

Service-enable Agile PLM with Oracle SOA Suite BPEL Process Manager

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1 Overview

This tutorial demonstrates native web services integration to Agile PLM using Oracle BPEL Process Manager.

Agile 9.3 exposes several key PLM functionalities as web services which allows easy integration to existing applications. The core web services enable access to a number of Agile services viz. Business Objects, Collaboration, Metadata, Attachments, Search, Tables, Product Collaboration (PC) and Engineering Collaboration (EC); hence the ability to easily integrate with existing ERP, CRM and SCM applications.

More information is available at the Agile and Fusion Middleware Best Practice Center on Oracle Technology Network:

<http://www.oracle.com/technology/tech/fmw4apps/agile>

In this tutorial:

- You will use the Agile BusinessObject web service
- BPEL invokes the getObject operation in the Agile BusinessObject WSDL
- The result is a synchronous response from Agile containing the Object ID for the input part number.

Software Used:

- Agile PLM 9.3
- Oracle SOA Suite version 10.1.3.1 (available for download from [OTN](#))
- Oracle JDeveloper version 10.1.3.3 (available for download from [OTN](#))

2 Getting Started

2.1 Starting Oracle SOA Suite and JDeveloper

Ensure that the Oracle SOA Suite is running and start JDeveloper.

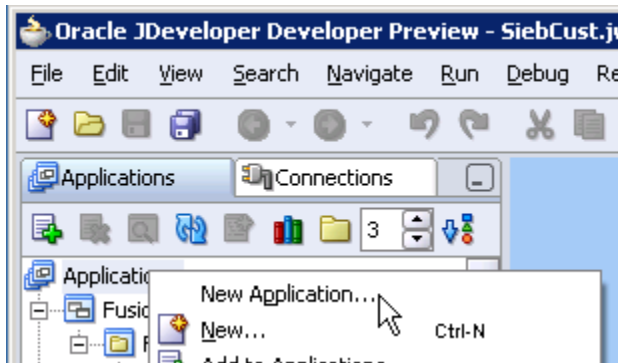
Verify that the Agile web services are accessible at: `http://<your-agile-server>/CoreService/services`

The guide also assumes that the schema ([InvokeAgile.xsd](#)) file is located at `C:\FMW4Apps\LabFiles\Agile`. If these files are located elsewhere on your setup, make the appropriate modifications.

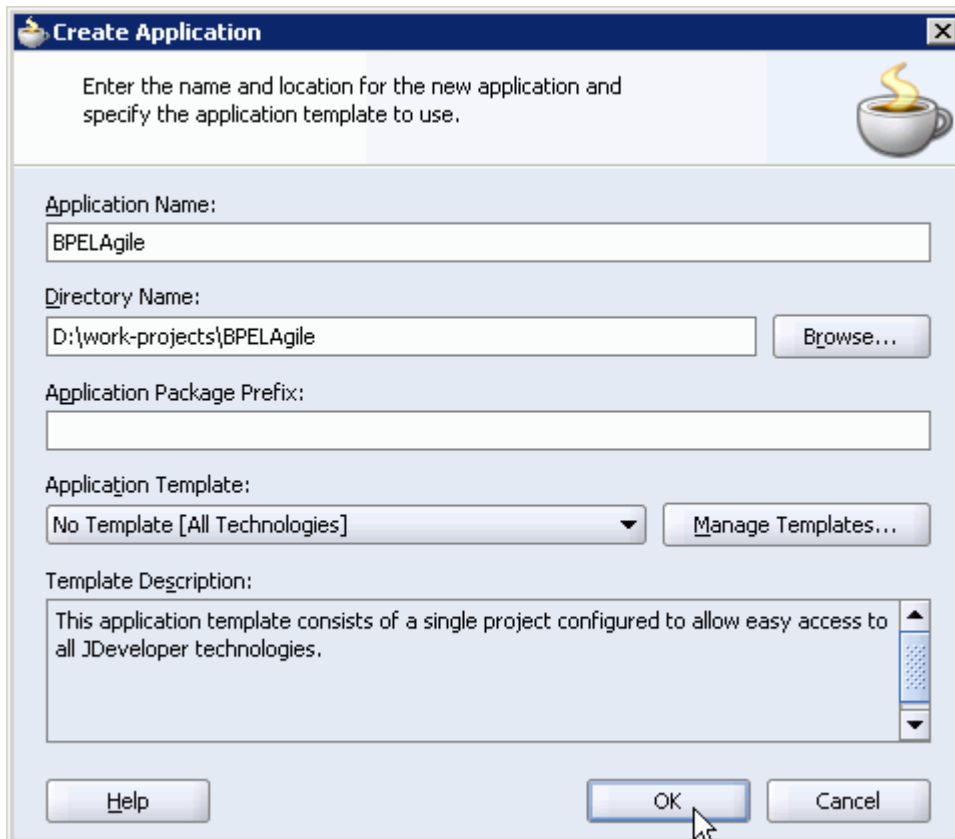
3 Create the BPEL Process

3.1 Create the BPEL Workspace and Project

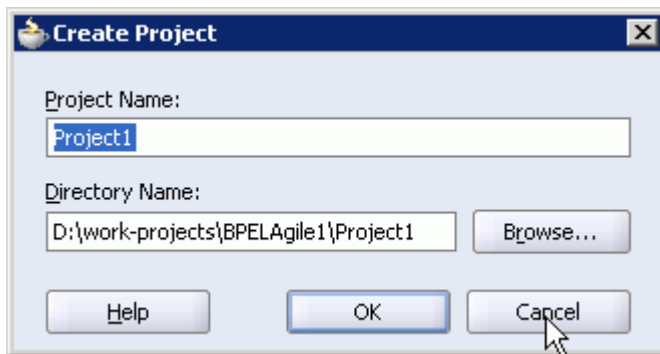
1. In the Applications Navigator window, right-click on **Applications** and select **New Application...**



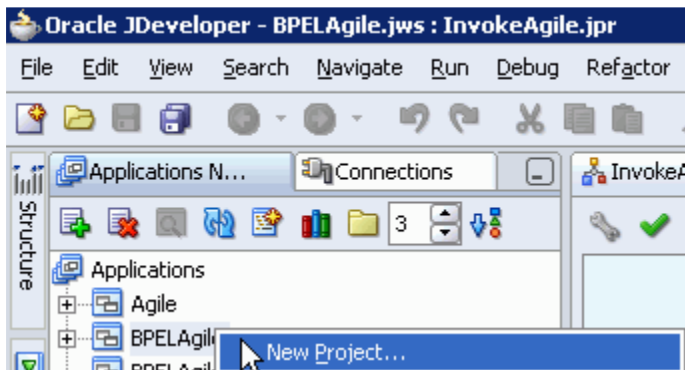
2. Enter **BPELAgile** as the application name and accept all defaults (your Directory Name may show up differently than the figure below – ignore that and accept defaults). Click **OK** to continue.



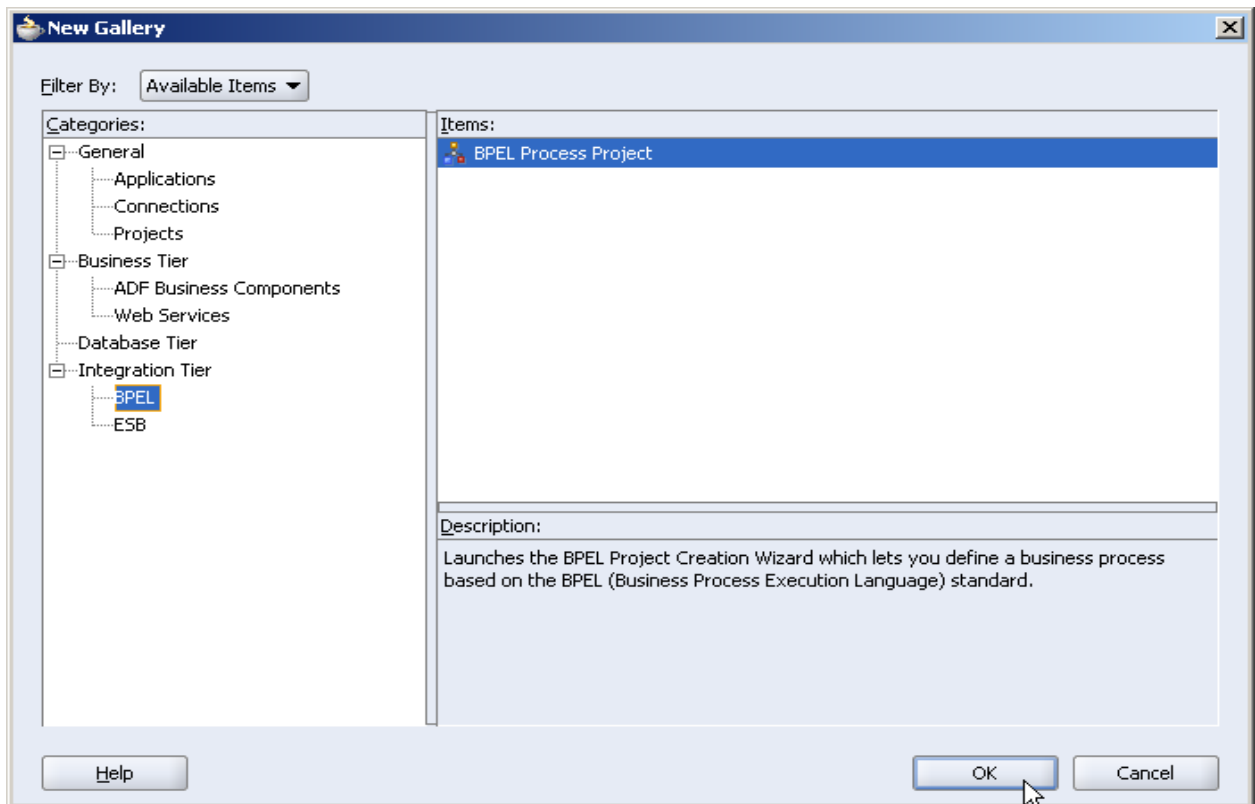
3. Click **Cancel**.



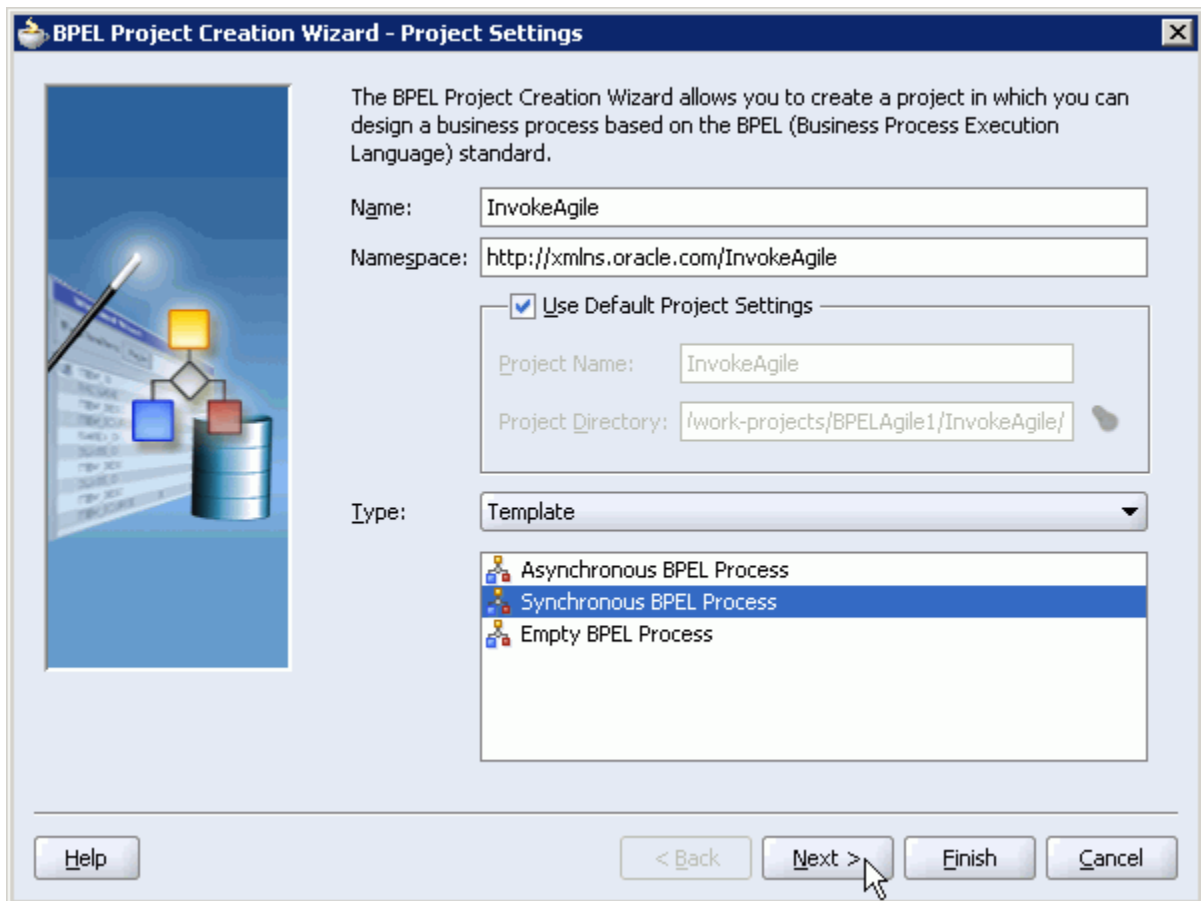
4. Right-click on the new **BPELAgile** Application, and select **New Project**.



5. Select **BPEL** in the Categories list and **BPEL Process Project** in the Items window.
6. Click **OK**.

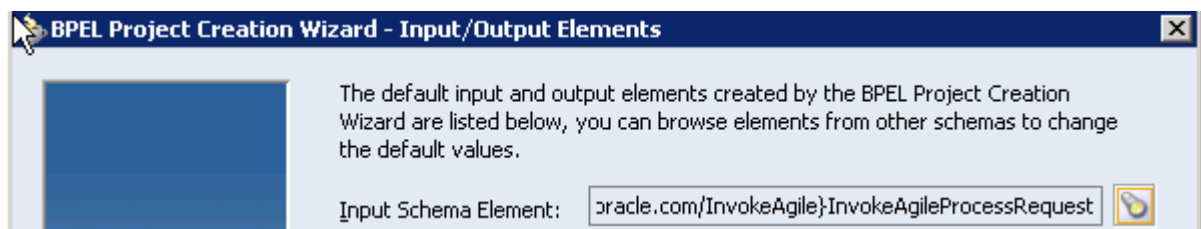


7. This brings up the BPEL Project Creation Wizard. In the Project Settings screen, set the Name of the process to **InvokeAgile**.
8. Select **Synchronous BPEL Process** as shown. Click **Next**.



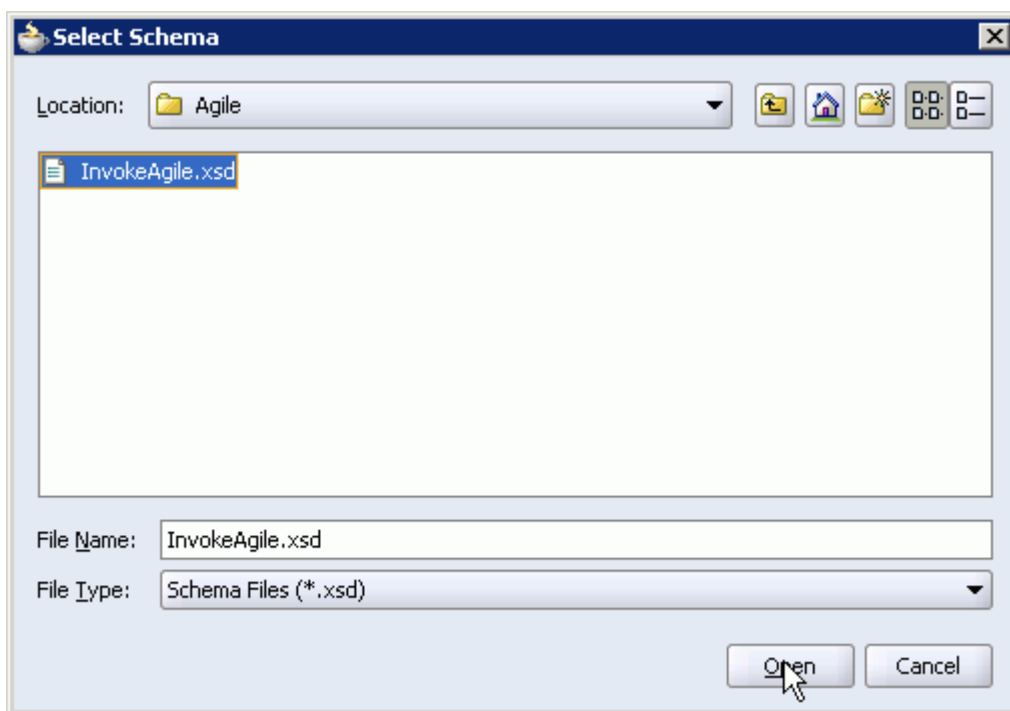
The BPEL Project Creation Wizard - Project Settings dialog box. The title bar reads "BPEL Project Creation Wizard - Project Settings". On the left is a graphic of a magic wand pointing at a BPEL diagram. The main text area says: "The BPEL Project Creation Wizard allows you to create a project in which you can design a business process based on the BPEL (Business Process Execution Language) standard." Below this are fields for "Name:" (InvokeAgile) and "Namespace:" (http://xmlns.oracle.com/InvokeAgile). A checkbox "Use Default Project Settings" is checked. Below it are "Project Name:" (InvokeAgile) and "Project Directory:" (I:\work-projects\BPELAgile1\InvokeAgile\). A "Type:" dropdown menu is set to "Template", and a list below it shows "Asynchronous BPEL Process", "Synchronous BPEL Process" (highlighted), and "Empty BPEL Process". At the bottom are buttons: "Help", "< Back", "Next >" (with a mouse cursor), "Finish", and "Cancel".

9. Click on the flashlight icon next to the **Input Schema Element**.

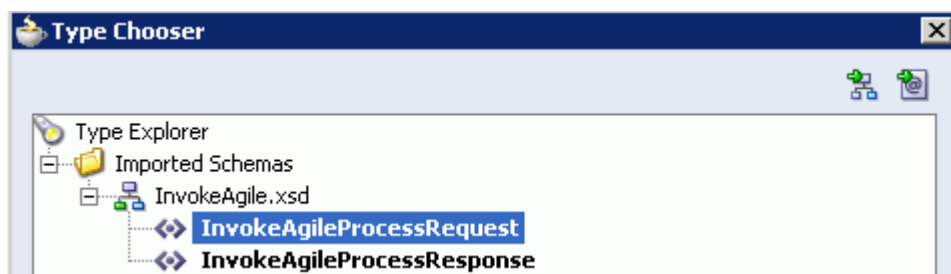


The BPEL Project Creation Wizard - Input/Output Elements dialog box. The title bar reads "BPEL Project Creation Wizard - Input/Output Elements". On the left is a graphic of a flashlight. The main text area says: "The default input and output elements created by the BPEL Project Creation Wizard are listed below, you can browse elements from other schemas to change the default values." Below this is a field for "Input Schema Element:" containing the text "oracle.com/InvokeAgile}InvokeAgileProcessRequest". To the right of the field is a small icon of a flashlight.

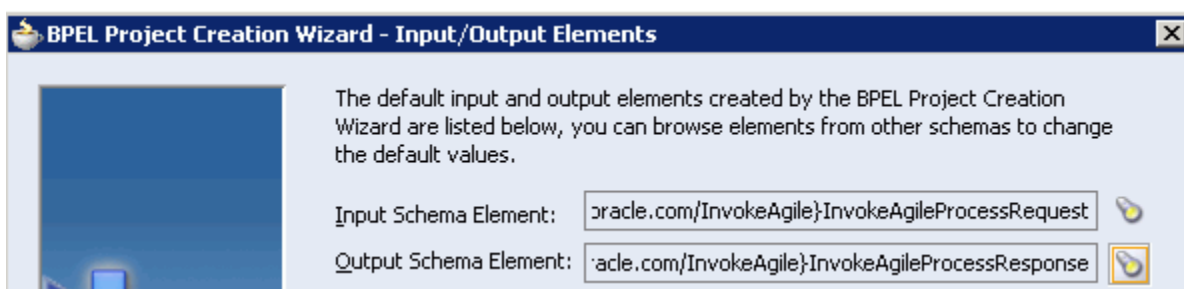
10. Locate the schema file in your folder (C:\FMW4Apps → LabFiles → Agile) and click **Open**.



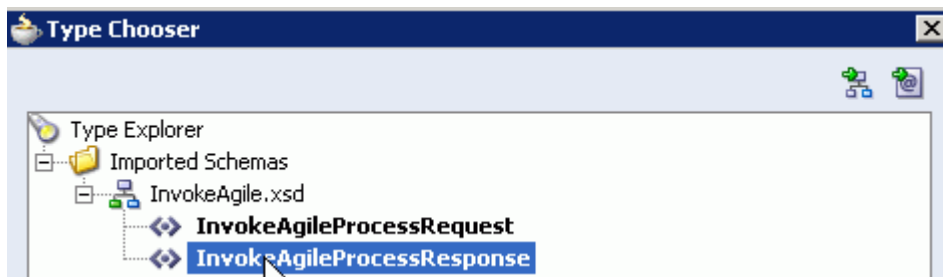
11. In the Type Chooser, select **InvokeAgileProcessRequest** and click **OK**.



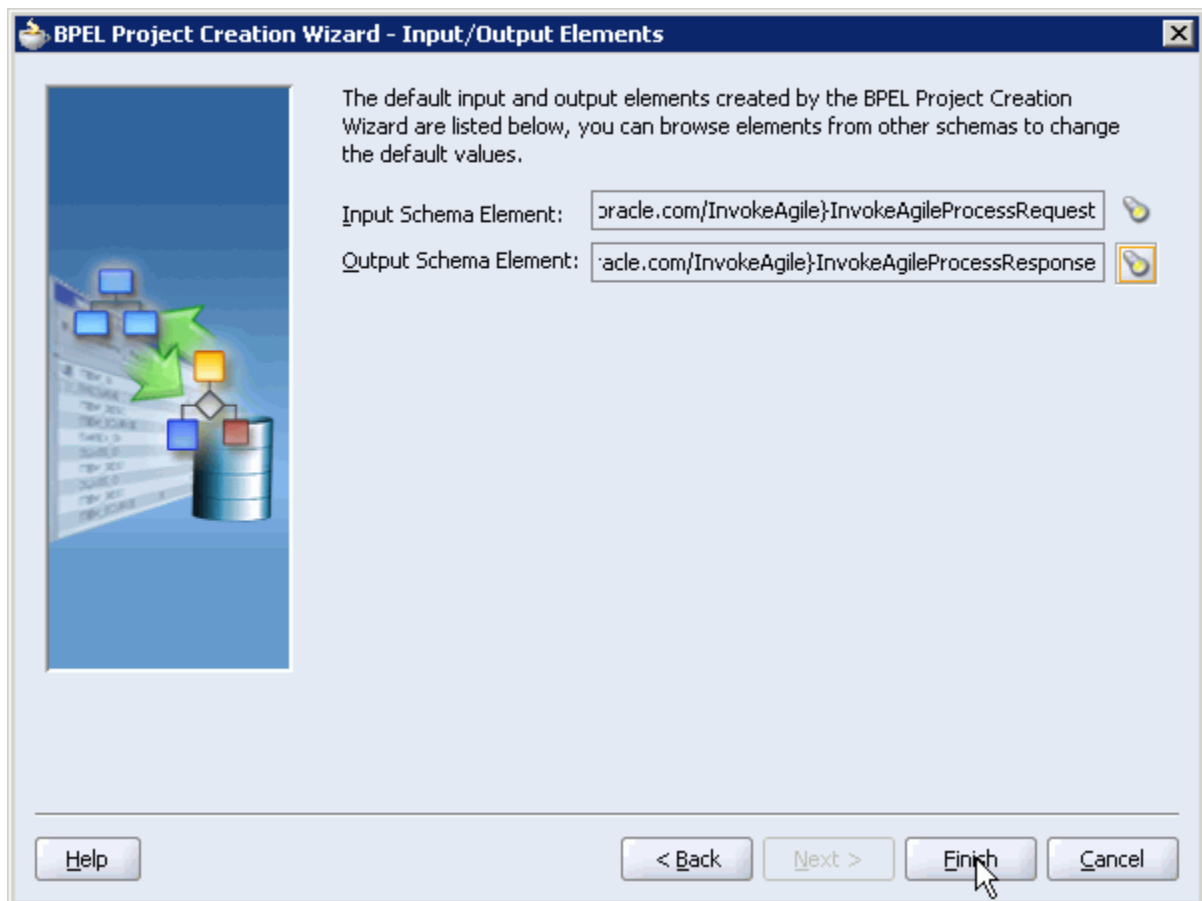
12. Click on the flashlight icon next to the **Output Schema Element**.



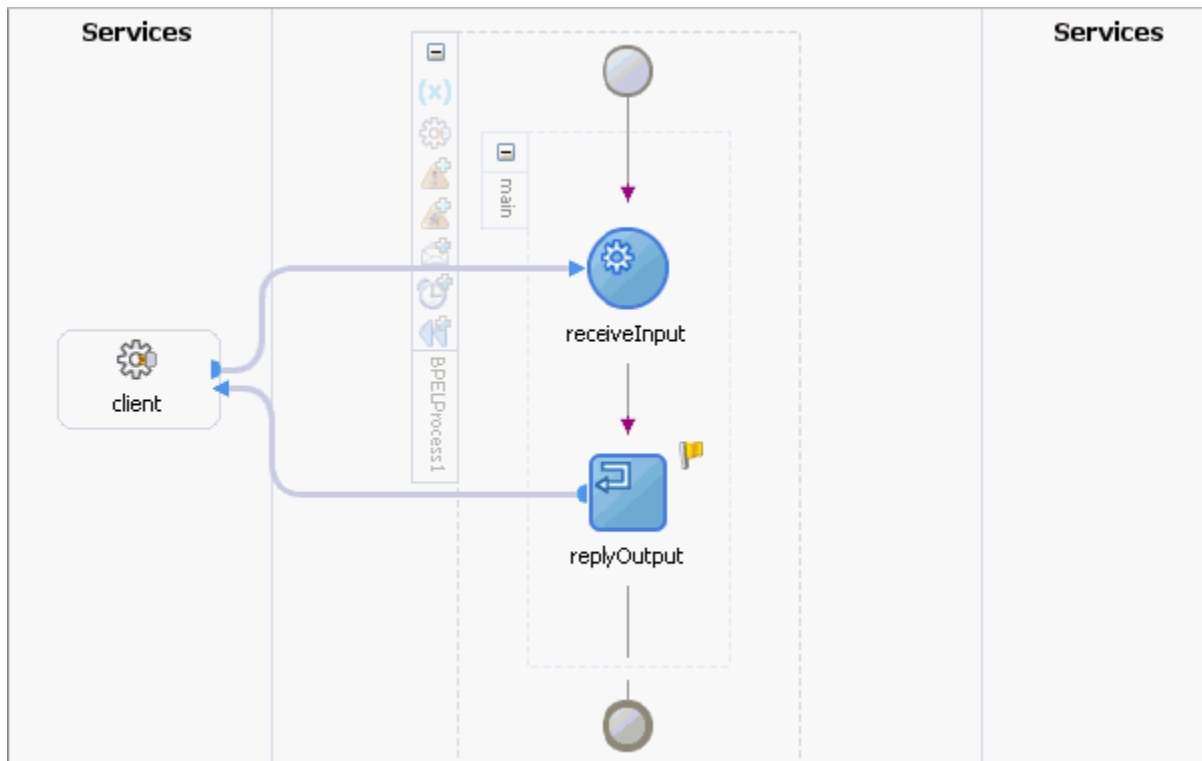
13. In the Type Chooser, select **InvokeAgileProcessResponse** and click **OK**.



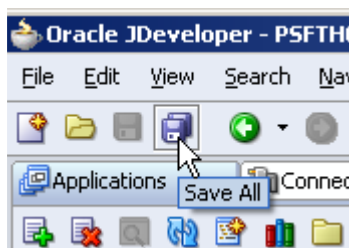
14. Click **Finish** to proceed.



15. The BPEL process diagram should look as shown.

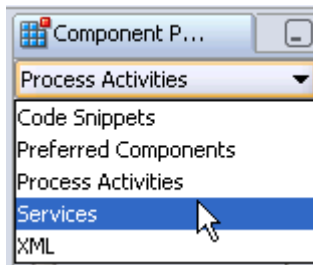


16. Save your work by clicking on the **Save All** button.



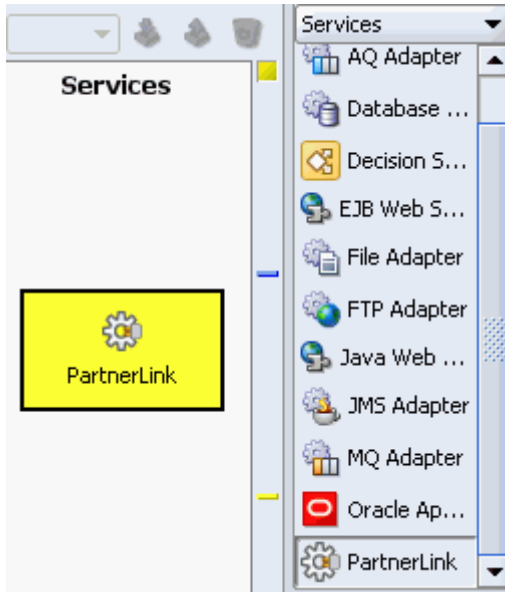
3.2 Create the Agile Partner Link

1. In the Component Palette (upper right section of JDeveloper window), select **Services** from the drop down menu.



2. Drag and drop a **PartnerLink** activity onto the **right** side of the designer window anywhere beneath the Services.

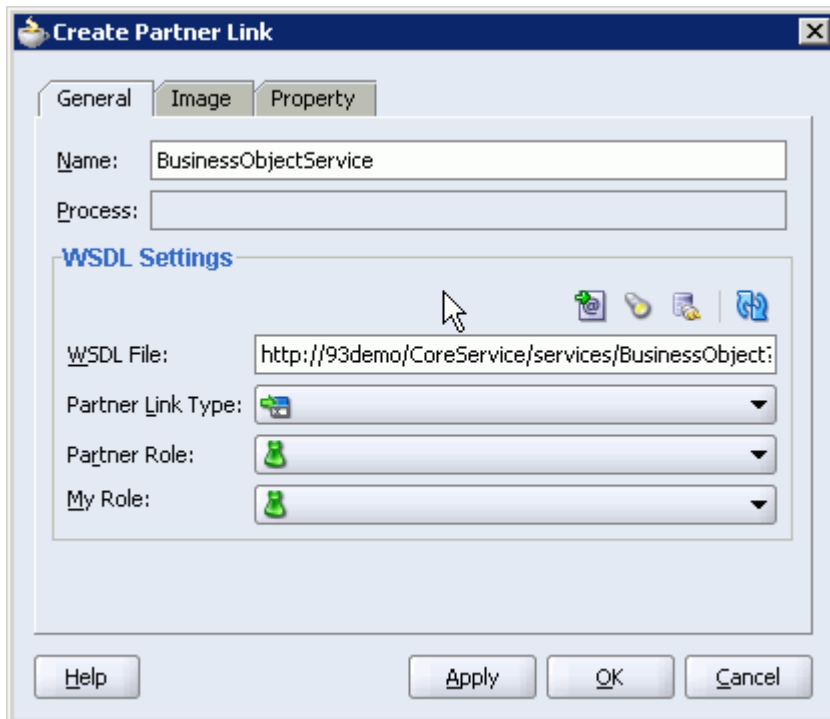




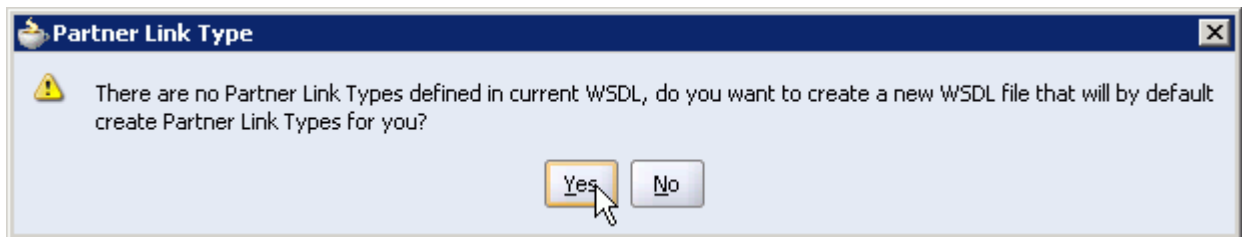
3. In the Create Partner Link window, enter the **Agile WSDL URL** in the **WSDL File** field and press **ENTER**. Oracle BPEL Process Manager will now load WSDL from the Agile.

The URL is: **`http://93demo/CoreService/services/BusinessObject?wsdl`**

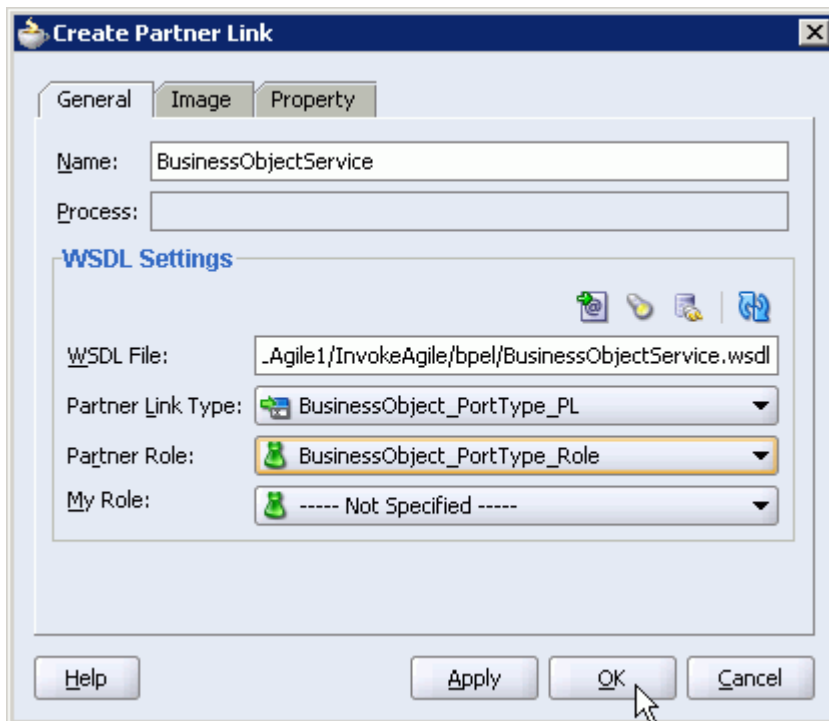
Note: Replace 93demo in the above URL with the location of your Agile instance.



4. Click **Yes**.



5. The **Name** and **Partner Link Type** fields are automatically populated.
6. Select **Partner Role** as shown below.



7. The next two steps (8 and 9) are required only if your Agile web service invocation requires the use of security credentials. Click OK to exit otherwise.

8. Click on **Property**.

The screenshot shows the 'Edit Partner Link' dialog box with the 'Property' tab selected. The 'Name' field contains 'BusinessObjectService' and the 'Process' field contains 'InvokeAgile'. Under the 'WSDL Settings' section, the 'WSDL File' is 'file:///D:/work-projects/agile-upd/Workflow/Agile/Invok', 'Partner Link Type' is 'BusinessObject_PortType_PL', 'Partner Role' is 'BusinessObject_PortType_Role', and 'My Role' is '----- Not Specified -----'. At the bottom are 'Help', 'Apply', 'OK', and 'Cancel' buttons.

9. Click **Create** to add these three property-value pairs:

basicHeaders: credentials

basicPassword: <your system specific password>

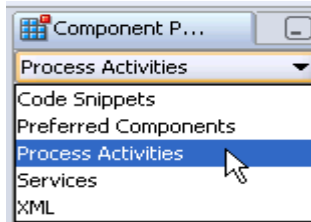
basicUsername: <your system specific username>

Click OK.

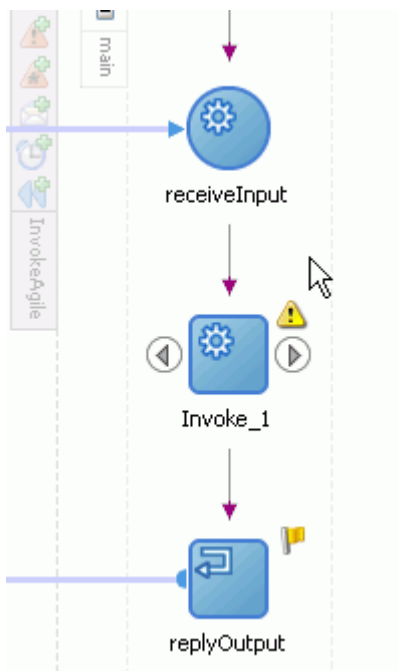
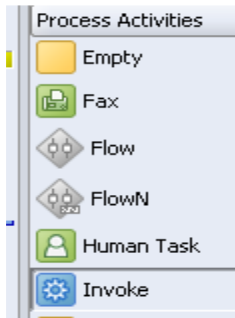
The screenshot shows the 'Edit Partner Link' dialog box with the 'Property' tab selected. The 'Property Names' list contains 'basicHeaders', 'basicPassword', and 'basicUsername'. The 'Property Value' field contains 'credentials'. At the top right of the list are 'Create' and 'Delete' buttons. At the bottom are 'Help', 'Apply', 'OK', and 'Cancel' buttons.

3.3 Create an Invoke activity

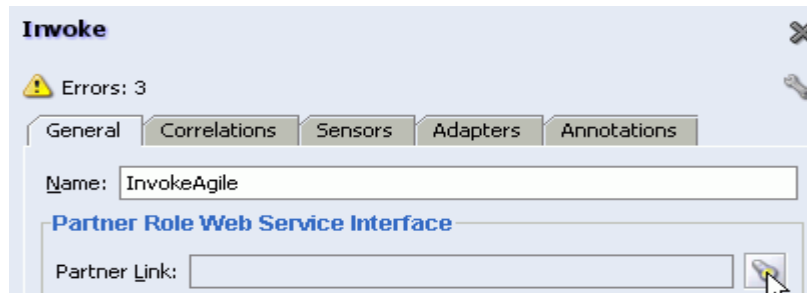
1. In the Component Palette section (upper right section of JDeveloper window), select **Process Activities** in the drop down list. The Process Activities display the BPEL activities that you can drag and drop into the process designer window.



2. Drag and drop an **Invoke** from the Component Palette section onto the canvas immediately **after** the **receiveInput** activity.



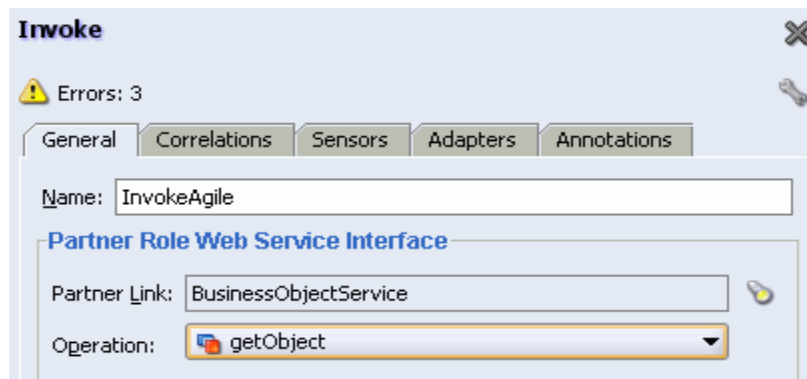
3. Double-click the **Invoke** icon to open the Invoke window
4. In the Invoke window, enter the following:
 - a. Set Invoke Name to **InvokeAgile**
 - b. Click the flashlight icon for the Partner Link field to open the Partner Link Chooser popup window.



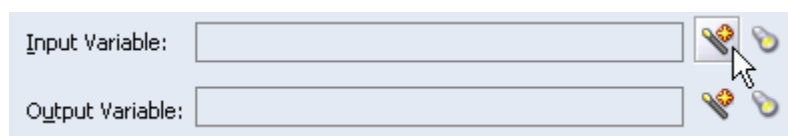
- c. Select Partner Link to **BusinessObjectService** and click **OK** button



- d. Set Operation to **getObject**.



- e. Click on the '**Auto-create variable**' icon next to the **Input Variable** text field to create a global variable for this activity. Accept defaults. Click **Apply** and then **OK**.



- f. Click on the '**Auto-create variable**' icon next to the **Output Variable** text field to create a global variable for this activity.

g. Accept defaults. Click **Apply**, followed by **OK**.

h. Ensure your invoke window looks as shown. Click **OK**.

Invoke

Errors: 3

General Correlations Sensors Adapters Annotations

Name: InvokeAgile

Partner Role Web Service Interface

Partner Link: BusinessObjectService

Operation: getObject

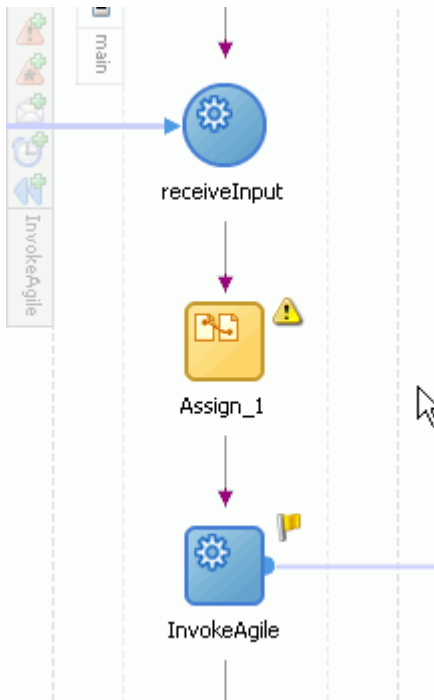
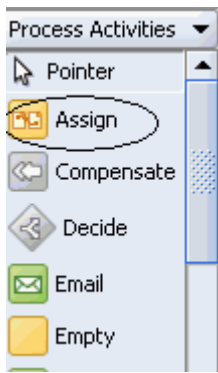
Input Variable: InvokeAgile_getObject_InputVariable

Output Variable: InvokeAgile_getObject_OutputVariable

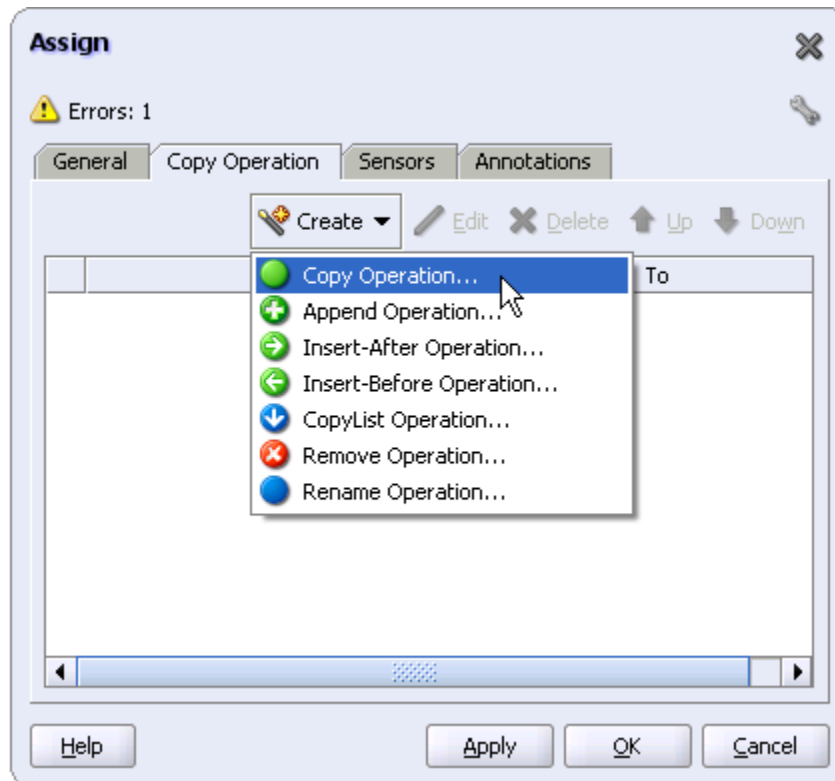
Help Apply OK Cancel

3.4 Create an Assign activity

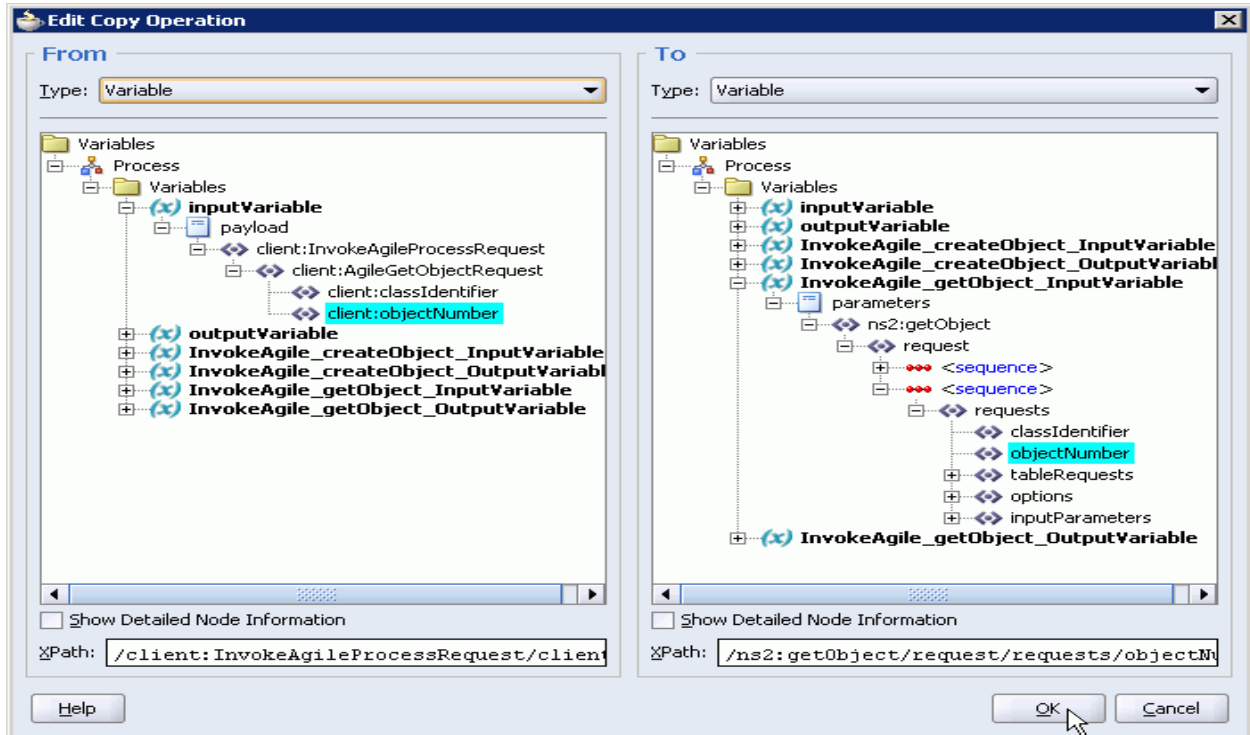
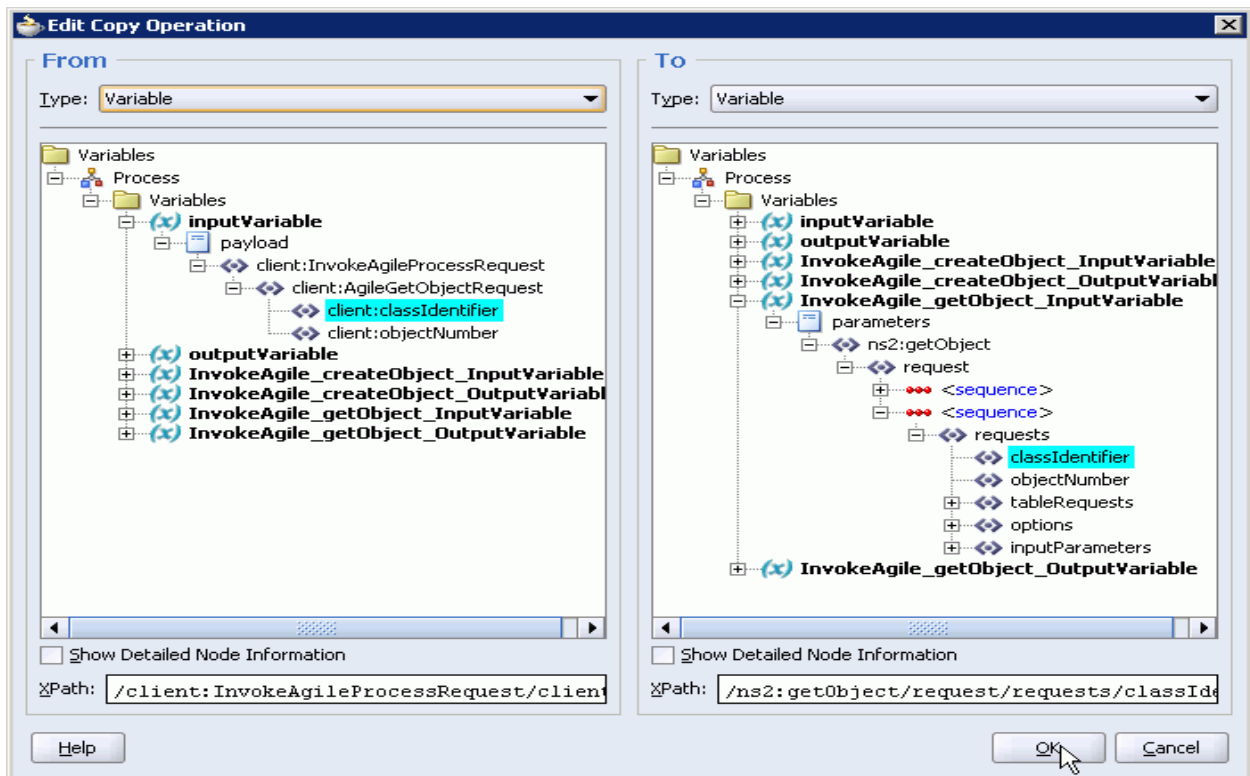
1. Drag and drop an **Assign** activity from the Component Palette section to between the **receiveInput** and **InvokeAgile** activities.



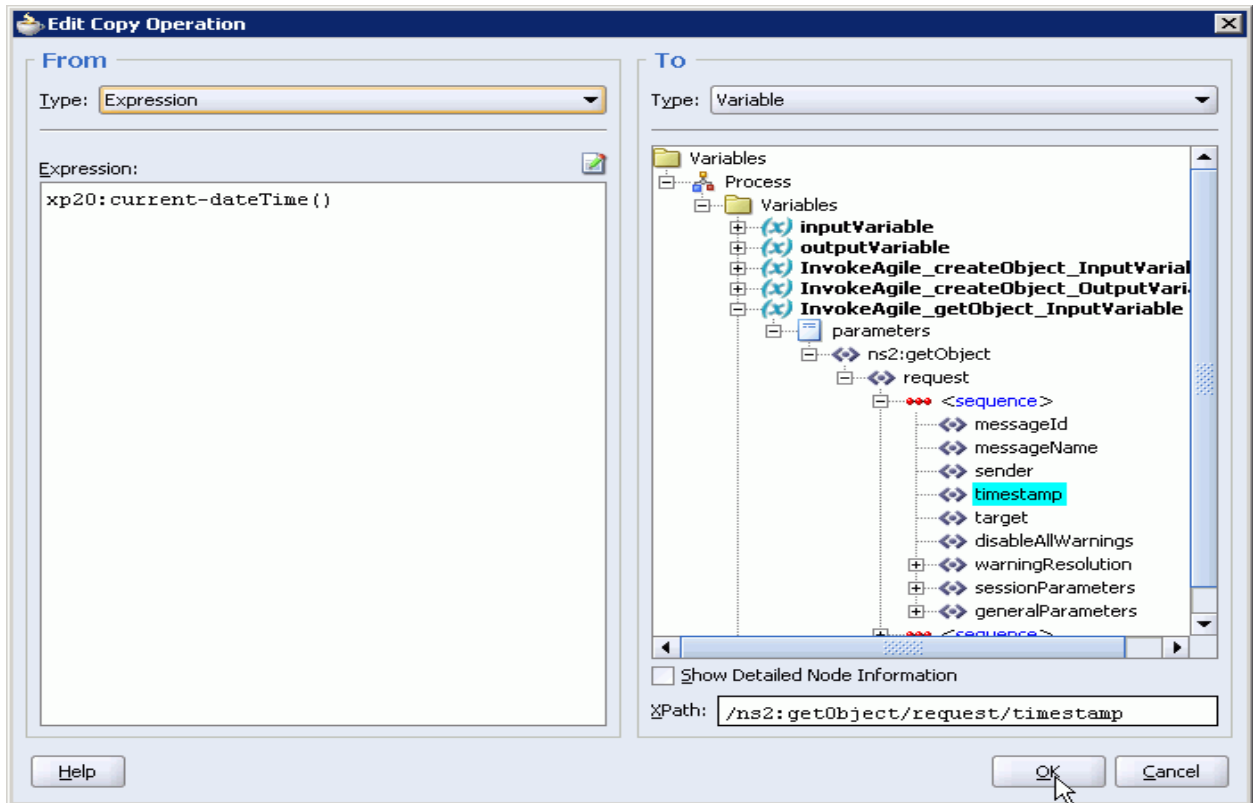
2. Double click on the recently added **Assign** icon.
3. Click on the **General** tab and enter **CopyInput** in the **Name** field.
4. Click **Apply**
5. Click the **Copy Operation** tab
6. Click **Create** and select **Copy Operation** from the drop down list.



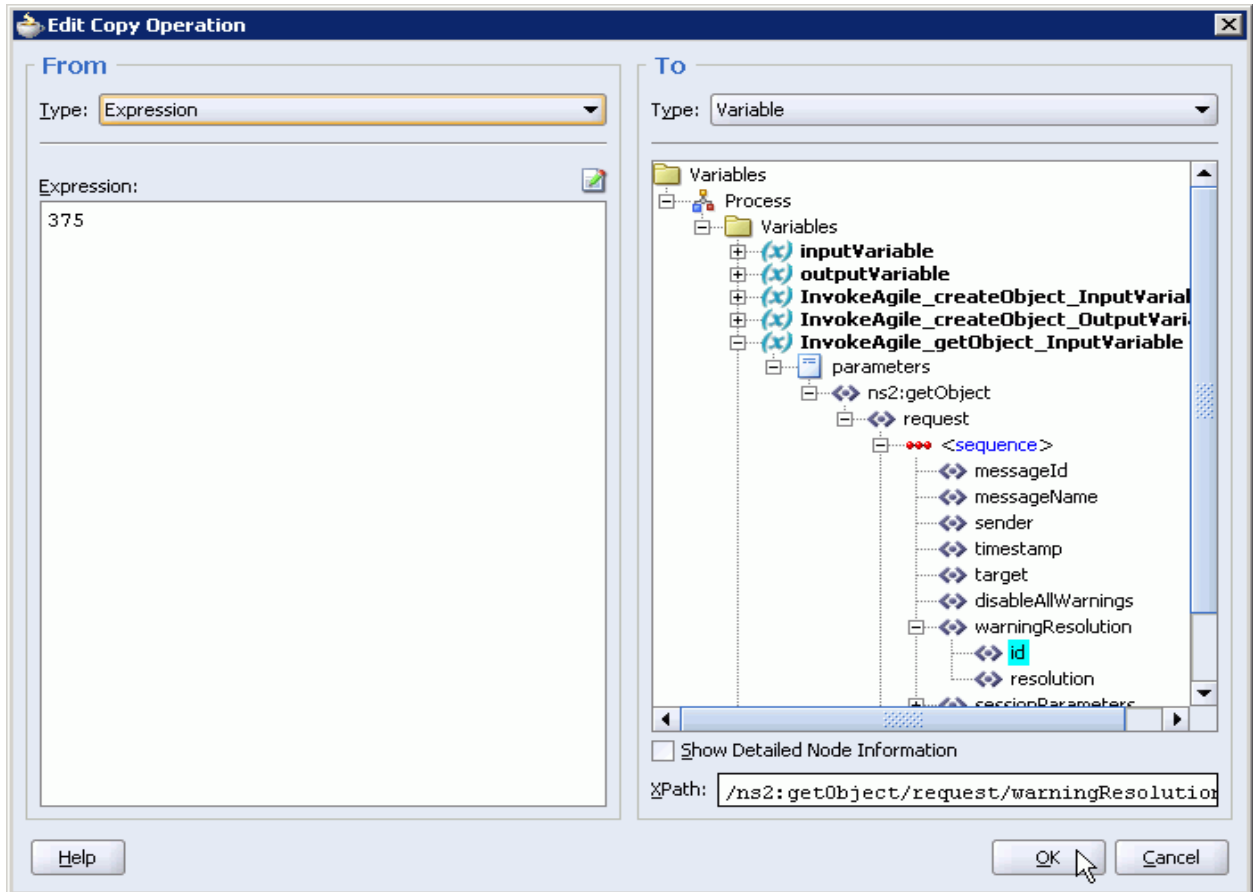
7. Create **two** Copy Operations as shown. Click **OK** after every copy operation to continue.



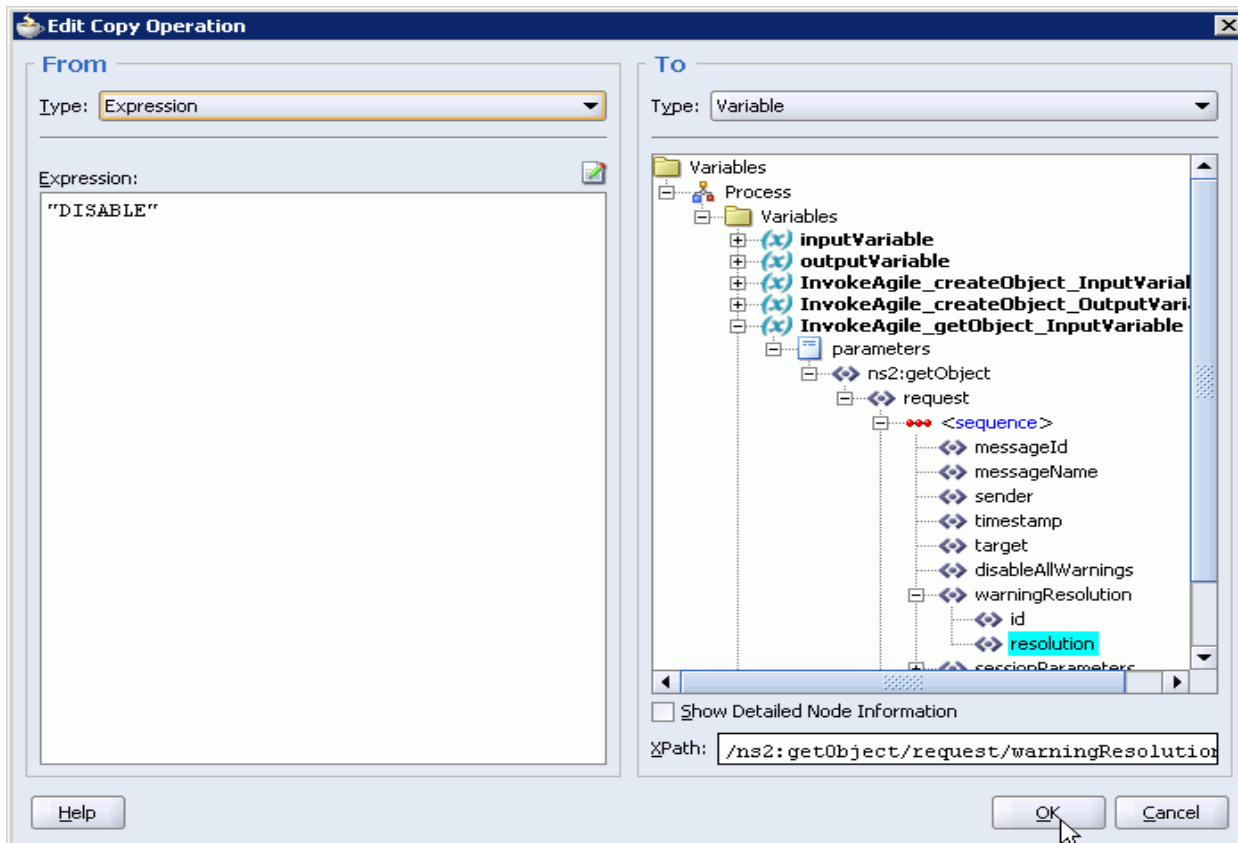
8. Click **Create** and select **Copy Operation** from the drop down list (as in Step 6).
9. Select **Expression** from the Type drop down list in the **From** column and enter **xp20:current-dateTime()**
10. Expand the **InvokeAgile_getObject_InputVariable** as shown and click **OK**.



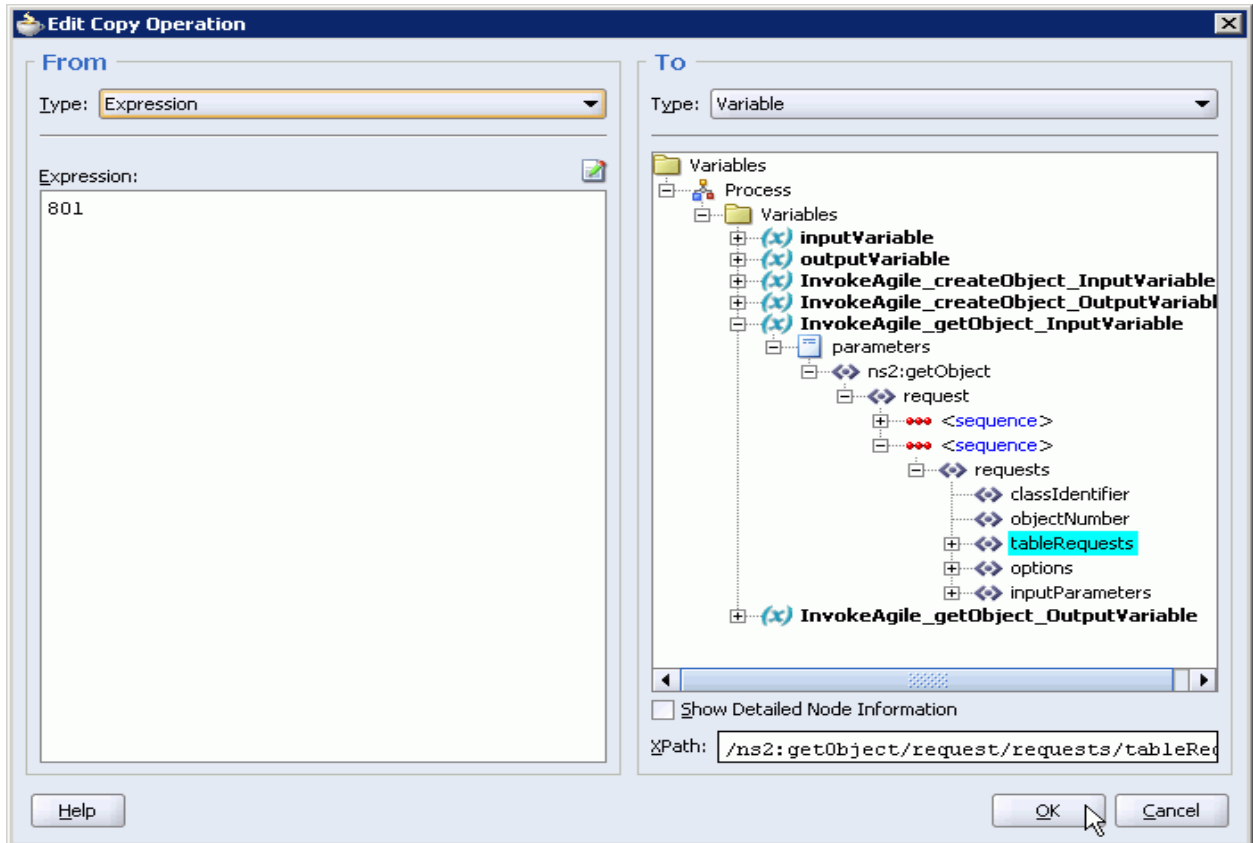
11. Click **Create** and select **Copy Operation** from the drop down list (as in Step 6).
12. Select **Expression** from the Type drop down list in the **From** column and enter **375**
13. Expand the **InvokeAgile_getObject_InputVariable** as shown and click **OK**.



14. Click **Create** and select **Copy Operation** from the drop down list (as in Step 6).
15. Select **Expression** from the Type drop down list in the **From** column and enter **"DISABLE"**
16. Expand the **InvokeAgile_getObject_InputVariable** as shown and click **OK**.



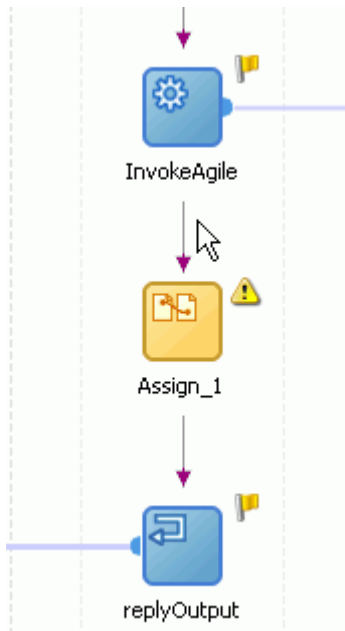
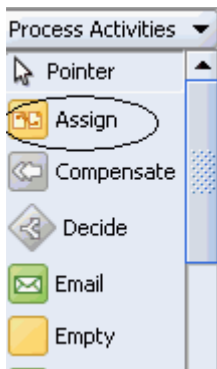
17. Click **Create** and select **Copy Operation** from the drop down list (as in Step 6).
18. Select **Expression** from the Type drop down list in the **From** column and enter **801**
19. Expand the **InvokeAgile_getObject_InputVariable** as shown and click **OK**.



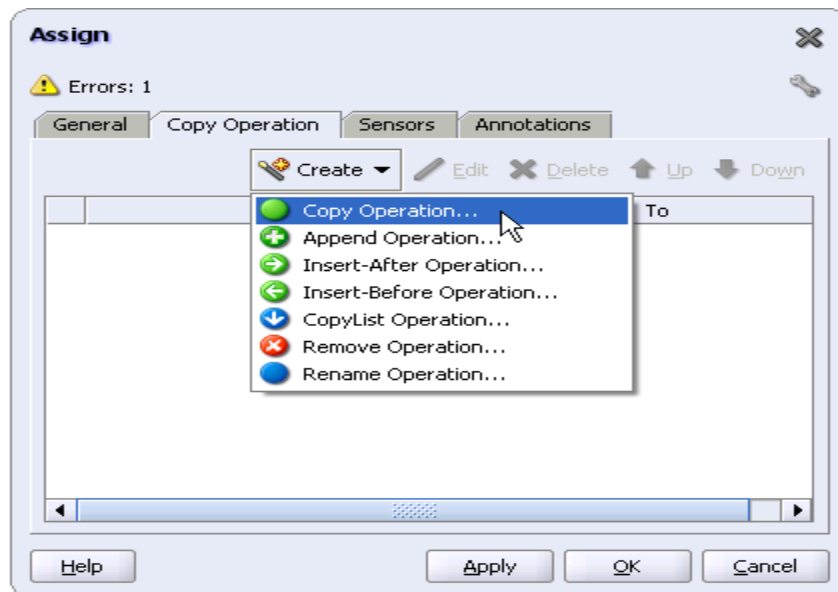
20. Click **OK** to close the Assign window.

3.5 Setup the Output

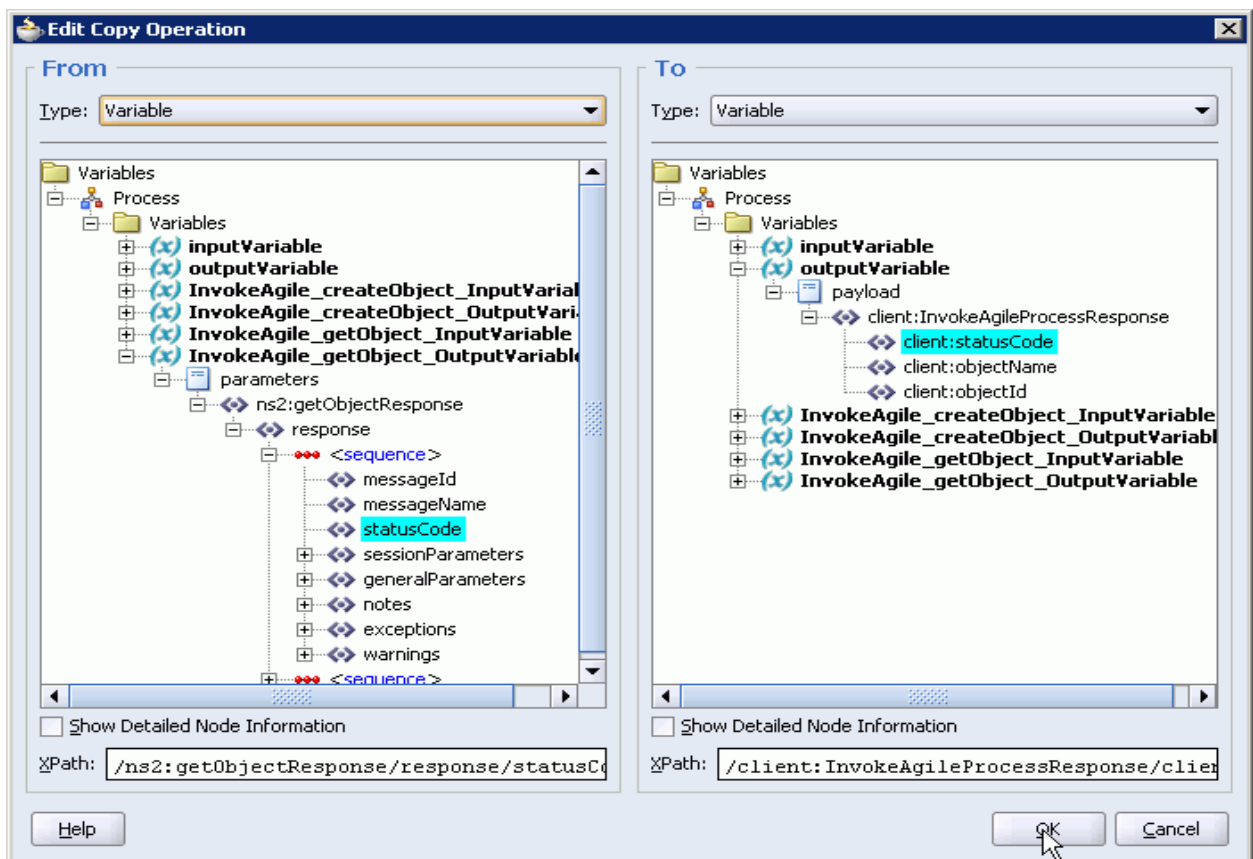
1. Drag and drop an **Assign** activity from the Component Palette section to between the **InvokeAgile** and **replyOutput** activities.

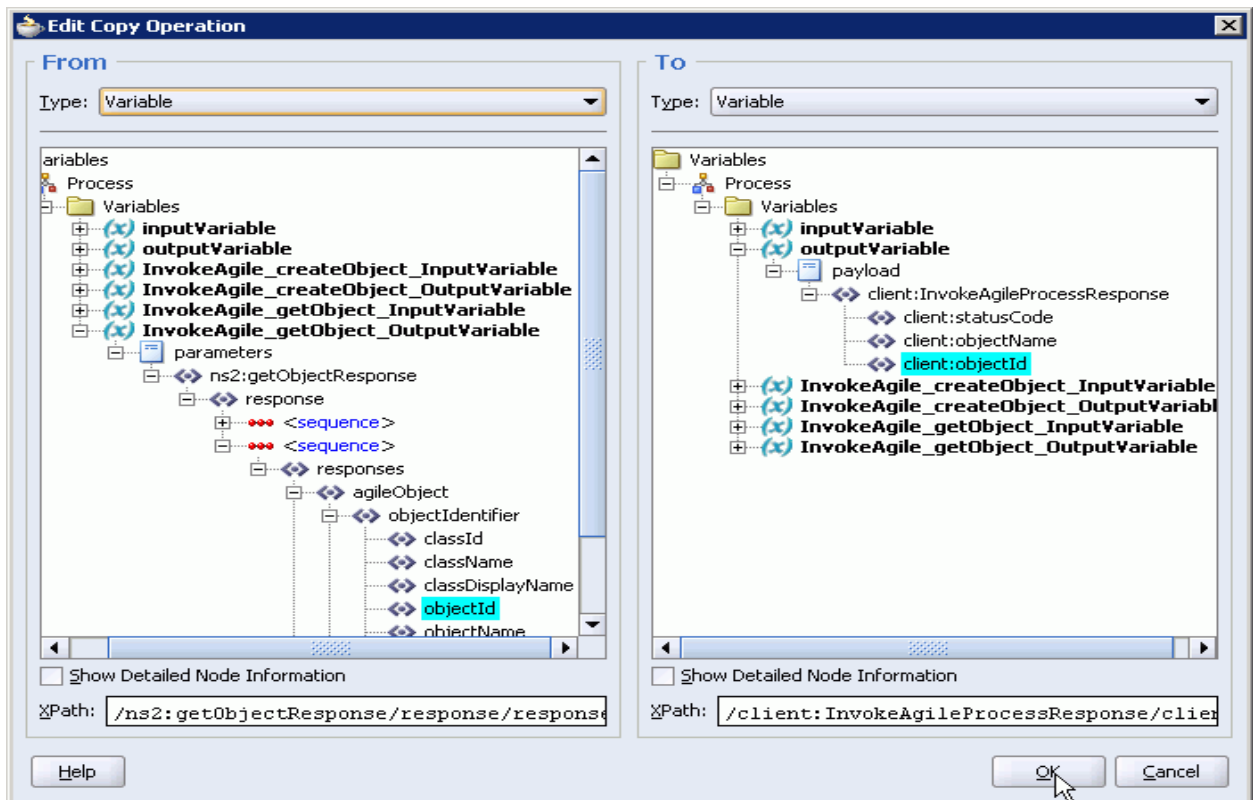
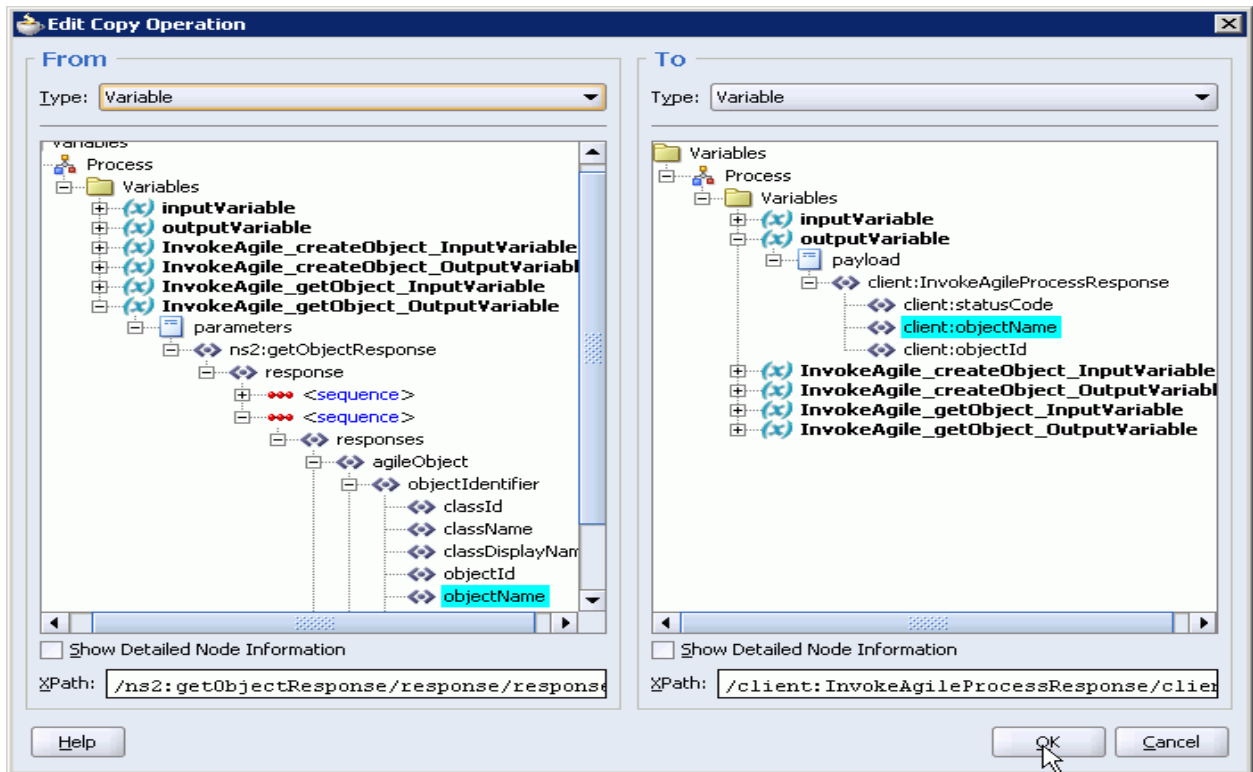


2. Double click on the recently added **Assign** icon.
3. Click on the **General** tab and enter **CopyOutput** in the **Name** field.
4. Click **Apply**
5. Click the **Copy Operation** tab
6. Click **Create** and select **Copy Operation** from the drop down list.



7. Create **three** Copy Operations as shown. Click **OK** after every copy operation to continue.

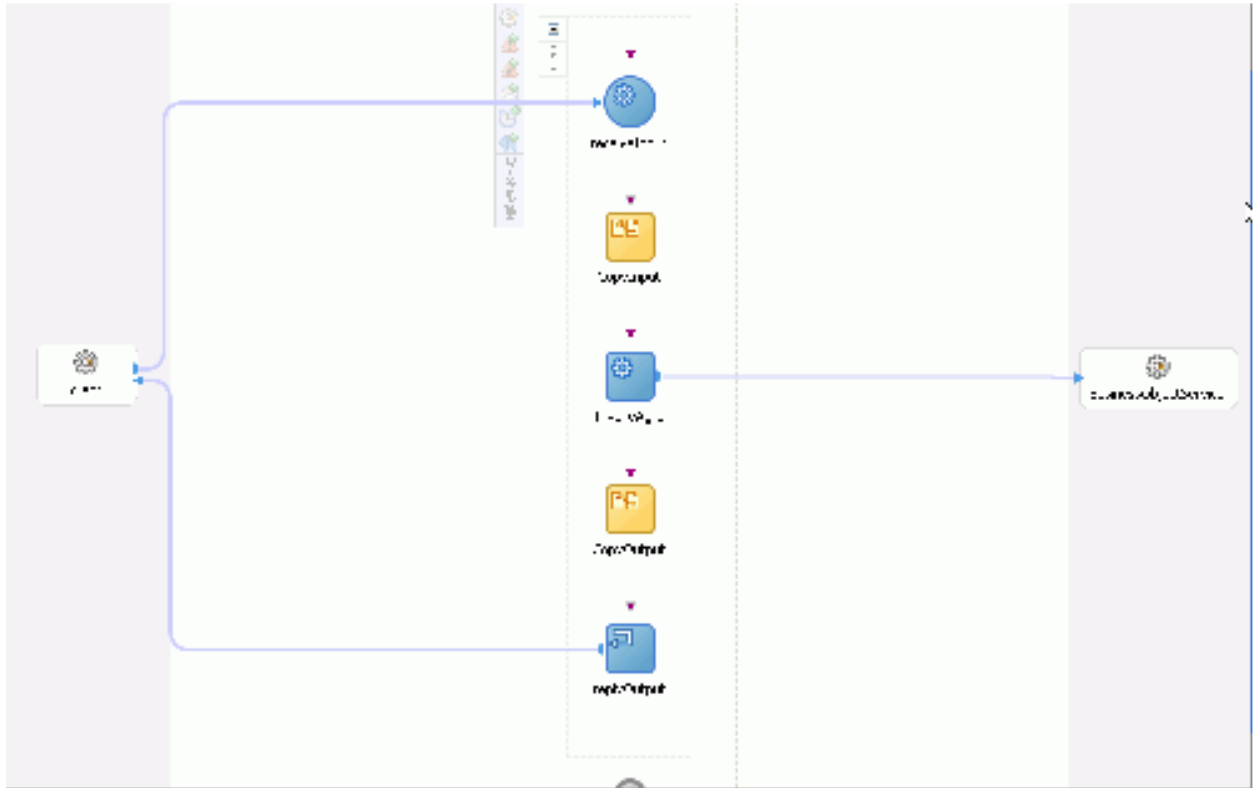




8. Click **OK** to close the **Assign** window. This completes the creation of the BPEL process.

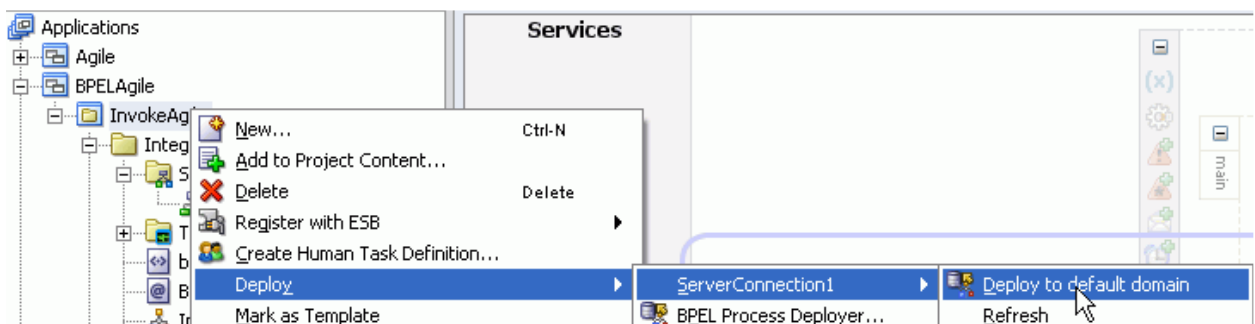
3.6 Validating, Compiling and Deploying the BPEL Process

1. The completed BPEL process should resemble the following figure.

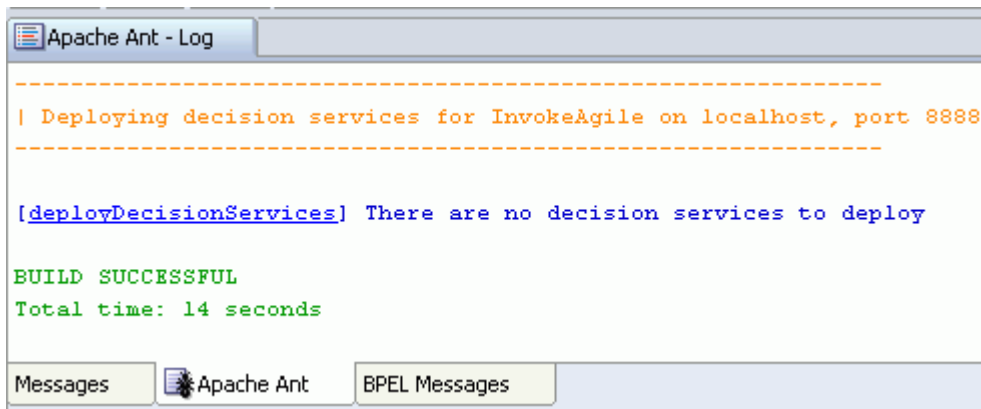


2. Click the **Save All** button to save the BPEL project.
3. Go to the **Applications Navigator** section.
4. Right-click the **InvokeAgile** BPEL Project.
5. Select **Deploy** → **ServerConnection1** → **Deploy to default domain**

Note: Replace ServerConnection1 with your Integration Server connection name.



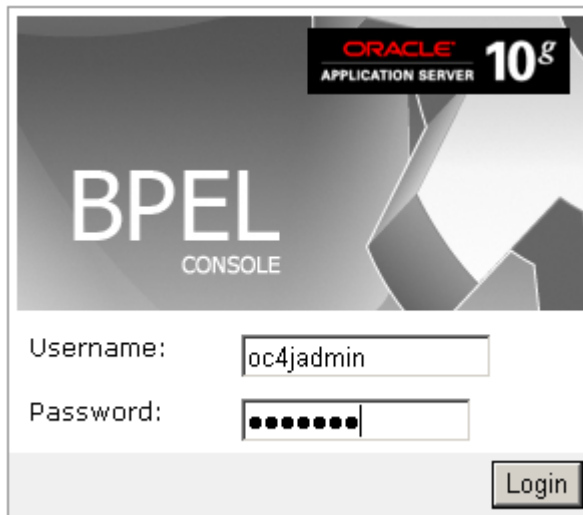
6. This will compile and deploy the BPEL process to the local Application Server.



4 Testing

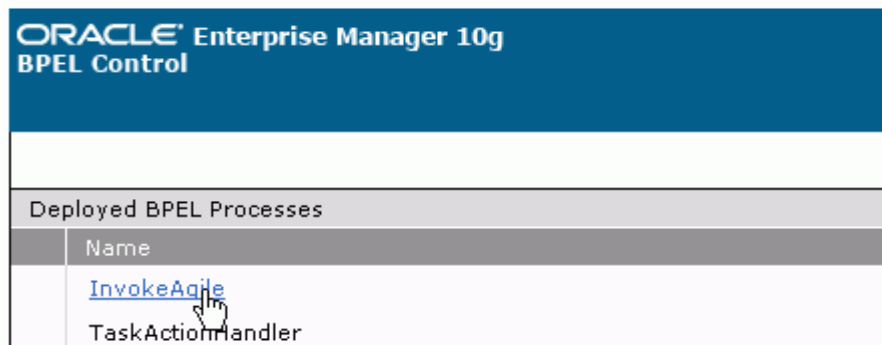
4.1 Invoking the Agile Web Service from BPEL

1. Log into the Oracle BPEL Console.
2. The default Username is **oc4jadmin** and the default password is **welcome1**



The image shows the Oracle BPEL Console login interface. At the top, there is a banner with the Oracle 10g Application Server logo. Below the banner, the text "BPEL CONSOLE" is displayed. The login form consists of two input fields: "Username:" with the value "oc4jadmin" and "Password:" with a masked password represented by dots. A "Login" button is located at the bottom right of the form.

3. Click on the **InvokeAgile** process in the Deployed BPEL Processes list.



The image shows the Oracle Enterprise Manager 10g BPEL Control page. The header is blue with the text "ORACLE Enterprise Manager 10g BPEL Control". Below the header, there is a section titled "Deployed BPEL Processes". This section contains a table with one row. The table has a header row with the column "Name". The data row contains the text "InvokeAgile" (which is a hyperlink) and "TaskActionHandler". A mouse cursor is pointing at the "InvokeAgile" link.

Name
InvokeAgile TaskActionHandler

- This takes you to the Initiate tab of the **InvokeAgile** BPEL Process where you see an HTML form to initiate a test instance. Enter the AgileGetObjectRequest input parameters as shown and click on **Post XML Message**.

ORACLE® Enterprise Manager 10g
BPEL Control

BPEL Process: InvokeAgile Version: 1.0 Lifecycle: Active
Statistics: [0 Open Instances](#) | [1 Closed Instances](#)

[Manage](#) **Initiate** [Descriptor](#) [WSDL](#)

Testing this BPEL Process

Initiating a test instance
To create a new 'test' instance of this BPEL Process, fill this form and click on **Post XML Message**.

Operation: ☒ HTML Form ☐ XML Source

☐ WS-Security ☐ Include In Header

☐ WS-Addressing ☐ Include In Header

☐ payload

☐ AgileGetObjectRequest

classIdentifier: xsd:string

objectNumber: xsd:string

Note: XML source view contents will not be reflected in the HTML form view

☐ Save Test

☐ Perform stress test

Post XML Message

- The following output is displayed, indicating a successful invocation of the Agile GetObjectRequest web service.

ORACLE® Enterprise Manager 10g
BPEL Control

BPEL Process: InvokeAgile Version: 1.0 Lifecycle: Active
Statistics: [0 Open Instances](#) | [1 Closed Instances](#)

[Manage](#) **Initiate** [Descriptor](#) [WSDL](#) [Sensors](#) [Source](#) [Test Suites](#) [Reports](#)

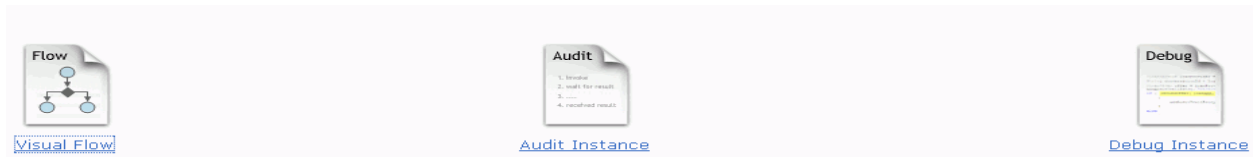
Test Instance Initiated

Your test request was processed synchronously. It took 782.0milliseconds to finish and generated the following output:

Value:

```
<InvokeAgileProcessResponsehttp://xmlns.oracle.com/InvokeAgile>
  <statusCodehttp://xmlns.oracle.com/InvokeAgile>SUCCESS</statusCode>
  <objectNamehttp://xmlns.oracle.com/InvokeAgile>P00216</objectName>
  <objectIdhttp://xmlns.oracle.com/InvokeAgile>6164358</objectId>
</InvokeAgileProcessResponse>
```

- Click on any of the **Visual Flow**, **Audit Instance** or the **Debug Instance** links to get more information on how this BPEL request was processed.



- Here is an example looking at the **Audit Instance** link. You can click on various operations in the page to see each step in the BPEL Process that queried Agile. Click on the “More” links to see additional details on process execution, such as input and output parameters.

ORACLE® Enterprise Manager 10g
BPEL Control

Title: Instance #2 of InvokeAgile
Reference Id: 2 **Tree Finder**
BPEL Process: [InvokeAgile \(v. 1.0\)](#)

[Manage](#) [Flow](#) **[Audit](#)** [Debug](#) [Interactions](#) [Sensor Values](#) [Test](#)

Audit trail of this BPEL instance | [View Raw XML](#)

[2009/08/04 12:07:08] New instance of BPEL process "InvokeAgile" initiated (# "2").

```

<process>
  <sequence>
    receiveInput
      [2009/08/04 12:07:08] Received "inputVariable" call from partner "client" More...
    CopyInput
      [2009/08/04 12:07:08] Updated variable "InvokeAgile_getObject_InputVariable" More...
      [2009/08/04 12:07:08] Updated variable "InvokeAgile_getObject_InputVariable" More...
      [2009/08/04 12:07:08] Updated variable "InvokeAgile_getObject_InputVariable" More...
      [2009/08/04 12:07:08] Updated variable "InvokeAgile_getObject_InputVariable" More...
      [2009/08/04 12:07:08] Updated variable "InvokeAgile_getObject_InputVariable" More...
      [2009/08/04 12:07:08] Updated variable "InvokeAgile_getObject_InputVariable" More...
    InvokeAgile
      [2009/08/04 12:07:09] Invoked 2-way operation "getObject" on partner "BusinessObjectService". More...
    CopyOutput
      [2009/08/04 12:07:09] Updated variable "outputVariable" More...
      [2009/08/04 12:07:09] Updated variable "outputVariable" More...
      [2009/08/04 12:07:09] Updated variable "outputVariable" More...
    replyOutput
      [2009/08/04 12:07:09] Reply to partner "client". More...
  </sequence>
  [2009/08/04 12:07:09] BPEL process instance "2" completed
</process>
  
```