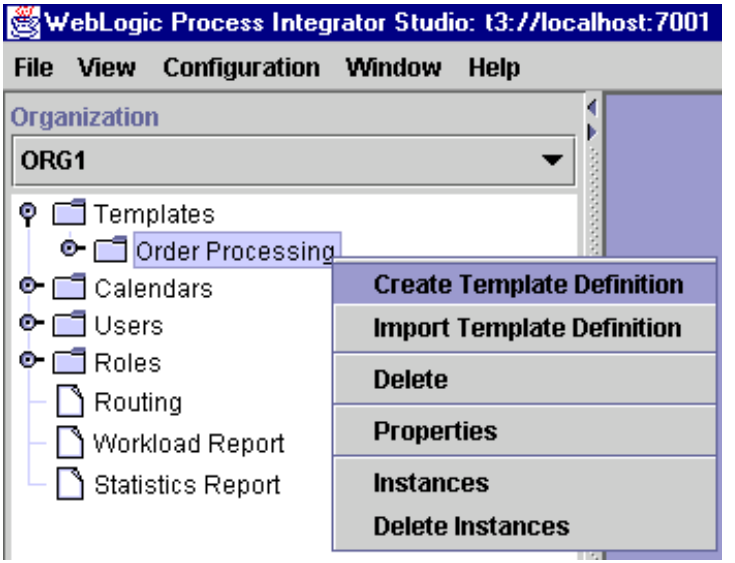


Creating a New Workflow Template Definition

To create a new workflow template definition for the new workflow template:

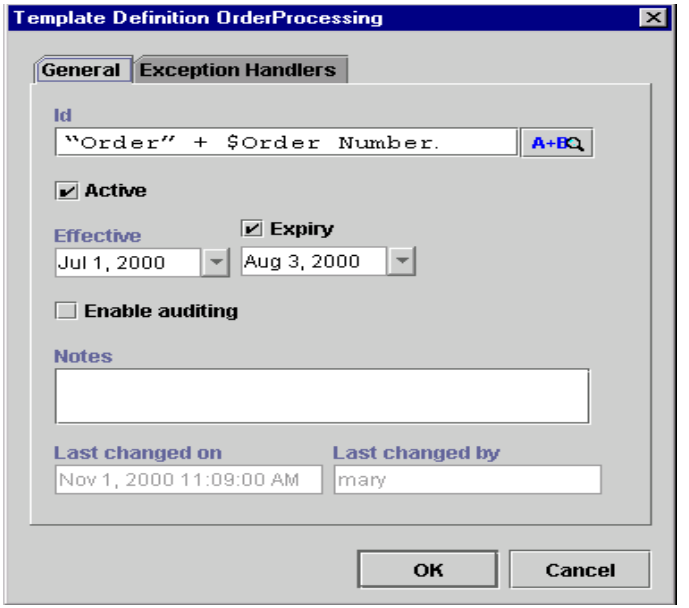
1. Under the Templates folder, right-click Order Processing workflow template and choose New Template Definition from the pop-up menu.

Figure 2-5 Create Template Definition



2. In the dialog box that is displayed, enter an Effective date for the new workflow template definition and click OK. (In this example, do not specify an Expiry date in order to make this workflow template definition always effective.)

Figure 2-6 Template Definition Dialog Box

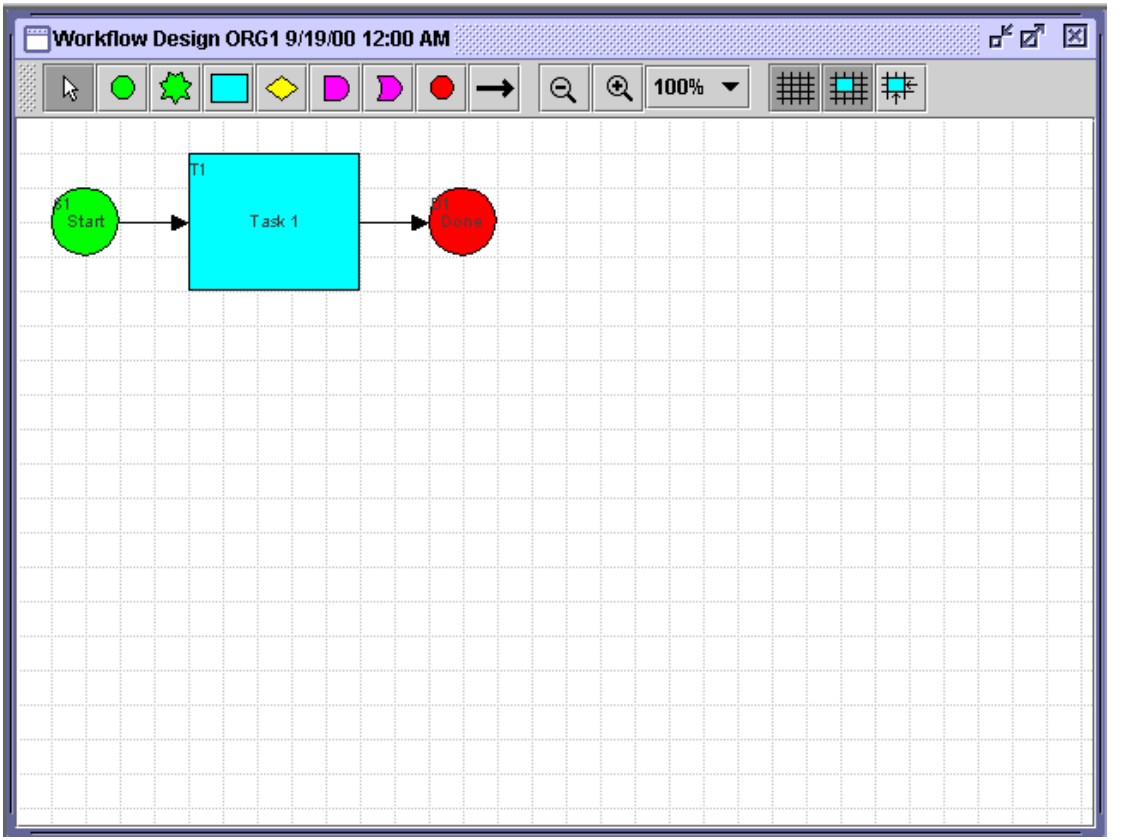


The Effective and Expiry dates allow you to make the workflow template definitions valid for a specific range of time. Each workflow template can contain one or more workflow template definitions, distinguished by the Effective and Expiry dates. At run time, the processing engine chooses the most effective workflow template definition for the specified workflow template, the most effective being the most current template definition that is marked Active.

Drawing the Flow

Once you complete the Template Definition dialog box and click OK, the drawing area is displayed with a simple predefined workflow containing a start node, a task node, and a done node. From the toolbar, you choose the icons that represent nodes and other elements that you use to draw the flow. (Nodes in the drawing area are also referred to as shapes.)

Figure 2-7 Workflow Drawing Area



The Processing Order workflow requires the following nodes:

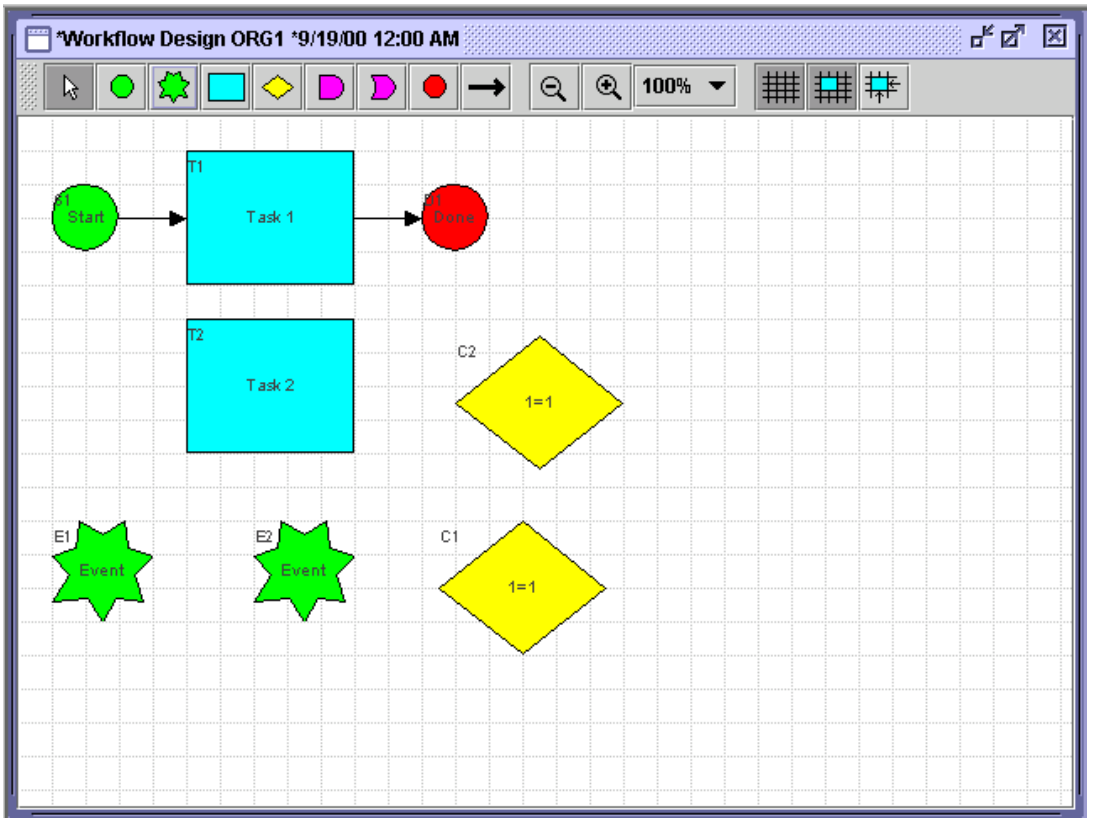
- Start
- Two tasks
- Two events
- Two decisions
- Done

Placing Node Icons (Shapes) in the Drawing Area

Place a shape in the drawing area by clicking its icon in the toolbar and then clicking the drawing area. This drops the shape (representing a workflow node) in the drawing area. Follow this procedure to place one task, two events, and two decisions in the drawing area. (The start and done nodes and one task node are already represented.)

You can move shapes within the drawing area by dragging and dropping them anywhere in the drawing area.

Figure 2-8 Shapes Placed in Drawing Area



Connecting the Nodes

Next, you connect the shapes in the drawing area to form the flow of the workflow. You connect shapes in one of two ways:

- Click the connector arrow in the icon toolbar to select it. Then, click the shape from which you want to connect. Continue to hold down your left mouse button, and drag the connector to the shape that you want to connect to the first shape. This inserts a line arrow between the two shapes; the shape of the arrow conforms to the positioning of the shapes in the drawing area.
- Double-click a shape in the drawing area to display its corresponding Properties dialog box. In the Next tab in the Properties dialog box, select the checkbox to the left of the shape name that should come next. Click OK.

To connect the nodes:

1. Before you begin making the connections, delete the connection between the Task 1 node and the Done node by clicking once on the arrow connecting them, right-clicking with your mouse, and choosing Delete Connection from the pop-up menu.
2. Make the following shape connections using the first connection method described at the beginning of this section.
   a. Connect the Start node to Event 1 (E1). (The Start node, by default, is connected to Task 1 (T1). Leave this connection intact.)
   b. Connect Event 1 (E1) to the done node.
   c. Connect Task 1 (T1) to the C1 decision node.
   d. Connect the C1 decision node to Task 2 (T2).

Note: A Decision node contains a condition, which can be either True or False. If the condition within the Decision node is verified as True, the workflow continues to Task 2.

   e. A dialog box appears asking you what kind of connection you want. Select True.
   f. Connect Task 2 (T2) to the C2 decision node.
   g. Connect the C2 decision node to Event 2 (E2).

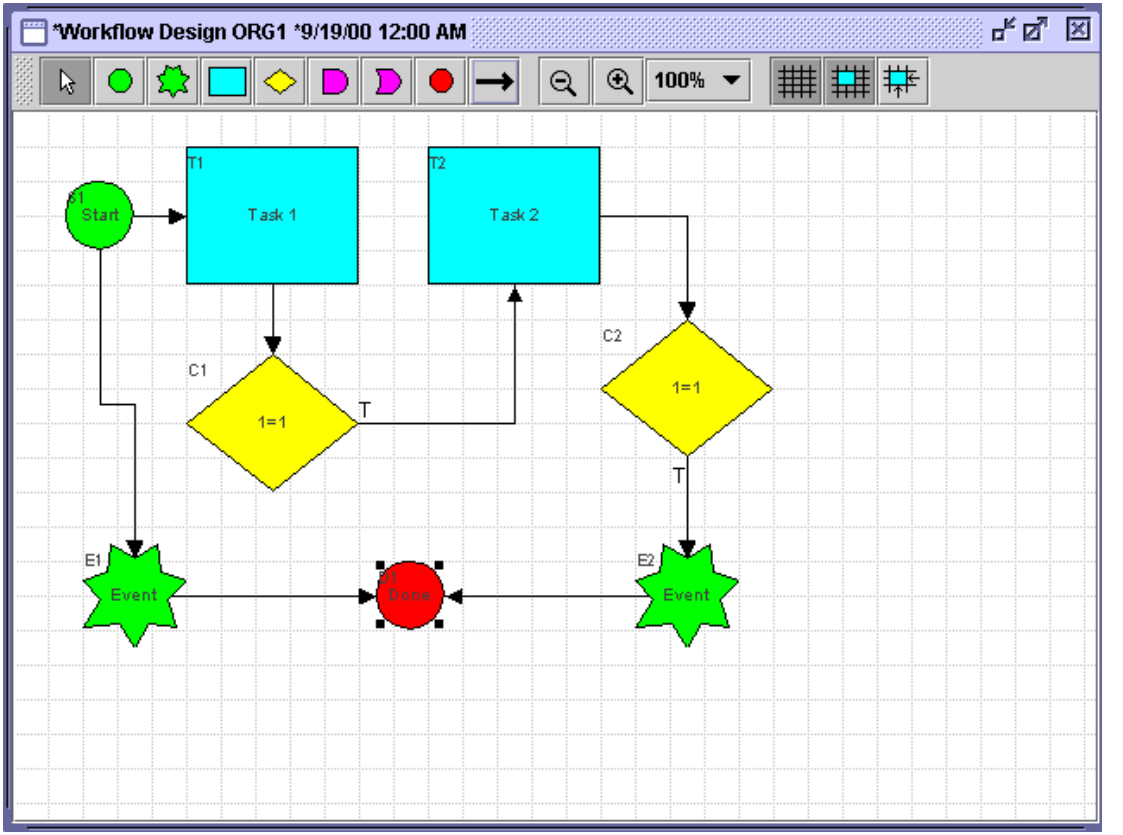
Note: A decision node contains a condition, which can be either True or False. If the condition within the decision node is verified as True, the workflow continues to Task 2.

h. A dialog box appears asking you what kind of connection you want. Select True.

i. Connect Event 2 (E2) to the done node.

You should have the following flow.

Figure 2-9 Completed Drawing



Renaming Nodes

Next, you will rename nodes in the drawing area.

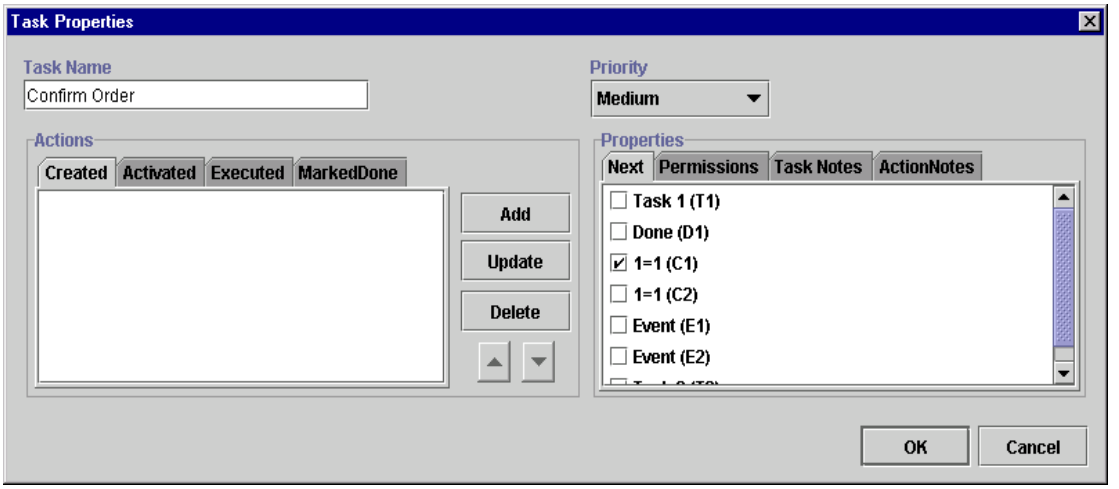
Task 1 (T1) Node

1. In the drawing area, double-click the Task 1 (T1) node to open the Task Properties dialog box.

   This dialog contains the names of the nodes in the drawing area.

2. Enter Confirm Order in the Task Name field, and click OK.

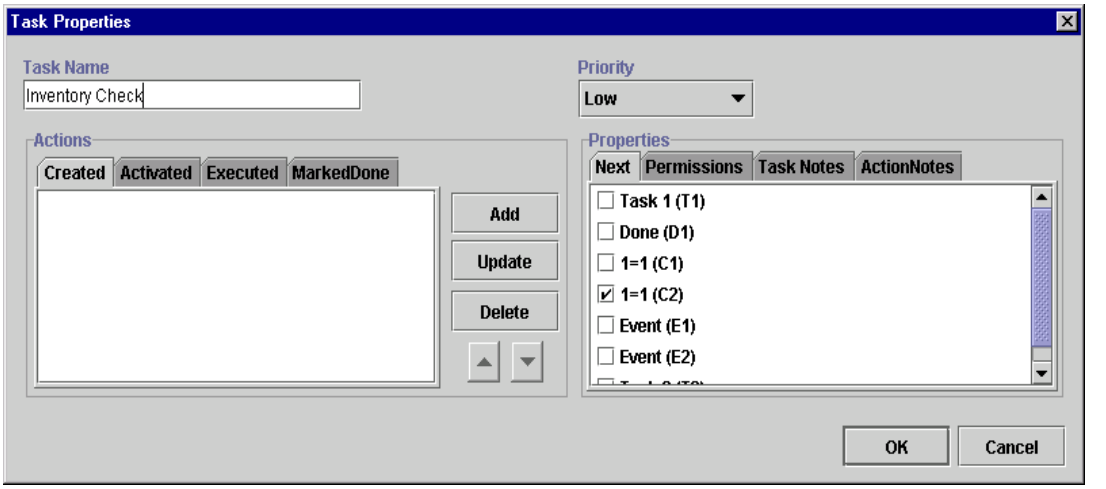
Figure 2-10 Task Properties Dialog Box



Task 2 (T2) Node

1. In the drawing area, double-click the Task 2 (T2) node.
2. Enter Inventory Check in the Task Name field, and click OK.

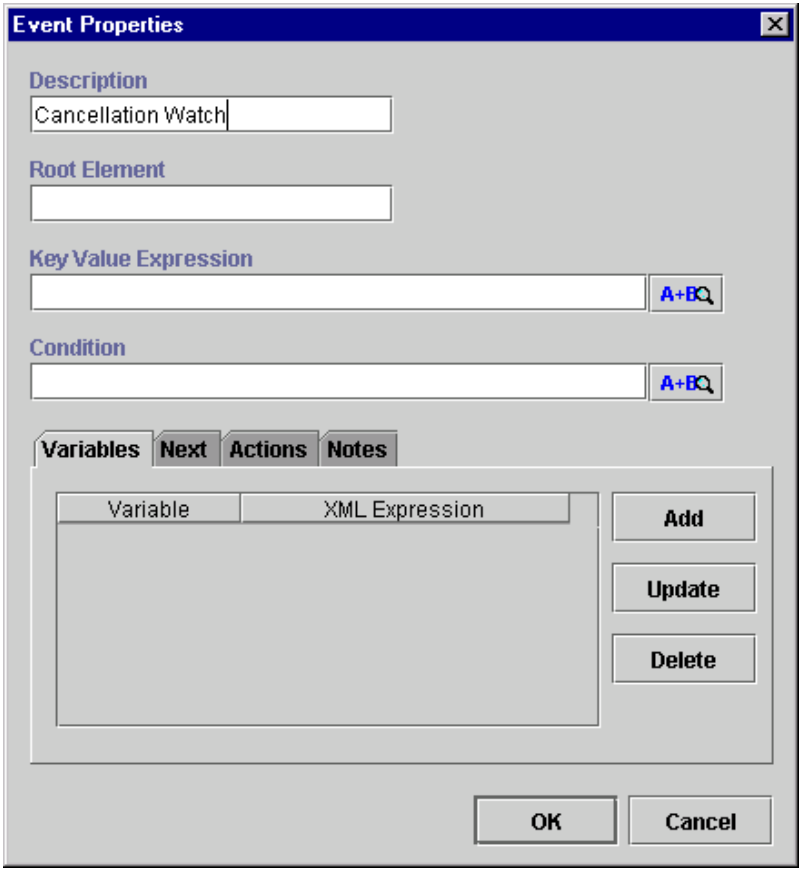
Figure 2-11 Task Properties Dialog Box



Event 1 (E1) Node

1. In the drawing area, double-click the Event 1 (E1) node to open the Event Properties dialog box.
2. Enter Cancellation Watch in the Description field, and click OK.

Figure 2-12 Event Properties Dialog Box



Event 2 (E2) Node

1. In the drawing area, double-click the Event 2 (E2) node.
2. Enter Ship/Bill Confirmation in the Description field, and click OK.

Figure 2-13 Event Properties Dialog Box

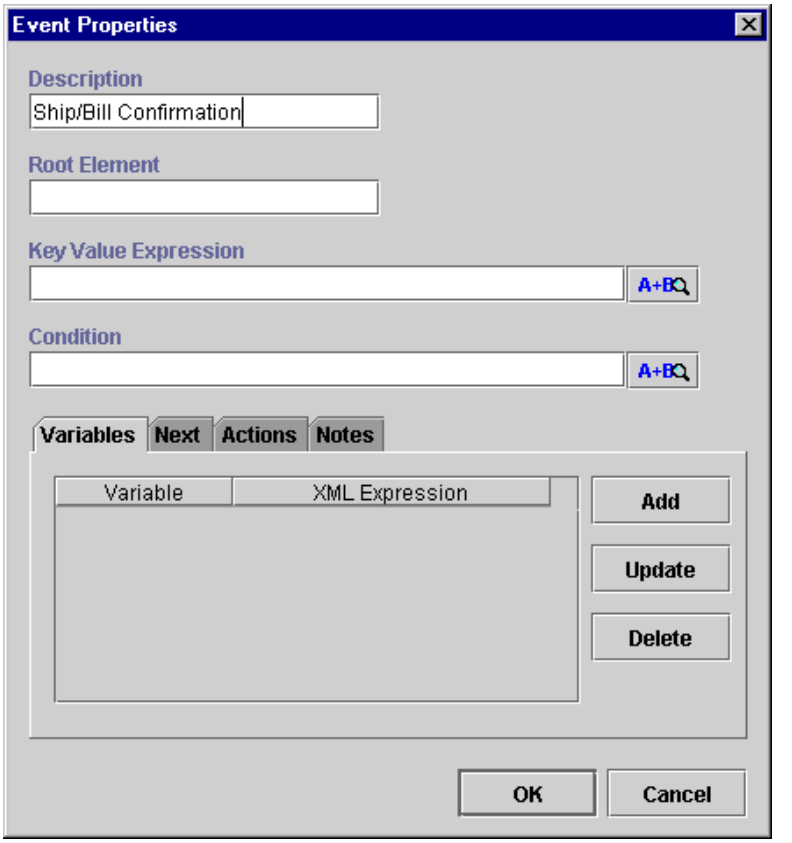
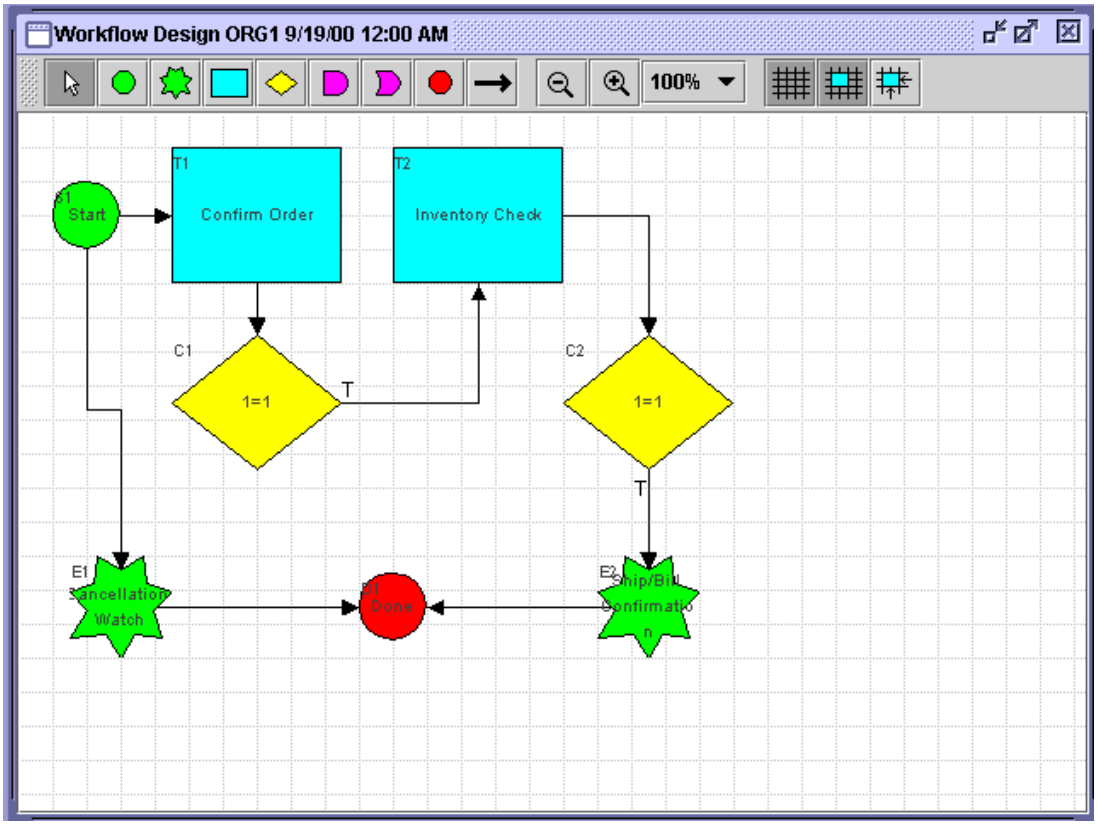


Figure 2-14 Final Flow



After you connect all the nodes, you will define variables for the workflow; add the appropriate properties to each node; and define the actions for each node. These actions are executed at run time upon the instantiation of the workflow. Instantiation means that the workflow is started or placed into run time.

Defining Variables

Each workflow has a set of variables associated with it. A variable is typically used to store application-specific information required by the workflow at run time. This information is often used to control the logic within a workflow.

The Order Processing workflow requires the following variables.

Table 2-2 Variable Definitions

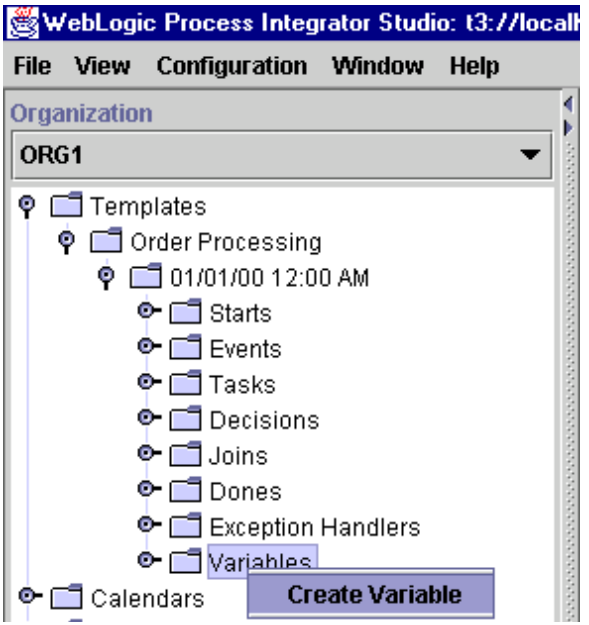
Variable	Type	Description
Confirm	String	User confirmation response; values are: Y or N
Inventory	Integer	Number of items available in inventory; can be zero
CustomerName	String	Name of the customer ordering the item
CustomerId	String	ID number of the customer ordering the item
CustomerMail	String	E-mail address of the customer
CustomerState	String	State or province for billing address and tax calculation
ItemName	String	Name of the ordered product
ItemNumber	Integer	Numerical identifier of the item
ItemQuantity	Integer	Quantity ordered
ItemPrice	Double	Unit price of the item
TotalPrice	Double	Total price of the order
OrderStatus	String	Status of the order
OrderNumber	Integer	Numerical identifier of the order
POBeanHandle	Session EJB	Handler for POBean EJB

You will also need to define some of these variables for the ShipBill workflow that will be called by this workflow.

To define the variables for the Order Processing workflow:

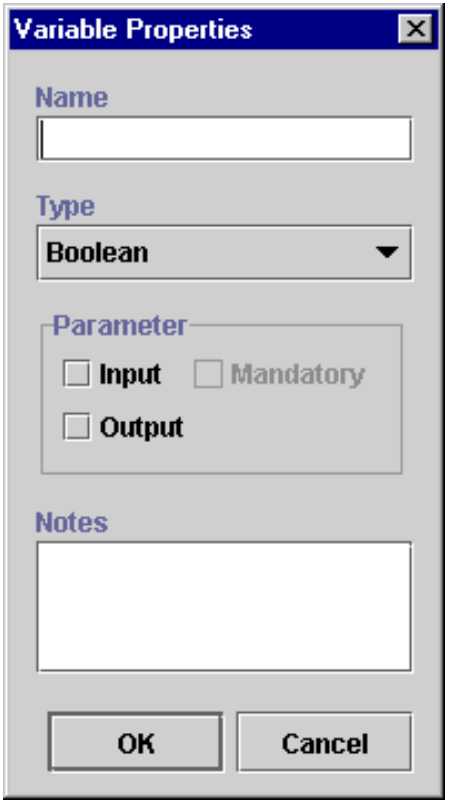
1. Expand the Order Processing folder, right-click Variable, and choose Create Variable from the pop-up menu.

Figure 2-15 Create Variable



The Variable Properties dialog box is displayed.

Figure 2-16 Variable Properties Dialog Box



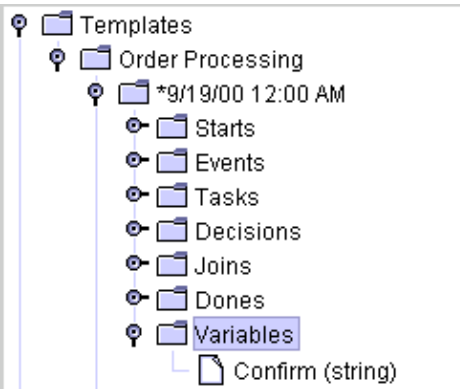
You will define all of the variables in the preceding table using the Variable Properties dialog box. For example, you will begin by defining the variable Confirm, which is a string type variable. It is a user confirmation response, and its possible values are Y (yes) or N (no).

Note: For now, you will only enter the variable name and type. You will define the possible values later in this tutorial.

To define this variable, proceed as follows:

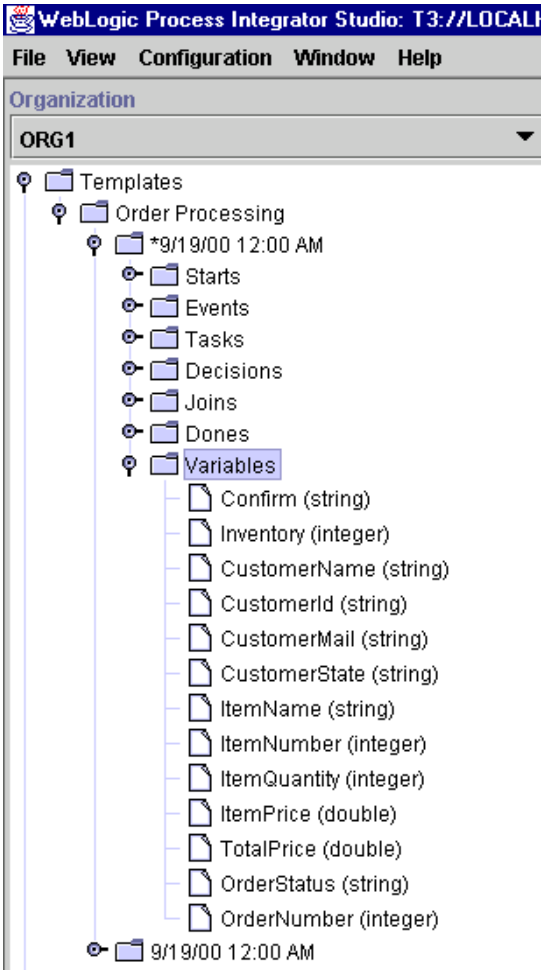
1. In the Variable Properties dialog box, enter the variable name Confirm in the Name field.
2. From the Type drop-down list, select String.
3. For this demonstration, do not enter values in the Parameter and Notes portions of the dialog box, and click OK.
4. Expand the Variables folder to view the new variable.

Figure 2-17 New Variable



5. Repeat these steps to create all variables listed in Table 2-2. When you have created all new variables, your folder tree should look like the following:

Figure 2-18 New Variables List



Defining Business Operations

In WebLogic Process Integrator, a business operation represents a method call on an Entity/Session EJB or Java class instance. This method call is added to a workflow in WebLogic Process Integrator through use of the Perform Business Operation action. The invocation results of this action can be assigned to the workflow variables.

Entity/Session EJBs represent a component architecture for developing and deploying object-oriented, distributed, enterprise-level applications. The Business Operations feature, in effect, allows for the creation of customized actions, which create the connection between WebLogic Process Integrator and end-user applications and components.

The WebLogic Processing Integrator Business Operations facility enables business analysts to design workflows that invoke the methods of Java objects and Enterprise Java Beans (EJBs) that are registered in WebLogic Sever (WLS). Using this Business Operations facility, you provide a descriptive name for the remote methods and parameters of the Entity/Session EJBs or Java classes that you wish to deploy, thus providing non-technical users with an understanding of the business meaning behind these remote methods and parameters.

Using the Define Business Operation dialog box, you will define two Session EJB business operations. These business operations represent remote methods of invoking the `wlpi.tour.POBean` JavaBean. This JavaBean is used in the workflow to check the inventory for the item ordered and return the results to the workflow.

The business operations are:

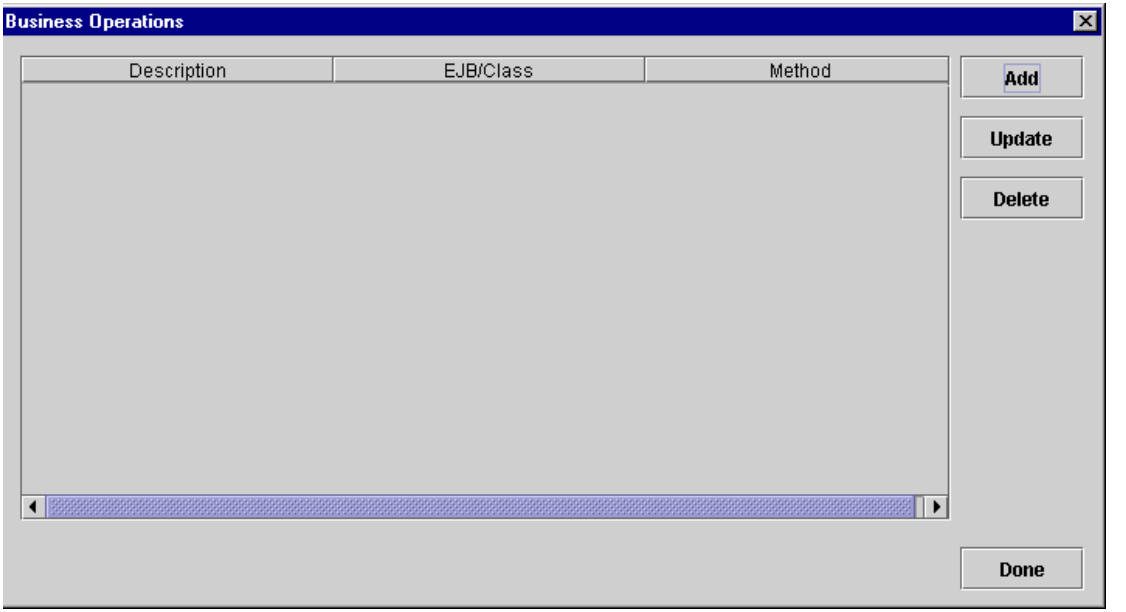
- The remote method `Check Inventory`, called from the Order Processing workflow, returns the number of items available in stock.
- The remote method `Calculate Total Price`, which calculates the total price of the order and is called within the workflow ShipBill.
- The home method `Create PO Bean`, which creates the POBean object.

Defining the Check Inventory Business Operation

To define the first business operation, `Check Inventory`, which is called from the Order Processing workflow and returns the number of items available in stock:

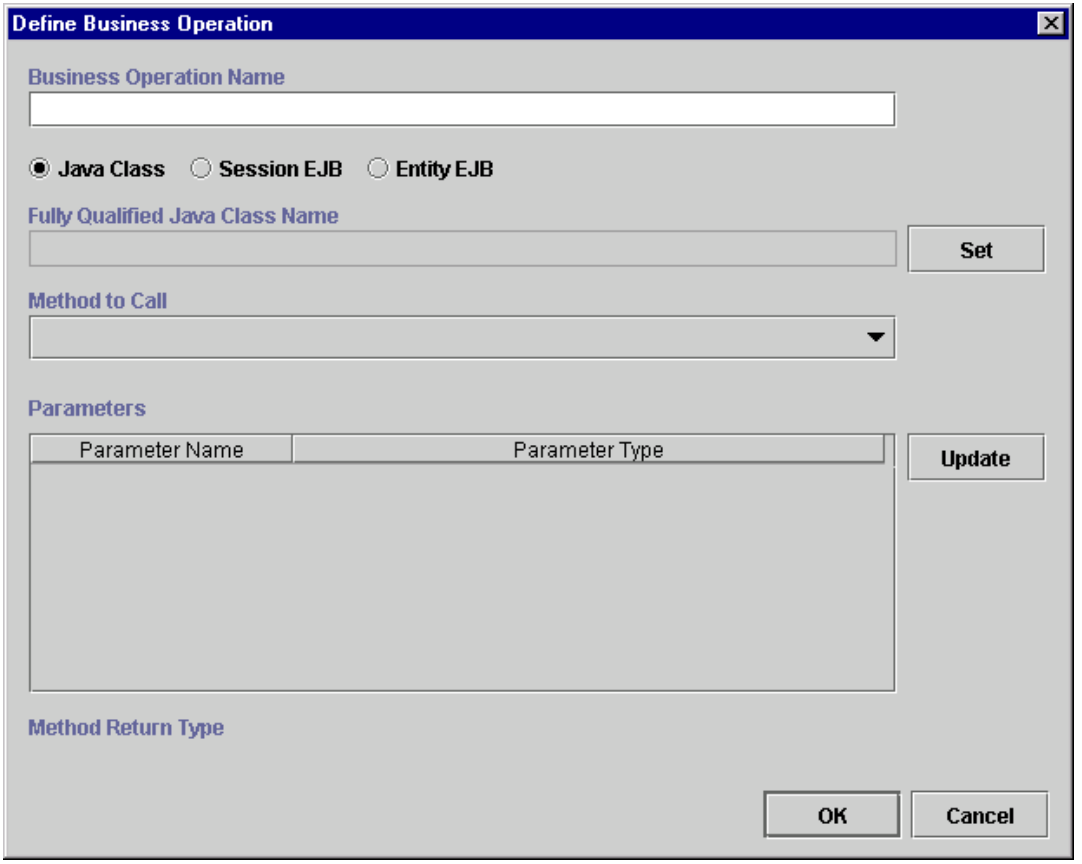
1. From the Configuration menu, choose Business Operation to display the Business Operations dialog box.

Figure 2-19 Business Operations Dialog Box



2. Click Add to display the Define Business Operation dialog box.

Figure 2-20 Define Business Operation Dialog Box



3. In the Business Operation Name field, enter the business operation name `Check Inventory`.

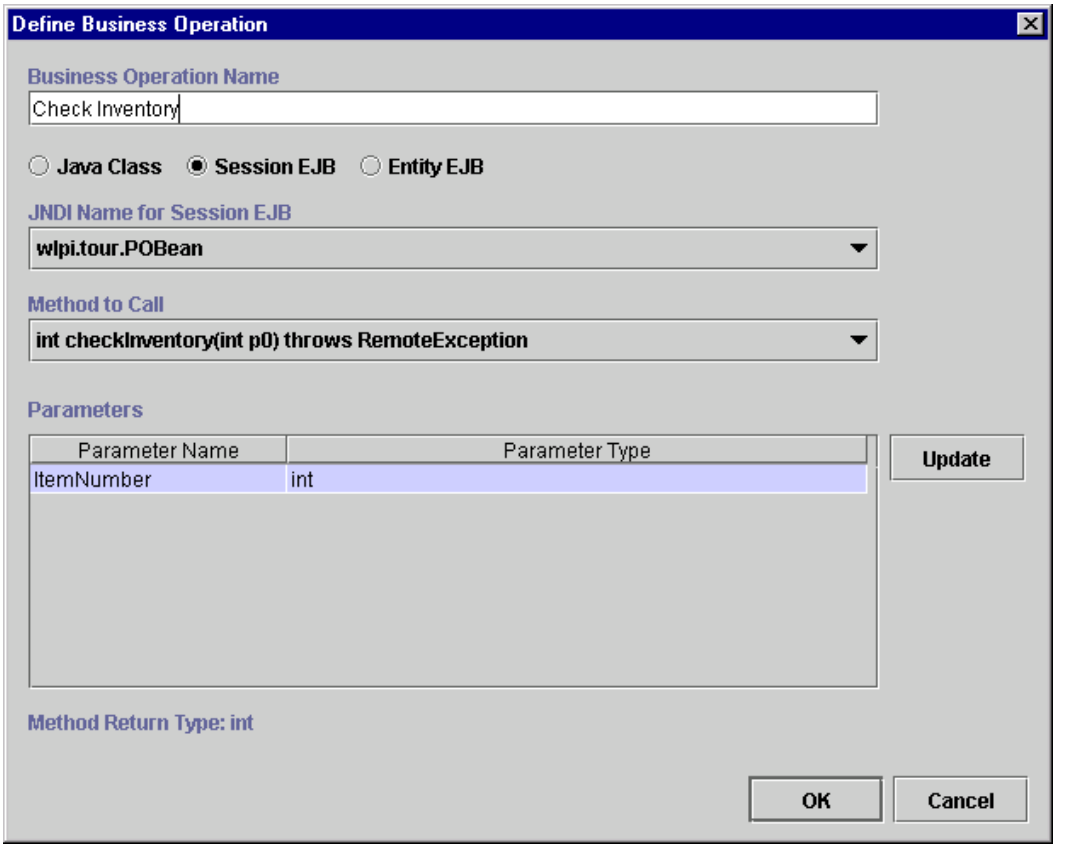
Next, you will select the type of business operation that you are defining. The choices are:

- Java Class — only serializable Java classes may be used in business operations. This restriction exists because WebLogic Process Integrator often needs to persists the Java objects referenced by these business operations as part of a workflow instance. In order to accomplish this task, WebLogic Process Integrator needs to be able to serialize the underlying Java objects.
- Session EJB — used in a business operation that wraps a Session-type EJB on the server. A Session EJB is a server-side process EJB that acts as an interface between the server and the client. Although Session EJBs can be placed in workflow variables, they are not persisted with workflow instances. Instead they exist only for the life of the transaction in which they are created.
- Entity EJB — used in a business operation that wraps an Entity-type EJB on the server. An Entity EJB represents an internal state of the WebLogic Process Integrator engine; the client accesses that state indirectly through Session EJBs. Entity EJBs are persisted through the workflow instance.

  Entity beans most often represent the internal state of WebLogic Process Integrator. They are often deployed by other Entity beans on WebLogic Server. In general, an Entity bean represents an object with persistent data that behaves transactionally. Unlike Java classes, WebLogic Process Integrator does not persist an Entity bean's data in a workflow instance. Instead, WebLogic Process Integrator maintains a reference to the Entity bean as part of the workflow instance data. This fact implies that the underlying entity bean can be modified or even deleted outside of the control (or knowledge) of the workflow instance.

4. You will create a Session EJB business operation. Select the Session EJB radio button to display fields relevant to Session EJBs in the Define Business Operation dialog box.

Figure 2-21 Create Session EJB Business Operation



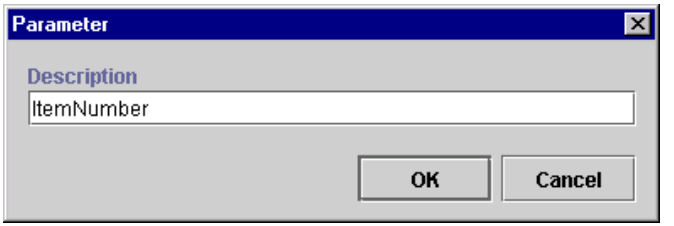
5. From the JNDI Name for Session EJB drop-down list, select the JNDI (Java Naming and Directory Interface) name for the Session EJB: `wlpi.tour.POBean`.

   JNDI is a service provided by WebLogic Server; this service stores objects much like a database. Here, you are selecting the JNDI name for the Session EJB; a Session EJB is an object stored in this service.

6. The Method to Call drop-down list contains a list of methods (or operations) that you can perform on the Session EJB. Select the method to call from the drop-down list: `int checkInventory(int p0) throws RemoteException`.

7. Highlight the Parameter Name field, and click Update to display the Parameter dialog box.

Figure 2-22 Parameter Dialog Box



8. In the Description field, enter the parameter description `ItemNumber`, and click OK.

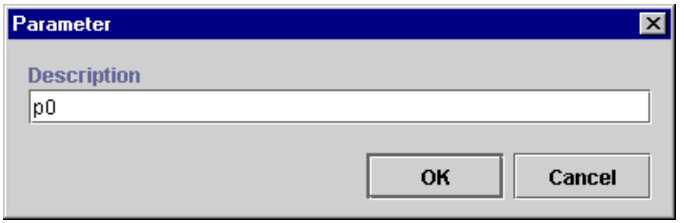
Note: The parameter type is displayed for each parameter; these parameters are already defined.

Defining the Calculate Total Price Business Operation

To create the next business operation, `Calculate Total Price`, which calculates the total price of the order and is called within the workflow ShipBill:

1. From the Configuration menu, choose Business Operation to display the Business Operations dialog box. (See Figure 2-19.)
2. Click Add to display the Define Business Operation dialog box. (See Figure Figure 2-20.)
3. In the Business Operation Name field, enter the business operation name `Calculate Total Price`.
4. Select the Session EJB radio button to display fields relevant to Session EJBs in the Define Business Operation dialog box. (See Figure 2-21.)
5. From the JNDI Name for Session EJB drop-down list, select the JNDI (Java Naming and Directory Interface) name for the Session EJB: `wlpi.tour.POBean`.
6. The Method to Call drop-down list contains a list of methods (or operations) that you can perform on the Session EJB by calling it. Select the method to call from the drop-down list: `double calculate(int p0, int p1, String p2)`.
7. Highlight the first Parameter Name field, and click Update to display the Parameter dialog box.

Figure 2-23 Parameter Dialog Box

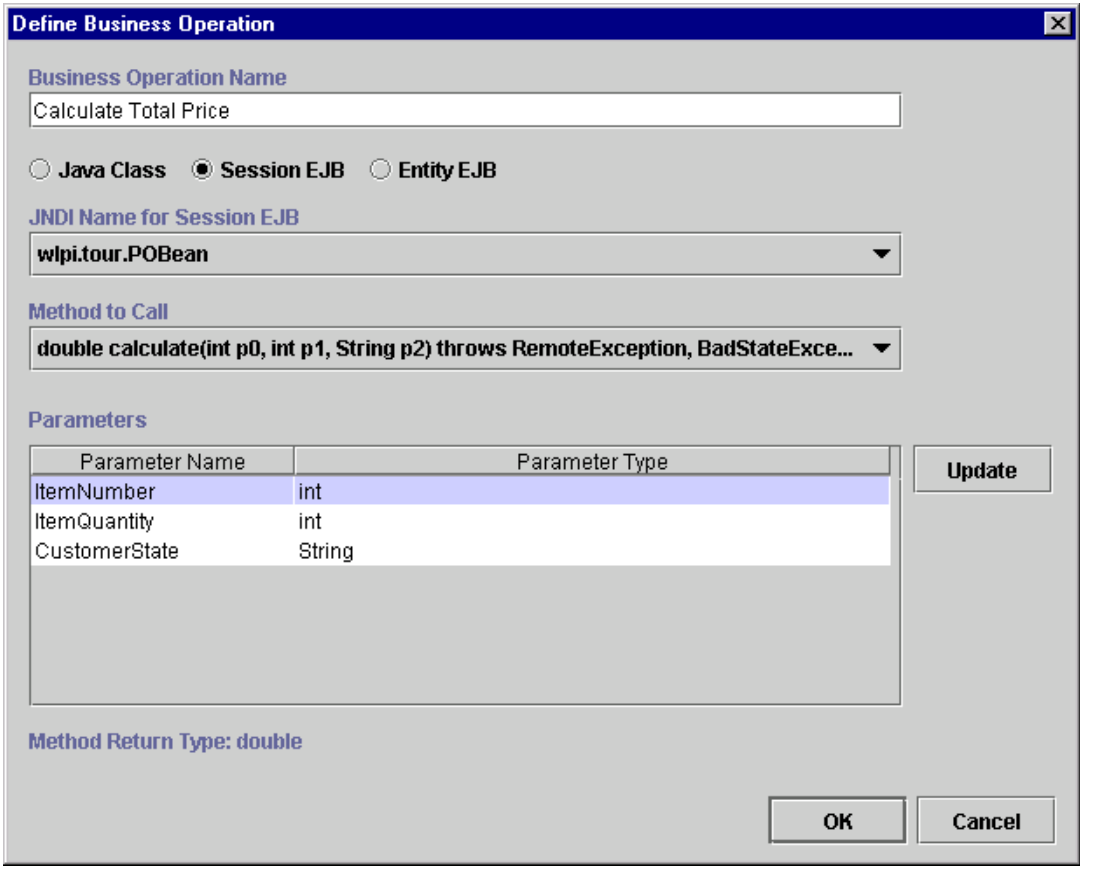


8. In the Description field, enter the parameter description `ItemNumber`, and click OK.

9. Repeat these steps to enter the remaining two parameter names. The second parameter should be named `ItemQuantity`, and the third parameter should be named `CustomerState`.
10. Click OK.

Note: The parameter type is displayed for each parameter.

Figure 2-24 Calculate Business Operation



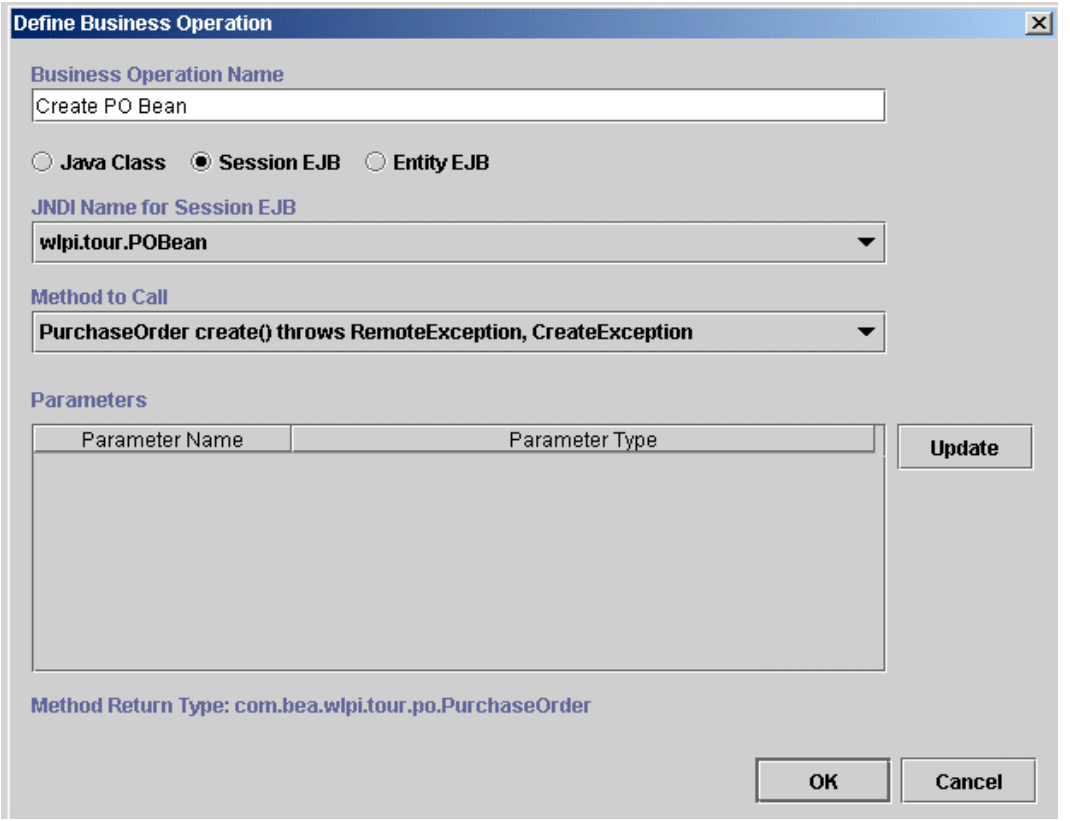
Defining the Create PO Bean Business Operation

To define the final business operation, `Create PO Bean`, which creates the POBean object for the Order Processing workflow:

1. From the Configuration menu, choose Business Operation to display the Business Operations dialog box. (See Figure 2-19.)
2. Click Add to display the Define Business Operation dialog box. (See Figure 2-20.)
3. In the Business Operation Name field, enter the business operation name `Create PO Bean`.
4. Select the Session EJB radio button to display fields relevant to Session EJBs in the Define Business Operation dialog box. (See Figure 2-21.)
5. From the JNDI Name for Session EJB drop-down list, select the JNDI (Java Naming and Directory Interface) name for the Session EJB: `wlpi.tour.POBean`.
6. The Method to Call drop-down list contains a list of methods (or operations) that you can perform on the Session EJB by calling it. Select the method to call from the drop-down list: `PurchaseOrder create()`, and click OK.

Note: This method contains no parameters.

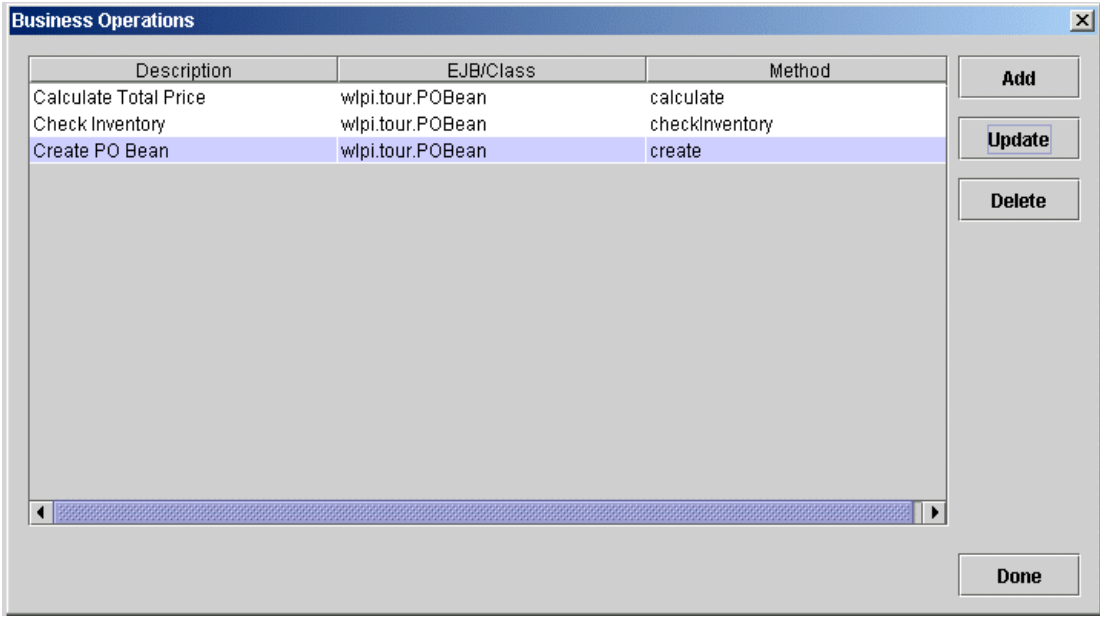
Figure 2-25 Create PO Bean Business Operation



After Business Operation Creation

The Business Operations dialog box now contains the three business operations you have just defined.

Figure 2-26 Business Operations Dialog Box



Once you have defined the business operations, you can call them from the workflow using the Perform Business Operation action. This action calls the business operations from the workflow. Instructions for using the Perform Business Operations action are provided in "Define Inventory Check Task" and in Chapter 4, "Defining the ShipBill Workflow: An Exception Handling Example."

Defining Tasks

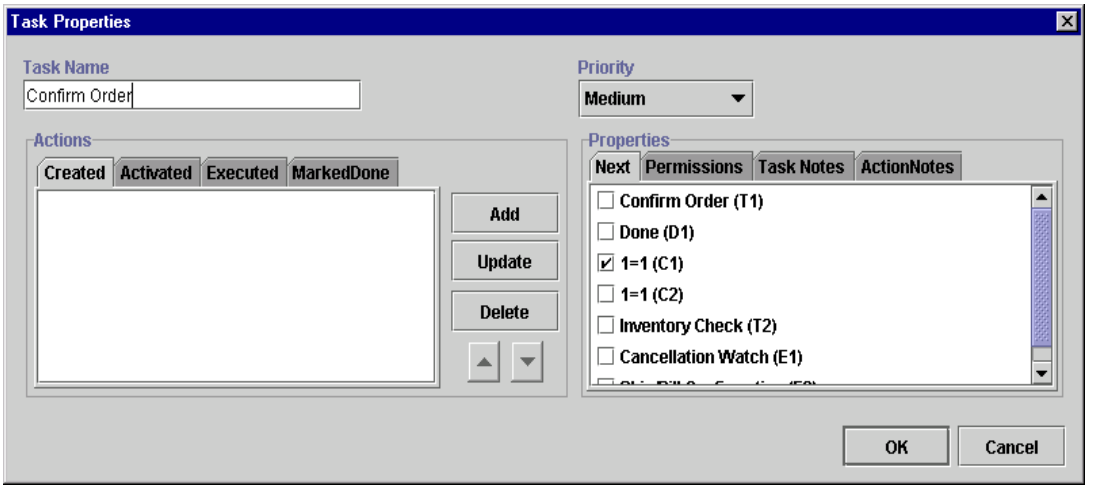
A workflow consists of a series of tasks, each of which represents a discrete activity to be performed automatically by the WebLogic Process Integrator server or by a workflow end user by using the worklist application. In this section, you define the tasks in the Order Processing workflow.

Defining the Confirm Order Task

To define the Confirm Order task:

1. In the workflow diagram, double-click the task Confirm Order to display the Task Properties dialog box.

Figure 2-27 Task Properties



Confirm Order is the first task in this workflow. At run time, this task is performed by an end user. Therefore, it is assigned to an actual user and is displayed on that user's worklist upon instantiation of the workflow.

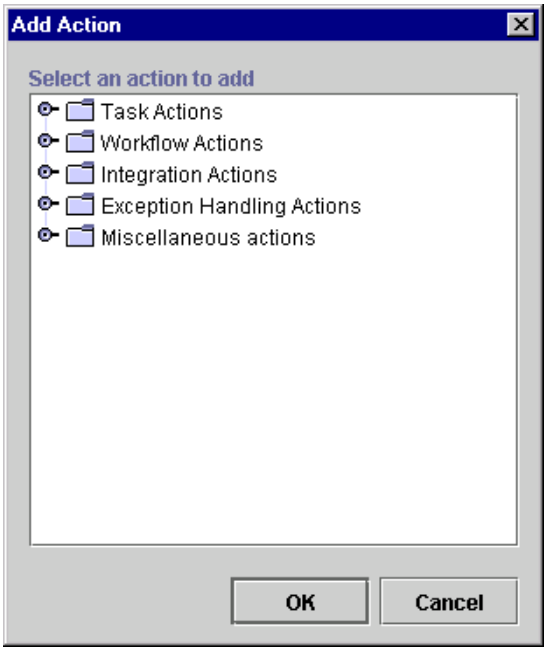
The tabs on the left side of the dialog box display four separate lists of actions for the tasks that are performed at the four task events. A task responds to an event at run time by executing the associated actions. The four task events are:

- Created—the Created event is automatically triggered when the workflow is started.
- Activated—the flow hits this particular task and the task is available to be performed.
- Executed—an event occurs that causes the task to be executed. This usually occurs when the user double-clicks on the task in a worklist.
- Marked Done—the Marked Done event is automatically raised when the task is marked done. This can be done through the Mark Task as Done action or through an API call.

2. Select the Activated tab. The Assign Task "Confirm Order" to User Workflow Attribute ("Initiator") action, by default, is already defined in this task event.
3. Select the Assign Task to User action in the Activated tab, and click Delete to delete this action.
4. Click Yes to confirm the delete.

   You are now ready to add the new Assign Task to User action.
5. Click Add to display the Add Action dialog box.

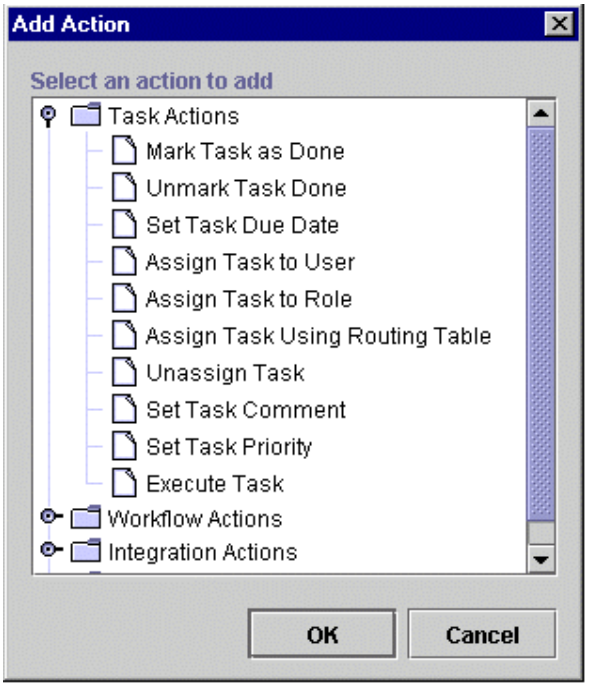
Figure 2-28 Add Action Dialog Box



Actions are the basic building blocks of the workflow. They can be defined within tasks, events, decisions, starts, and as a subaction of an action itself.

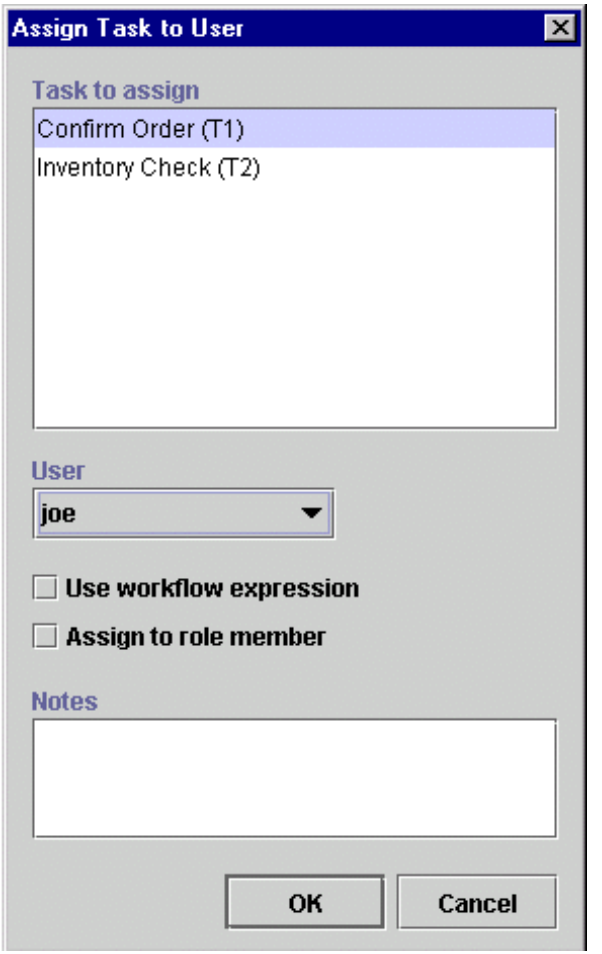
The action categories are Task, Workflow, Integration, Exception Handling, and Miscellaneous. The task category contains all actions relevant to tasks, including actions that allow the assignment of tasks to users and roles.

Figure 2-29 Add Action Dialog Box



6. Select Assign Task to User and click OK.

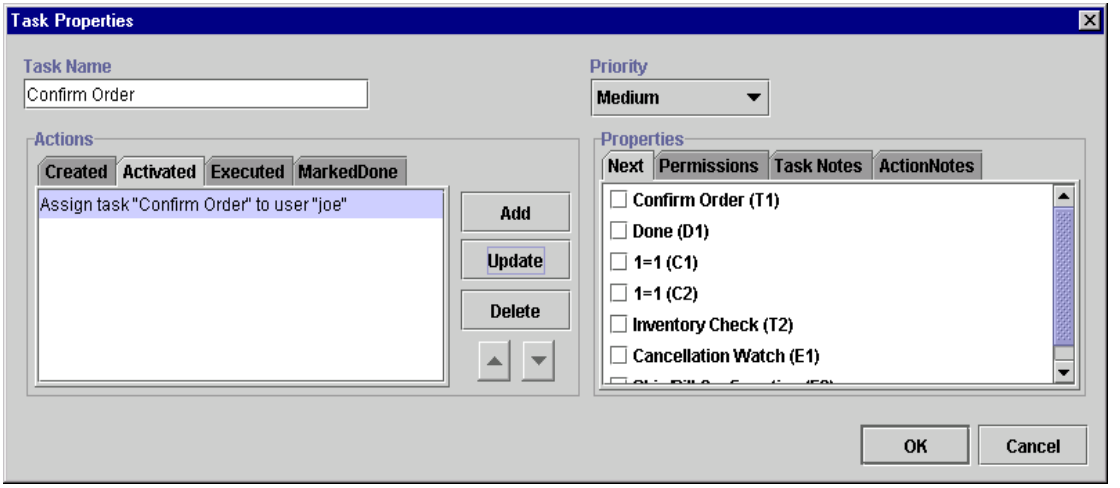
Figure 2-30 Assign Task to User Dialog Box



7. In the Task to assign portion of the dialog box, select the task Confirm Order.
8. Select the user joe from the User drop-down list, and click OK.

The Assign Task to User action is displayed in the Activated tab.

Figure 2-31 Task Properties: Assign Task to User Action

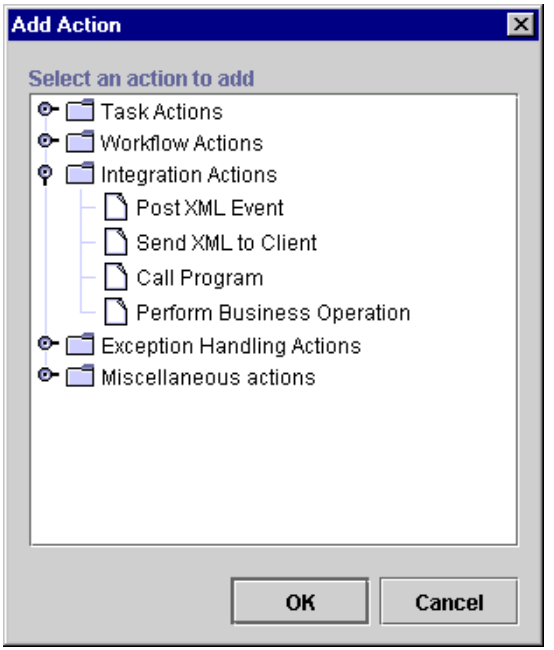


The Confirm Order task, upon execution, prompts the user to confirm the order. The Decision node that succeeds the task directs the flow according to the user's response.

9. Select the Executed tab of the task and click Add.
10. Select Integration Actions from the Add Action dialog box.

    The action that allows the user to interact with the worklist and enter a response to a question or value for a variable is Send XML to Client in the Integration Actions category.

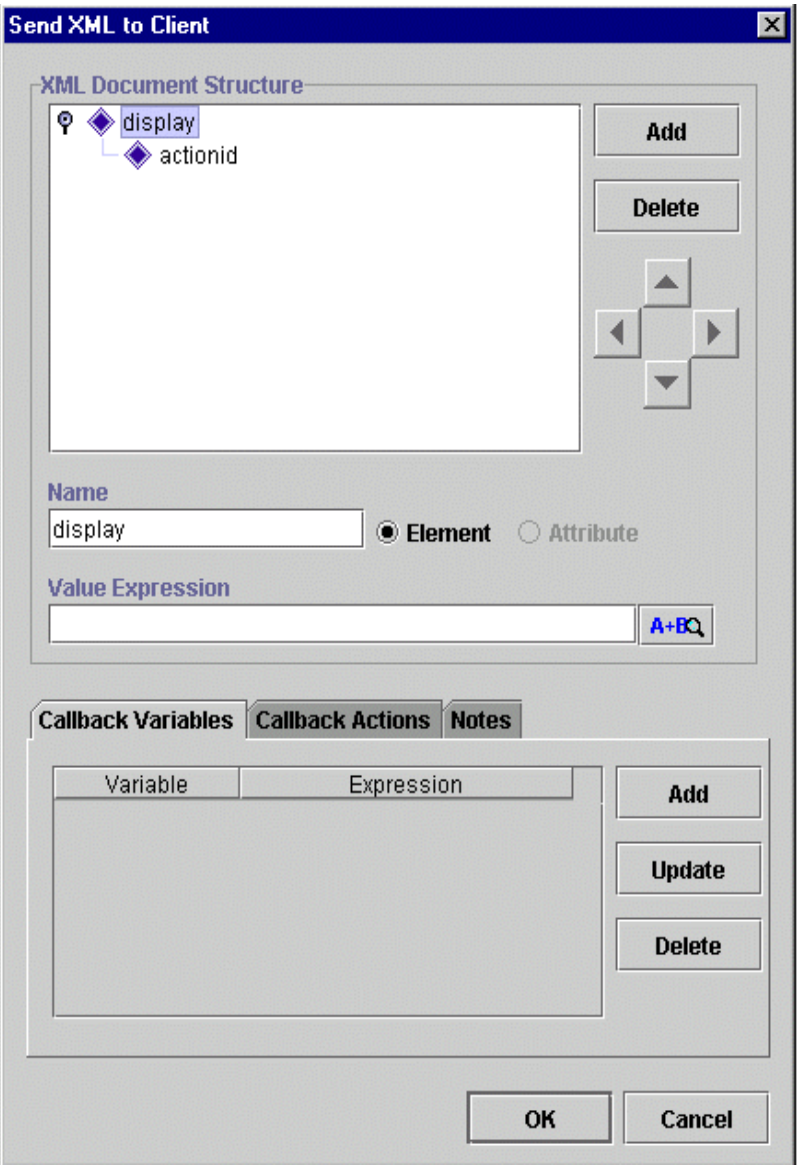
Figure 2-32 Integration Actions



11. Select Send XML to Client, and click OK to display the Send XML to Client dialog box.

    Proceed to the next section, “Defining the XML Document Structure,” to continue defining the Confirm Order task.

Figure 2-33 Send XML to Client Dialog Box



Understanding the XML Document Structure

In the Send XML to Client dialog box, you define an XML document, which will be sent out to the client application. The client application should be programmed to identify this XML document, respond to it appropriately, and send an XML document to the WebLogic Process Integrator server with information that can be used to populate workflow variables. The WebLogic Process Integrator Worklist responds to certain default setups of this action.

Default structures for the XML document can be used to:

- Prompt the user for variable input.
- Display a message-box to the user containing information or asking a question. (You can set up the responses to be OK, OK/Cancel, Yes/No, or Yes/No/Cancel.)
- Call a program on the client machine.
- Call an API.

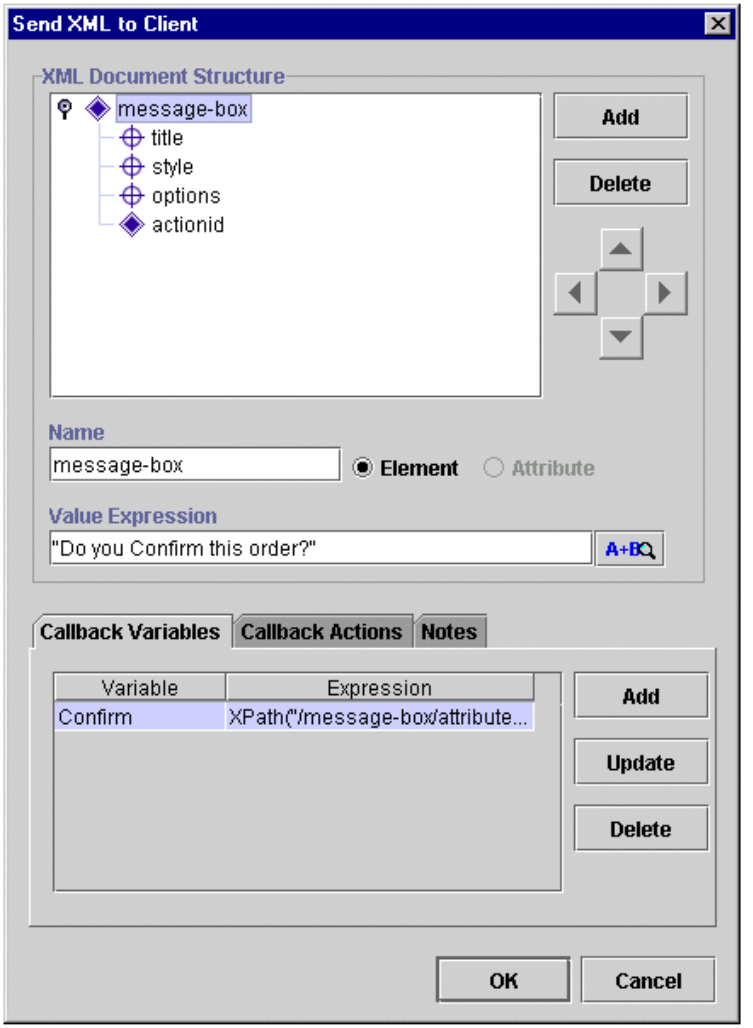
To prompt the user for a simple Yes/No confirmation, the XML document must have the following structure, where:

- The root element of the XML document is `message-box`. The value of `message-box` is the actual question that will be displayed to the user.
- The root element `message-box` has an attribute `title` that is the title of the message-box to be displayed to the user.
- The root element `message-box` has an attribute `style` that is the type of message-box that will be displayed: plain, information, question, warning, or error. In this case, the `style` will be a question.
- The root element `message-box` has an attribute `options` that is the admissible response type: OK, OK/Cancel, Yes/No, or Yes/No/Cancel. In this case, the `options` will be Yes/No.
- `actionid` is an internal unique ID that identifies this particular Send XML to Client action and will also identify and match the message coming back from the worklist.

Defining the XML Document Structure

Refer to the following figure and procedure to define the XML document structure. The following figure shows how the Send XML to Client dialog box should look after you complete the procedure.

Figure 2-34 Final XML Document Structure



To define the XML document structure:

1. In the Send XML to Client dialog box, change the default root element `display` to `message-box` by highlighting the default root element and entering the name `message-box` in the Name field.
2. In the Value Expression field, enter the following value: `"Do you Confirm this Order?"` This is the question that will be presented to the end user in the message-box.
3. Select the root element `message-box` and click Add to add the attribute `title` to `message-box`. A new XML node is displayed in the XML Document Structure portion of the dialog box.
4. Select the Attribute radio button to make this new XML node an attribute, and rename the new XML node by entering `title` in the Name field.
5. In the Value Expression field, enter the message-box title: "`Confirm Order`".
6. Select the root element `message-box` and click Add to add the attribute `style` to `message-box`. A new XML node is displayed in the XML Document Structure portion of the dialog box.
7. Select the Attribute radio button to make this new XML node an attribute, and rename the new XML node by entering `style` in the Name field.
8. In the Value Expression field, enter the message-box style: "`question`".
9. Select the root element `message-box` and click Add to add the attribute `options` to `message-box`. A new XML node is displayed in the XML Document Structure portion of the dialog box.
10. Select the Attribute radio button to make this new XML node an attribute, and rename the new XML node by entering `options` in the Name field.
11. In the Value Expression field, enter the message-box options: "`Yes_No`".
12. Using the up and down arrows, rearrange the XML nodes so that they appear in the XML document structure in the following order:
    - `title`
    - `style`
    - `options`
    - `actionid`

13. Click the Add button at the bottom of the dialog box to add a callback variable. The Workflow Variable Assignment dialog box is displayed.

14. From the Variable drop-down list, select the `Confirm` variable.

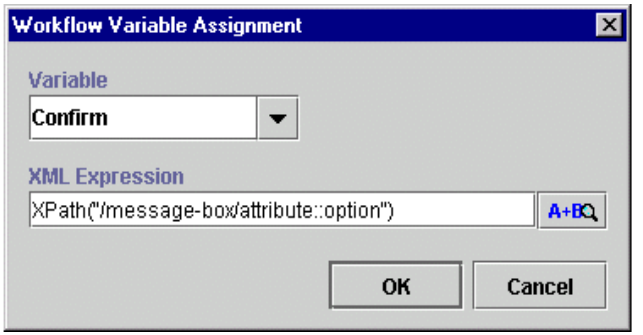
15. In the XML Expression field, enter the XML expression for the message-box using the XPath language structure. The XML expression for Confirm should be:

    ```
    XPath("/message-box/attribute::option")
    ```

    Note: If you know XML, you can type the expression directly into this field. Otherwise, click the A+B button to access the Expression Builder. For instructions on using the Expression Builder, see Chapter 6, "Using Expressions and Conditions," of the *BEA WebLogic Process Integrator Studio Guide* and "Using the Expression Builder" in this document.

    BEA WebLogic Process Integrator uses the XPath XML model. For information on XPath, refer to the following Web site: http://www.w3.org/TR/xpath.html. Also, refer to Chapter 6, "Using Expressions and Conditions," in the *BEA WebLogic Process Integrator Studio Guide*.

Figure 2-35 Workflow Variable Assignment



In the example here, the user's response will be stored in the workflow variable `Confirm` as defined in the Callback Variables tab in the lower part of the Send XML to Client dialog box.

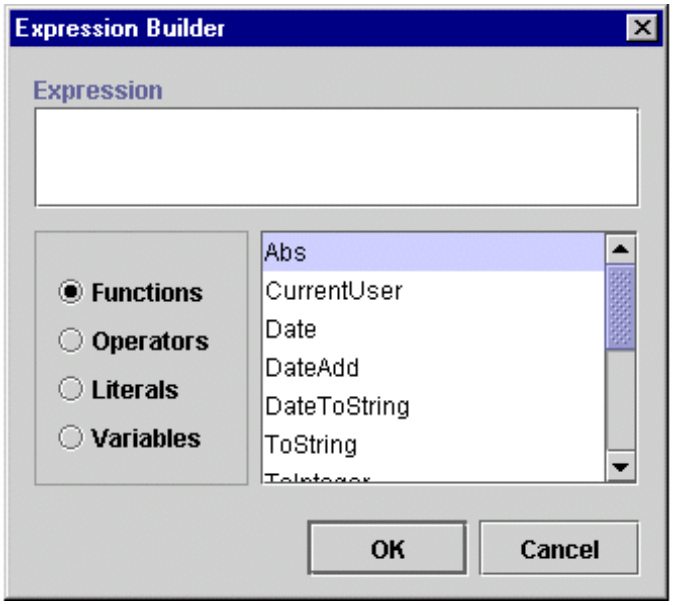
16. Click OK to return to the Confirm Order Task Properties dialog box. Click OK.

Using the Expression Builder

You use the Expression Builder to define the value of the variable coming back in an XML document from the worklist client application. The function XPath is used to parse the XML document and extract the relevant value from it.

The Expression Builder, available in dialog boxes where you see A+B, enables you to build expressions, by using predefined functions, literals and operators, which will be evaluated and executed at run time. Workflow variables are usually used in expressions. Clicking A+B in any dialog box displays the Expression Builder dialog box.

Figure 2-36 Expression Builder



See Chapter 6, "Using Expressions and Conditions," of the *BEA WebLogic Process Integrator Studio Guide* for detailed explanations of each function available in the Expression Builder.

Define Inventory Check Task

Upon activation, the Inventory Check task calls the JavaBean POBean, which checks the inventory for the item ordered and returns the results to this workflow.

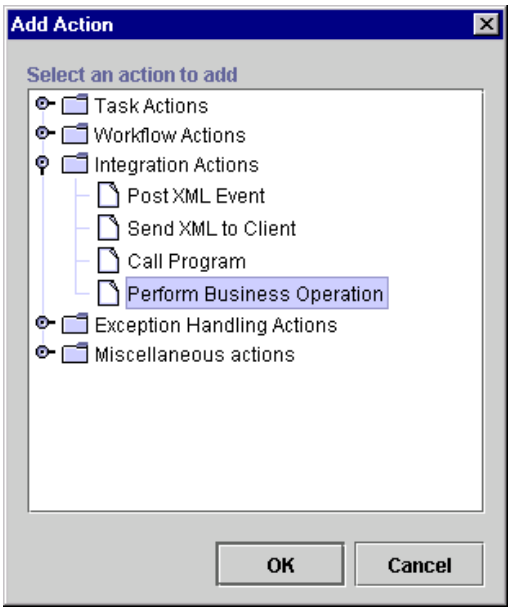
To define the Inventory Check task, you create two Perform Business Operation actions, which perform the business operations you defined in "Defining Business Operations," and one Mark Task as Done action, which marks the task as done once the two business operations are complete.

Defining the Create PO Bean Perform Business Operation Action

To define the `Create PO Bean` Perform Business Operation action, which creates the POBean object:

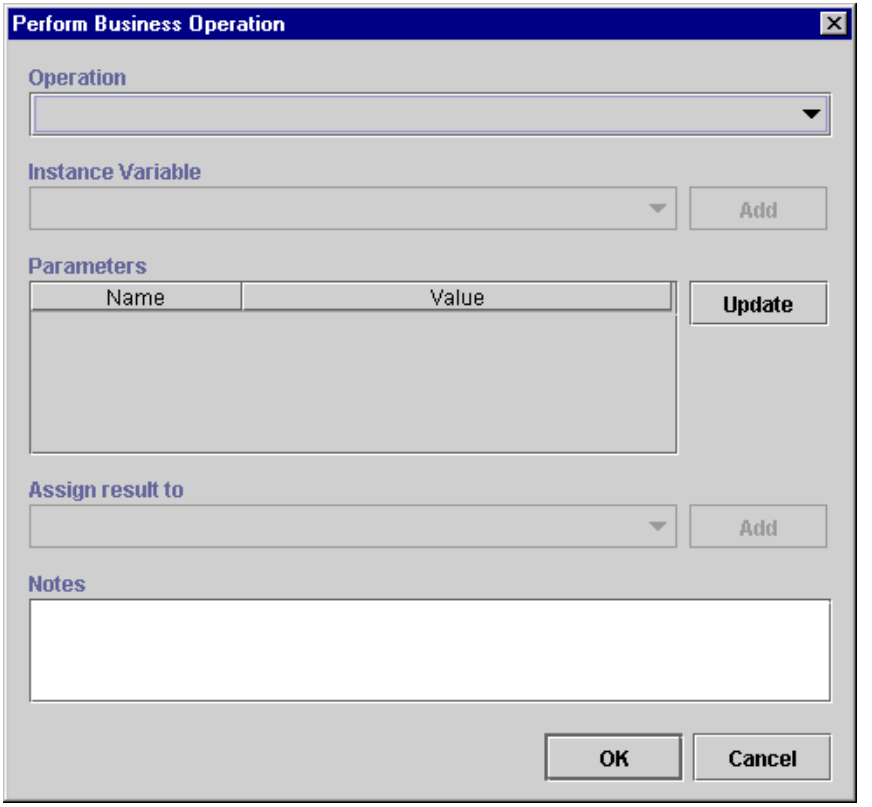
1. In the workflow diagram, double-click the Inventory Check task.
2. In the Task Properties dialog box, select the Activated tab, then click Add to display the Add Action dialog box.

Figure 2-37 Add Action: Perform Business Operation



3. In the Add Action dialog box under Integration Actions, select the Perform Business Operation action, and click OK to display the Perform Business Operation dialog box.

Figure 2-38 Perform Business Operation Dialog Box



4. The Operation drop-down list contains three business operations `Check Inventory`, `Calculate Total Price`, and `Create PO Bean` that you defined earlier. Select `Create PO Bean`.

   Note: No parameters are associated with the `Create PO Bean` business operation, since it represents a home method session EJB.

   The Assign result to (int) drop-down list already contains the value associated with this business operation, `PoBeanHandle`.

5. Click OK to return to the Task Properties dialog box.

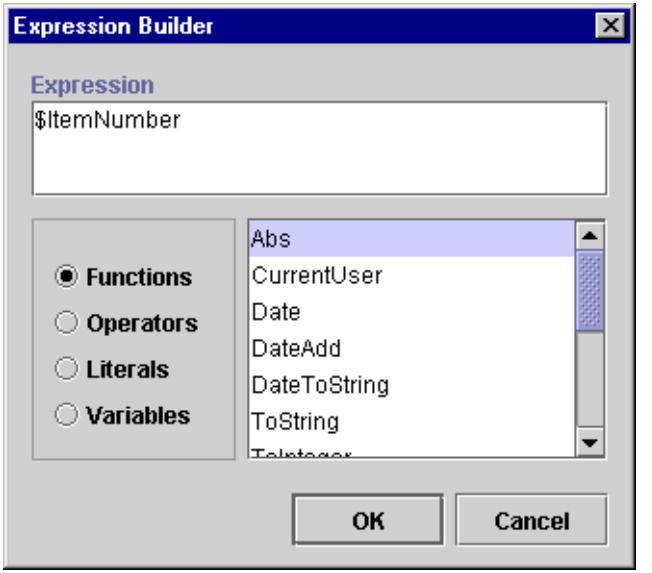
Defining the Check Inventory Perform Business Operation Action

To define the `Check Inventory` Perform Business Operation action, which returns the total number of items in stock:

1. With the Inventory Check Task Properties dialog box still open, select the Activated tab, then click Add to display the Add Action dialog box. (See Figure 2-37.)
2. In the Add Action dialog box under Integration Actions, select the Perform Business Operation action, and click OK to display the Perform Business Operation dialog box. (See Figure 2-38.)
3. From the Operation drop-down list, select the `Check Inventory` business operation.

   Instance Variable, Parameter Name, and Assign result to are already populated with values correlating to the `Check Inventory` business operation.
4. In the Parameters section, the variable `ItemNumber` (defined earlier) is automatically inserted. Highlight it and click the Update button to display the Expression Builder. You will use the Expression Builder to specify the value of the `ItemNumber` input parameter.

Figure 2-39 Expression Builder Dialog Box

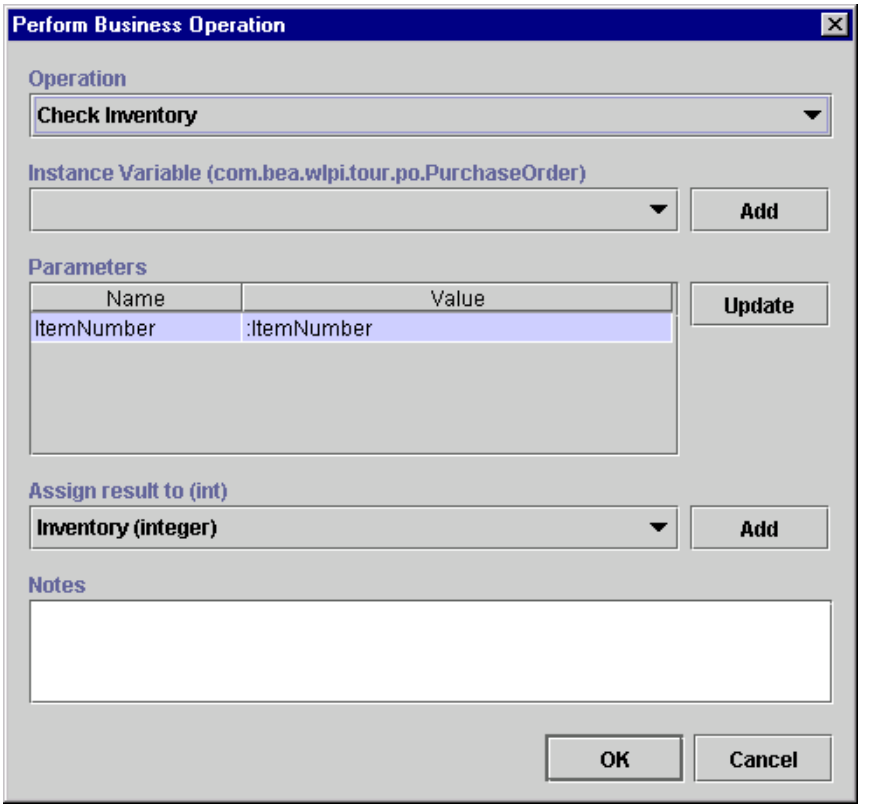


5. Select the Variables radio button, and from the scrollable list of variables (which you defined earlier), select the `ItemNumber` input parameter.
6. Double-click on this parameter to display it in the Expression field, then click OK.

   The Value field of the Perform Business Operation dialog box is now populated with the `$ItemNumber` parameter value.
7. From the Assign result to (int) drop-down list, select the variable `Inventory (integer)`, and click OK to return to the Task Properties dialog box.

   You have now placed the value of the variable `ItemNumber` as the input parameter to the JavaBean POBean and the variable `Inventory (integer)` will get the result back from the execution of this JavaBean.

Figure 2-40 Perform Business Operation Dialog Box: Check Inventory

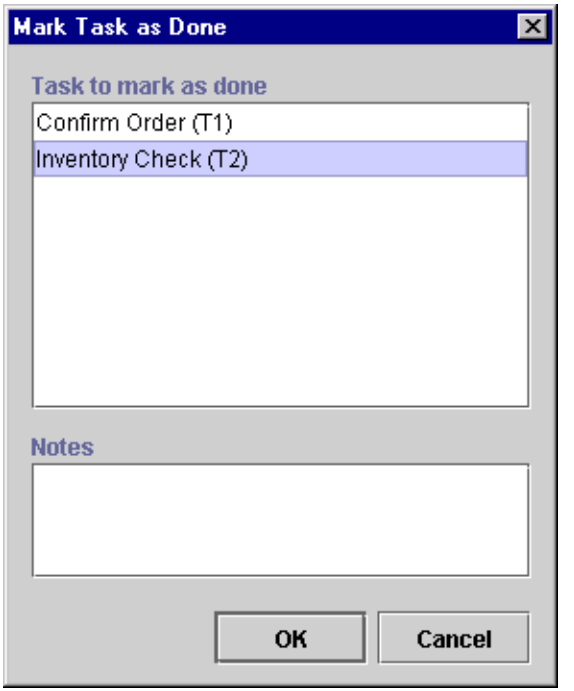


Defining the Mark Task as Done Action

You will now add the Mark Task as Done action to the Activated tab of the Task Properties dialog box. This action marks the task as done once all other actions within this task are performed and activates the C2 Decision node.

1. With the `Check Inventory` Task Properties dialog box still open, select the Activated tab, then click Add to display the Add Action dialog box. (See Figure 2-37.)
2. In the Add Action dialog box under Task Actions, select the Mark Task as Done action, and click OK to display the Mark Task as Done dialog box.

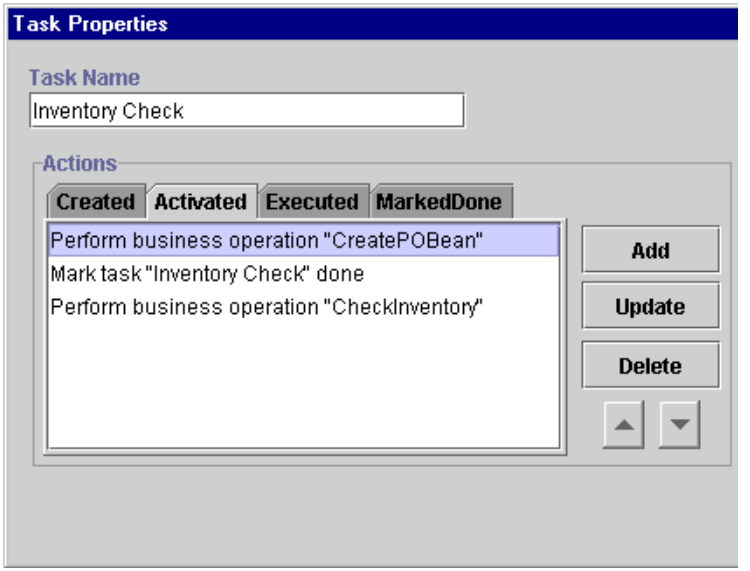
Figure 2-41 Mark Task as Done Dialog Box



3. Select the Inventory Check (T2) task as the task to be marked done, and click OK.

   The Activated tab of the Task Properties dialog box now contains three tasks that will be executed upon activation of the workflow. (See Figure 2-42.)

Figure 2-42 Activated Tab



Defining Decisions

A decision allows you to control the flow by evaluating a condition as true or false. Actions can be defined within the decision for each true or false case. The Order Processing workflow contains two decisions: one decision evaluates whether the user has confirmed the order, and the other confirms whether the inventory is available. If the inventory is available, the Order Processing workflow starts the ShipBill workflow, discussed in Chapter 4, “Defining the ShipBill Workflow: An Exception Handling Example.”

Decision: Has Order Been Confirmed?

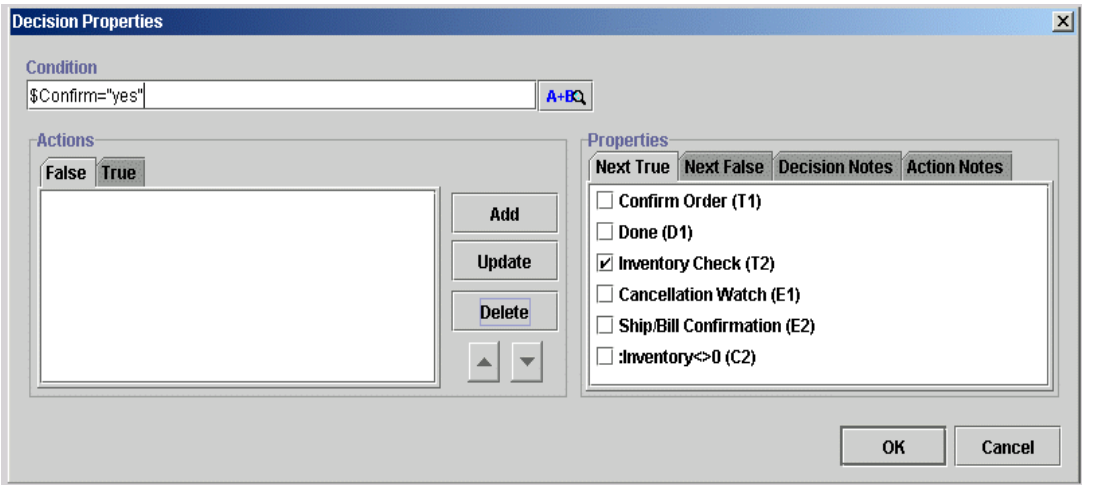
The first decision checks whether the user has confirmed the order. If the order has been confirmed, the flow continues to the next task Inventory Check. If the order has not been confirmed, an XML message is sent to cancel the workflow; the Cancellation Watch event in the workflow is triggered by this XML message, and the succeeding done node will cause the workflow to cancel.

Defining the C1 Decision Node

To define the C1 decision node:

1. With the Order Processing workflow diagram open in the drawing area, double-click the C1 decision shape to display the Decision Properties dialog box.

Figure 2-43 Decision Properties Dialog Box



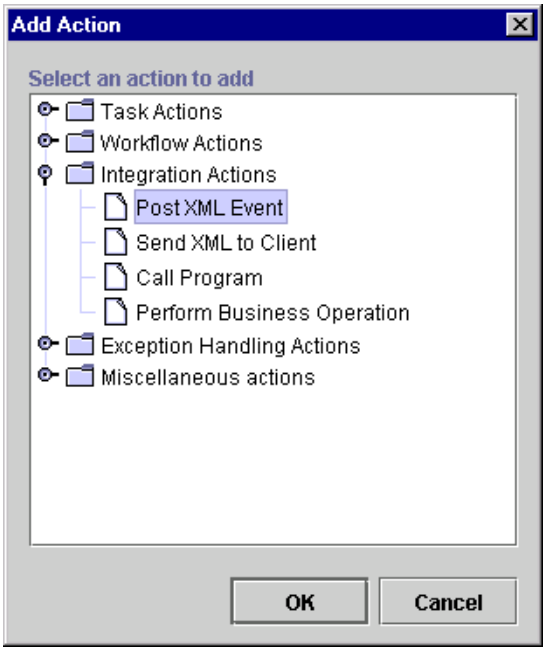
2. In the Condition field, enter `$Confirm="yes"` to rename the C1 decision node. Note that this is an expression.

   This condition evaluates whether the user has responded Yes or No to the confirmation of the order. If the condition is true (the user has double-clicked Confirm Order in the worklist and responded Yes to the Confirm Order message), the flow moves to the next node. If the condition is false, an XML message is sent to the workflow server, which cancels the order.

3. The action that allows you to define an XML document and post it is Post XML Event in the Integration Actions category. Select the False tab in the Decision Properties dialog box. In the False tab, you set up the Post XML Event action. If the condition evaluates to false (if the order is not confirmed by the user joe), WebLogic Process Integrator will trigger the event Cancellation Watch as a result of this particular XML document. You will set up the Cancellation Watch event in "Defining Events."

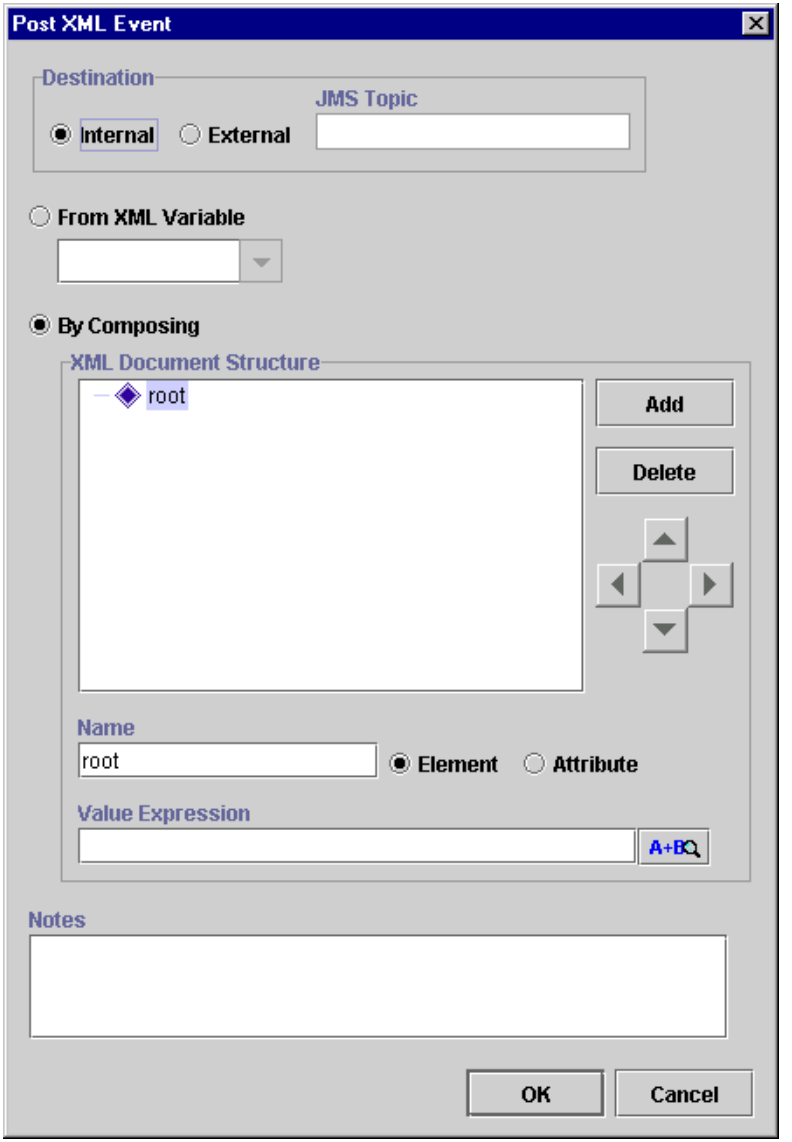
4. Click Add to display the Add Action dialog box.

Figure 2-44 Decision Properties Dialog Box



5. Under Integration Actions, select Post XML Event and click OK to display the Post XML Event dialog box.

Figure 2-45 Post XML Event Dialog Box



Defining the XML Document Structure

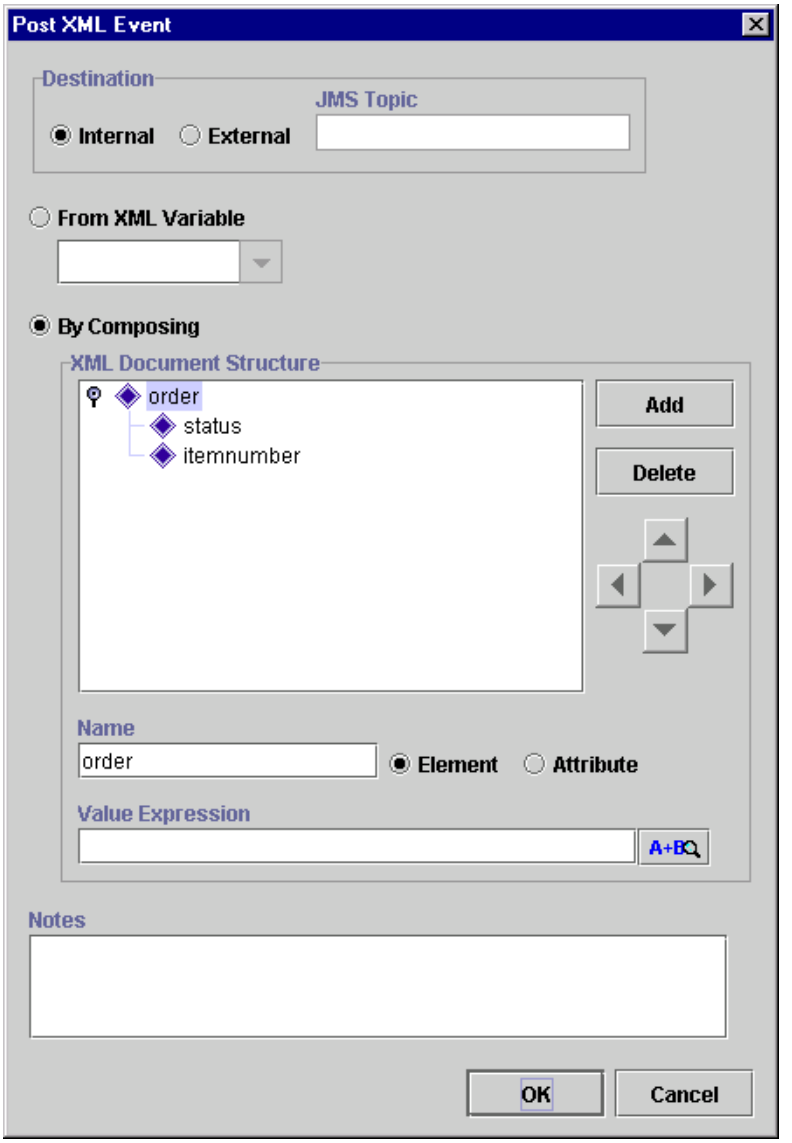
In the Post XML Event dialog box, you define an XML document. In this example, the XML document has the root element `order` and two subelements:

- `status` having a value of `"cancelled"`
- `itemnumber` identifying the order that is being cancelled

To define the XML document structure:

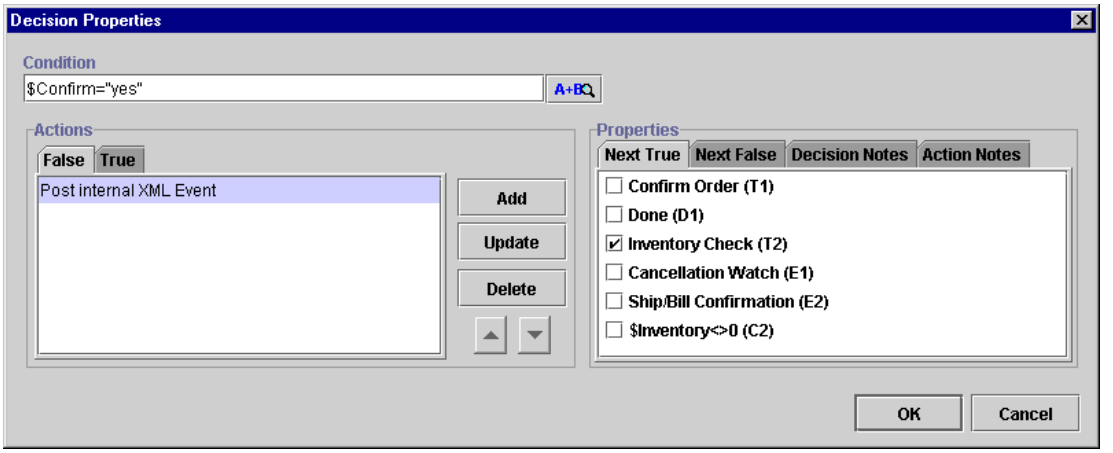
1. Select the By Composing radio button on the Post XML Event dialog box.
2. Select the root element `root`, and in the Name field, type `order`.
3. Select the Element radio button.
4. Click Add to insert a new XML node in the XML document structure.
5. Highlight the new XML node, and in the Name field, type `status`.
6. In the Value Expression field, type `"cancelled"`.
7. Highlight the `order` node, and click Add to insert a new node in the XML document structure.
8. Highlight the new node, and in the Name field, enter `itemnumber`.
9. In the Value expression field, enter `$ItemNumber`.

Figure 2-46 Post XML Event Dialog Box



10. Click OK to add the action to the False tab of the Decision Properties dialog box.

Figure 2-47 Decision Properties Dialog Box



As you will see in the "Defining Events" section, the event Cancellation Watch will be triggered by this particular XML document.

Decision: Is Item Available?

This decision evaluates the value of a variable that is set as the result of a call to the JavaBean POBean. The value is the quantity in stock of the ordered item. If this number is zero, the order is cancelled. If the number is greater than zero, the ShipBill workflow is started by the Start Workflow action and the flow moves on to the next node, which is the Ship/Bill Confirmation event. (In this example, the available number of items is greater than the numbers of items ordered.)

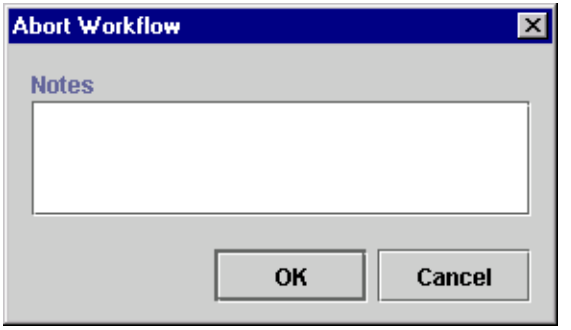
To define the C2 Decision node:

1. In the workflow diagram, double-click the C2 Decision shape to open the Decision Properties dialog box.
2. In the Condition field, type `$Inventory<>0`. (This means "Inventory not equal to zero.")

This expression can be typed directly into the Condition description field or can be constructed using the Expression Builder, accessed by clicking the A+B button. This condition evaluates whether the user has responded Yes or No to the confirmation of the order.

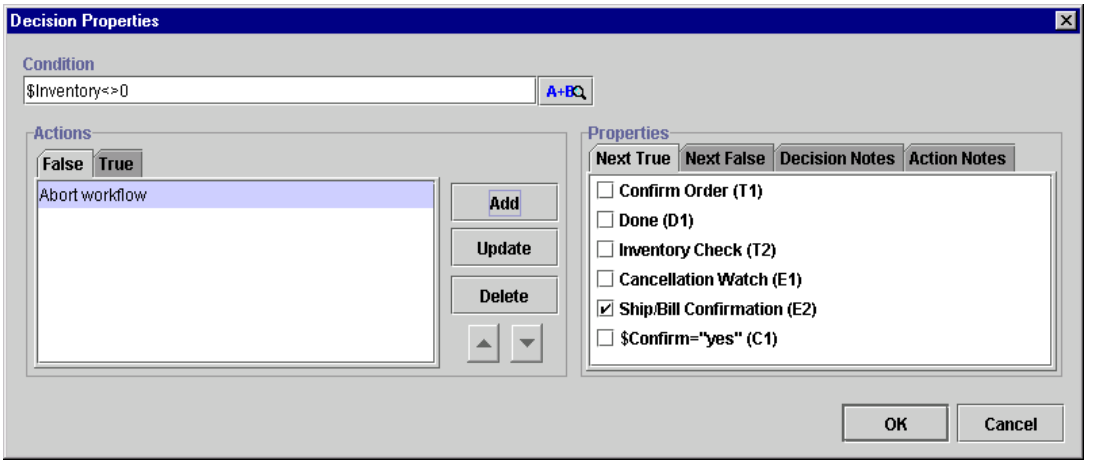
3. Select the False tab and Click Add.
4. In the Add Action dialog box under Workflow Actions, select the Abort Workflow action and click OK to display the Abort Workflow dialog box.

Figure 2-48 Abort Workflow Dialog Box



5. You do not need to enter anything in this dialog box. Simply click OK.
6. The Abort Workflow action is added to the False tab in the Decision Properties dialog box. If the condition "Inventory not equal to zero" (`$Inventory<>0`) is false, the Abort Workflow action causes the workflow to cancel and the order cannot be completed.

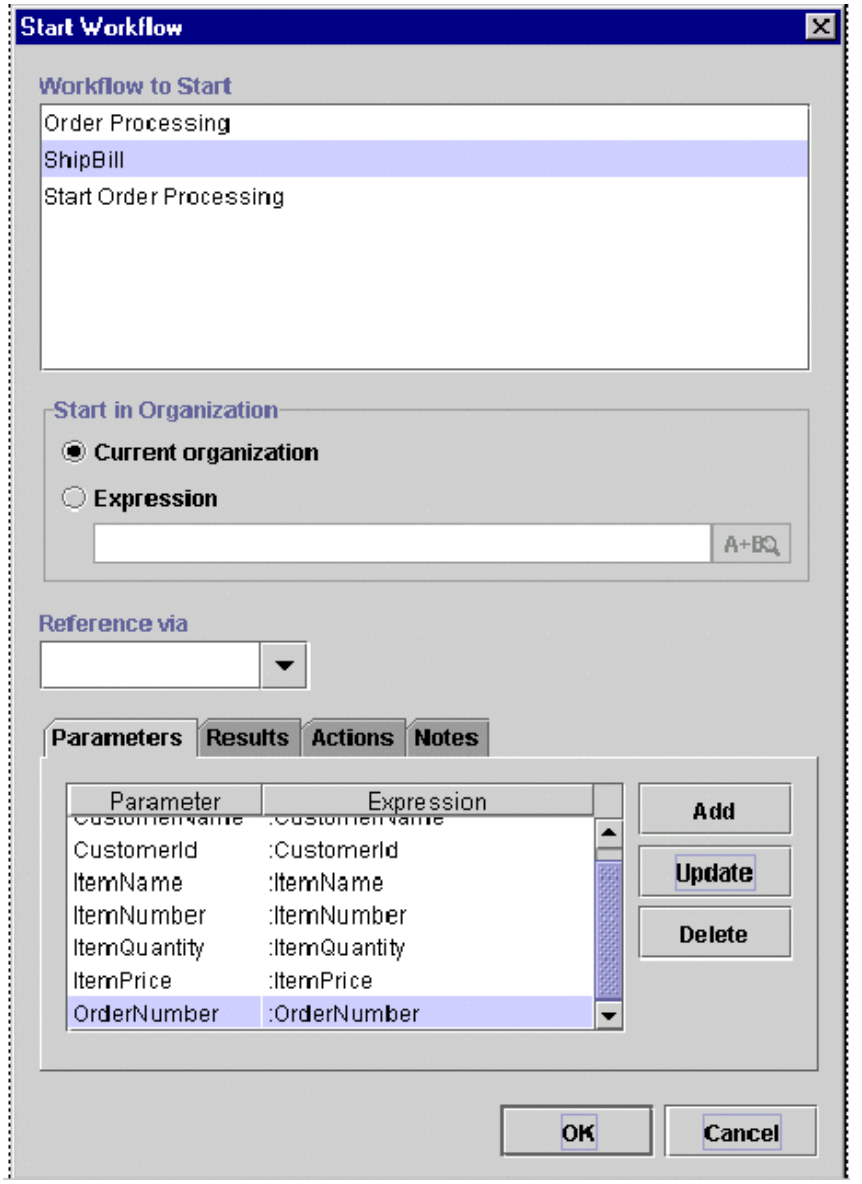
Figure 2-49 Decision Properties Dialog Box: Abort Workflow Action



7. Select the True tab and click Add to display the Add Action dialog box.
8. Under Workflow actions, select the Start Workflow action and click OK to display the Start Workflow dialog box.

   The Start Workflow action enables you to start a sub-workflow (in this case, ShipBill) from the current workflow, Order Processing.

Figure 2-50 Start Workflow Dialog Box



9. In the Workflow to Start portion of the dialog, select ShipBill.

10. Under Start in Organization, select Current Organization.

In this example, the organization will remain ORG1, and the value of some variables are transferred from the Order Processing workflow to the ShipBill workflow.

As the example progresses, the variables in the "child" workflow (ShipBill), which will receive values from the "parent" workflow (Order Processing), will be defined as input variables within the variable definition dialog box. All input variables of the child workflow will automatically be displayed. Ordinarily, you can then use the Expression Builder to assign values to them. (In the example, we are simply transferring the values of the variables in the current workflow.)

Defining Events

An event is a notification node. An event is triggered by the arrival of an XML document that is produced internally within the WebLogic Process Integrator processing engine or from an external source through a Java Message Service (JMS) topic. When the flow reaches an event node, it waits until that event is triggered. An event can be cancelled by using the Cancel XML Event action.

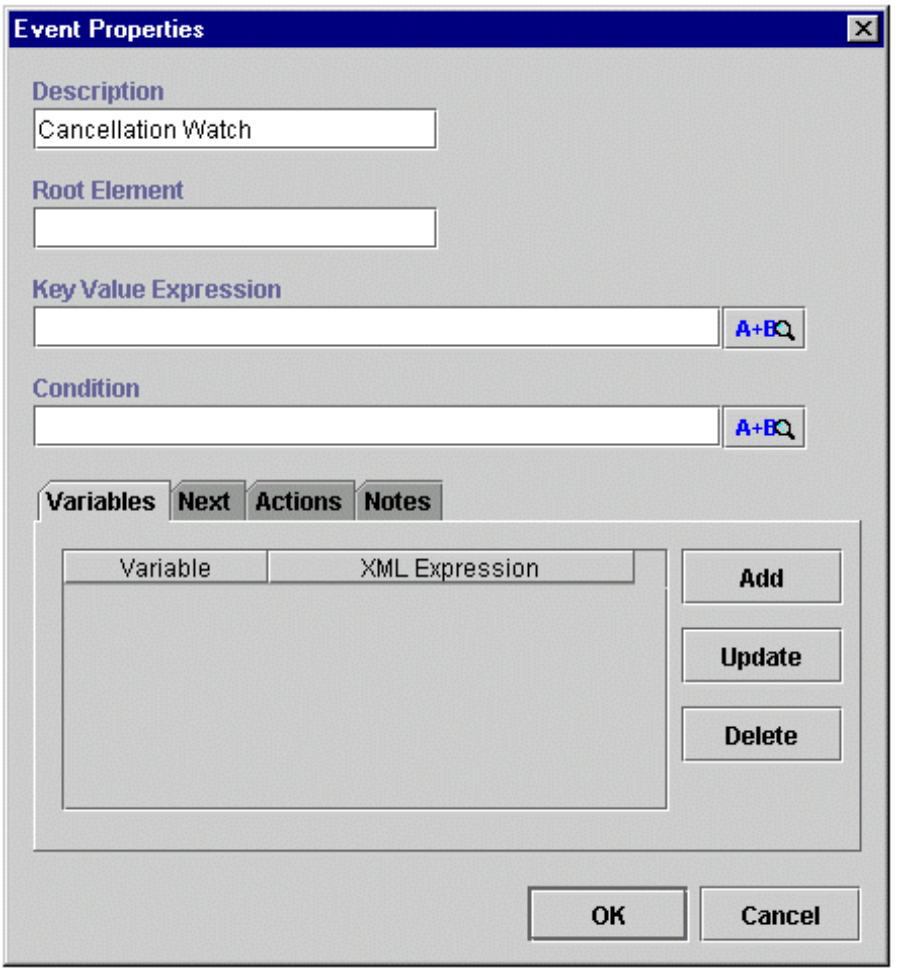
The example contains two events: one event waits for the cancellation message, and the other event is triggered upon receipt of the shipping and billing confirmation in order to complete the order.

Event: Cancellation Watch

To define the Cancellation Watch event:

1. In the Order Processing workflow diagram, double-click the Cancellation Watch (E1) event to open the Event Properties dialog box.

Figure 2-51 Event Properties Dialog Box

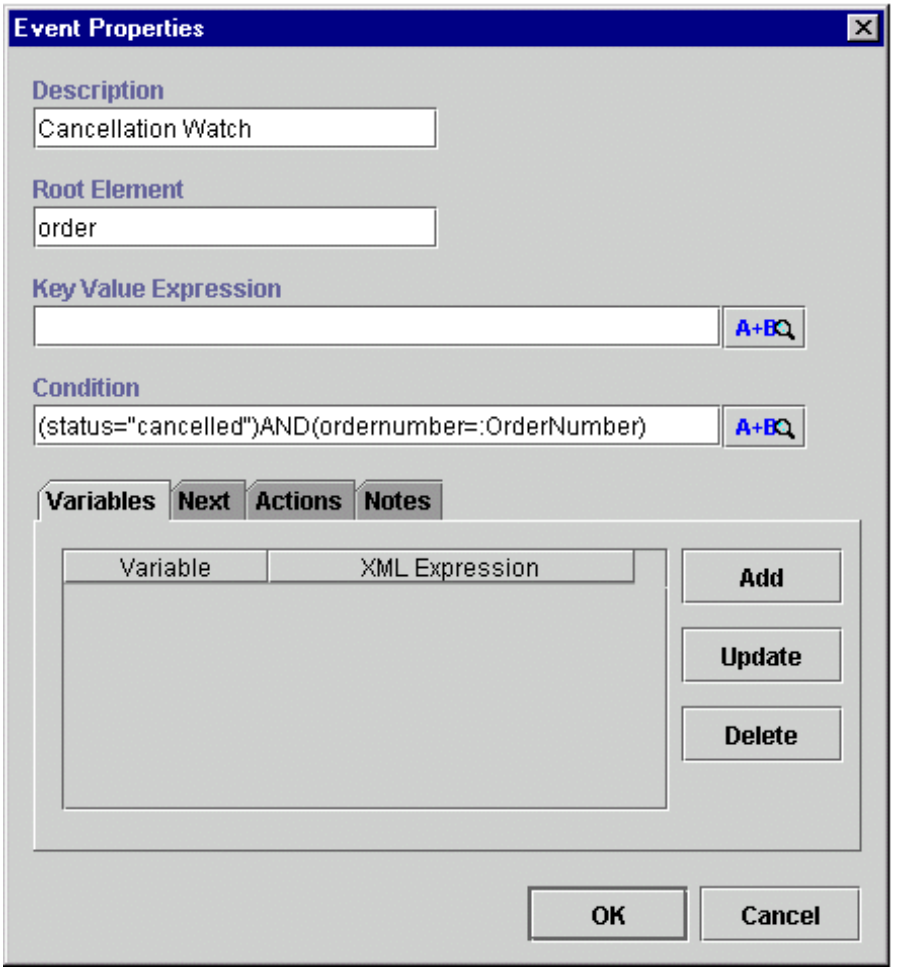


2. In the Root Element field, enter the root element of the XML document: `order`. As described in the "Decision: Has Order Been Confirmed?" section, `order` is the root element of the XML message sent by the Confirm Order task if the user does not confirm the order.

3. In the Condition field, enter the condition to be satisfied. In this case, the condition is for the status to be `"cancelled"` and the ID of the workflow to match the value of the variable `OrderNumber`. Enter the condition as an expression in the Condition field or use the Expression Builder to compose the expression by clicking the A+B button. The expression in the Condition field should be:

   ```
   (status="cancelled")AND(ordernumber=:OrderNumber)
   ```

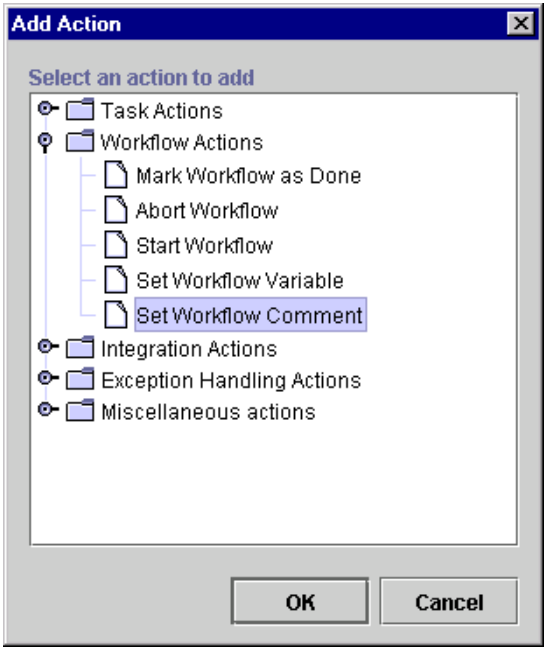
Figure 2-52 Event Properties Dialog Box



No further actions will be performed within this event, and the flow will move to the next node, which is the done node. However, in order to distinguish between a cancelled order and a completed one (having reached the done node of the workflow), you will add a workflow comment that will be displayed on the monitoring window upon execution of this workflow and when the cancellation occurs.

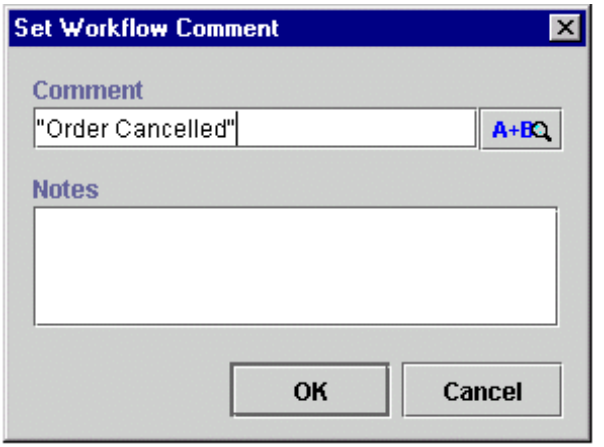
4. Select the Actions tab and click Add to display the Add Action dialog box.

Figure 2-53 Add Action Dialog Box



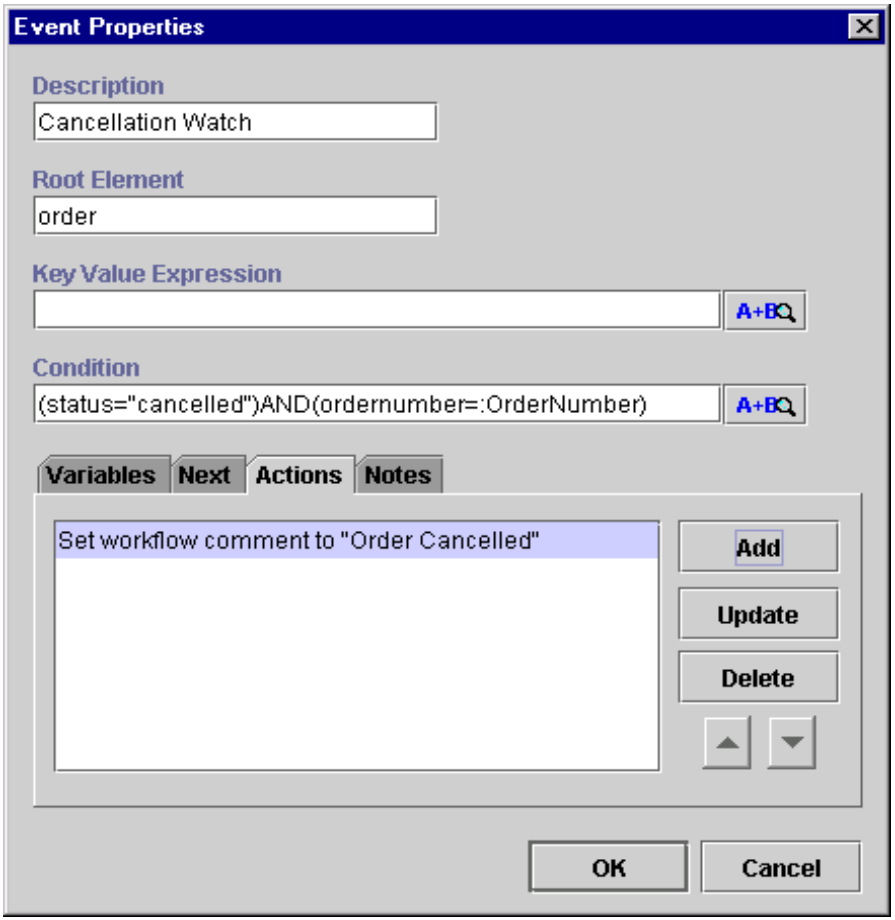
5. In the Add Action dialog box under Workflow Actions, select Set Workflow Comment and click OK.
6. In the Set Workflow Comment dialog box, type `"Order Cancelled"`.

Figure 2-54 Set Workflow Comment Dialog Box



7. Click OK to add the action to the Actions tab of the Event Properties dialog box.

Figure 2-55 Event Properties Dialog Box



Event: ShipBill Confirmation

Next, you set up the ShipBill Confirmation event, which waits for the ShipBill workflow to send back an XML document confirming the shipping and billing for the ordered item. (The ShipBill workflow is predefined for this example and is discussed in Chapter 4, "Defining the ShipBill Workflow: An Exception Handling Example.")

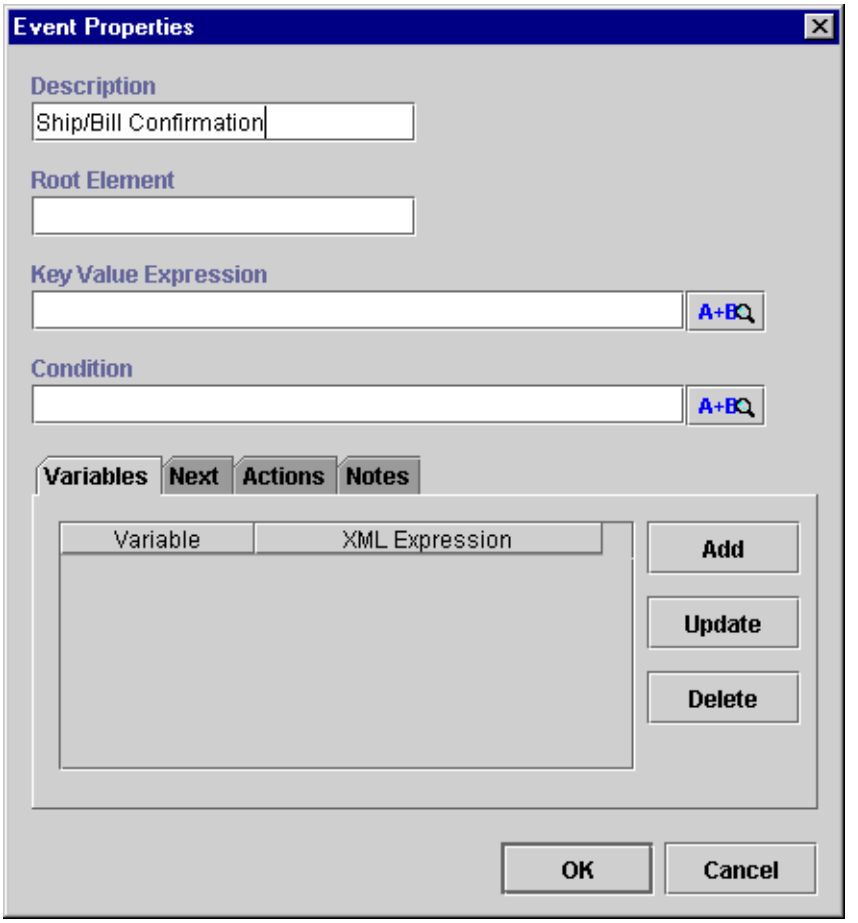
The root element of the XML message that will trigger this event is `order`, the same element that triggers the Cancellation Watch event. The condition, however, is different. For this event to be triggered, the status has to be `"complete"`.

The total price of the item calculated by the JavaBean POBean in the ShipBill workflow is also returned to this workflow through the XML document.

To define the ShipBill Confirmation event:

1. In the Order Processing workflow diagram, double-click the ShipBill Confirmation (E2) event to open the Event Properties dialog box.

Figure 2-56 Event Properties Dialog Box



2. In the Root Element field, enter the root element of the XML document: `order`. As described in the "Decision: Has Order Been Confirmed?" section, `order` is the root element of the XML message sent by the Confirm Order task if the user does not confirm the order.

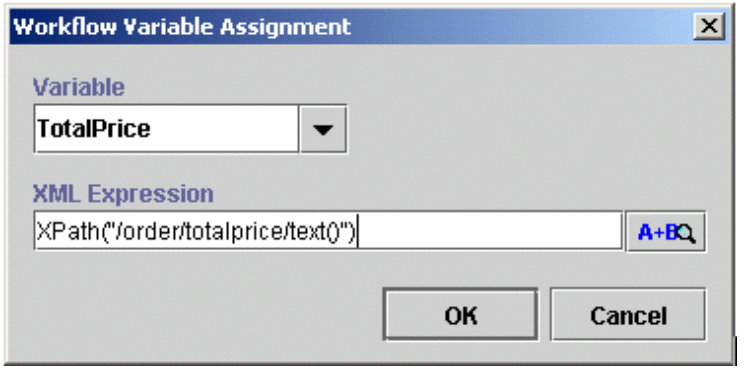
3. In the Condition field enter the condition to be satisfied. In this case, the condition is for the status to be `"complete"`. The status must be such in order to trigger the Ship/Bill Confirmation event. Enter the condition as an expression in the Condition field or use the Expression Builder to compose the expression by clicking the A+B button. The expression should read as follows:

   ```
   status="complete"
   ```

   Next, you will set up an XML document, which returns the total price of the item calculated by the JavaBean POBean in the ShipBill workflow to the Order Processing workflow.

4. In the Event Properties dialog box, click the Add button to display the Workflow Variable Assignment dialog box.

Figure 2-57 Workflow Variable Assignment Dialog Box



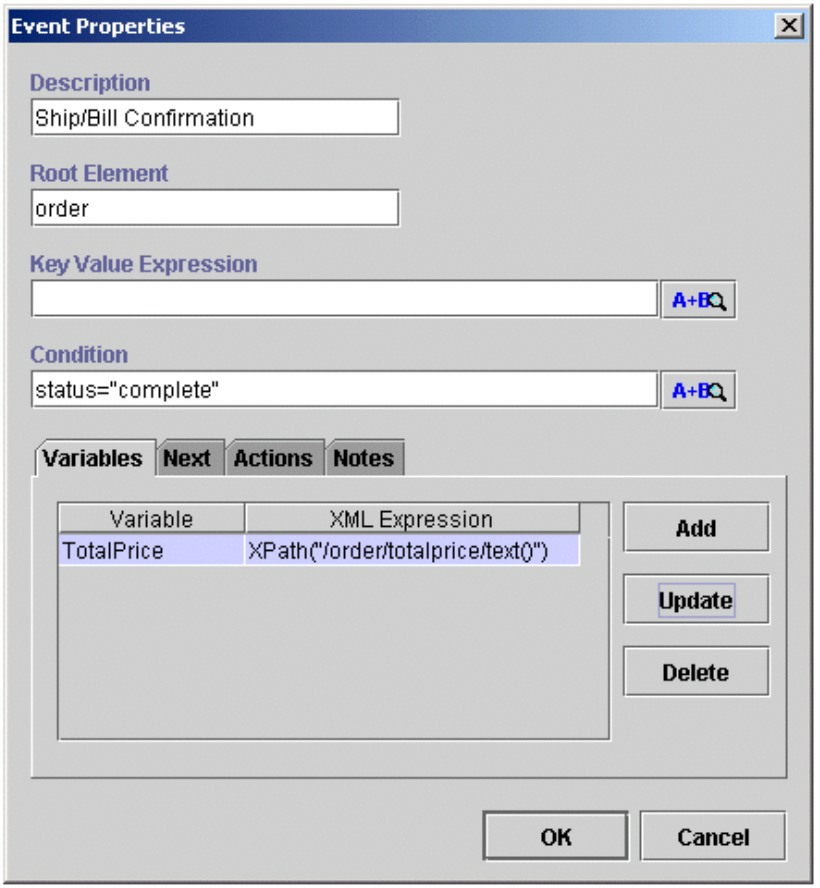
5. From the Variable drop-down list, select the variable `TotalPrice`.

6. In the XML Expression field, enter the XML expression directly in the field or use the A+B button to access the Expression Builder to compose the expression, then click OK. The expression should read as follows:

   ```
   XPath("/order/totalprice/text()")
   ```

Your final Event Properties dialog box should look like the following figure:

Figure 2-58 Final Event Properties Dialog Box



Setting Up the Trigger

The Order Processing workflow is an event-triggered workflow. An XML document will be constructed and sent from the Start Order Processing workflow to trigger the Order Processing workflow. You specify the trigger conditions for the workflow in the Start node. There are four ways to start a workflow:

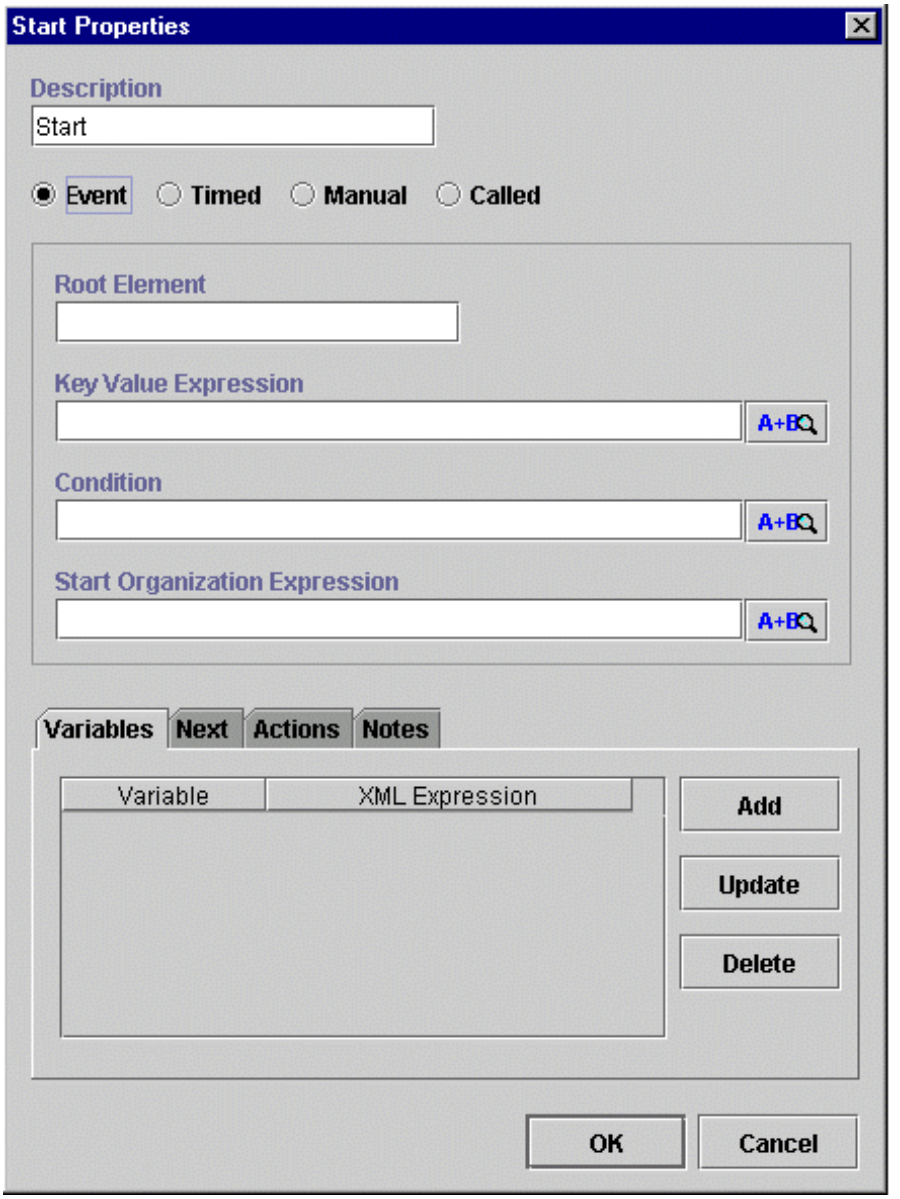
- Event—XML document
- Timed—exact date and time start
- Manual—manual start from the worklist
- Called—called from another workflow by the Start Workflow action

This example uses the Event method. The root element of the XML document will be `order`, and the condition is `status="new"`. The organization for which this workflow should be instantiated also must be specified. Once this workflow is triggered, some of the variables will be populated by values contained in the XML document.

To set up the XML document that will trigger the Order Processing workflow:

1. In the Order Processing workflow diagram, double-click the Start node to display the Start Properties dialog box.
2. Select the Event radio button.

Figure 2-59 Start Properties Dialog Box: Event



3. In the Root Element field, enter the root element of the XML document: `order`. As described in the "Decision: Has Order Been Confirmed?" section, `order` is the root element of the XML message sent by the Confirm Order task if the user does not confirm the order.

4. In the Condition field, enter the condition to be satisfied. In this case, the condition is for the status to be `"new"`. The status must be such in order to trigger the Order Processing workflow whenever a new order is processed. Enter the condition as an expression in the Condition field or use the Expression Builder to compose the expression by clicking the A+B button. The expression should look like the following:

   ```
   status="new"
   ```

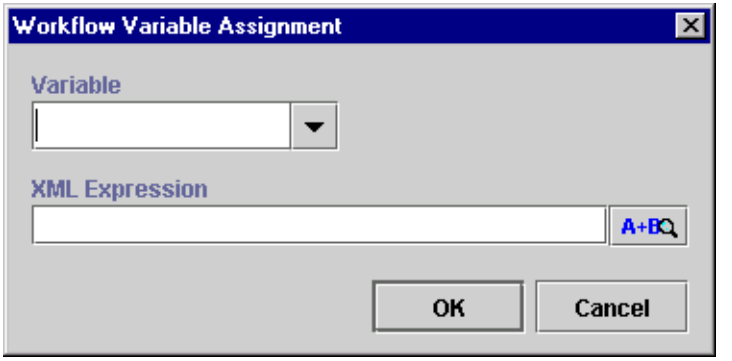
5. In the Start Organization Expression field, enter an expression indicating in which organization the Order Processing will be started:

   ```
   "ORG1"
   ```

   Next, you will construct an XML document by defining the variable `CustomerName` to extract the value of the element name from the root `customer`.

6. Click the Add button to display the Workflow Variable Assignment dialog box.

Figure 2-60 Workflow Variable Assignment Dialog Box



7. From the Variable drop-down list, select the variable `CustomerName`.
8. In the XML Expression field, enter the XML expression to extract the value of the element name from the root `customer`. Enter the XML expression directly in the field or use the A+B button to access the Expression Builder to compose the expression:

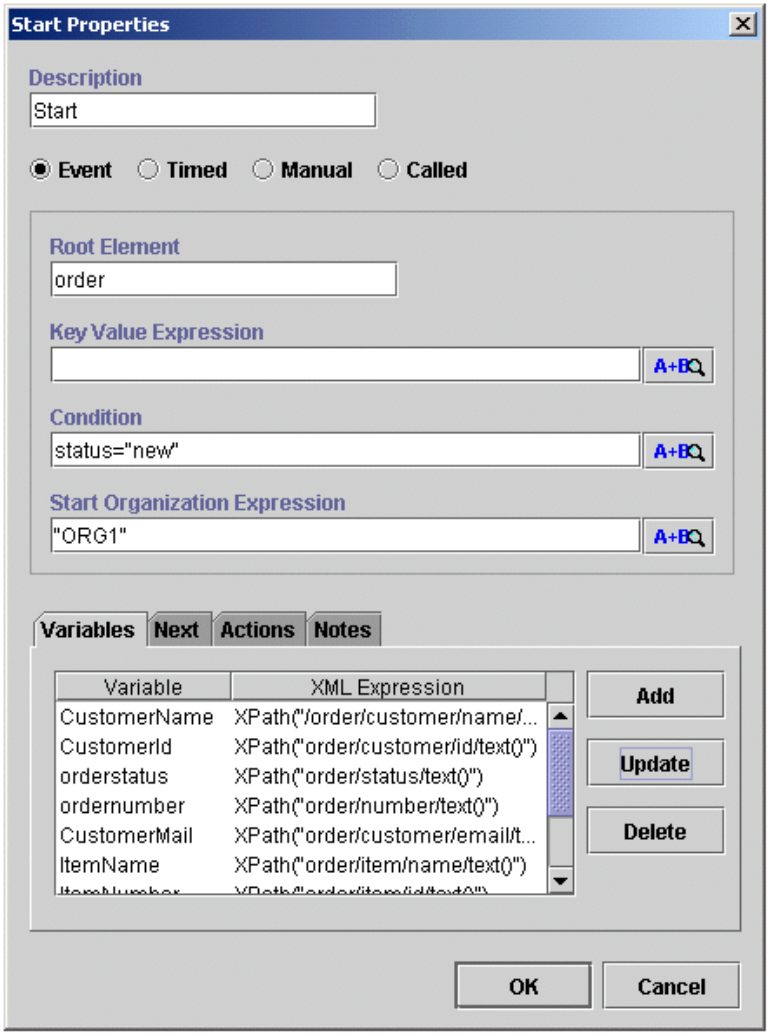
   ```
   XPath("/order/customer/name/text()")
   ```

9. Click OK.
10. Repeat steps 7 through 9 for the following variables:

Table 2-3 Variable Expressions

Variable	Expression
CustomerId	`XPath("order/customer/id/text()")`
CustomerMail	`XPath("order/customer/email/text()")`
CustomerState	`XPath("order/customer/state/text()")`
ItemName	`XPath("order/item/name/text()")`
ItemNumber	`XPath("order/item/id/text()")`
ItemQuantity	`XPath("order/item/quantity/text()")`
ItemPrice	`XPath("order/item/price/text()")`
OrderStatus	`XPath("order/status/text()")`
OrderNumber	`XPath("order/number/text()")`

Figure 2-61 Start Properties Dialog Box



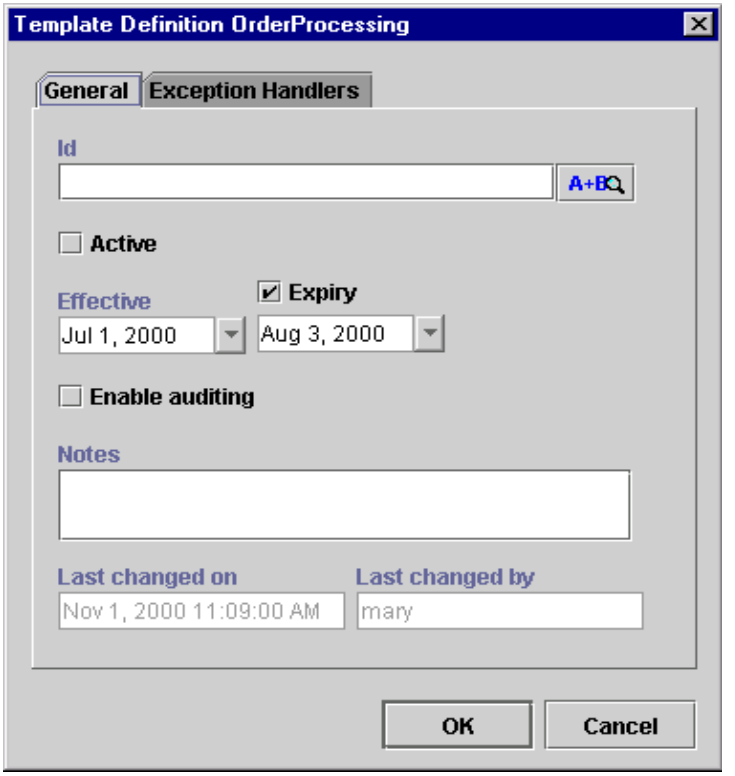
Setting Up the Workflow Template Definition Processing Properties

In order to process the Order Processing workflow, you must set up certain workflow template definition processing properties. The workflow must be marked as Active in the Properties dialog before it can be instantiated.

To set up the workflow template definition processing properties:

1. In the main window of the WebLogic Process Integrator Studio, expand the Order Processing folder to display its template definitions.
2. Right-click the template definition and choose Open to open the template definition, and right-click the template definition again and choose Properties from the pop-up menu to display the Template Definition Order Processing dialog box.

Figure 2-62 Template Definition Order Processing Dialog Box



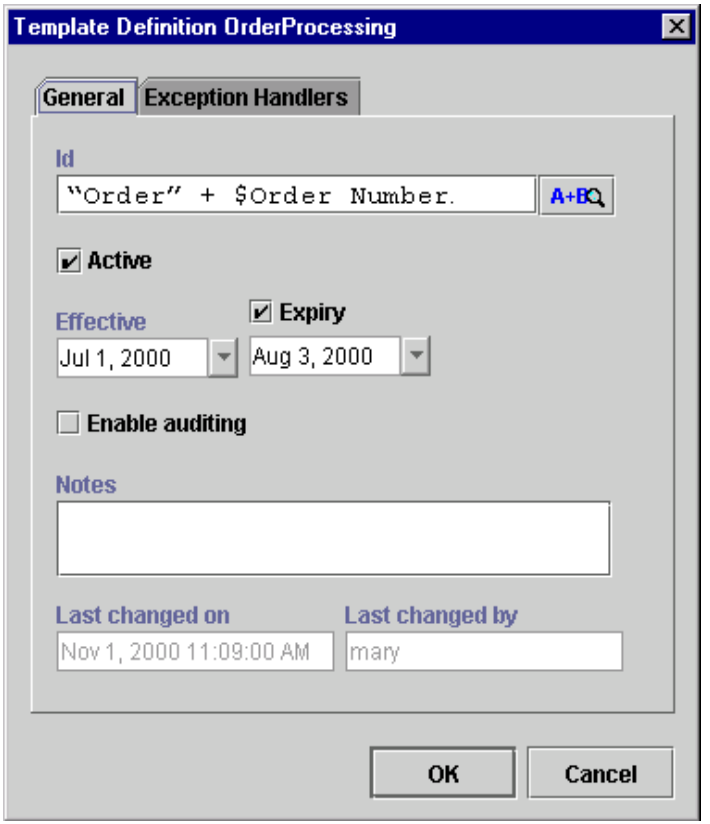
3. In the Id field, type `"Order" + $Order Number`.

   The ID for the Order Processing workflow will be displayed on the worklist and on the monitoring screens. This ID is unique for each instance of this workflow; it is an expression built using workflow variables.

4. Select the Active checkbox to allow the instantiation of the Order Processing workflow at run time. (A workflow cannot start unless it is marked Active.)

   You already defined the Effective and Expiry dates when you created the workflow template definition for Order Processing in "Creating a New Workflow Template Definition."

Figure 2-63 Template Definition Order Processing Dialog Box



5. Click OK.

Note: For instructions on using the Exception Handlers tab to set up an exception handler, see Chapter 4, "Defining the ShipBill Workflow: An Exception Handling Example."

CHAPTER

3 Defining the Start Order Processing Workflow

The Start Order Processing workflow contains only one task, which, upon execution, creates an XML document that in turn triggers the Order Processing workflow.

The following sections describe the process of creating and defining the Start Order Processing workflow:

- Creating the Start Order Processing Workflow Template
- Importing the Start Order Processing Workflow Template Definition
- Start Order Processing Workflow Template Definition Overview

Creating the Start Order Processing Workflow Template

Create a new workflow template called Start Order Processing by following the procedure in "Creating a New Workflow Template" in Chapter 2, "Defining the Order Processing Workflow." This workflow template will serve as the container into which you will import the Start Order Processing workflow template definition.

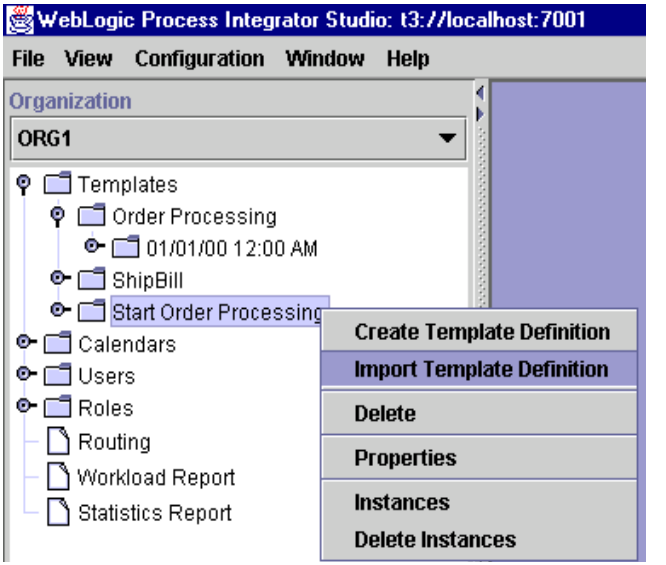
Importing the Start Order Processing Workflow Template Definition

You import the Start Order Processing workflow template definition from the `Examples` subdirectory found in the `Studio` directory, which you loaded onto your computer from the BEA WebLogic Process Integrator CD. All workflow template definitions can be exported and imported as XML documents.

To import the Start Order Processing workflow template definition:

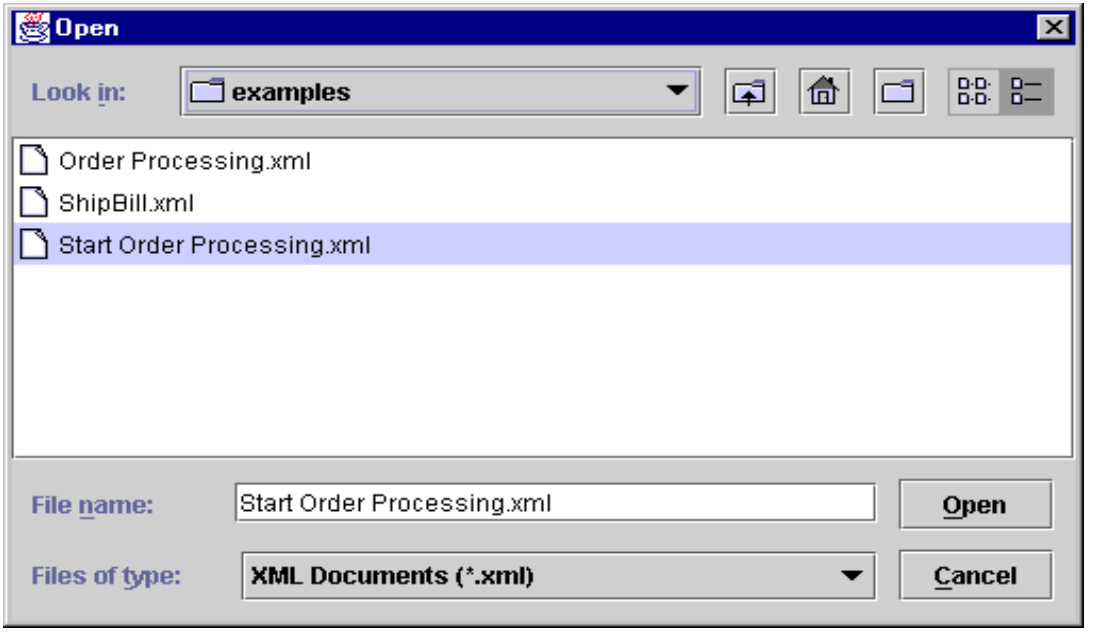
1. In the folder tree of the main Studio window, right-click the Start Order Processing workflow template and choose Import Template Definition from the pop-up menu.

Figure 3-1 Select Import Template Definition



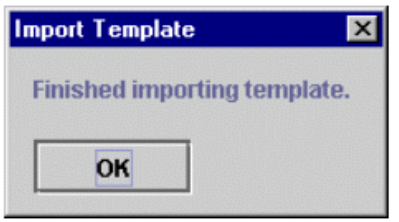
The Open dialog box is displayed.

Figure 3-2 Open Dialog Box



2. Select the Start Order Processing workflow from the directory where you installed the BEA WebLogic Process Integrator Studio product. The Start Order Processing workflow can be found in the `Examples` subdirectory of the `Studio` directory.
3. Click Open. A confirmation message is displayed when the workflow is successfully imported.

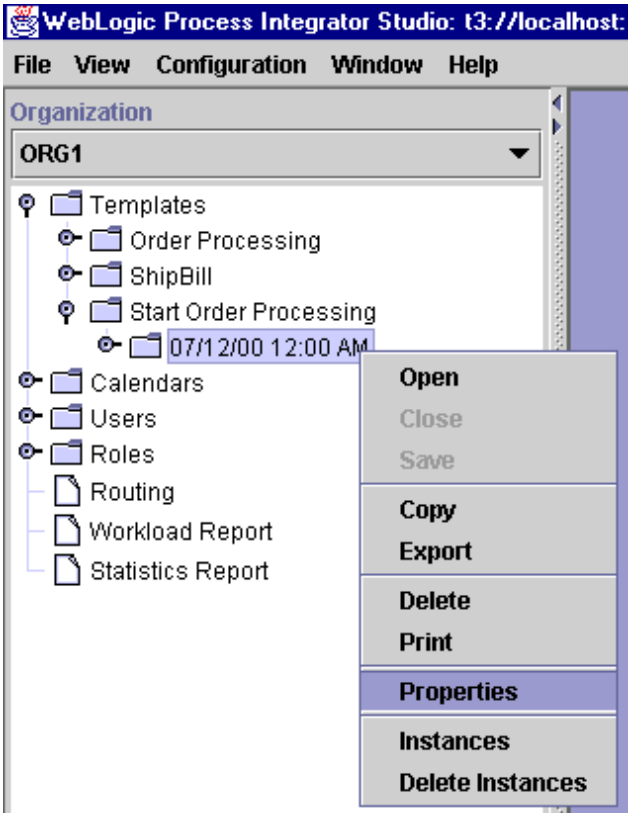
Figure 3-3 Import Template Dialog Box



An imported workflow is marked as inactive. You must mark it as Active before executing the workflow; an inactive workflow cannot be started.

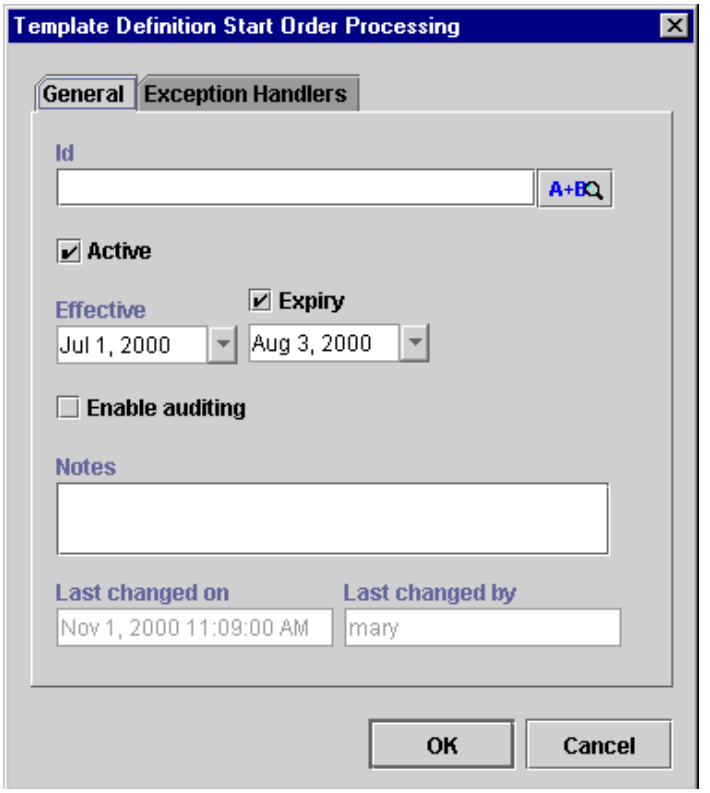
4. In the WebLogic Process Integrator Studio main window, right-click the workflow template definition within the Start Order Processing workflow template.
5. From the pop-up menu, select Properties.

Figure 3-4 Select Properties from Menu



The Template Definition dialog box is displayed.

Figure 3-5 Template Definition Dialog Box



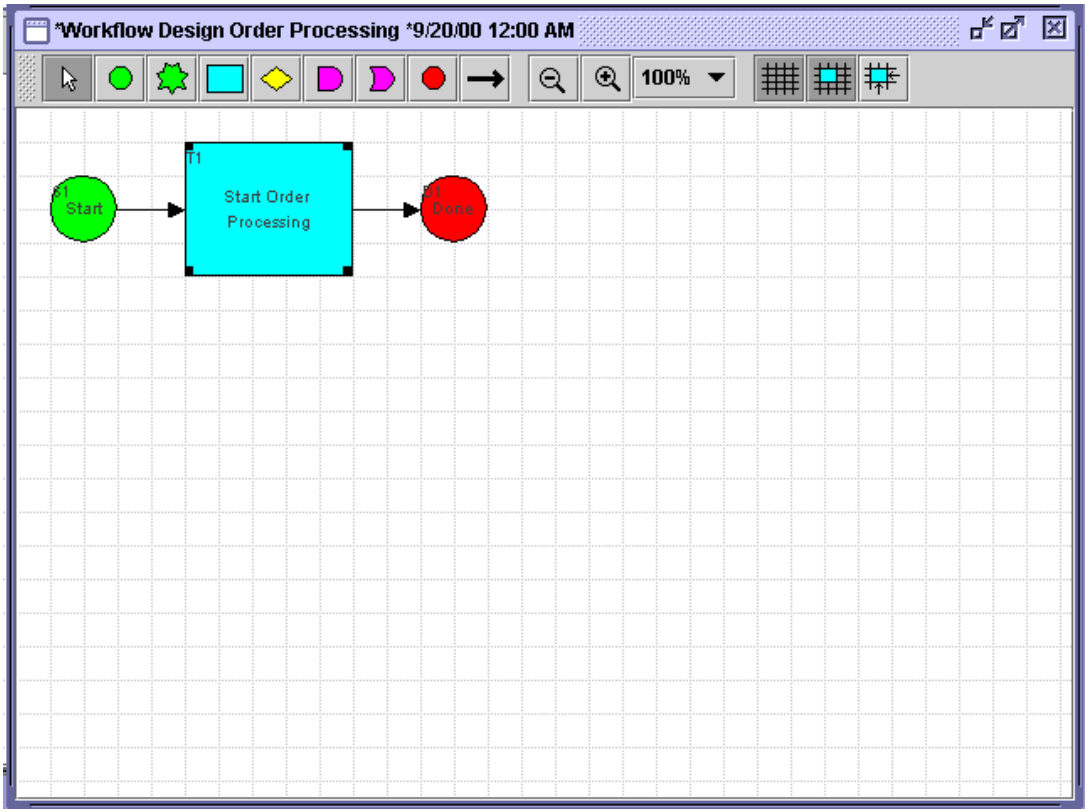
6. Select the Active dialog box to mark the imported Start Order Processing workflow template definition Active, and click OK.

Start Order Processing Workflow Template Definition Overview

Because the workflow template definition for the Start Order Processing workflow was already defined before you imported it, you do not have to perform the tasks discussed in this section for the purpose of this tutorial. However, for your reference, screen shots of dialog boxes that already contain the setup information are provided, as well as an overview of what was involved in defining the Start Order Processing workflow.

For details on procedures for creating and setting up a workflow, see Chapter 2, “Defining the Order Processing Workflow.”

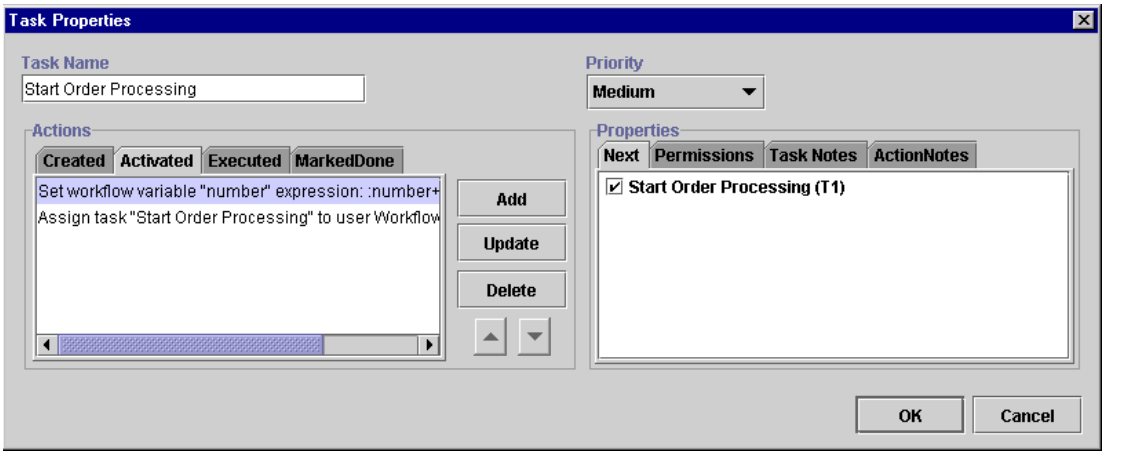
Figure 3-6 Start Order Processing Workflow



The Start node within the Start Order Processing workflow is set to a Manual start and must be started by a user from the Worklist application. Upon instantiation of this workflow, the first and only task, Start Order Processing, is displayed on the task list of the user who started the workflow. Upon the user's execution of the task, an XML document is created that triggers the Order Processing workflow.

In the workflow drawing area, double-click on the Start Order Processing task node to observe its task properties.

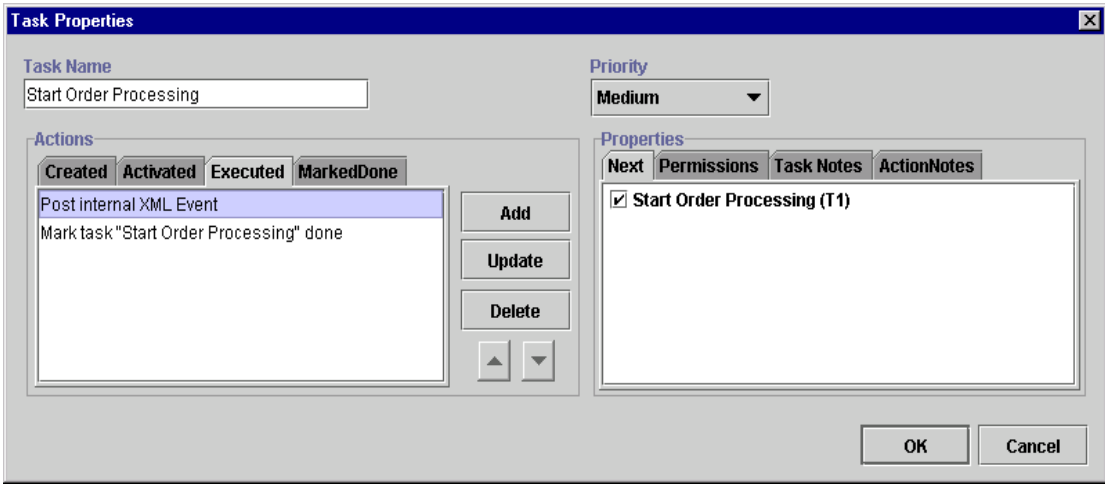
Figure 3-7 Task Properties: Start Order Processing



Under the Activated tab, the variable number is incriminated and the task is assigned to the workflow initiator. Note that the successor to this task is itself. This workflow does not contain a done node and will actually never complete. Because we are using this workflow to start the entire ordering process, the recursive aspect of the Start Order Processing task allows you to start multiple instances of the Order Processing workflow by double-clicking the task in the drawing area (Figure 3-6).

Each time you double-click the task, the ID of the Order Processing workflow is incriminated by 10, which produces a different instance. However, the details of the order contained in the XML document defined by the Post XML Event action will not change, and you will have to modify that action manually if you want to modify the details of the order.

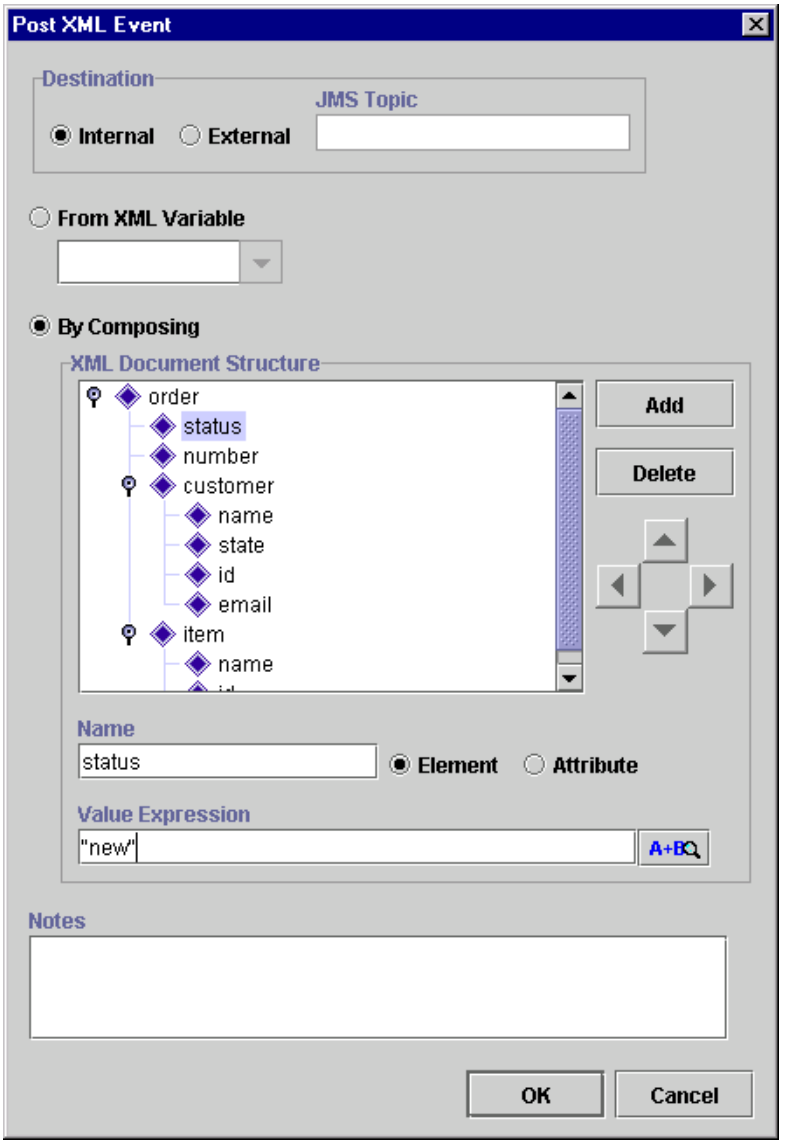
Figure 3-8 Task Properties: Post XML Event Action



Under the Executed tab, you define the Post XML Event action, which sends the XML document to start the Order Processing workflow. In the Post XML Event dialog box, you create the XML document structure. Refer to "Defining Events" in Chapter 2, "Defining the Order Processing Workflow."

Select the Post Internal Event action and click Update to display the Post XML Event dialog box.

Figure 3-9 Post XML Event Dialog Box



The Post XML Event dialog box shows the following XML document:

Listing 3-1 XML Document

```
<Order>
  <status>new</status>
  <number>10</number>
  <customer>
  <name>John</name>
  <id>1234</id>
  <email>joe@bea.com</email>
  <state>CA</state>
  </customer>
  <item>
  <name>disk</name>
  <id>1314</id>
  <quantity >2</quantity >
  <price>24.5</price>
  </item>
<Order/>
```

Finally, you add a Mark Task as Done action to the Executed tab. This action completes this workflow because the successor to the task is the done node.

4 Defining the ShipBill Workflow: An Exception Handling Example

The following sections explain the ShipBill workflow definition:

- ShipBill Workflow Overview
- The Exception Handler
- Billing Task
- Send Confirmation Back Task

ShipBill Workflow Overview

The ShipBill workflow handles the shipping and billing of the ordered item.

In order to demonstrate the Exception Handling facility within WebLogic Process Integrator, the ShipBill workflow contains a user-defined exception handler. An error is purposefully introduced while invoking a business operation within the Billing task; this in turn invokes the user-defined exception handler. For more information on this topic, see Chapter 7, "Handling Workflow Exceptions," in *BEA WebLogic Process Integrator Studio User Guide*.

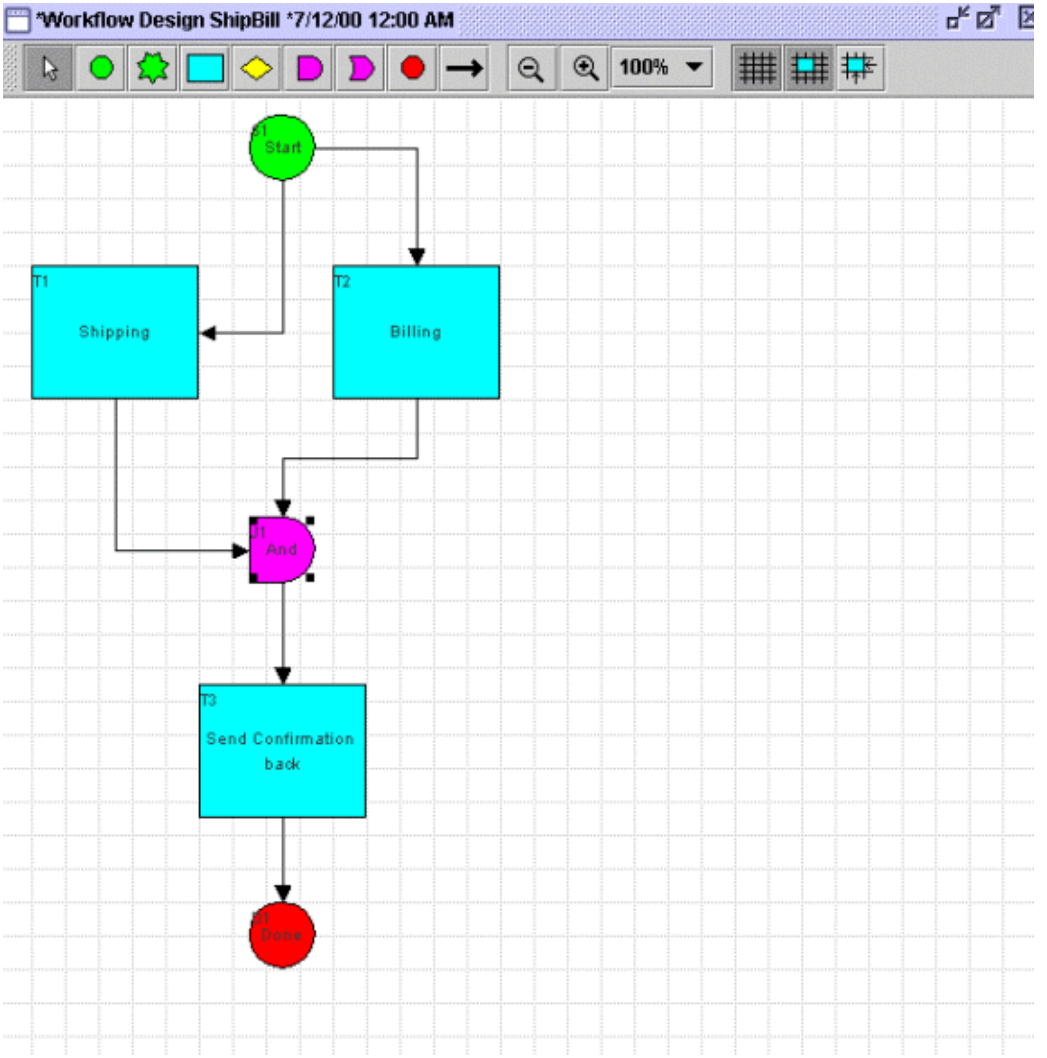
Import the ShipBill workflow template definition by using the procedure described in "Importing the Start Order Processing Workflow Template Definition" in Chapter 3, "Defining the Start Order Processing Workflow."

Once you import the workflow template definition for the ShipBill workflow, you do not have to perform the tasks discussed in this section for the purpose of this tutorial. However, for your reference, screen shots of dialog boxes that already contain the setup information are provided, as well as a brief overview explaining what was involved in defining the Ship/Bill workflow.

For details on procedures for creating and setting up a workflow, see Chapter 2, "Defining the Order Processing Workflow."

Opening the ShipBill workflow template displays the following flow.

Figure 4-1 Drawing Area: ShipBill Workflow Diagram



The ShipBill workflow is called by the Order Processing workflow, as defined in the C2 Decision node of the Order Processing workflow in "Defining Decisions" of Chapter 2, "Defining the Order Processing Workflow." ShipBill is a sub-workflow to Order Processing. The value of the following variables are transferred from the Order Processing workflow to the ShipBill workflow:

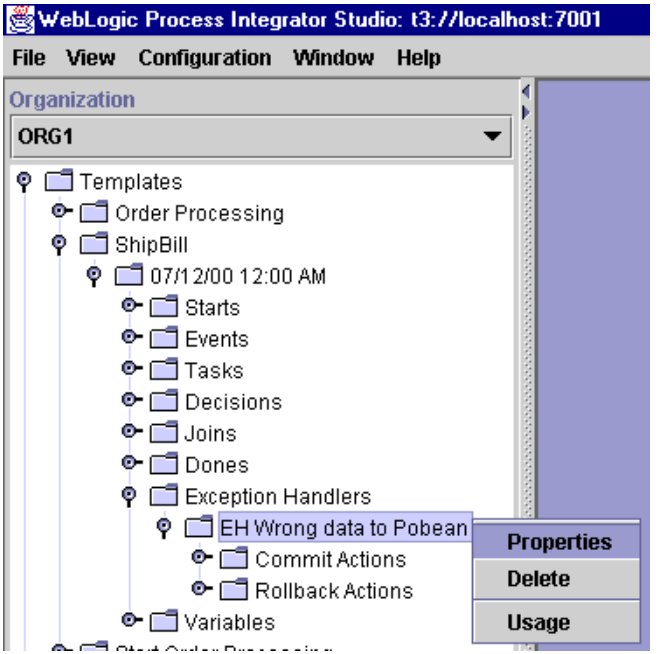
- CustomerName
- CustomerState
- CustomerId
- ItemName
- ItemNumber
- ItemQuantity
- ItemPrice
- OrderNumber

The Exception Handler

The ShipBill workflow contains a user-defined exception handler, which WebLogic Process Integrator invokes upon the passing of an incorrect parameter to the method called on POBean. This exception handler is set in the workflow through use of the Set Workflow Exception Handler action, located in the Activated tab of the Billing Task Properties dialog box. (See “Billing Task.”)

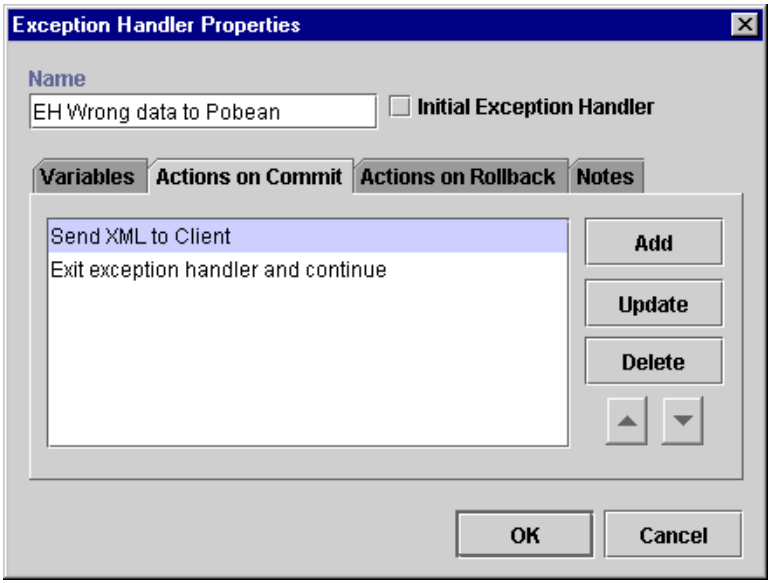
To view the properties of the exception handler, right click the EH Wrong data to POBean exception handler in the folder tree and select Properties.

Figure 4-2 Exception Handler Properties



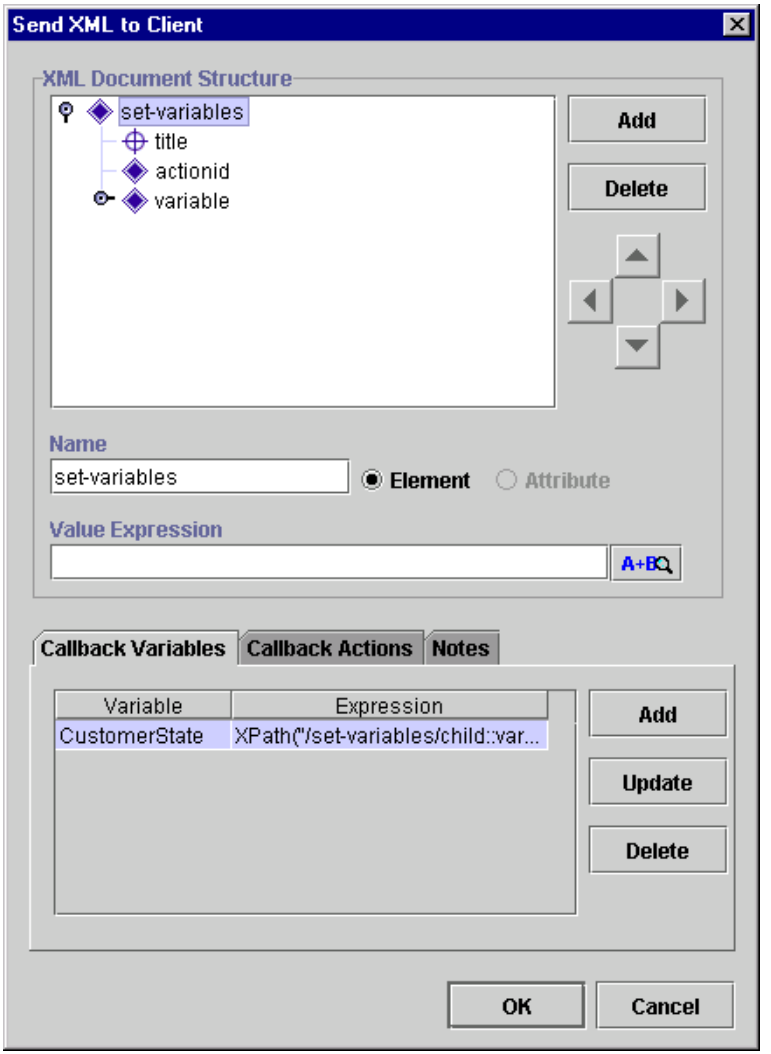
Select the Actions from the Commit tab of the Exception Handler Properties dialog box to view the actions set in the commit path of the handler.

Figure 4-3 Actions on Commit Tab



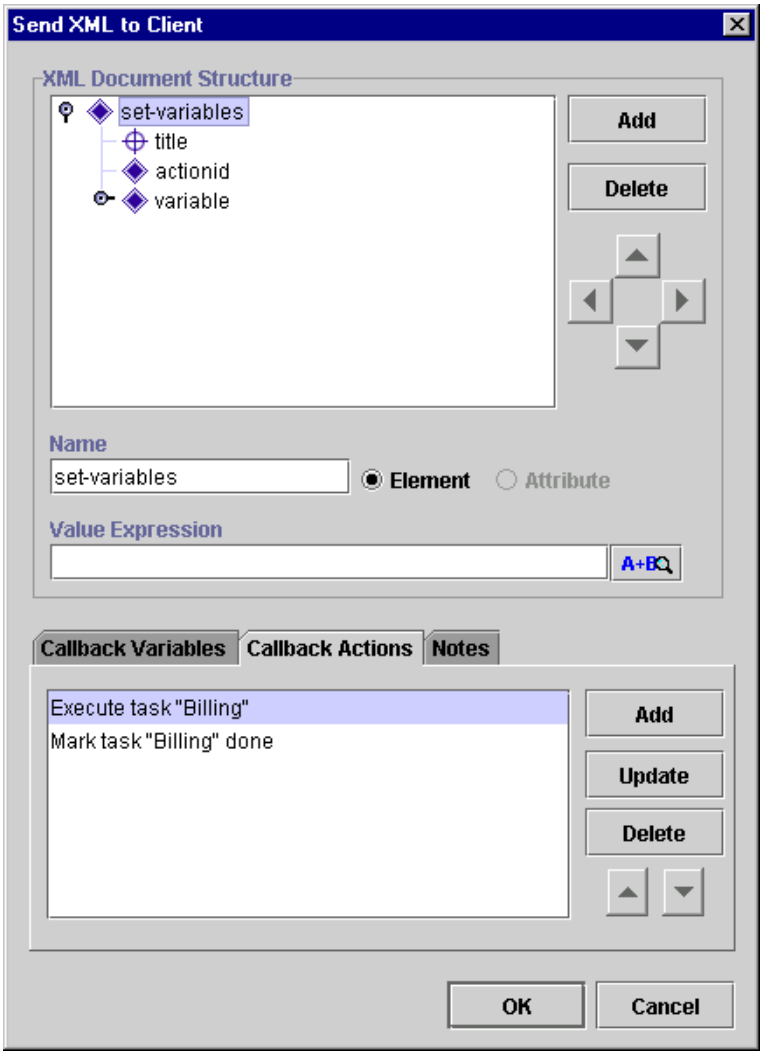
The Send XML to Client action prompts you at runtime with a message box to enter a valid state abbreviation, correcting the invalid state abbreviation: KK.

Figure 4-4 Send XML to Client Dialog Box



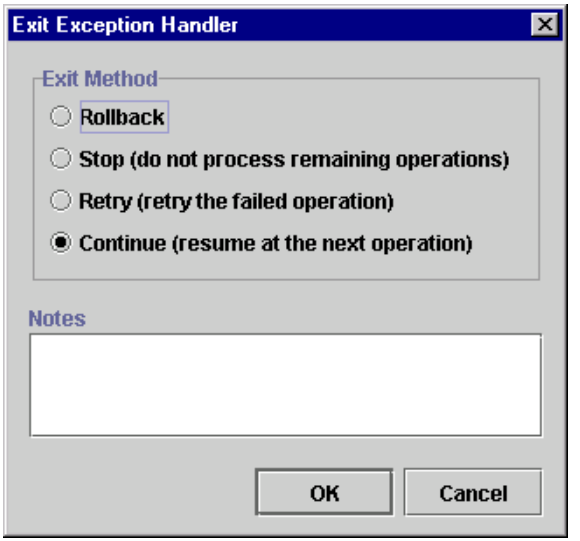
After you enter a valid state abbreviation, the two actions defined in the Callback Actions of Send XML to Client will re-execute the task Billing and mark it as done.

Figure 4-5 Send XML to Client: Callback Actions



The Exit Exception Handler action sets the exception handler exit to Continue. This stops the execution of the exception handler and attempts to continue the execution of the workflow at the next operation (in this case, the action following the business operation that caused the exception).

Figure 4-6 Exit Exception Handler Dialog Box



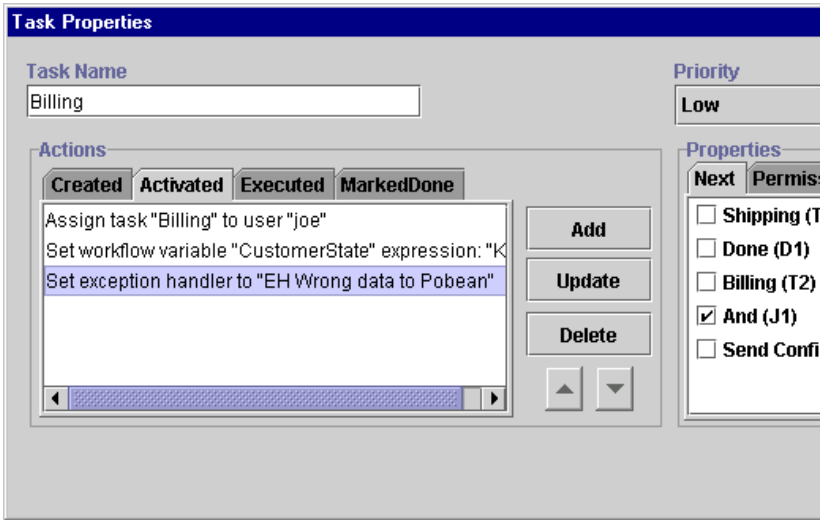
Billing Task

The Billing task within the ShipBill workflow calls a method of the EJB POBean, which calculates the final price of the ordered item including tax and returns the value to the variable: `TotalPrice`.

The Activated tab of the Billing Task Properties dialog box contains three actions:

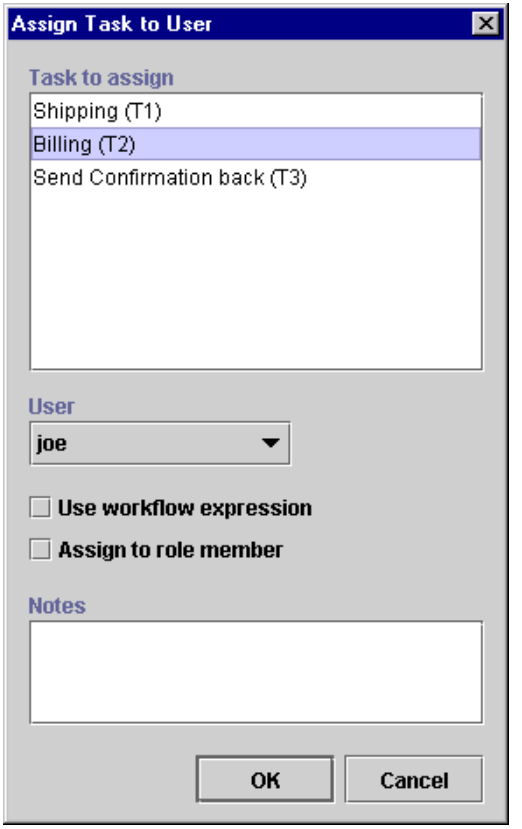
- Assign Task to User
- Set Workflow Variable
- Set Exception Handler

Figure 4-7 Billing Task Properties Dialog Box: Activated Tab



The Assign Task to User action is set in the Activated tab. This action assigns the Billing task to the user joe. Double-click this action in the Activated tab to display the Assign Task to User dialog box.

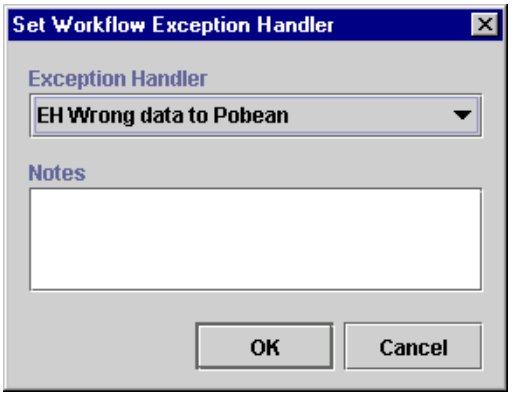
Figure 4-8 Assign Task to User Dialog Box



The ShipBill workflow contains a user-defined exception handler, which is invoked upon the passing of an incorrect parameter to the POBean. This exception handler is set in the workflow through use of the Set Workflow Exception Handler action, located in the Activated tab of the Billing Task Properties dialog box.

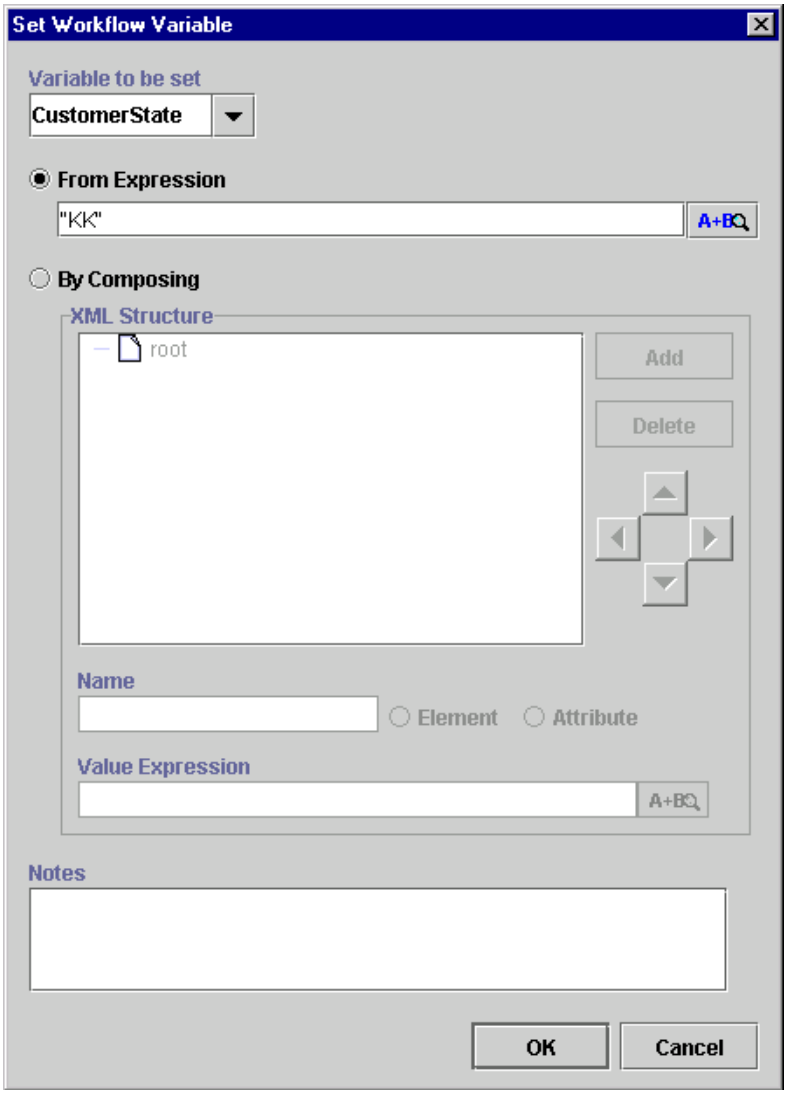
Double-click the Set exception handler to "EH Wrong data to POBean" task to display the Set Workflow Exception Handler dialog box.

Figure 4-9 Set Exception Workflow Handler Dialog Box



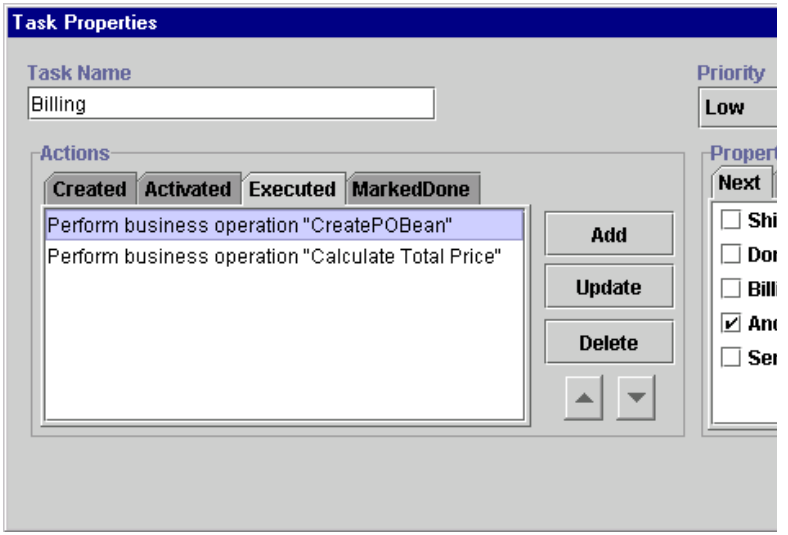
A Set Workflow Variable action is set in the Activated tab of the Billing Task Properties dialog box. This action purposefully, for demonstration, sets the value of the variable `CustomerState` to the invalid state abbreviation (KK). Invoking the Perform Business Operation action, which uses this value as an input, introduces an exception, which invokes the exception handler.

Figure 4-10 Set Workflow Variable Dialog Box



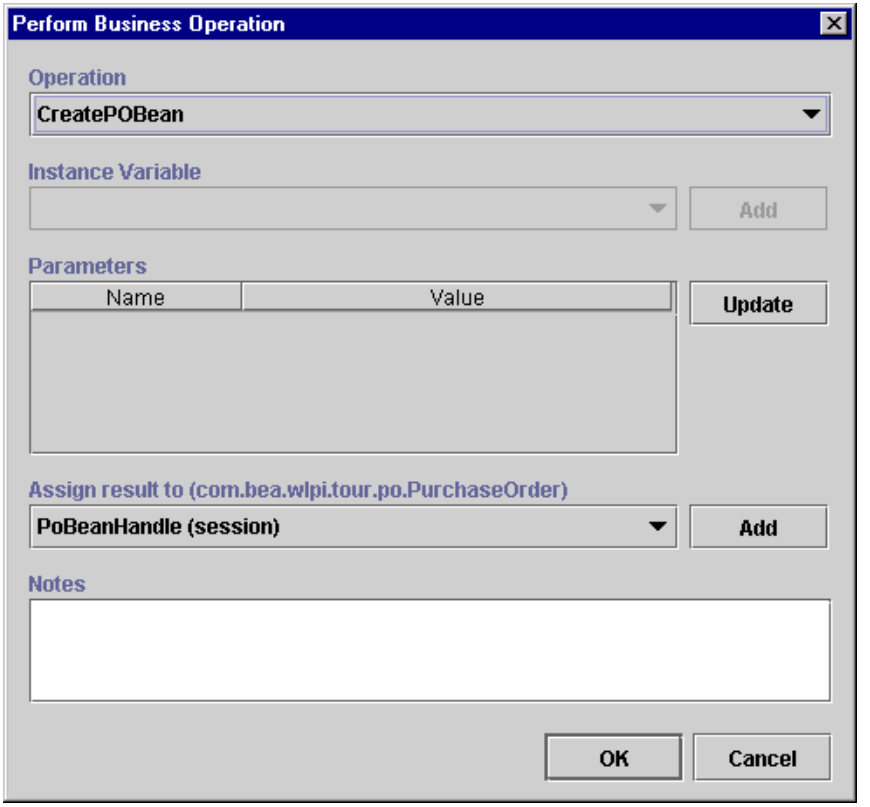
The Executed tab of the Billing Task Properties dialog box contains two Perform Business Operation actions.

Figure 4-11 Billing Task Properties Dialog Box: Executed Tab



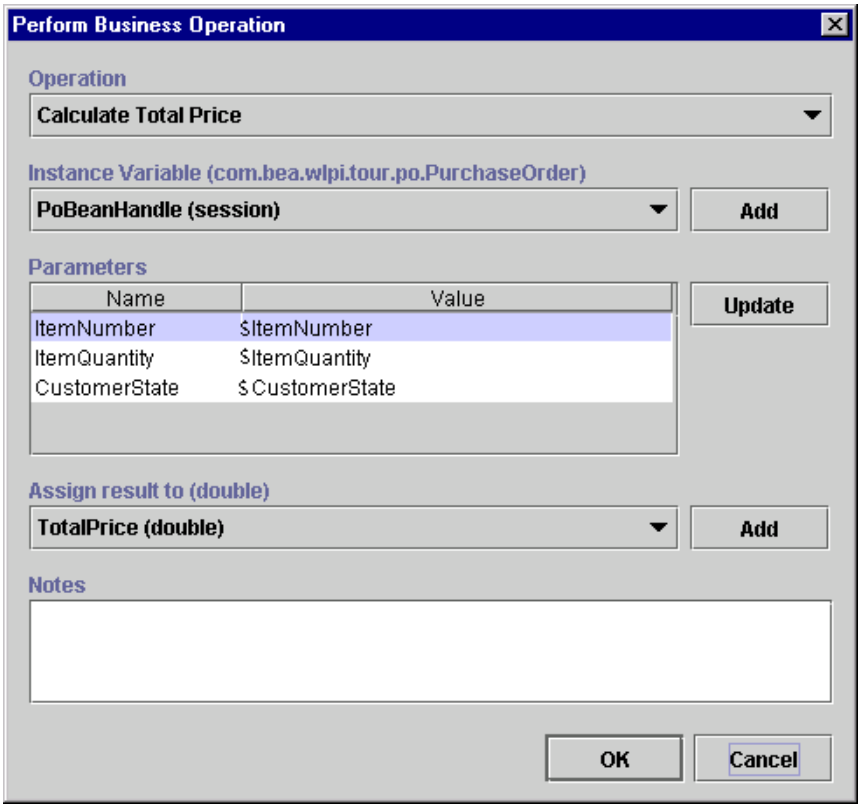
The first Perform Business Operation action creates a handler for the EJB POBean in order to allow for calling methods of this bean.

Figure 4-12 Perform Business Operation Create PO Bean



The second Perform Business Operation action calls the method that calculates the total price and returns the result to the variable `TotalPrice`.

Figure 4-13 Perform Business Operation Calculate Total Price



Upon execution of the Billing task, the Perform Business Operation action attempts to call the `Calculate Total Price` method with the wrong `CustomerState` variable value as input. WebLogic Process Integrator invokes the exception handler, which then prompts you to enter a valid state abbreviation.

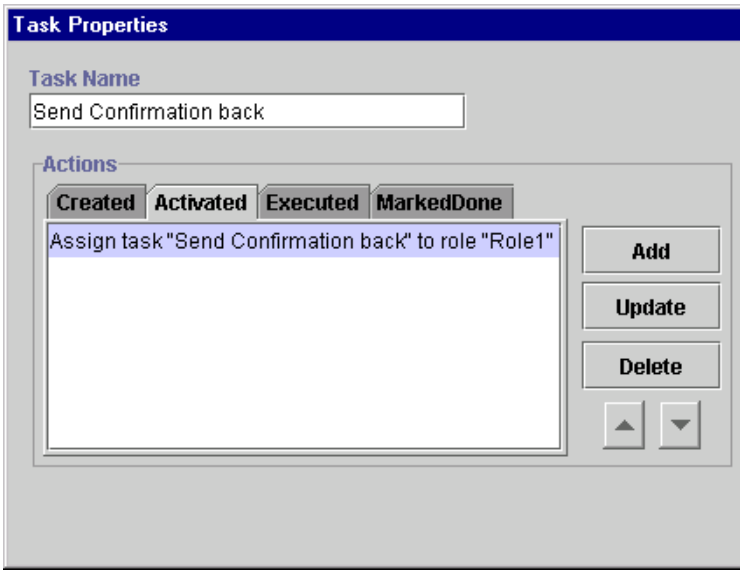
Send Confirmation Back Task

WebLogic Process Integrator sends the `TotalPrice` variable to the Order Processing workflow by way of an XML message that is created and sent upon execution of the Send Confirmation Back task.

Note the use of the AND join in this workflow, whereby both tasks, Shipping and Billing, have to be marked as done before the flow moves on.

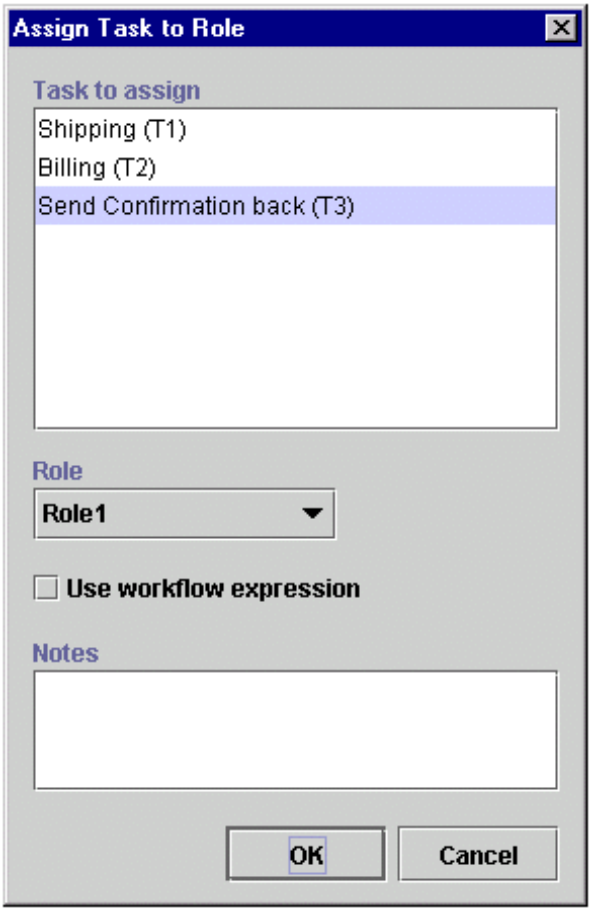
In the workflow diagram, double-click the Send Confirmation Back task to display the task properties.

Figure 4-14 Task Properties Dialog Box: Activated Tab



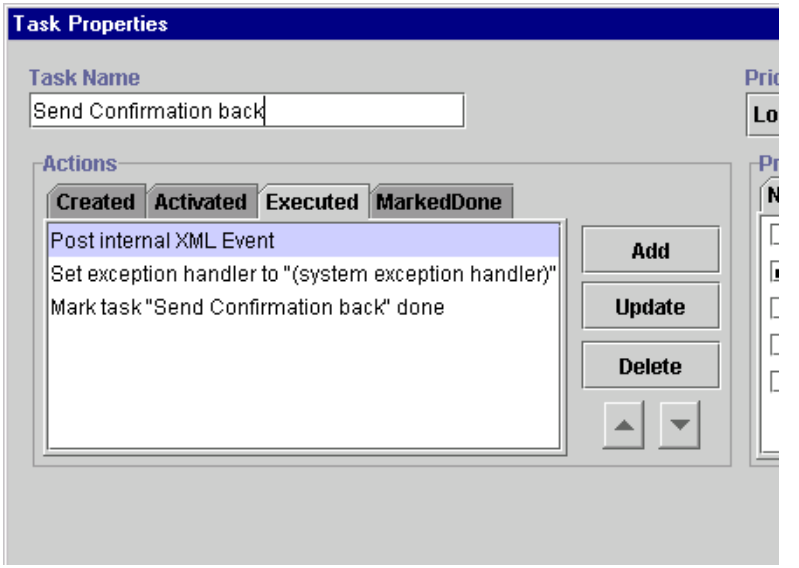
The Send Confirmation Back task is assigned to the role: Role1 by use of the Assign Task to Role action, as illustrated in the following dialog box.

Figure 4-15 Assign Task to Role Dialog Box



Select the Executed tab of the task.

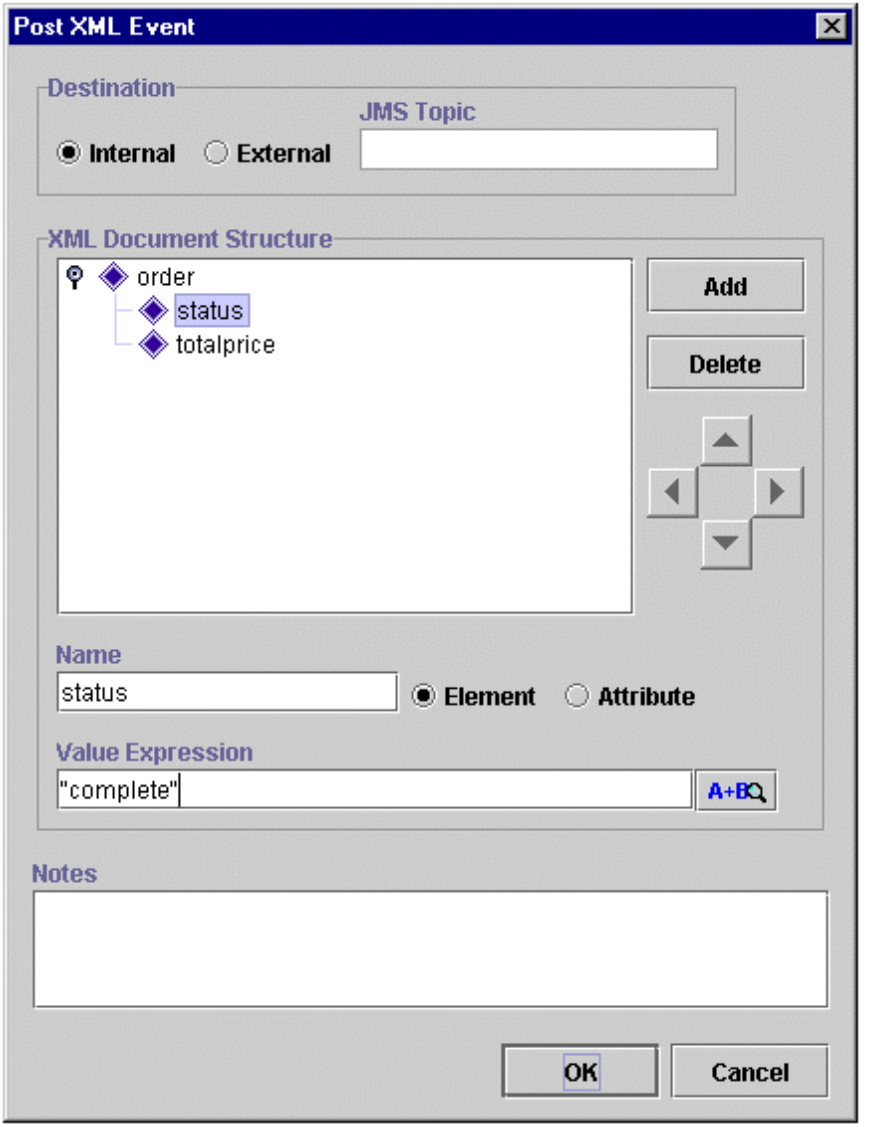
Figure 4-16 Task Properties Dialog Box: Executed Tab



Upon execution of this task, an internal XML message is posted to the WebLogic Process Integrator server that will trigger the event in the Order Processing workflow and complete the entire process. Click Update on the Post Internal XML Event action.

Note: The exception handler is reset to the System exception handler to avoid calls to the customized exception handler within this workflow; the System exception handler responds to any errors that may occur other than the one purposefully introduced in this workflow.

Figure 4-17 Post XML Event Action Dialog Box: Internal XML Event



The XML document has the root element order and the status as complete. The value of the variable TotalPrice is also sent and will be read by the Order Processing workflow.

5 Executing the Workflow Example

The execution starting point for the workflow example is the Start Order Processing workflow. You start this workflow manually through the WebLogic Process Integrator Worklist application.

The following sections describe how to execute the workflow example:

- Logging On to the Worklist Application
- Executing the Sample Workflows

Logging On to the Worklist Application

To start the worklist application:

1. From your desktop, choose Start > Programs > WebLogic Process Integrator > Worklist to display the Logon dialog box.

Figure 5-1 Logon to WebLogic Process Integrator Dialog Box

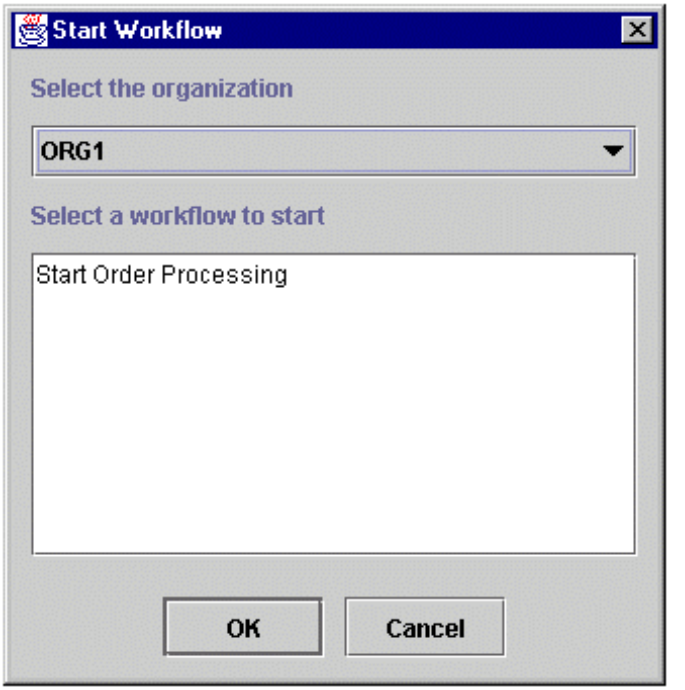
2. Enter your user ID, password, and the name of the WebLogic Process Integrator server to which you will connect.

Executing the Sample Workflows

To execute the sample workflows:

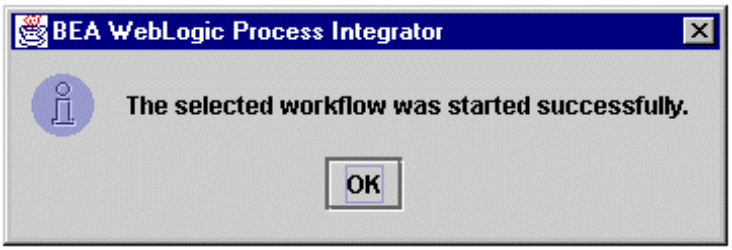
1. From the Workflow menu, choose Start Workflow to display the Start Workflow dialog box.

Figure 5-2 Start Workflow Dialog Box



2. Select the Start Order Processing workflow and click OK. The workflow is instantiated and a confirmation message is displayed.

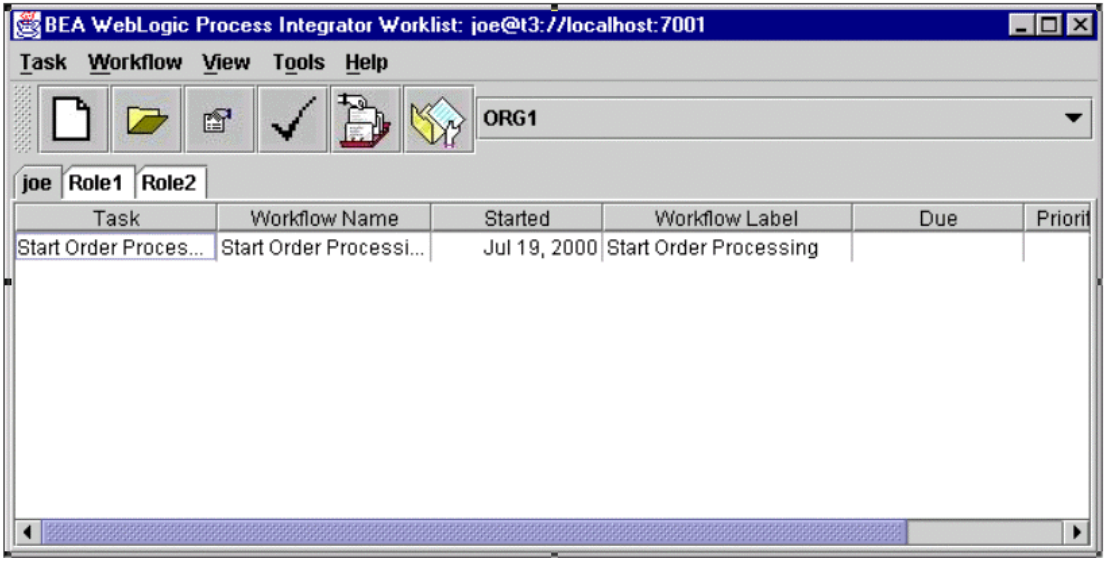
Figure 5-3 Workflow Successfully Started



3. Click OK.

   The first and only task of the Start Order Processing workflow is assigned to the user joe and is displayed on the worklist.

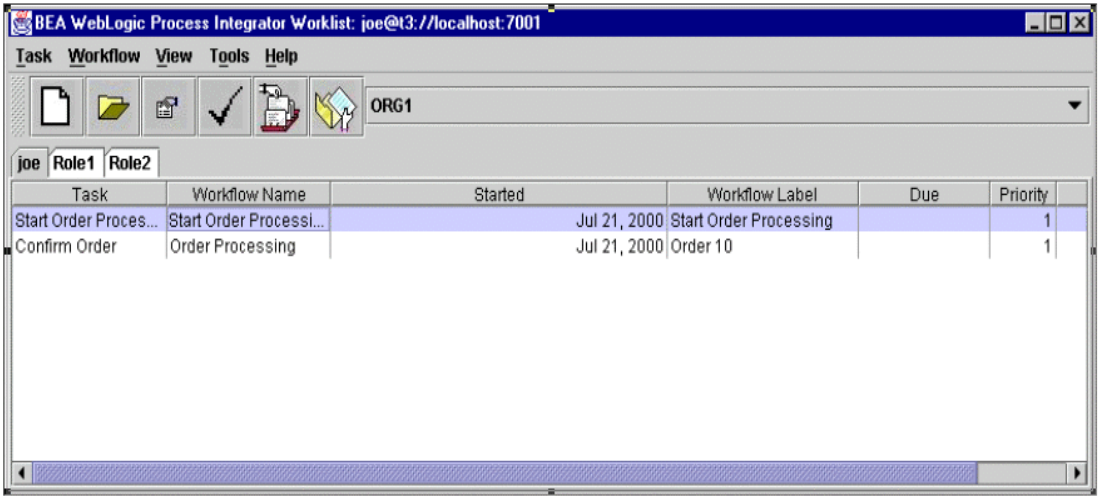
Figure 5-4 Worklist Application: Task List



4. Double-click the Start Order Processing task to execute the actions defined earlier under the Executed event of the Start Order Processing task; in this case, the creation of an XML document that triggers the Order Processing workflow.

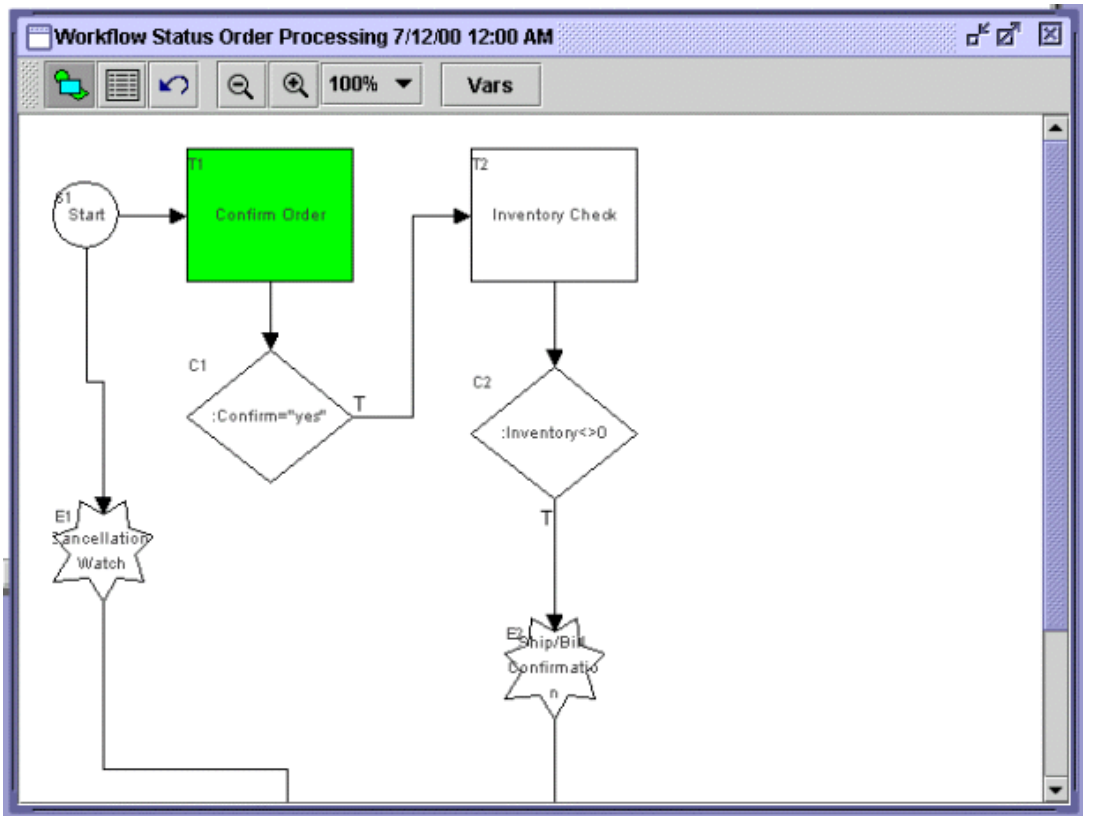
   The first task of the Order Processing workflow is Confirm Order, which is assigned to the user joe. This task is displayed on Joe's worklist, once the workflow is triggered.

Figure 5-5 Worklist Application: Triggered Workflow



5. To verify that the Order Processing workflow has been triggered, you open the instances window of that workflow. In the WebLogic Process Integrator Studio, right-click the workflow template definition for the Order Processing workflow and choose Instances from the pop-up menu. The following dialog box is displayed.

Figure 5-6 Workflow Status Dialog Box



The diagram shows the instance that has been started.

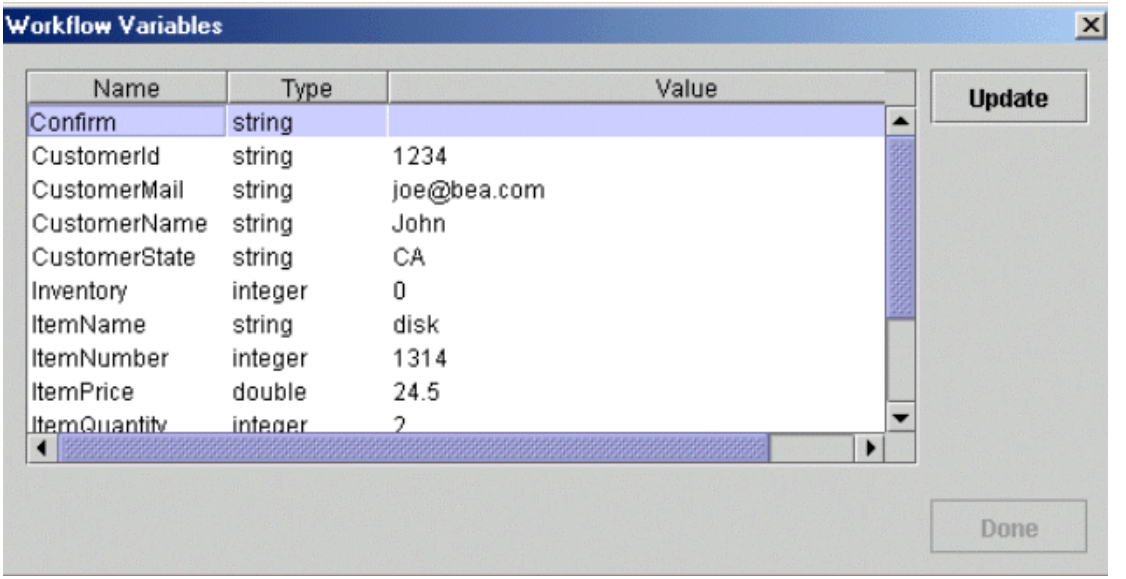
6. Right-click anywhere in the instance diagram to display a menu with the following options:
   - Workflow Status
   - Variables
   - Delete
7. Choose Workflow Status to find out which node is the current active one.

   The Confirm Order task will be highlighted, showing that it is active and not yet executed.

8. Choose the Variables option to display the list of Order Processing workflow variables and their current values.

   Note that all variables defined in the Start node are populated by the values coming from the XML document. The variable Confirm is still empty because the user has not confirmed the order yet.

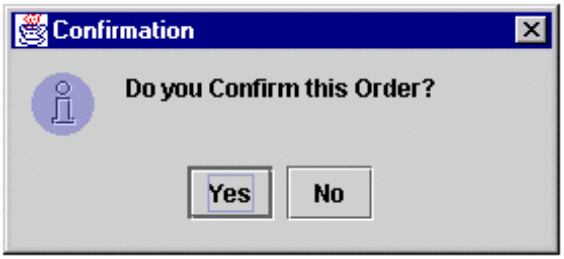
Figure 5-7 Workflow Variables Dialog Box



9. Return to the worklist and double-click the Confirm Order task.

   This executes the Send XML to Client action defined under the Executed tab of the Confirm Order Task Properties dialog box. The action displays the Confirmation message box to the user joe.

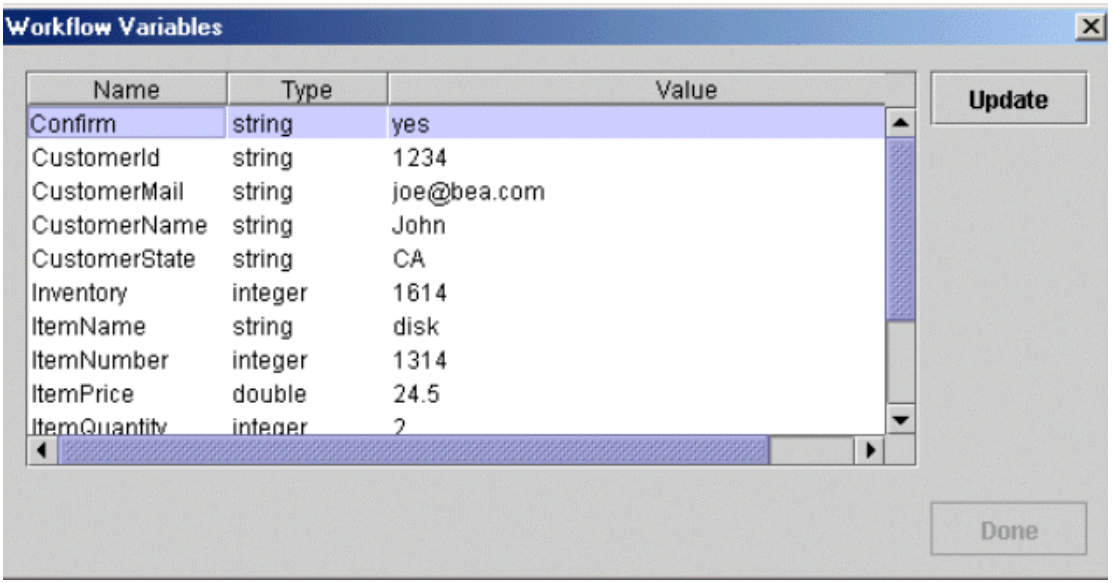
Figure 5-8 Confirmation Message



10. Click Yes to make the flow proceed and call the Inventory bean. Check the status of the Order Processing workflow again in the instances dialog box and particularly the values of the variables.

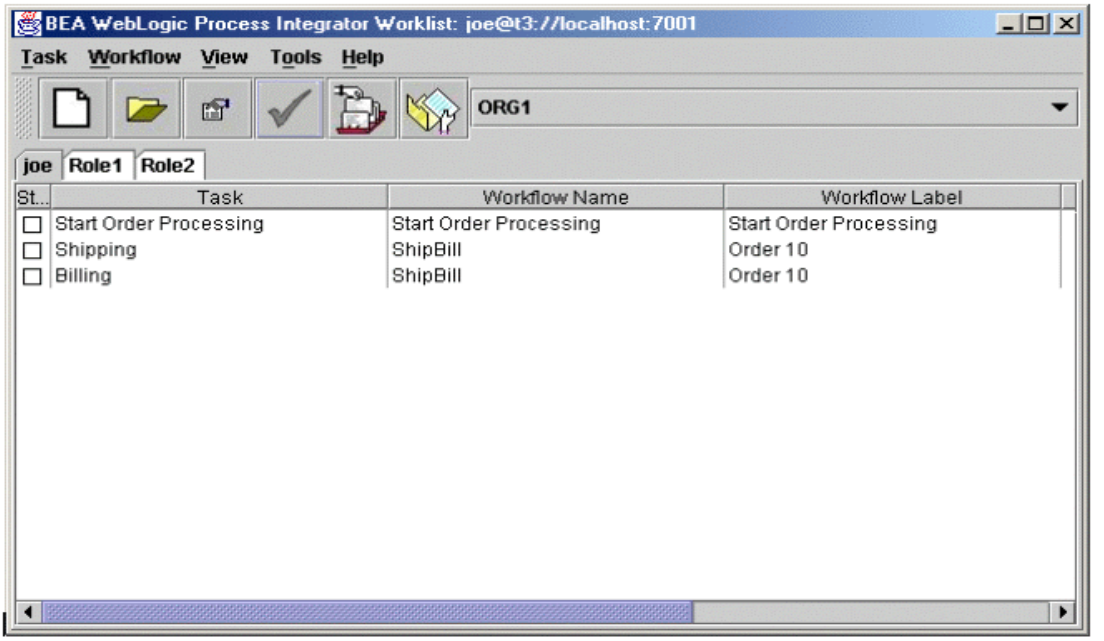
    The dialog box shows that both Confirm and Inventory now have values.

Figure 5-9 Workflow Variables Dialog Box



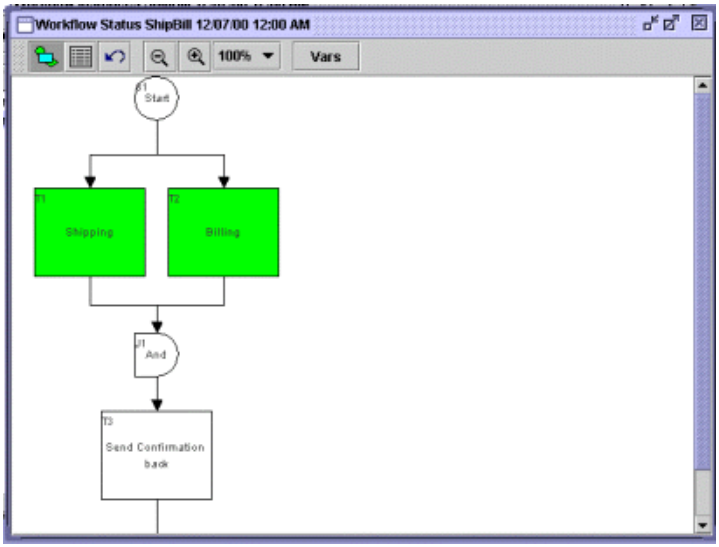
Because the value of the variable Inventory is not zero, the ShipBill workflow is called as the result of the execution of the Start Workflow action in the true case of the decision. This workflow assigns the Shipping and Billing tasks to the user joe. Therefore, joe's task list is updated with these tasks as follows:

Figure 5-10 Worklist Application: Joe's Task List



11. In the Studio application, right-click the ShipBill workflow template definition in the folder tree and choose Instances from the pop-up menu to display the started instance of the ShipBill workflow.

Figure 5-11 Workflow Status: ShipBill Workflow



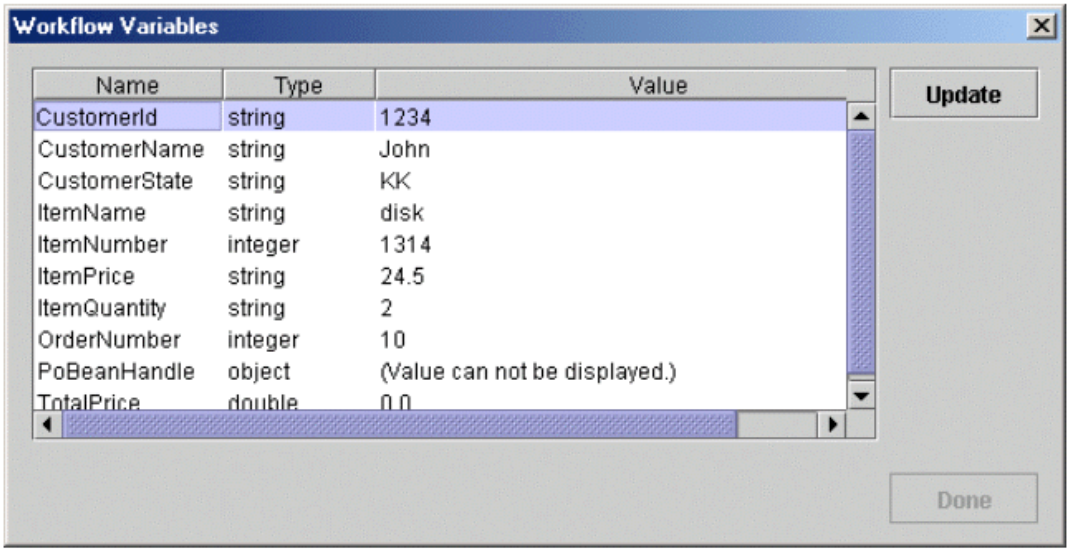
Note that the Shipping and Billing tasks are highlighted in green, because they are still active and have not been executed and marked done.

12. In the worklist, double-click the Shipping task to execute it. This removes the Shipping task from the worklist, since the only action in the Executed tab of the Shipping Task Properties dialog box is Mark Task as Done.

13. In the worklist, double-click the Billing task to execute it. The Billing task attempts to call the POBean, but since it purposefully (for this demonstration) contains an invalid parameter (state abbreviation KK), the exception handler is invoked.

    Note that the `CustomerState` variable contains an invalid value: `KK`.

Figure 5-12 Invalid Workflow Variable Value



When WebLogic Process Integrator invokes the exception handler, the Send XML to Client action is executed and you are prompted to enter a valid United States state abbreviation.

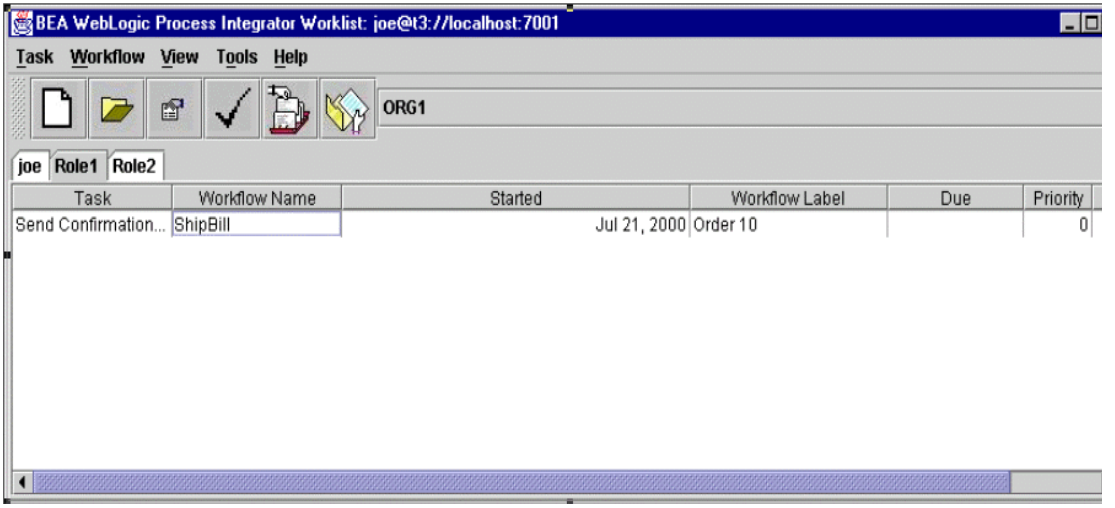
Figure 5-13 User Entry Dialog Box

14. Enter a valid state abbreviation and click OK to continue the workflow.

    The Billing task is now executed and marked as done. All variables that have been transferred from the parent Order Processing workflow are populated. The variable TotalPrice is calculated as the result of the call of the Billing POBean. The ShipBill workflow proceeds, and the next task, Send Confirmation Back, is activated.

15. Send Confirmation Back is assigned to Role1. Select the Role1 tab on joe's worklist to see the task.

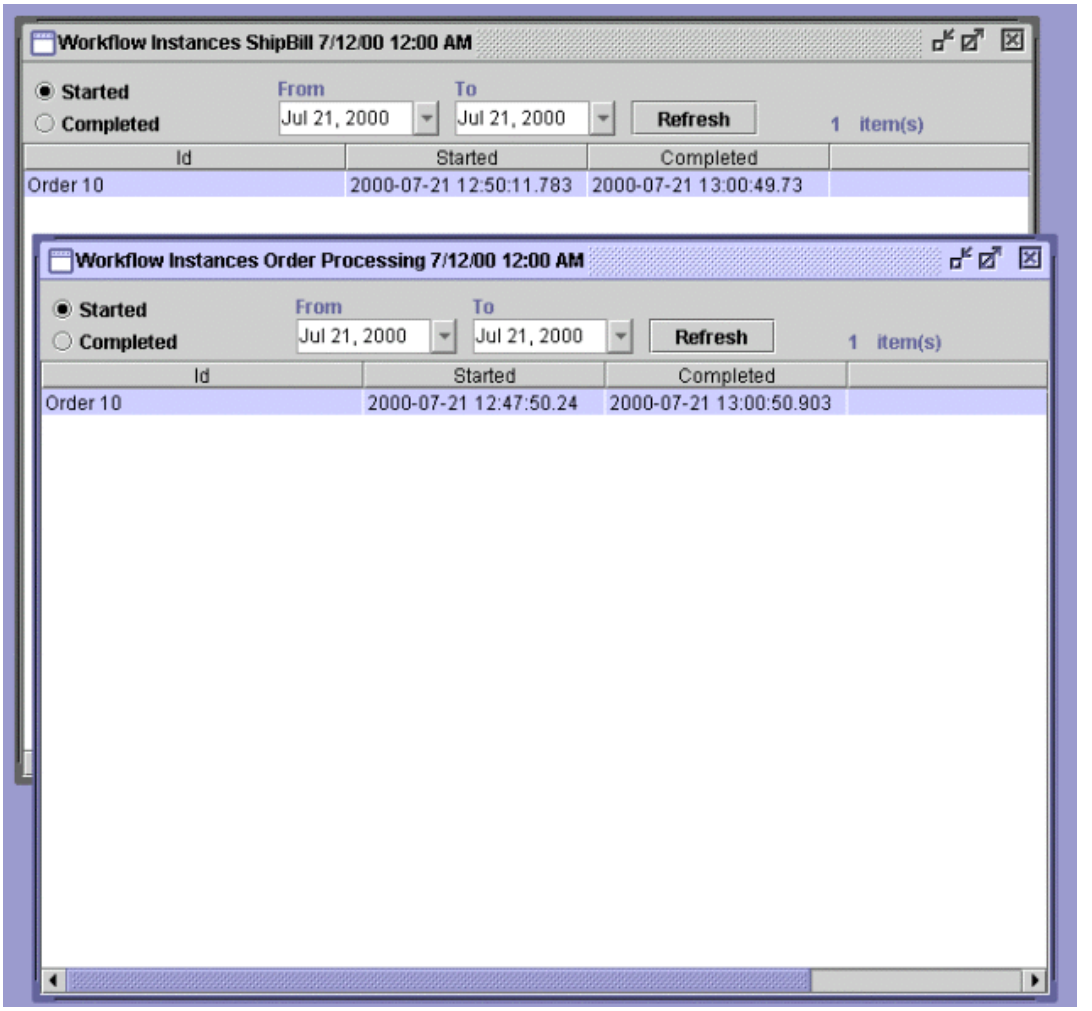
Figure 5-14 Worklist Application: Role1 Assignment



16. Double-click the Send Confirmation Back task to execute it and send an XML message back to the Order Processing workflow that completes the process.

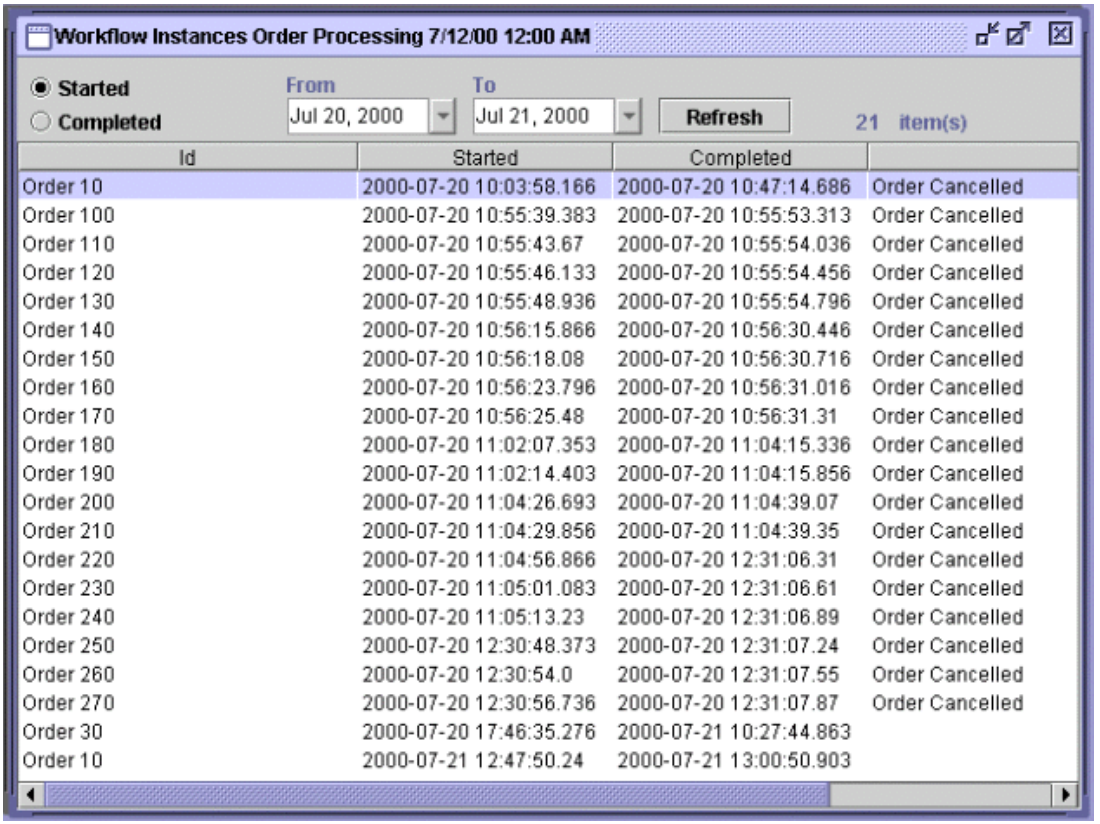
    The Order Processing and ShipBill workflow instances are marked as complete as reflected in the monitoring dialog boxes. The completed date and time are displayed.

Figure 5-15 Workflow Instances Dialog Boxes: Completed Date and Time



The preceding procedure is one scenario for this process. Another scenario that can be tested is to answer No to the confirmation and cause the order to cancel. In this case, the monitoring dialog box shows the instance of the Order Processing workflow with the comment Workflow Cancelled as defined in the Set Workflow Comment action.

Figure 5-16 Workflow Instances Dialog Box



Id	Started	Completed	
Order 10	2000-07-20 10:03:58.166	2000-07-20 10:47:14.686	Order Cancelled
Order 100	2000-07-20 10:55:39.383	2000-07-20 10:55:53.313	Order Cancelled
Order 110	2000-07-20 10:55:43.67	2000-07-20 10:55:54.036	Order Cancelled
Order 120	2000-07-20 10:55:46.133	2000-07-20 10:55:54.456	Order Cancelled
Order 130	2000-07-20 10:55:48.936	2000-07-20 10:55:54.796	Order Cancelled
Order 140	2000-07-20 10:56:15.866	2000-07-20 10:56:30.446	Order Cancelled
Order 150	2000-07-20 10:56:18.08	2000-07-20 10:56:30.716	Order Cancelled
Order 160	2000-07-20 10:56:23.796	2000-07-20 10:56:31.016	Order Cancelled
Order 170	2000-07-20 10:56:25.48	2000-07-20 10:56:31.31	Order Cancelled
Order 180	2000-07-20 11:02:07.353	2000-07-20 11:04:15.336	Order Cancelled
Order 190	2000-07-20 11:02:14.403	2000-07-20 11:04:15.856	Order Cancelled
Order 200	2000-07-20 11:04:26.693	2000-07-20 11:04:39.07	Order Cancelled
Order 210	2000-07-20 11:04:29.856	2000-07-20 11:04:39.35	Order Cancelled
Order 220	2000-07-20 11:04:56.866	2000-07-20 12:31:06.31	Order Cancelled
Order 230	2000-07-20 11:05:01.083	2000-07-20 12:31:06.61	Order Cancelled
Order 240	2000-07-20 11:05:13.23	2000-07-20 12:31:06.89	Order Cancelled
Order 250	2000-07-20 12:30:48.373	2000-07-20 12:31:07.24	Order Cancelled
Order 260	2000-07-20 12:30:54.0	2000-07-20 12:31:07.55	Order Cancelled
Order 270	2000-07-20 12:30:56.736	2000-07-20 12:31:07.87	Order Cancelled
Order 30	2000-07-20 17:46:35.276	2000-07-21 10:27:44.863	
Order 10	2000-07-21 12:47:50.24	2000-07-21 13:00:50.903	