IBM WebSphere Development Studio Client for iSeries

Build a Web user interface with subfiles using iSeries Web Tools

Version 6.0

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Introduction

In the tutorial called Build a Web user interface for an RPG application using iSeries™ Web Tools, you learned how to create an e-business RPG customer inquiry application. When you ran your Web RPG application a 'new' Web customer inquiry page opened in the workbench Web browser. You then entered a customer number and clicked the submit button. The customer details from a DB2/400 database appeared in the workbench Web browser.

This tutorial teaches you how to display a list of customers, display the details for each selected customer and then update selected customer information. You will learn how to use Page Designer to create a new customer list input page from a subfile. You will then learn how to link this new page to the customer inquiry page that you built in the previous tutorial. Then you will learn how to create new output pages (update record and update complete) using the Web Interaction wizard. You will also learn how to link these pages using the Web Interaction wizard. Finally you will learn how to test your new and updated input and output pages in your existing e-business RPG customer inquiry application.

Prerequisites

In order to complete this tutorial end to end, you should already have completed the tutorial called Build a Web user interface for an RPG application using iSeries Web Tools and have working knowledge of the following:

- Basic Microsoft® Windows® operations such as working with the desktop and basic mouse operations such as opening folders and performing drag-and-drop operations.
- How Web applications work.
- How to use a browser to navigate the Internet

It is also useful, but not necessary, for you to have basic knowledge of the following:

- HTML
- Servlets and Java™ Server Pages (to understand the generated output of the Web Interaction wizard)

The file(s) required for this tutorial are available for download at http://ibm.com/software/awdtools/wdt400/library.

Time required

To complete the modules of this tutorial, you will need approximately **1 hour and 40 minutes**.

Learning objectives

This tutorial is divided into six modules, each with its own learning objectives. You can choose to complete one or all of the modules. Each module contains several exercises that must be completed in order for the tutorial to work properly.

Chapter 1, "Module 1. Reviewing the existing RPG e-business application," on page 1 teaches you about the completed customer inquiry application that you

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built in the tutorial called Build a Web user interface for an RPG application using iSeries Web Tools. You will then see how this application changes with the updates you will make working through this tutorial. In this module you will:

- View the completed pages of the customer inquiry Web application
- Look at the enhanced customer inquiry application

Chapter 2, "Module 2. Creating the iSeries service program for your Web application," on page 9 teaches you how to select the RPG service program to handle the Web Interaction shown in Chapter 1, "Module 1. Reviewing the existing RPG e-business application," on page 1. In this module, you will:

- Check the Remote System Explorer perspective is open
- Create a library filter
- Open an ILE RPG source member for edit
- Add code to an ILE RPG source member
- Create an RPG module
- Create a service program

Chapter 3, "Module 3. Creating the customer list input page," on page 19 teaches you how to use Page Designer to create a Web input page of a subfile. This new input page will pass the customer number back to the inquiry page. You will also learn how to modify the inquiry page by adding a link (Find) that will open the customer list page. In this module, you will:

- Start the product
- Set the workspace location
- Check the Web perspective is open
- Create a JSP file
- Add an iSeries table component
- Select attributes for the table
- Insert a form on the page
- Add the iSeries button component
- Add iSeries button attributes
- Add a heading to the page
- Link the inquiry page to the customer list page
- Create another Web interaction to use the new input page and output pages
- Begin the process to add a program to the Web interaction
- Create an iSeries connection
- Select the service program
- Add an output parameter
- Map an output parameter to an output field

Chapter 4, "Module 4. Creating the update record output page," on page 53 teaches you how to create an output page using the Web Interaction wizard. This is the page that shows the customer information you can update. In this module, you will:

- Create the update record page
- Add a program
- Add parameters
- Design the output page

- Link the customer details page to the update record page
- Create an error page

Chapter 5, “Module 5. Creating the update complete output page,” on page 75 teaches you how to create another output page using the Web Interaction wizard. This is the page that shows the customer record was updated on the iSeries. In this module, you will:

- Generate another output page
- Add a program
- Add a parameter
- Design the output page
- Add a flow control error page
- Link the update complete page to the inquiry page
- View the flow structure of your Struts-based Web application

Chapter 6, “Module 6. Running the Web application,” on page 95 teaches you how to run the updated Web application in the WebSphere® Test Environment. In this module, you will:

- Start the application server
- Test the customer list page
- Test the update record and update complete pages
- View the flow structure of your Struts-based Web application

When you are ready, begin Chapter 1, “Module 1. Reviewing the existing RPG e-business application,” on page 1.

Chapter 1. Module 1. Reviewing the existing RPG e-business application

This module teaches you how the existing RPG e-business application that you built in the tutorial called Build a Web user interface for an RPG application using iSeries Web Tools works and looks. You will then see what this application will look like when you have completed this tutorial.

In this module, you will:

- View the completed pages of the customer inquiry Web application
- Look at the enhanced customer inquiry application

Requirement: Before beginning this module, you should have the prerequisite knowledge outlined in “Introduction” on page v.

Exercises

The exercises in this module must be completed in order.

- “Exercise 1.1: Reviewing the Web customer inquiry application”
- “Exercise 1.2: Introducing the enhanced Web application” on page 3

Time required

This module will take approximately **10 minutes** to complete.

Exercise 1.1: Reviewing the Web customer inquiry application

In the tutorial called Build a Web user interface for an RPG application using iSeries Web Tools you created a simple e-business customer inquiry application that uses a Web-based front end to communicate with RPG business logic residing on an iSeries server. You invoked the Web Interaction wizard to create the input and output pages and to create the servlet to invoke the RPG program or service program to get data from the iSeries database. Next you added this RPG program or service program to the Web application. Finally you tested the application in the local test environment on your workstation. You also created an informative error page for when a customer entered an incorrect customer number.

Here is what the finished e-business customer inquiry application looked like.

After the WebSphere server started, your Web application Customer Inquiry input page (inquiry.jsp) displayed in the workbench browser.

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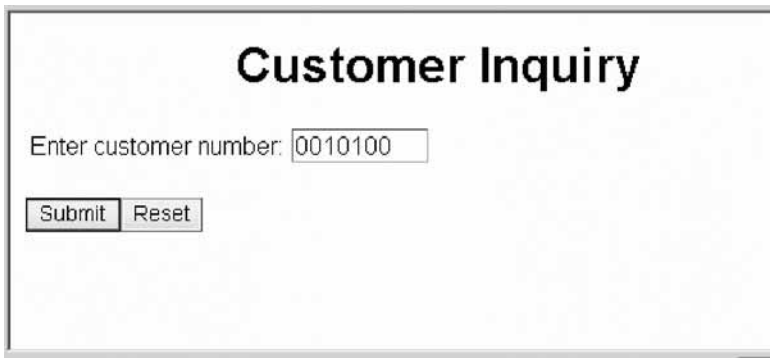


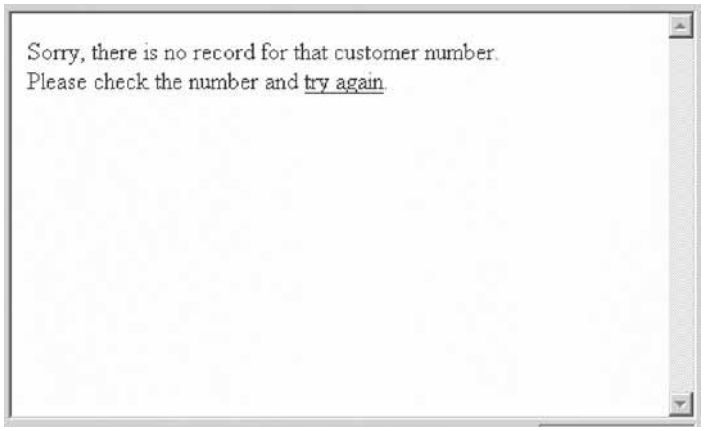
When you entered a customer number and clicked the **Submit** push button, the Customer Details output page (result.jsp) appeared.

Next, you clicked the Back button in the browser to return to the Customer Inquiry input page. Here you entered an incorrect customer number and clicked **Submit**.

An error message appeared.

You then added a new output error page to improve the message information so that if a wrong customer number was entered,

an error page opened instead of a message.



You have viewed the completed pages of the customer inquiry Web application and now you are ready to begin "Exercise 1.2: Introducing the enhanced Web application."

Exercise 1.2: Introducing the enhanced Web application

Before you begin, you must complete "Exercise 1.1: Reviewing the Web customer inquiry application" on page 1.

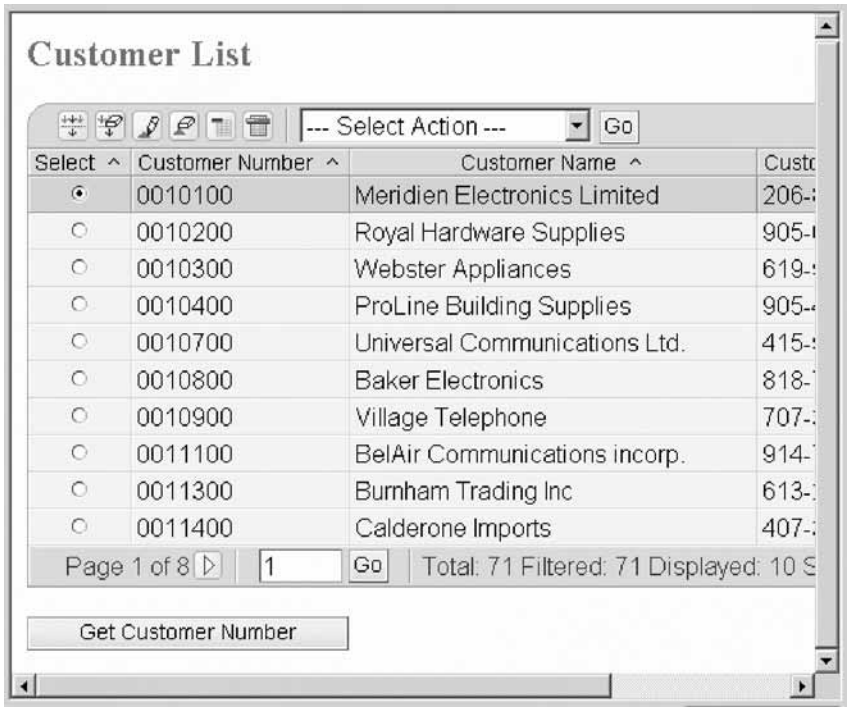
By the end of this tutorial you will have enhanced the Web customer inquiry application. You will invoke the Web Interaction wizard to first create a new input page to view a list of customers (custList.jsp). Next you will add an iSeries RPG service program to handle this Web interaction that you just created. Then you will

invoke the Web Interaction wizard to use the existing output page (result.jsp) to create new output pages to update customer records and confirm updates were completed on the iSeries (custDispUpdateResults.jsp and custDoUpdateResults.jsp). You will then run the application in the local test environment on your workstation. You will also create an informative error page if there is an error during the update of a customer record.

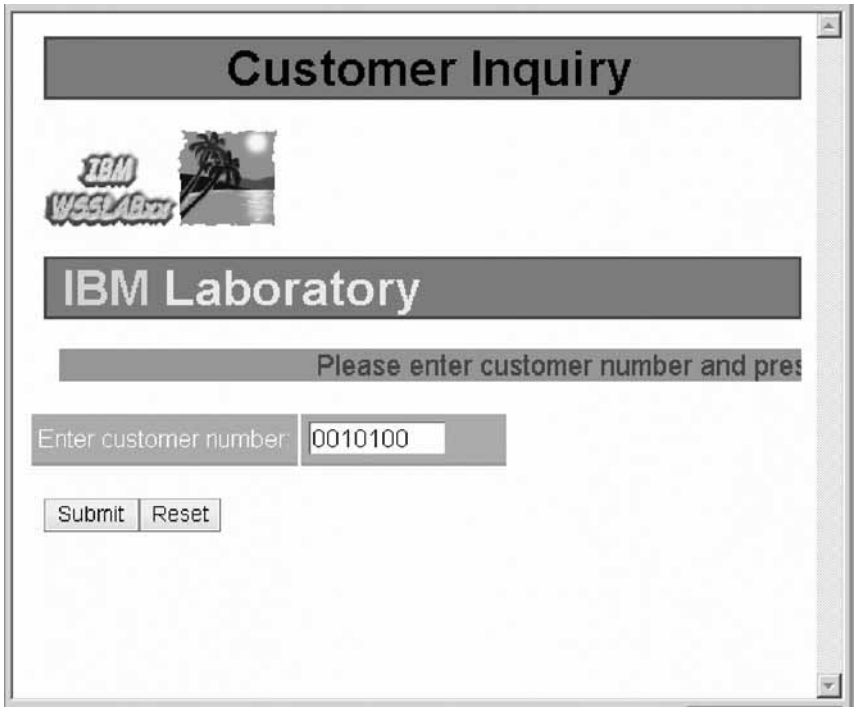
Here is the completed e-business customer inquiry application.

This is the Customer Inquiry input page.

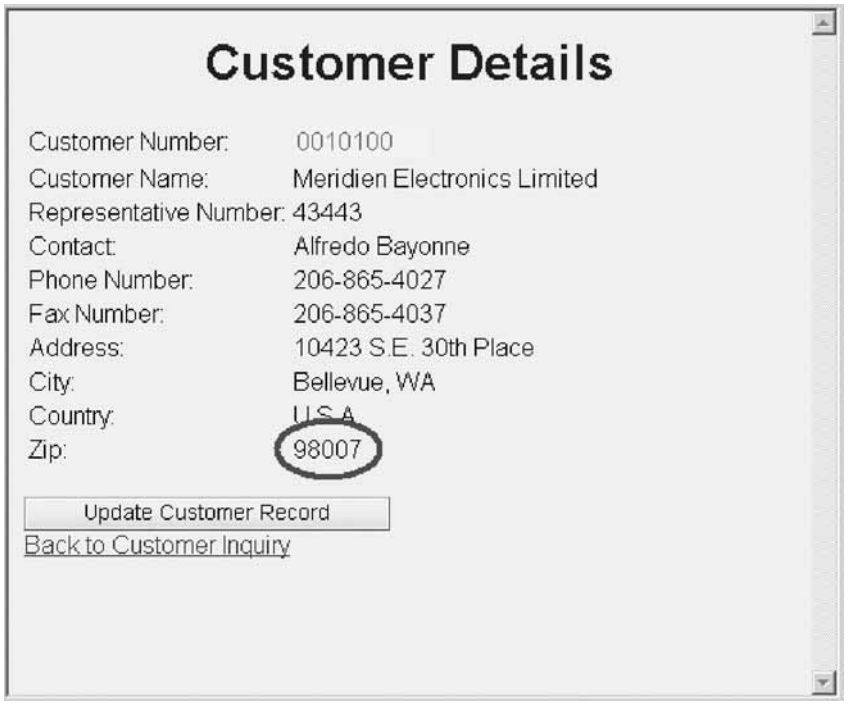
You click the **Find** link. The Customer List page opens:



You select the first entry on the list and then click the **Get Customer Number** button. You return to the Customer Inquiry page with the customer number entered into the customer number field.

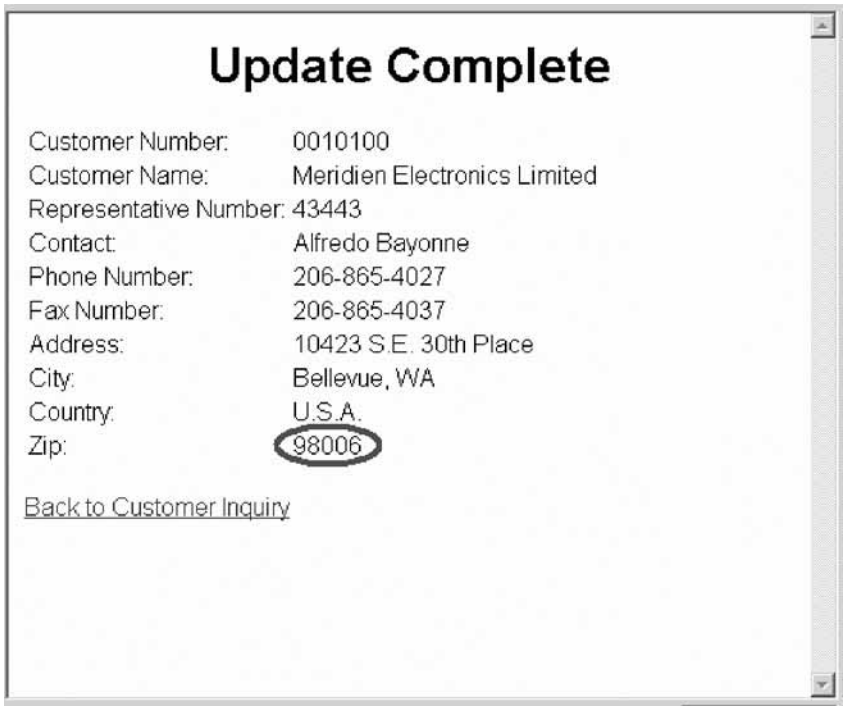


Next you click the **Submit** button. The Customer details page opens showing the details of the selected customer.



When the information is displayed, you click the **Update Customer Record** button.

You change some of the fields and click the **Submit** button. You see the confirmation page with the new values.



You then click the **Back to Customer Inquiry** link and you return to the Customer Inquiry page.

You have looked at the enhanced customer inquiry application that you will build in this tutorial.

Module recap

You have completed Chapter 1, “Module 1. Reviewing the existing RPG e-business application,” on page 1. You have learned how to:

- View the completed pages of the customer inquiry Web application
- Look at the enhanced customer inquiry application

You now know what the customer inquiry application will look like when you complete this tutorial and you are ready to begin Chapter 2, “Module 2. Creating the iSeries service program for your Web application,” on page 9.

Chapter 2. Module 2. Creating the iSeries service program for your Web application

This module teaches you how to use the Remote System Explorer perspective to edit and compile an iSeries service program.

Note: To access iSeries data and resources you will need to have a job description setup with WSSLABxx library in the list of libraries and associated with your user profile on your iSeries system.

In this module, you will:

- Check the Remote System Explorer perspective is open
- Create a library filter
- Open an ILE RPG source member for edit
- Add code to an ILE RPG source member
- Create an RPG module
- Create a service program

Exercises

The exercises in this module must be completed in order.

- "Exercise 2.1: Opening the Remote System Explorer perspective"
- "Exercise 2.2: Editing an iSeries source member" on page 10
- "Exercise 2.3: Compiling source changes" on page 12

Time required

This module will take approximately **10 minutes** to complete.

Exercise 2.1: Opening the Remote System Explorer perspective

To open the Remote System Explorer perspective:

1. In the workbench check whether you have the Remote System Explorer perspective already open. Look for the icon in the left taskbar of the workbench.

2. If you see it, click the Remote System Explorer icon.
3. Otherwise, click **Window > Open Perspective > Remote System Explorer** on the workbench menu.

   The Remote System Explorer perspective opens.

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You have checked that the Remote System Explorer perspective is open and now you are ready to begin “Exercise 2.2: Editing an iSeries source member.”

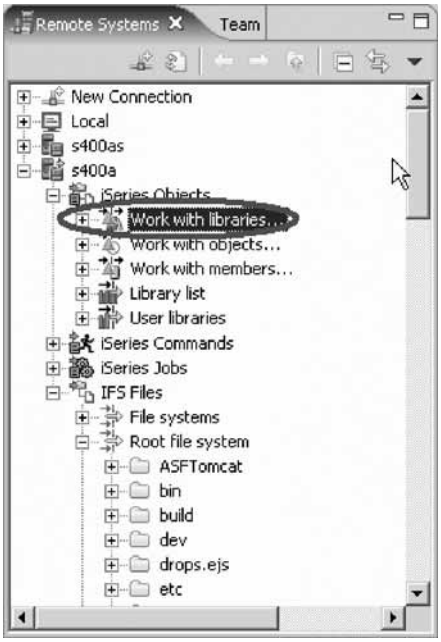
Exercise 2.2: Editing an iSeries source member

Before you begin, you must complete “Exercise 2.1: Opening the Remote System Explorer perspective” on page 9.

You will see a list of servers in the Remote Systems view.

To edit a member:

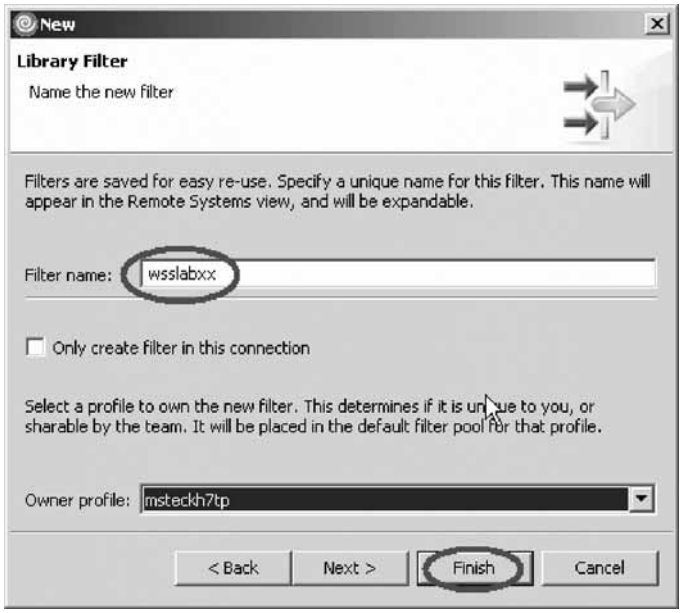
1. Expand **Library list**. If you do not see WSSLABxx then complete these steps:
   a. Double-click **Work with libraries**.



The Library Filter page opens.

   b. In the **Library** field, type WSSLABxx.

c. Click **Next**.



d. In the **Filter name** field, type WSSLABxx.

e. Click **Finish** to create the library filter WSSLABxx.

Next you edit the source file.

2. Expand WSSLABxx.*lib.prod.

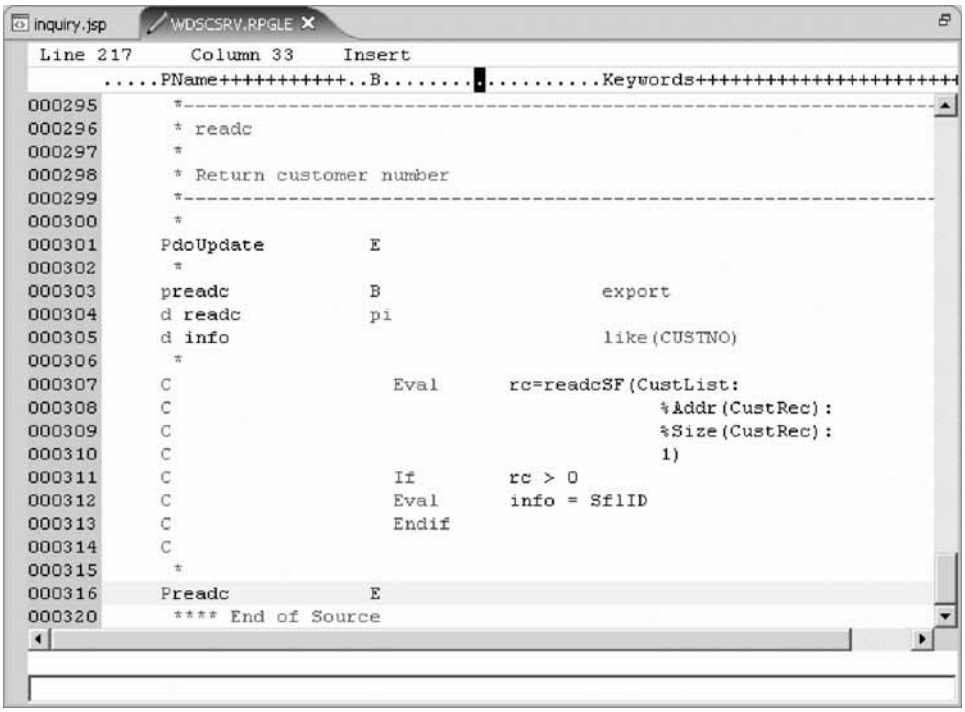
3. Expand QRPGLESRC.*file.pf-src.
4. Select WDSCSRV.rpgle.
5. Right-click WDSCSRV.rpgle.
6. Click **Open with > Remote Systems LPEX Editor** on the pop-up menu.

   Tip: You can also double-click on a member to open the Remote Systems LPEX editor.

   The Editor window opens. You are ready to write your program.

   The logic you add will do the following. It will retrieve a changed record from a table component. The changed record is the selected record in the table. It will pass the customer number from this selected table record back to the caller.

7. Now, add these source changes at the bottom of the source file:



8. Save the file (**Ctrl + S**).

You have created a library filter, opened an ILE RPG source member for edit, and added code to this member and now you are ready to begin "Exercise 2.3: Compiling source changes."

Exercise 2.3: Compiling source changes

Before you begin, you must complete "Exercise 2.2: Editing an iSeries source member" on page 10.

You need to compile your source file in order for the changes to take effect.

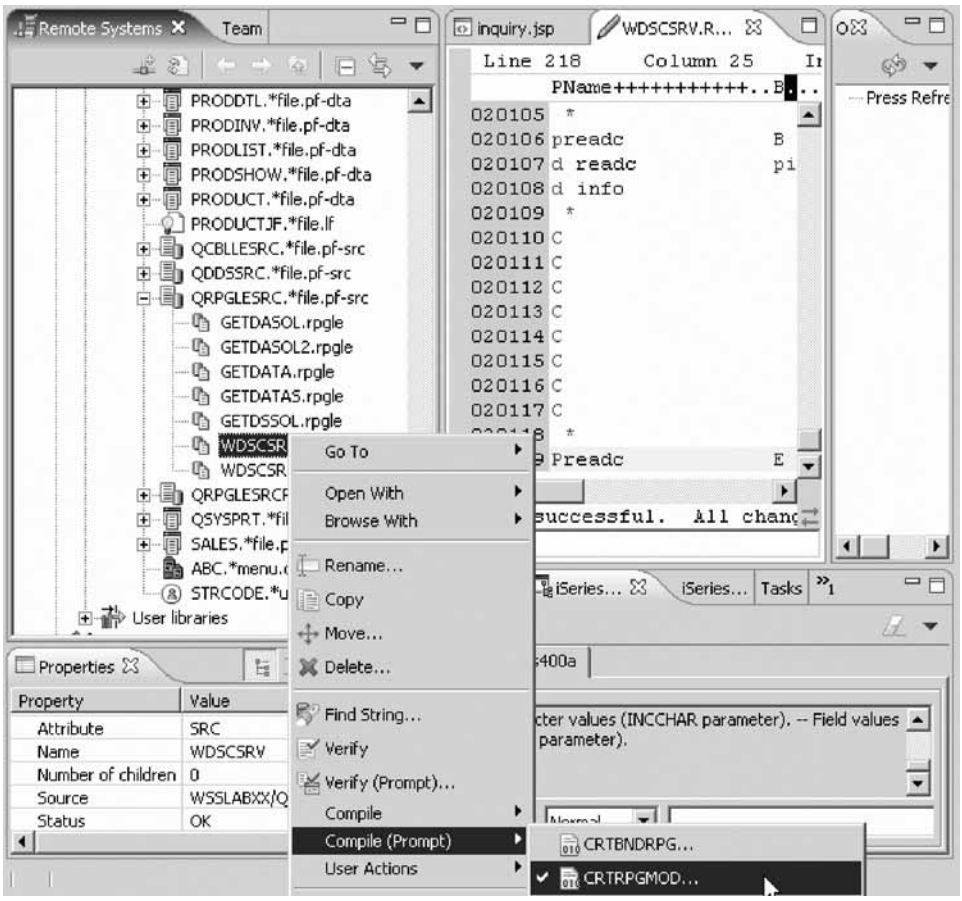
There are two steps to compile: create a module and then create the service program.

Note: The library WSSLABxx must be in your library list to compile your source changes.

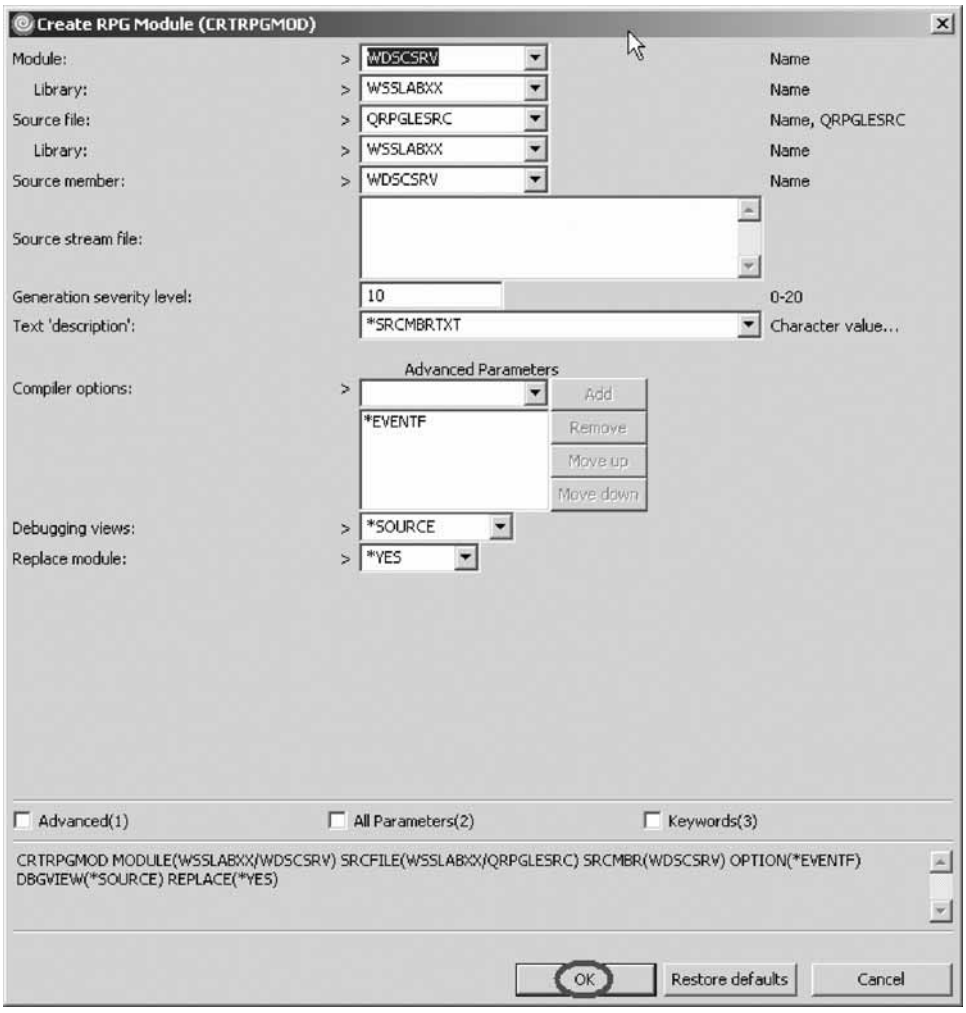
Creating the RPG module

To create the RPG module:

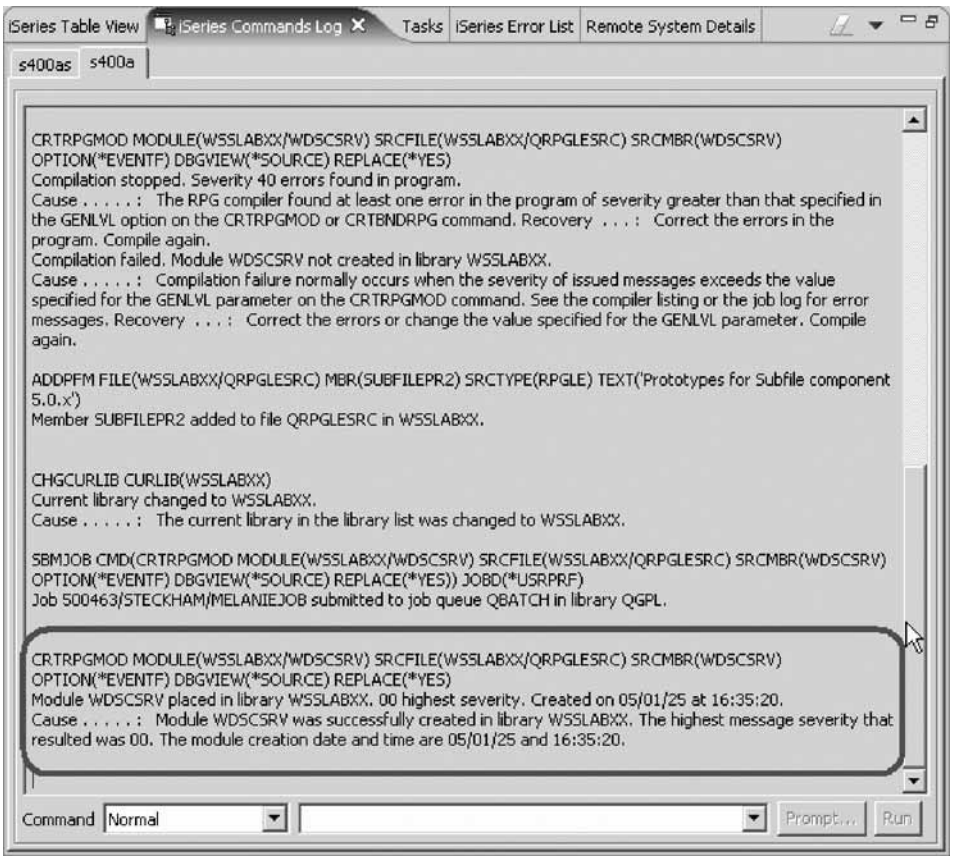
1. In the Remote Systems view, select **WDSCSRV.rpgle**.



2. Right-click and click **Compile (Prompt) > CRTRPGMOD** in the pop-up menu. The Create RPG Module (CRTRPGMOD) dialog opens.


Create RPG Module (CRTRPGMOD)
Module:
WDSCSRV
Name
Library:
WSSLABXX
Name
Source file:
QRPGLESRC
Name, QRPGLESRC
Library:
WSSLABXX
Name
Source member:
WDSCSRV
Name
Source stream file:
Generation severity level:
10
0-20
Text 'description':
*SRCMBRTXT
Character value...
Advanced Parameters
Compiler options:
Add
*EVENTF
Remove
Move up
Move down
Debugging views:
*SOURCE
Replace module:
*YES
Advanced(1)
All Parameters(2)
Keywords(3)
CRTRPGMOD MODULE(WSSLABXX/WDSCSRV) SRCFILE(WSSLABXX/QRPGLESRC) SRCMBR(WDSCSRV) OPTION(*EVENTF)
DBGVIEW(*SOURCE) REPLACE(*YES)
OK
Restore defaults
Cancel

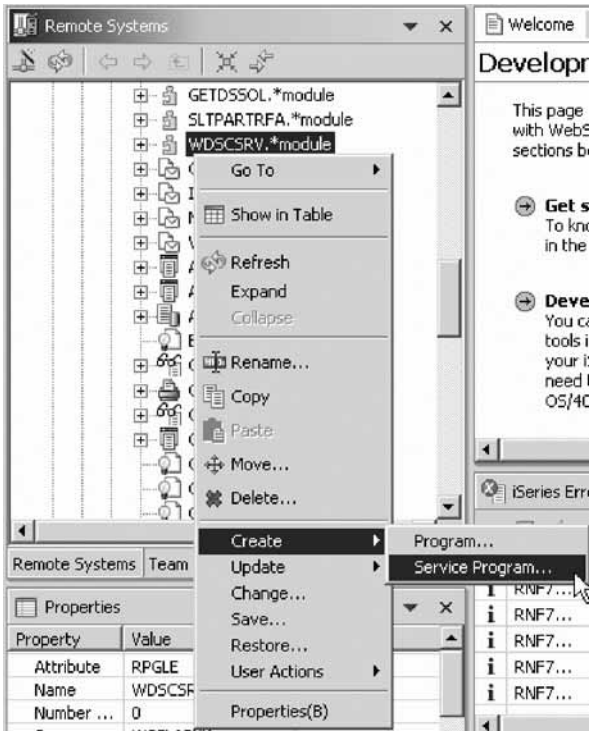
3. Click **OK**.



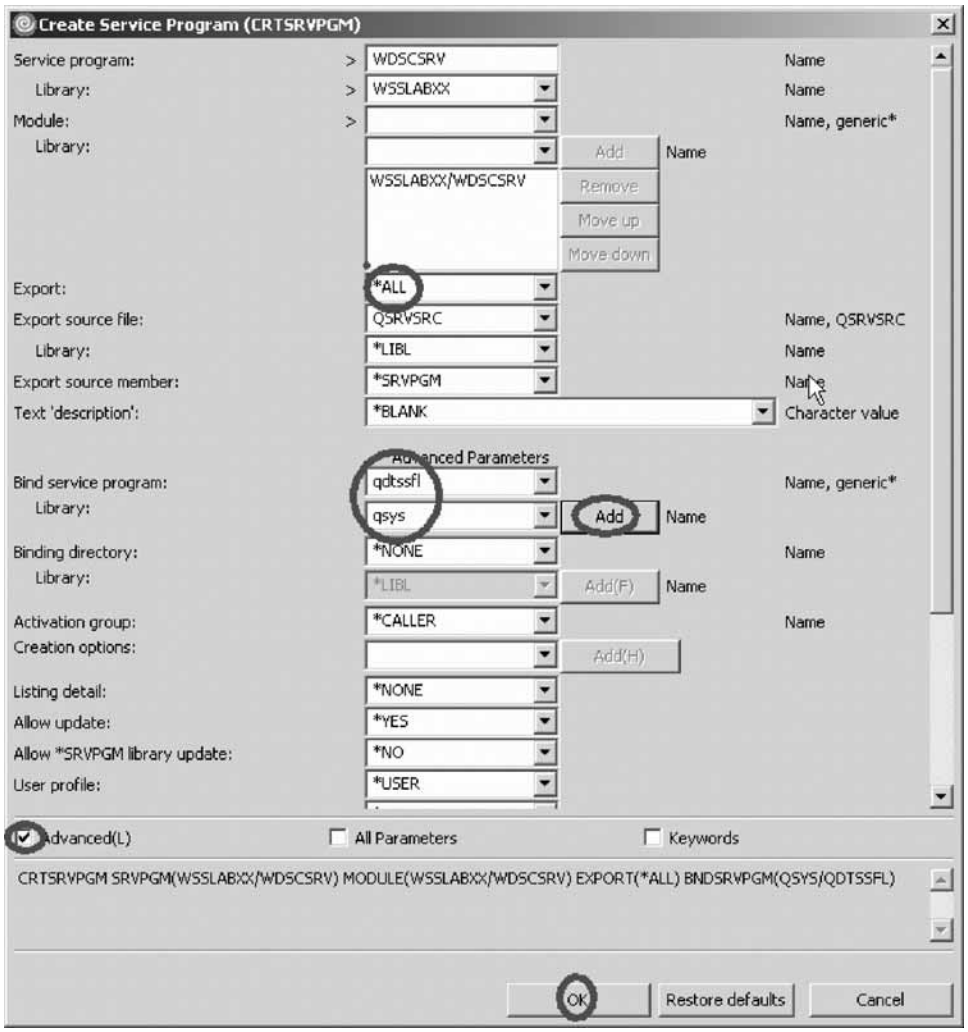
4. Check the iSeries Command Log and see if the module was created.
   You have now completed the first step of the compilation process.
   Now you complete the second step in compiling the source file.

Creating the service program

To complete the second step:



1. Right-click **WDSCSRV.module**.
2. Click **Create > Service Program** in the pop-up menu.
   The Create Service Program (CRTSRVPGM) dialog opens.



3. In the Export list, select ***ALL**.
4. If you cannot see the Bind service program, select the **Advanced** check box.
5. In the **Bind service program** field, type `qdtssfl`.
6. In the **Library** field, type `qsys`.
7. Click **Add**.
8. Click **OK**.

This completes the compilation step. The service program is created.

You have created an RPG module and created a service program using that module.

Module recap

You have completed Chapter 2, “Module 2. Creating the iSeries service program for your Web application,” on page 9. You have learned how to:

- Check the Remote System Explorer perspective is open
- Create a library filter
- Open an ILE RPG source member for edit
- Add code to an ILE RPG source member
- Create an RPG module

- Create a service program

Now that you have used the Remote System Explorer perspective to edit and compile an iSeries service program, you are ready to begin Chapter 3, “Module 3. Creating the customer list input page,” on page 19.

Chapter 3. Module 3. Creating the customer list input page

This module teaches you how to create a new input page using a table iSeries Web component that works similar to a subfile and link that new input page to the customer inquiry input page. You will also learn how to add the iSeries business logic (service program) and additional parameter to the existing Web application in order to process the request to get a customer number.

In this module, you will:

- Start the product
- Set the workspace location
- Check the Web perspective is open
- Create a JSP file
- Add an iSeries table component
- Select properties for the table
- Insert a form on the page
- Add the iSeries button component
- Add iSeries button properties
- Add a heading to the page
- Link the inquiry page to the customer list page
- Create another Web interaction to use the new input page and output pages
- Begin the process to add a program to the Web interaction
- Create an iSeries connection
- Select the service program
- Add an output parameter
- Map an output parameter to an output field

Exercises

The exercises in this module must be completed in order.

- "Exercise 3.1: Starting the product workbench" on page 20
- "Exercise 3.2: Opening the Web perspective" on page 21
- "Exercise 3.3: Creating the customer list page" on page 22
- "Exercise 3.4: Linking to the customer list page" on page 37
- "Exercise 3.5: Creating another Web interaction" on page 40

Time required

This module will take approximately **30 minutes** to complete.

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Exercise 3.1: Starting the product workbench

Skip this exercise if you imported WSSLABxx.zip or if you have already started the product workbench.

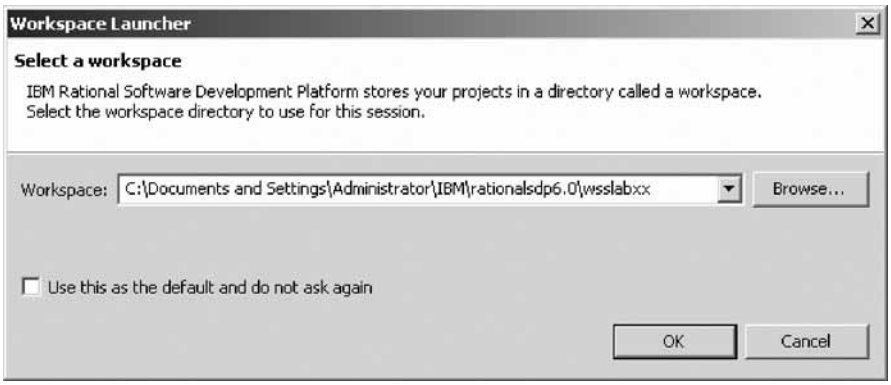
Now go ahead and start the product.

To start the product:

1. On the desktop task bar, click: **Start > Programs > IBM® Rational® > IBM WebSphere Development Studio Client for iSeries V6.0 > WebSphere Development Studio Client for iSeries**.

   A dialog for workspace selection will appear asking you for the workspace location, unless you used the Development Studio Client before and selected not to show this dialog again.

2. Name the directory of the workspace as shown. Use the directory name `WSSLABxx`. This is the same directory that you used for the tutorial called Build a Web user interface for an RPG application using iSeries Web Tools.



   Note: You must use the same workspace used for the previous tutorial as you need to access an existing Web project and Web application that you created in the previous tutorial called Build a Web user interface for an RPG application using iSeries Web Tools.

3. Click **OK**.

   After a few moments of loading, the workbench opens, and the initial product window.

You have started the product and set the workspace location and now you are ready to begin “Exercise 3.2: Opening the Web perspective.”

Exercise 3.2: Opening the Web perspective

Before you begin, you must complete “Exercise 3.1: Starting the product workbench” on page 20.

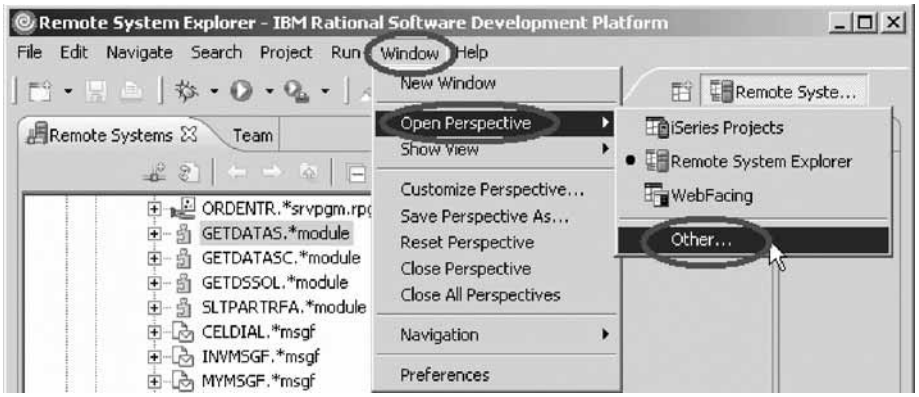
Skip this exercise if you imported WSSLABxx.zip.

In this exercise you will use the Web perspective since it gives you access to unique views and tools targeted towards Web tasks.

You first need to open the Web perspective to create a new customer list page. The perspective should already be open, but if not, check the workbench taskbar on the left for the Web perspective icon, otherwise follow the steps below.

To open the Web perspective:

1. Click **Window > Open Perspective > Other** from the workbench menu.



The Select Perspective dialogs opens.

2. Select **Web** from the list.
3. Click **OK**.

   The workbench shows the Web perspective with the Web Projects open in the Project Explorer.

You have checked that the Web perspective is open and now you are ready to begin "Exercise 3.3: Creating the customer list page."

Exercise 3.3: Creating the customer list page

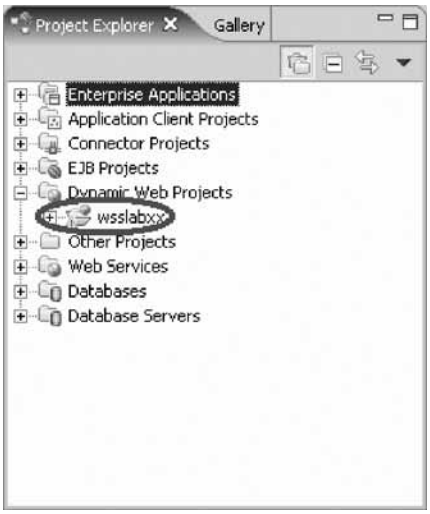
Before you begin, you must complete "Exercise 3.2: Opening the Web perspective" on page 21.

You will create the customer list page using several Page Designer iSeries Web components which will pass the customer number to the inquiry page (inquiry.jsp).

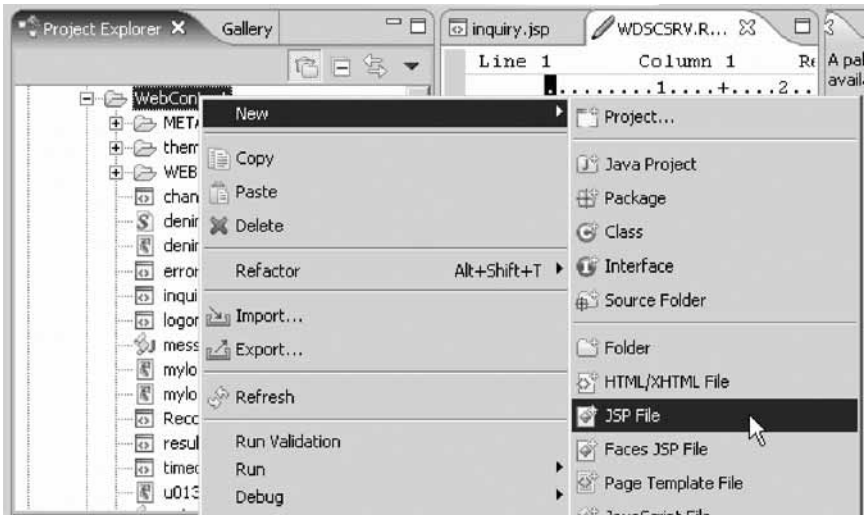
Creating a new customer list file

To create a new customer list file:

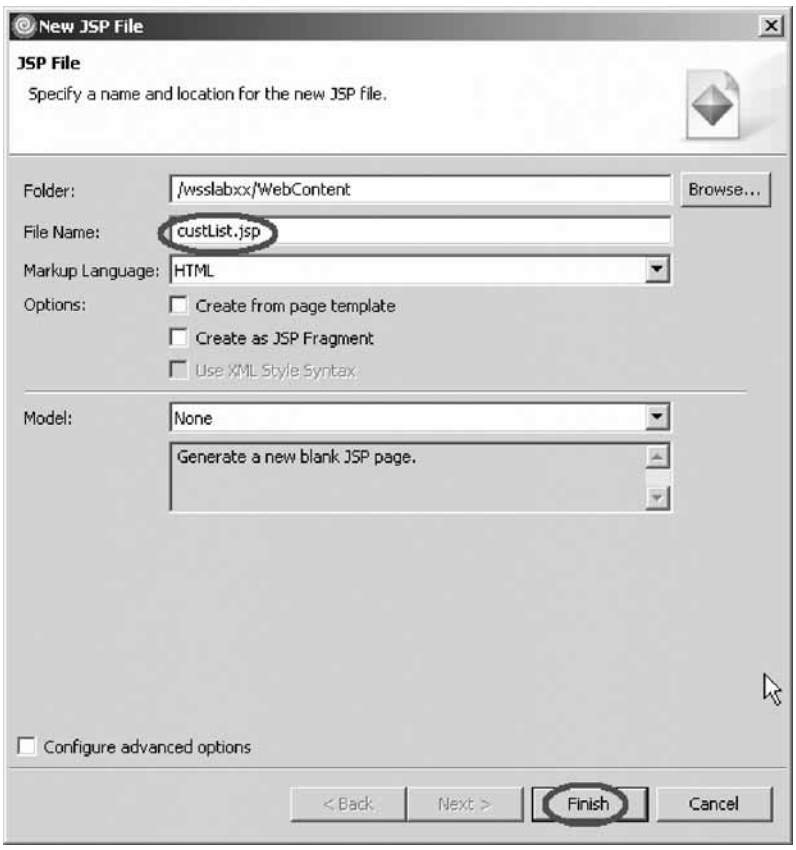
1. Locate the project WSSLABxx that you created in the previous tutorial.



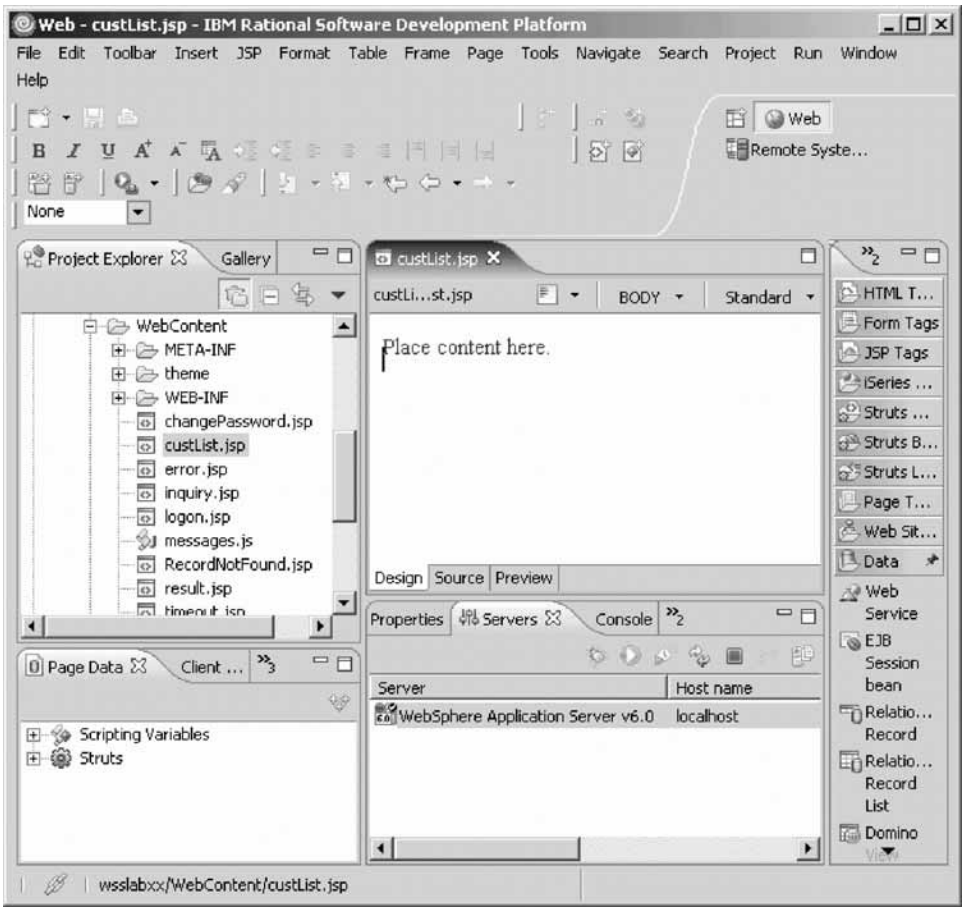
2. Expand the WSSLABxx folder, if not already expanded.
3. Navigate to the WebContent folder in your project.
4. Right-click the WebContent folder and click **New > JSP File** on the pop-up menu.



The New JSP File page opens.



5. In the **File Name** field, type `custList.jsp`.
6. Click **Finish** to create a new JSP file.
   The Page Designer opens in the workbench:



Adding the iSeries table component

To add the iSeries table component:

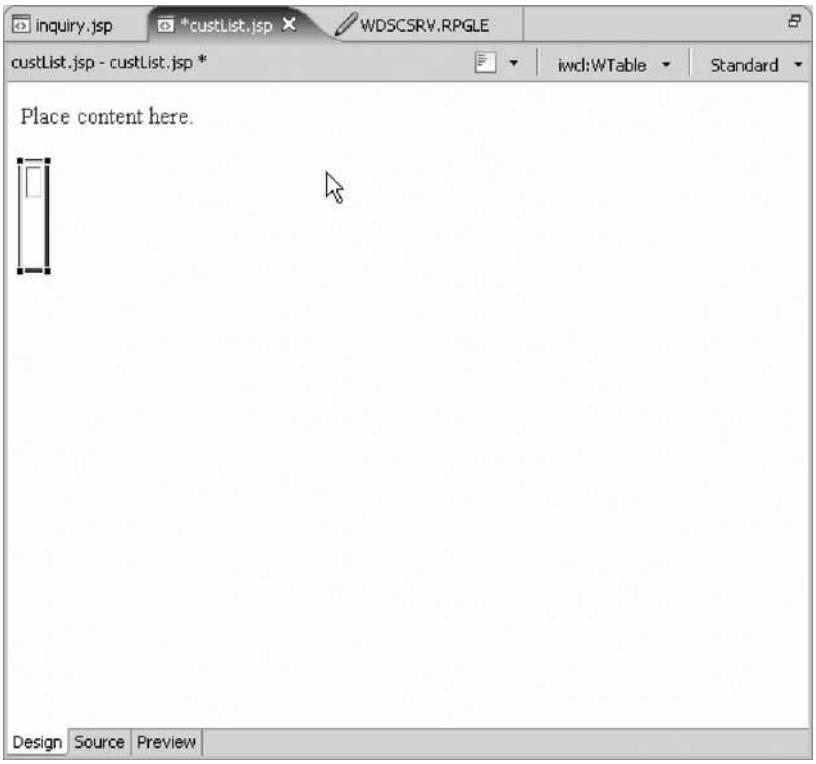
1. Click the **Palette** tab in the top right of the workbench.

2. Expand **iSeries Web Components**.
3. Select **Table** and drag it to your JSP under the text ″Place content here″.

   Make sure the Design page is selected to place the table component on the new custList.jsp page.

   You have selected the **iSeries Table Component**.
4. If you see this dialog, click **Yes**.

The Page Designer should look like this where the iSeries Table is on the Designer page.

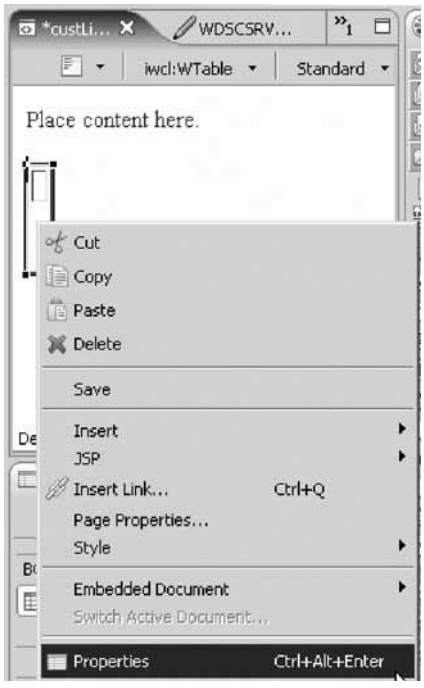


Now you select the properties for the table.

Selecting properties for the table

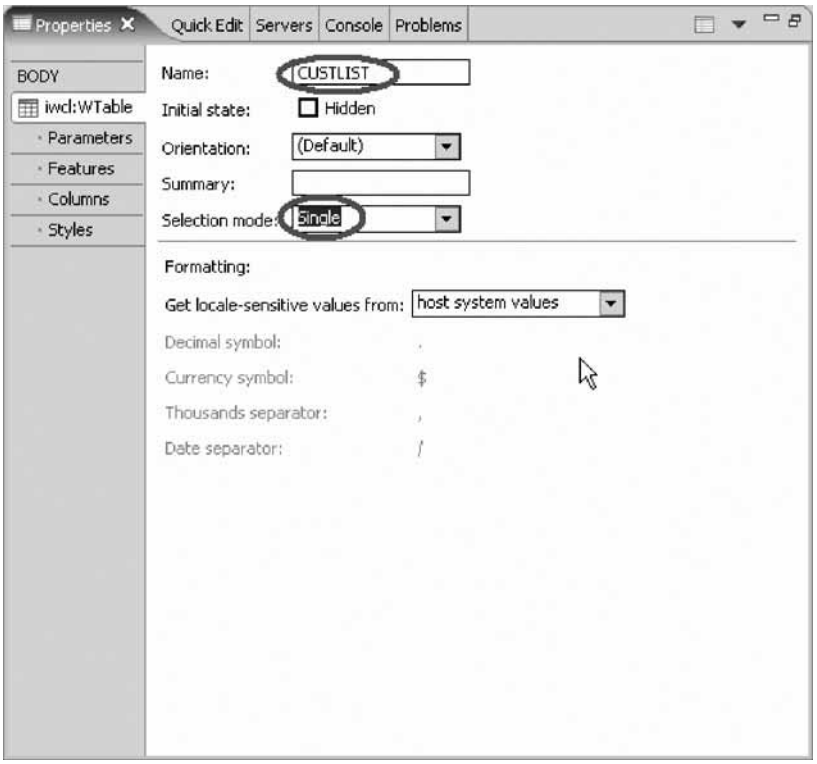
To select properties for the table:

1. The Properties pane in the bottom left of the workbench should open automatically. If not, right-click on your table object and click **Properties** on the pop-up menu.

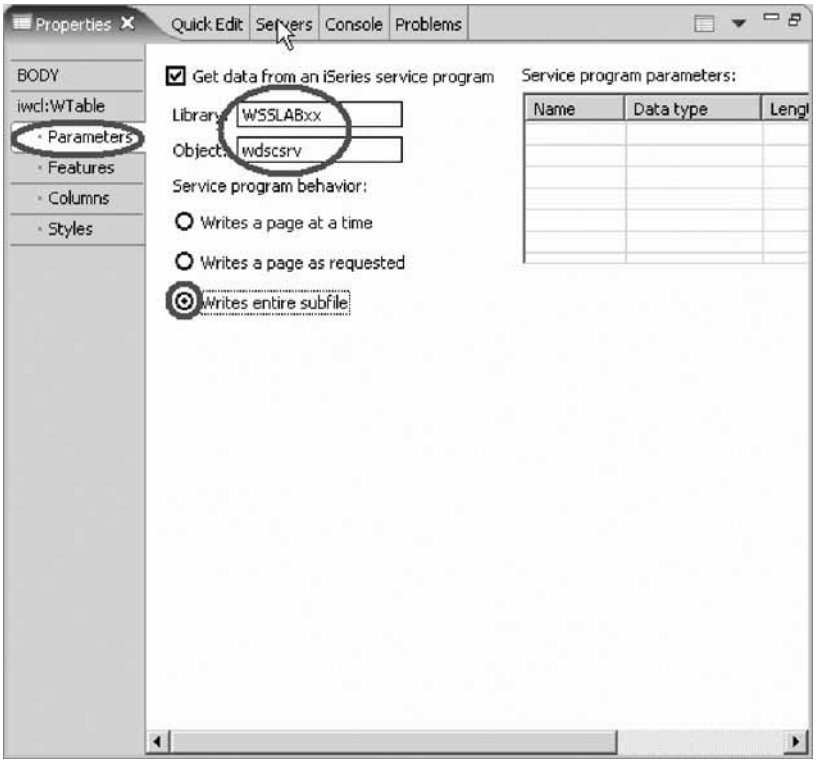


Next you fill in the general properties for the iSeries Table.

2. In the Properties pane, complete the following:



3. In the **Name** field, type CUSTLIST.
4. Select **Single** from the **Selection mode** list.
5. Click the **Parameters** tab to set the parameters for the iSeries Table.



To indicate that you want to provide the data by using a service program on the iSeries:

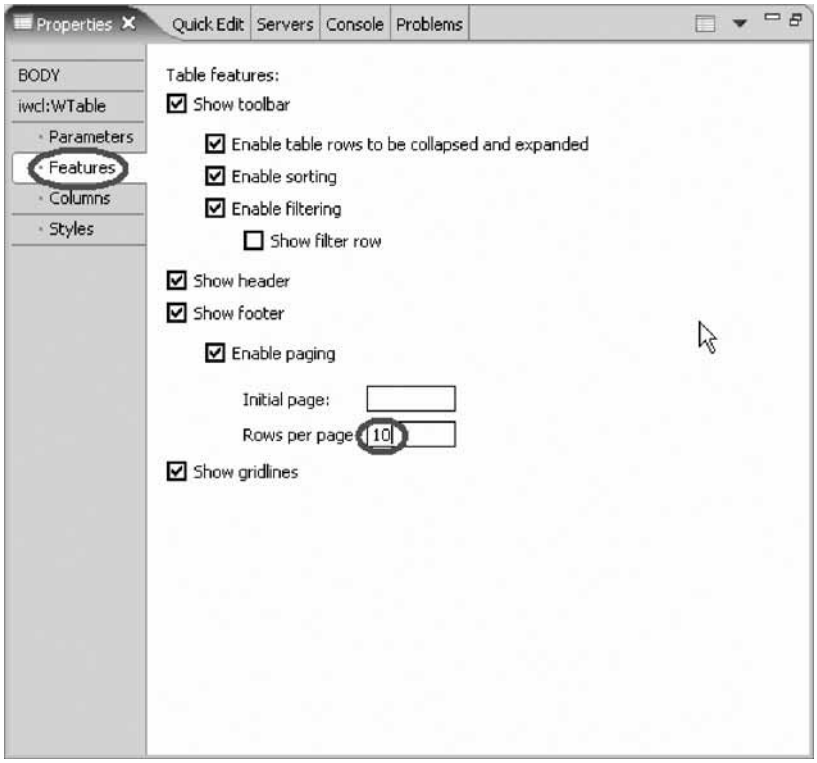
6. Select the **Get data from an iSeries service program** check box to specify the service program information.
7. In the **Library** field, type `WSSLABxx`.
8. In the **Object** field, type `wdscsrv`.
9. Click the **Writes entire subfile** radio button to indicate that you want to fill the table with all data available.

   Writes a page at a time allows you to programmatically control page down and page up.

   Writes a page as requested allows you to fill pages as needed.

   If no new data is needed the paging will be handled by the table component.

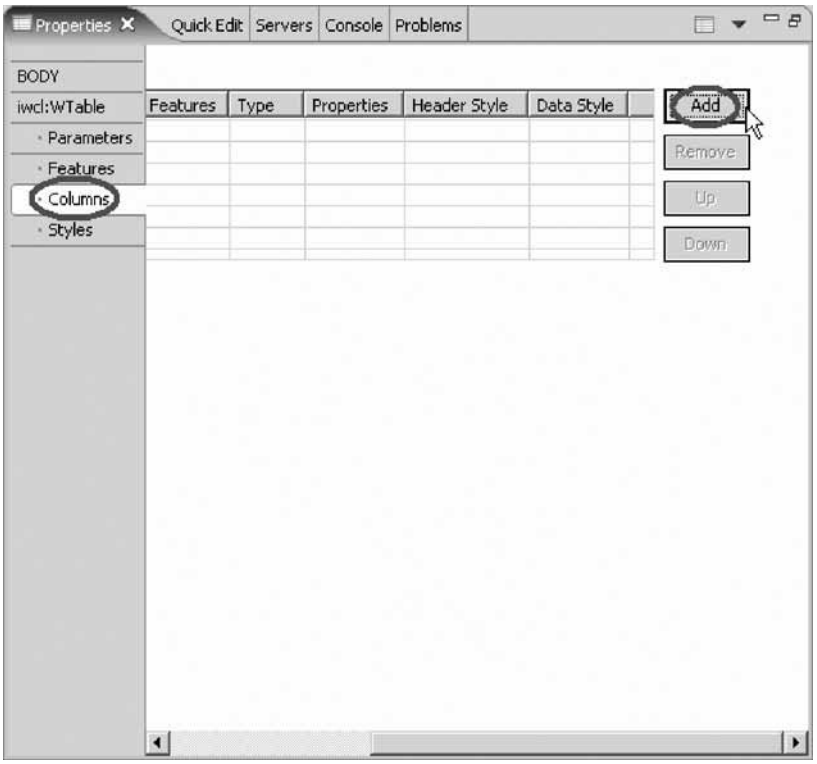
   Next you set the features for the iSeries Table.
10. Click the **Features** tab.



This will switch to the Features pane.

11. In the **Rows per page** field, type `10`.
12. Click the **Columns** tab.

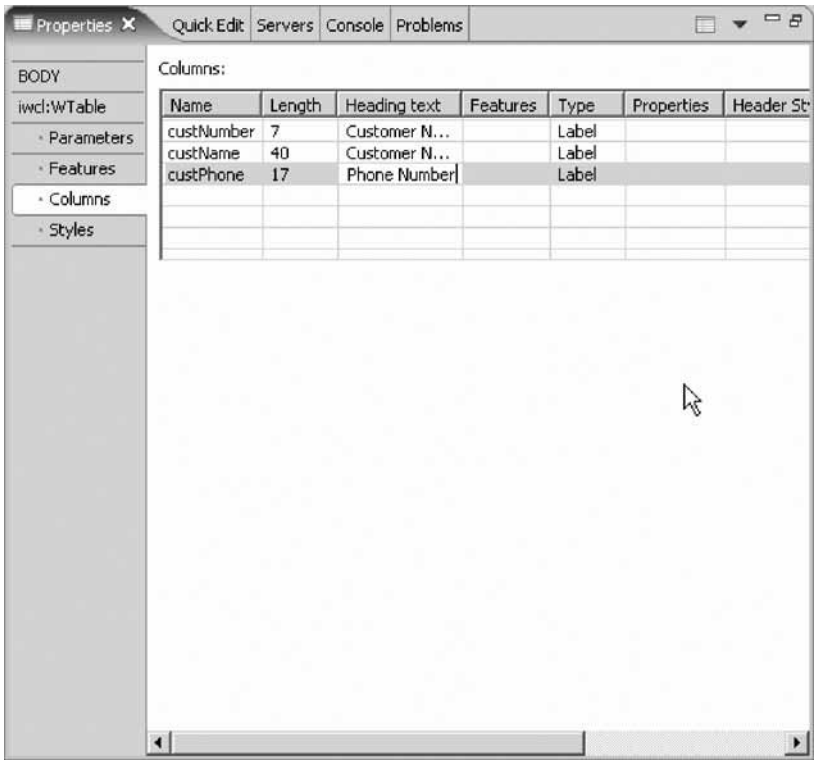
    This will switch to the Columns pane where you set the columns for the iSeries Table. There you specify the fields to be displayed.



13. Click **Add**.
14. Fill in the following, and click **Add** after each row.

NAME	LENGTH	HEADING TEXT
custNumber	7	Customer Number
custName	40	Customer Name
custPhone	17	Customer Phone Number

Your completed Properties pane for your table columns should look like this:



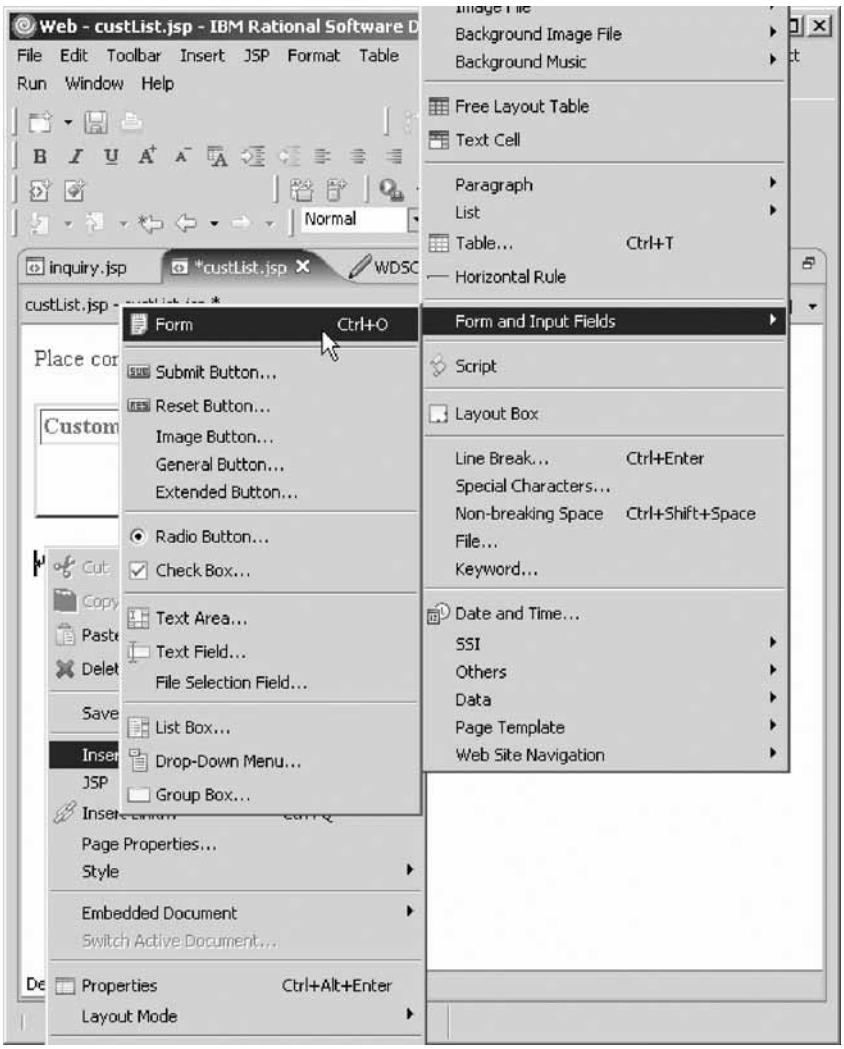
Now insert a form on the page.

Inserting a form on the page

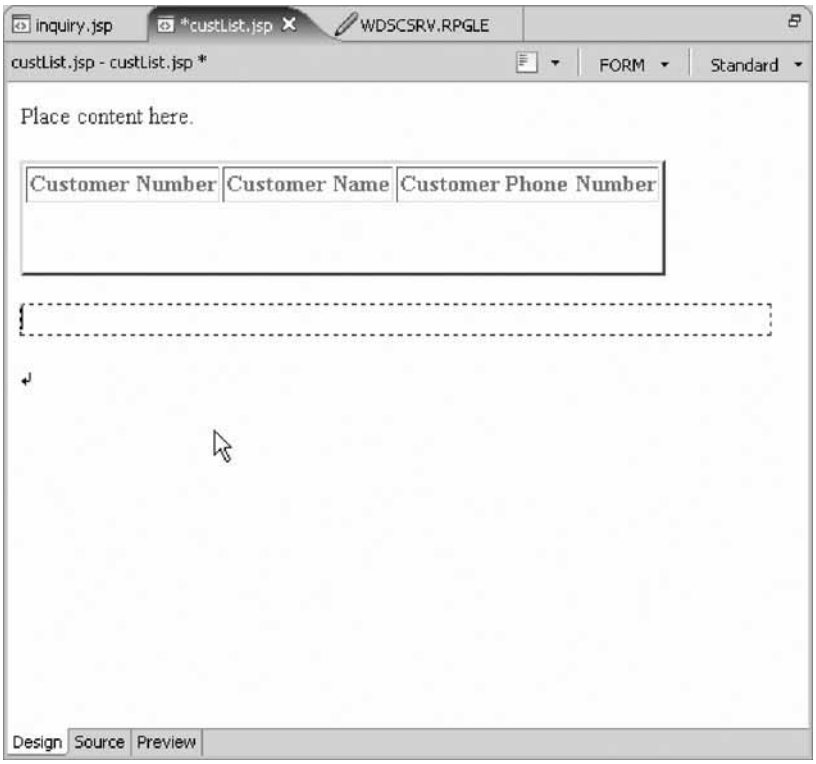
An html form is needed to send back data with a request that you want to send the selected customer number back. You need a push button to send the request.

To insert a form on the page:

1. Place your cursor below the table in the Page Designer (if not already), right-click and then click **Insert > Form and Input Fields > Form** on the pop-up menu.



2. Place your cursor inside the dotted rectangle, which represents the form that you just created.



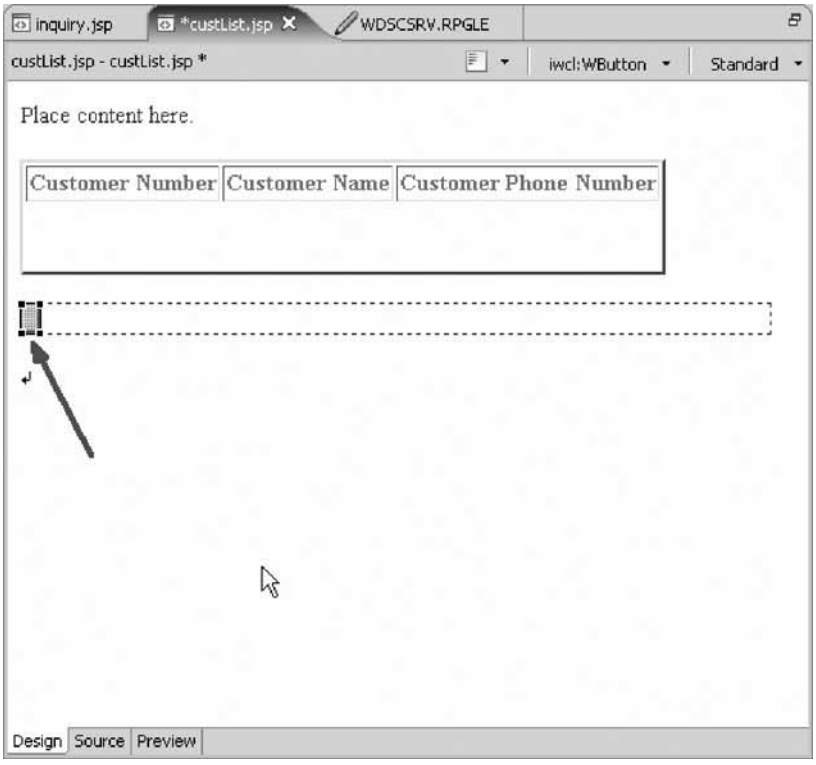
Next you want to access the Palette view again to select an **iSeries Button Component**.

Adding the iSeries button component

To add the iSeries Button Component:

1. Navigate back to the Palette view. Click the **Palette** tab at the right of the workbench.

2. Expand **iSeries Web Components** if not already.
3. Select **Button** then drag it to the form and drop it.
   You have placed the iSeries Button inside the form on the page.

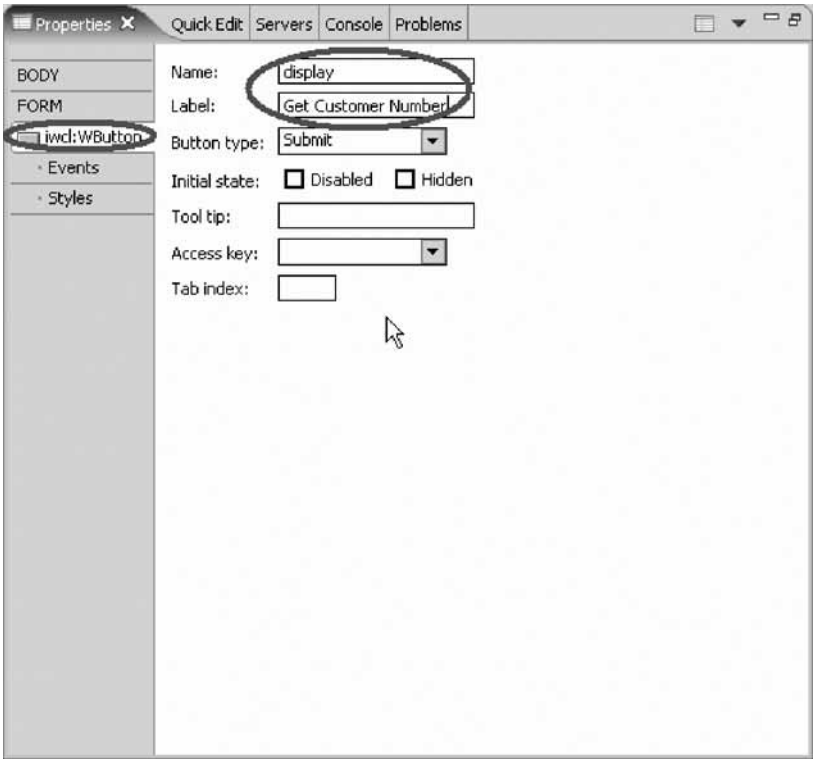


Next you complete the iSeries Button properties.

Adding iSeries button properties

To add iSeries Button properties:

1. The Properties pane for the button should automatically show up; if not, right-click the button and click **Properties** on the pop-up menu.



2. In the **Name** field, type `display`.
3. In the **Label** field, type `Get Customer Number`.

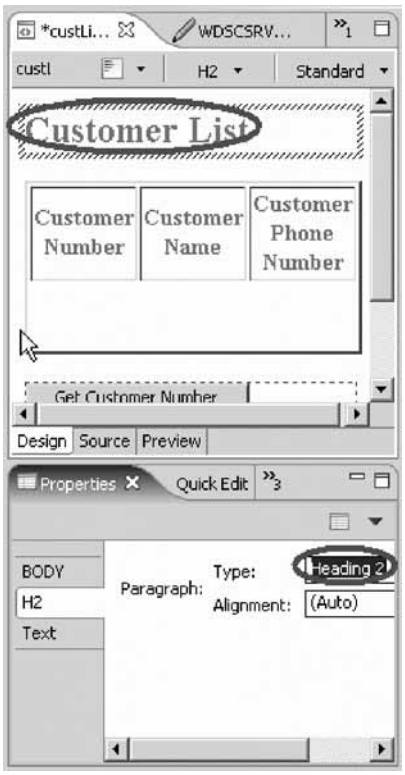
   You have finished creating and modifying the iSeries Web Components. Let's add a heading to this page.

Adding a heading to the page

Give the page a meaningful heading.

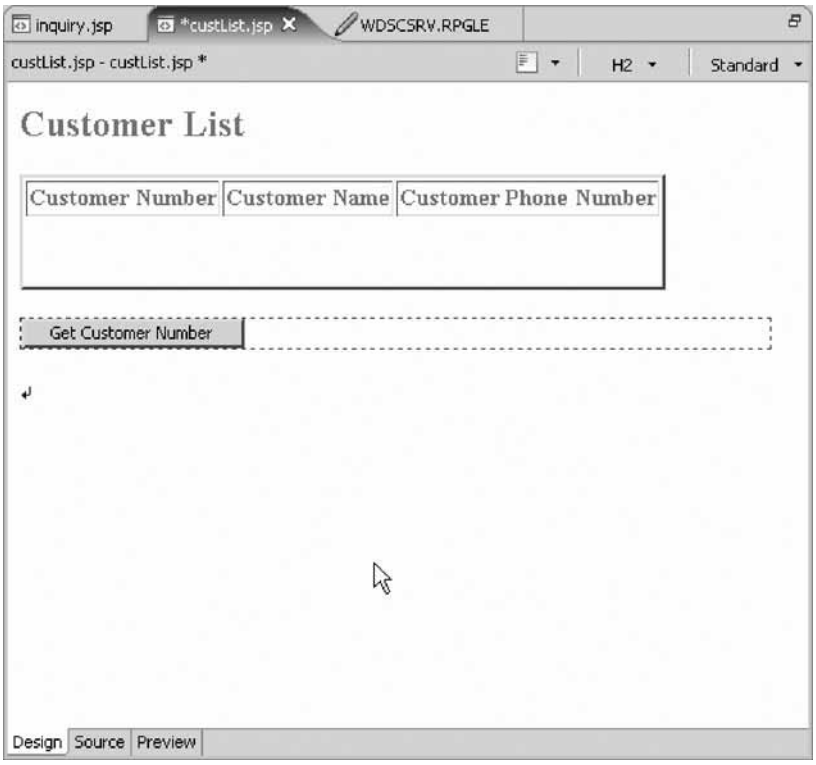
To add a heading to this page:

1. Select the text `Place content here`.
2. Replace it with the text `Customer List`.
3. In the Properties pane at the bottom of the workbench, select **Heading 2**.



You are finished creating the JSP.

Your finished page should look like this:



4. If you haven't done so already, save and close custList.jsp.

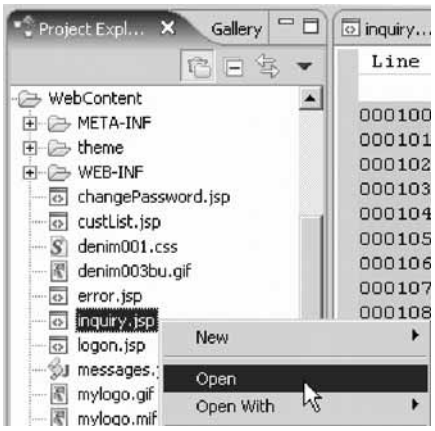
You have created a JSP file for the Customer List Web page, added an iSeries table component, selected properties for the table, inserted a form, added an iSeries button component, added iSeries button properties and added a heading to the Customer List Web page and now you are ready to begin "Exercise 3.4: Linking to the customer list page."

Exercise 3.4: Linking to the customer list page

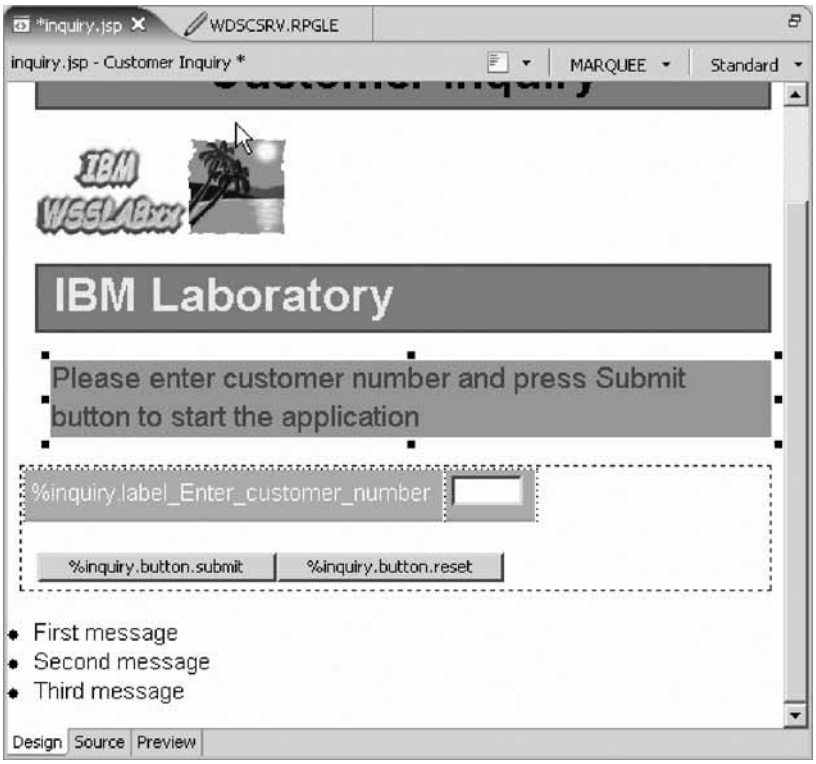
Before you begin, you must complete "Exercise 3.3: Creating the customer list page" on page 22.

Now, let's modify the inquiry page. You will add a link beside the entry field so the end user can click this link (Find) to get the customer list page you created in the previous exercise.

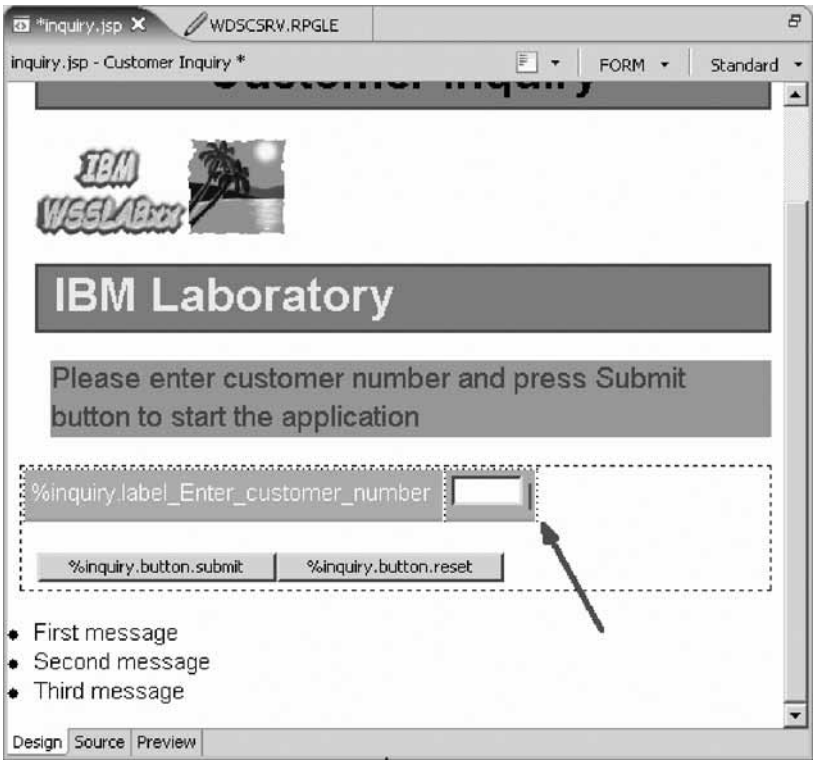
1. In the Project Explorer, right-click inquiry.jsp.
2. Click **Open** on the pop-up menu to edit the inquiry page named inquiry.jsp.



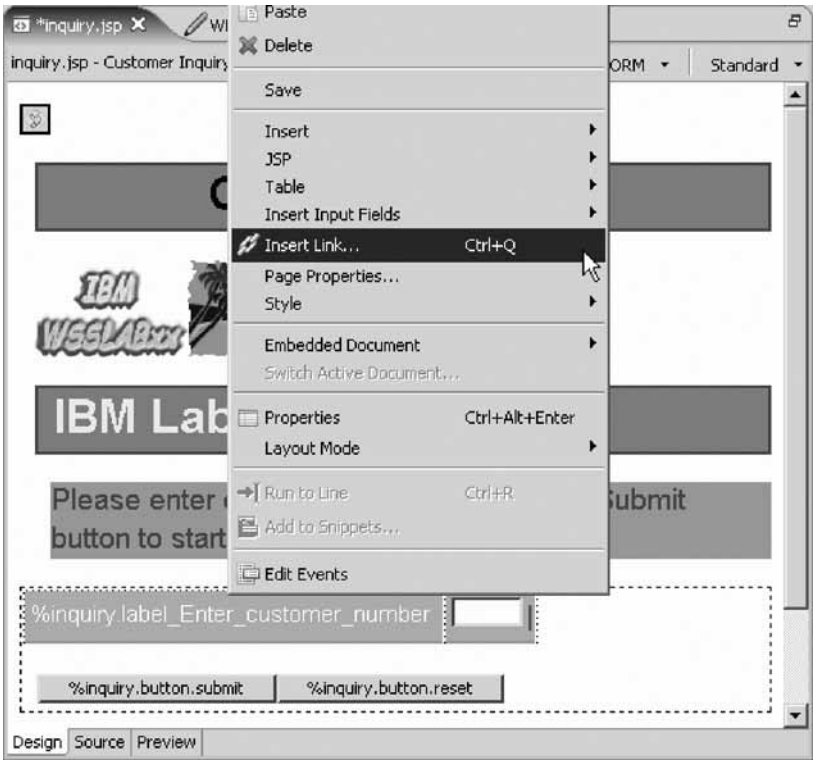
The Page Designer opens in the upper right pane of the workbench and shows the inquiry.jsp as the Web Interaction wizard created it and with the changes you made in Page Designer.



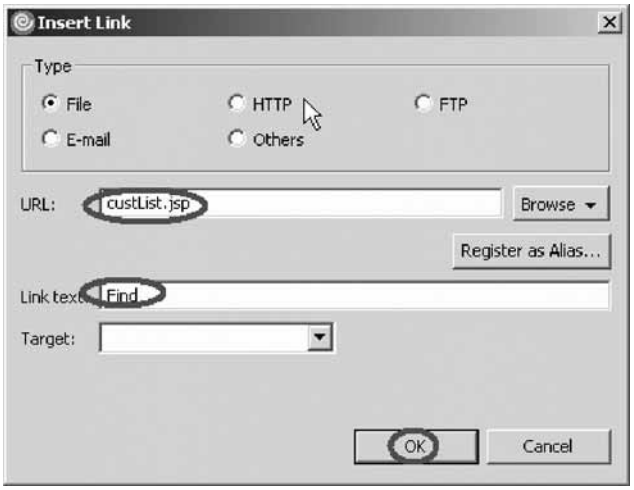
3. Make sure that you are on the Design page in Page Designer. Click the **Design** tab.
4. Now put the cursor after the Enter_customer_number field.



5. Right-click the page and click **Insert Link** on the pop-up menu.

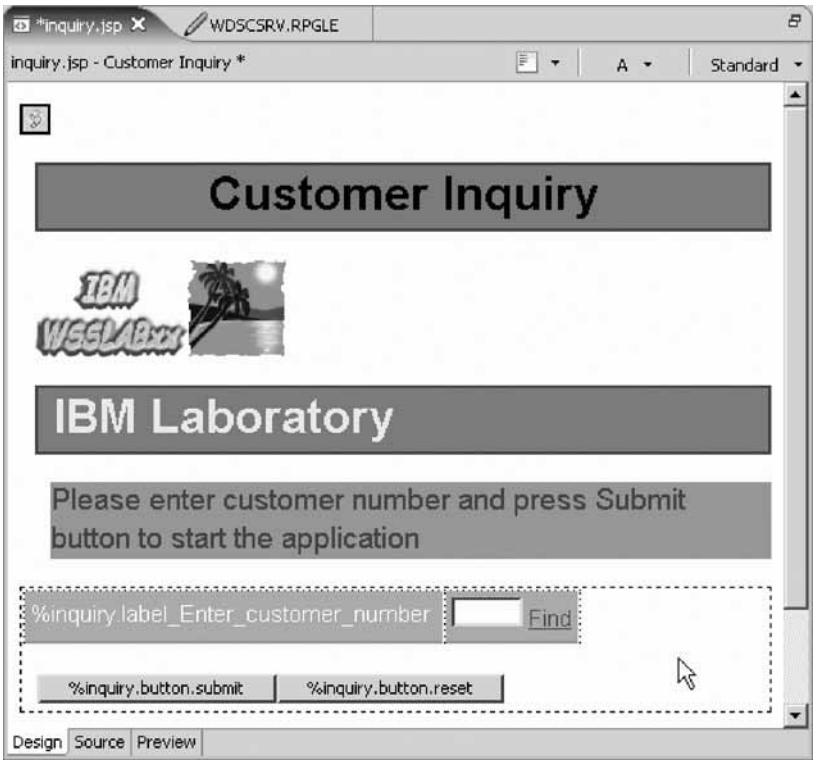


The Insert Link dialog opens.



6. In the **URL** field, type `custList.jsp`.
7. In the **Link text** field, type `Find`.
8. Click **OK**.

   The Customer Inquiry page after adding a link to customer list page (custList.jsp) should look like this:



9. If you haven't done so already, save and close inquiry.jsp.

You linked the inquiry page to the customer list page and now you are ready to begin "Exercise 3.5: Creating another Web interaction."

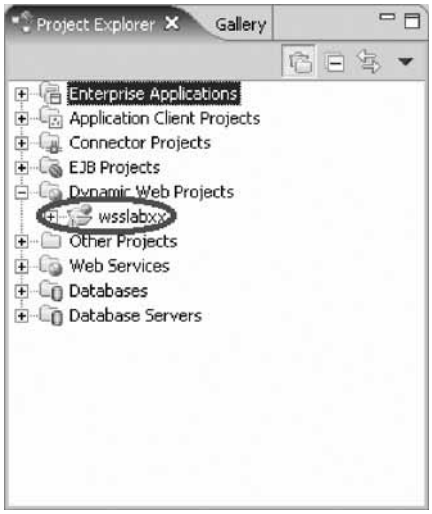
Exercise 3.5: Creating another Web interaction

Before you begin, you must complete "Exercise 3.4: Linking to the customer list page" on page 37.

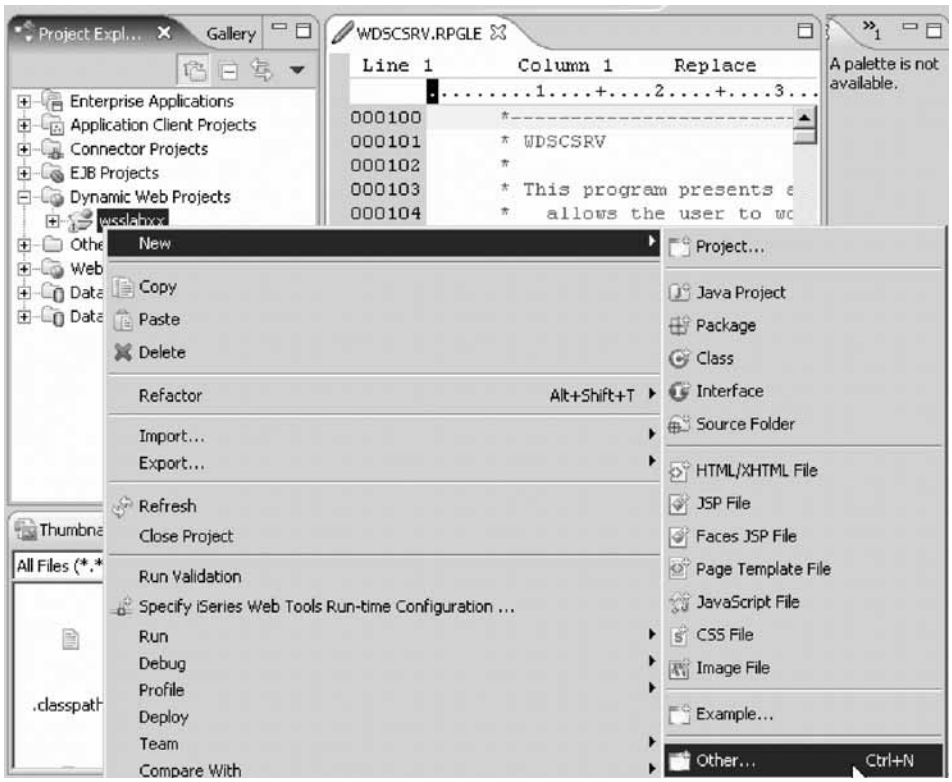
Next you create another Web interaction to use the new input page and output pages that you just created.

To create another Web interaction:

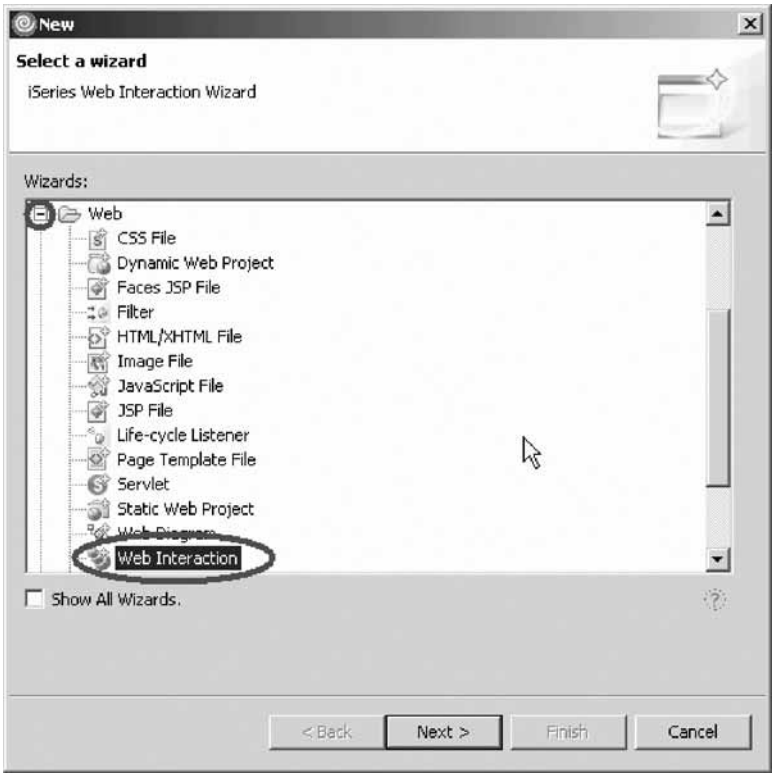
1. Locate your project WSSLABxx in the Project Explorer.



2. Right-click on your project and click **New > Other** on the pop-up menu.

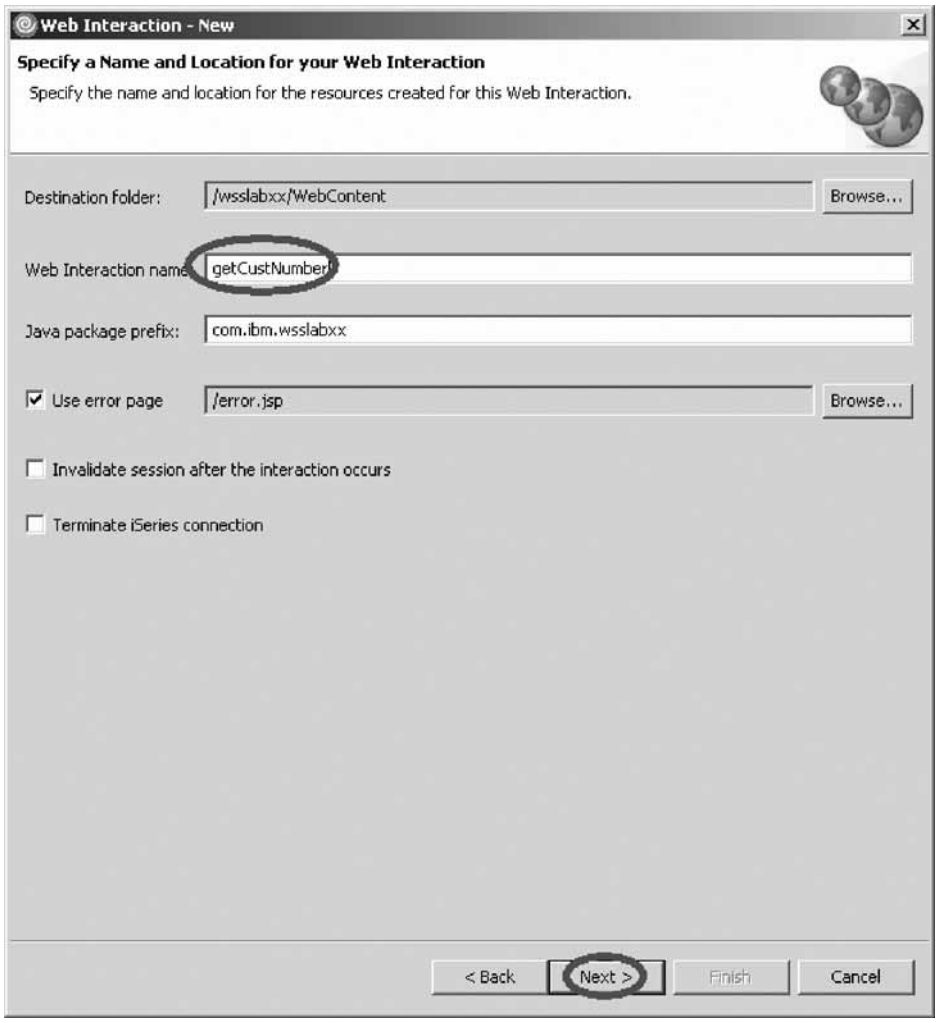


The Select page opens.



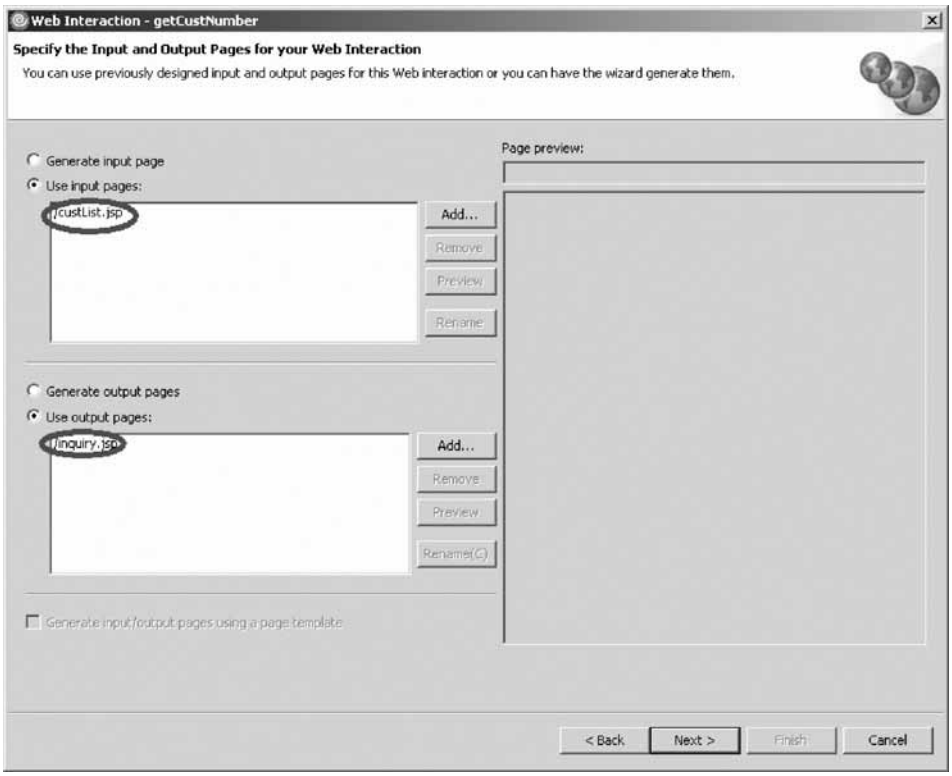
3. In the left pane of the Select page, select **Web**.
4. In the right pane of the Select page, select **Web Interaction**.
5. Click **Next**.

   The Web Interaction wizard opens.



6. In the **Web Interaction name** field, type `getCustNumber`.
7. Click **Next**.

   As you probably remember from the previous tutorial, this next page is where you specify the input and output pages.



8. Leave the **Use input pages** radio button selected and click **Add**.
9. Select **custList.jsp** on the Input page dialog. Click **OK**.

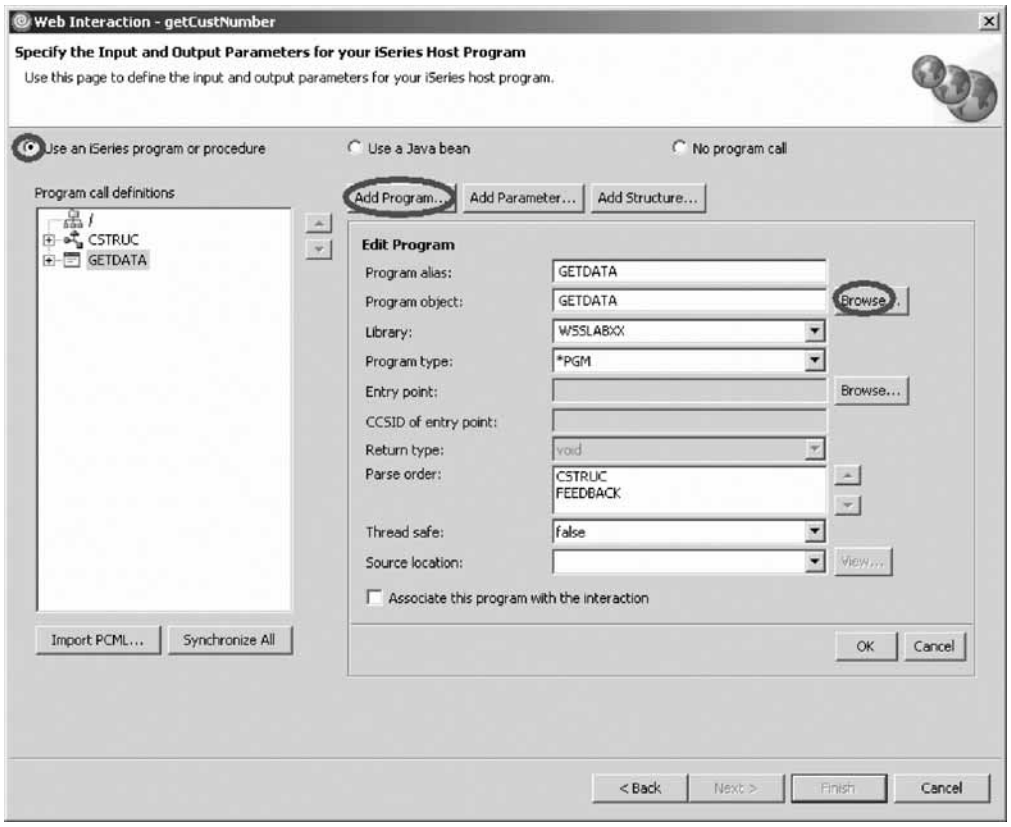
   This is the subfile that contains the list of customers. It is the input page because from here you fill the customer number field with data from the selected table record.
10. Leave the **Use output pages** radio button selected and click **Add**.
11. Select **inquiry.jsp** on the Output JSP dialog. Click **OK**.
12. Click **Next**.

    You have now defined your input and output pages.

Adding an iSeries ILE program to the interaction

Note: Some screens in this section will look different if you choose to use the GETDATAS service program instead of the GETDATA program to handle the Web interaction.

Next you will select the RPG service program you will use to handle your Web interaction.



To add a program to the Web interaction:

1. Leave the **Use an iSeries program or procedure** radio button selected.
2. Click **Add Program**.
3. Click **Browse** to browse for the service program you will use.

   If you don't see your connection then you will need to create a connection.

   Follow the steps under the next section called **Creating a connection**.

   If you do see your connection then skip the next section and proceed to the section **Selecting the service program**.

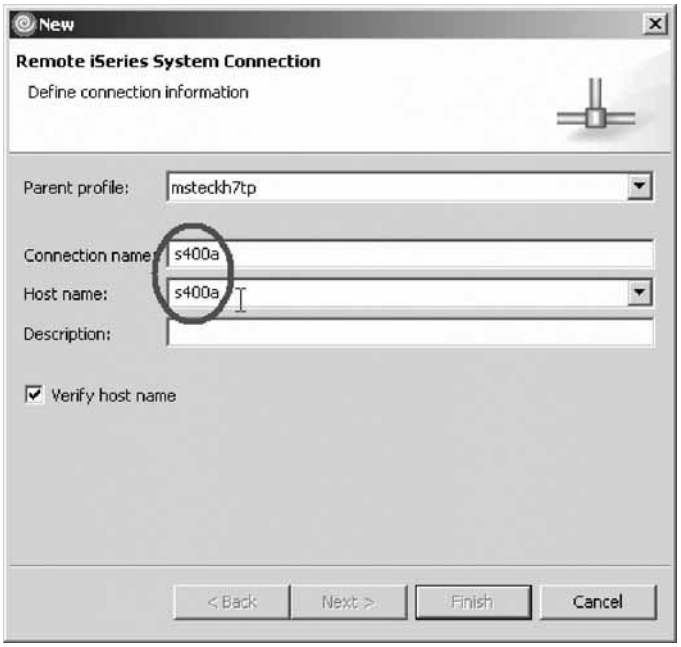
Creating a connection

To create a connection:

1. In the list in the left pane, expand the New Connection list item by clicking on the plus sign + beside its icon.

   The Name personal profile page opens.
2. Accept the default profile. Click **Next**.

   The Remote iSeries System Connection page opens.

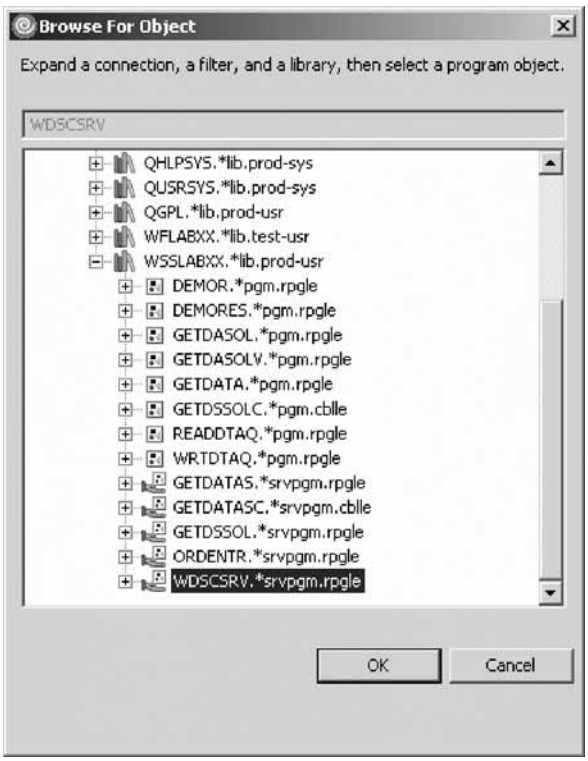


3. Leave the default value for the **Parent Profile** field.
4. In the **Host Name** field, type the name of the iSeries server (Same server name as you specified for the runtime).
5. Click **Finish** to create a connection.

Selecting the service program

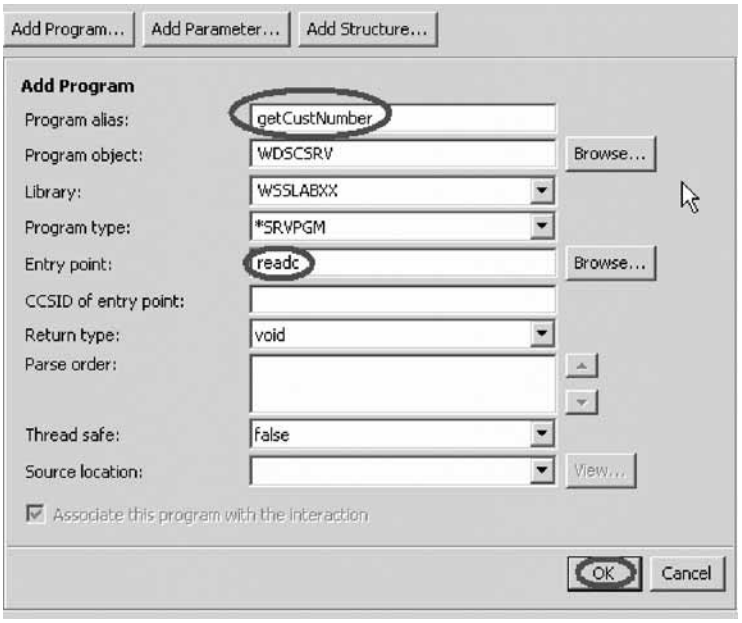
Now you select the RPG service program.

1. Expand your connection.
2. Expand *LIBL.
3. If you see a sign-on dialog, type your user ID and password.
4. If you don't see the WSSLABxx library, click **Work with libraries** and type `WSSLABxx` in the dialog, then click **OK**.
5. Expand the WSSLABxx library and select the WDSCSRV service program.



6. Click **OK**.

   Most of the fields have now been filled in for you. However you must fill in the values for the program alias and entry point fields.



7. In the **Program alias** field, type `getCustNumber`.
8. In the **Entry point** field, type `readc` (case sensitive).
9. Click **OK**.

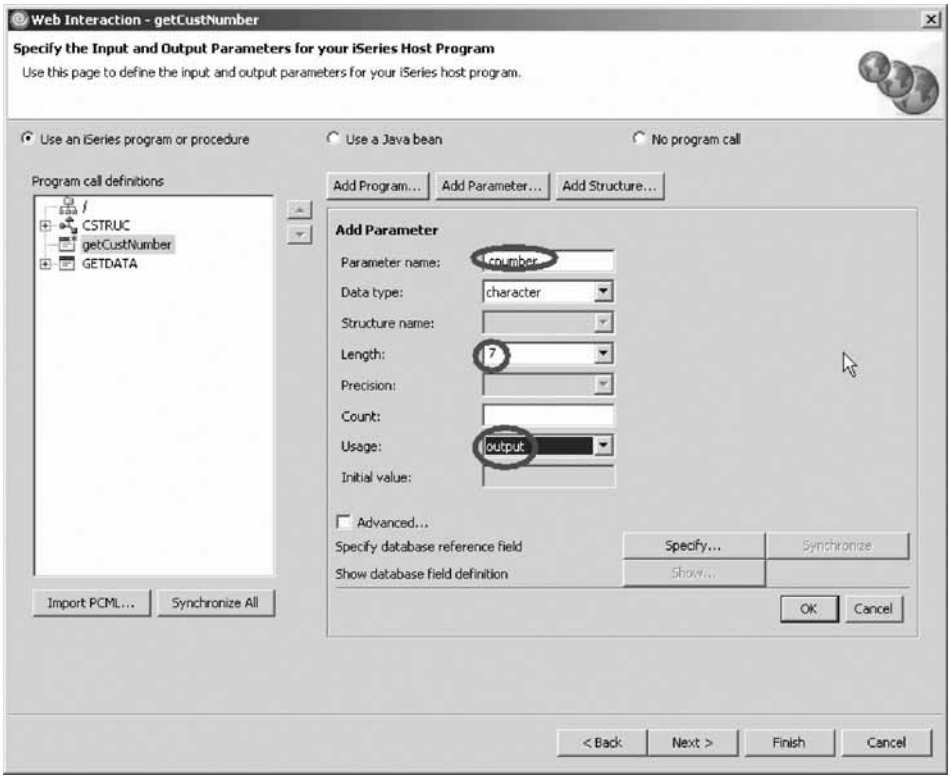
Adding a parameter

Let's add a parameter to the service program interface definition that you just added. You might remember the procedure readc returns the customer number as a parameter.

To add a parameter:

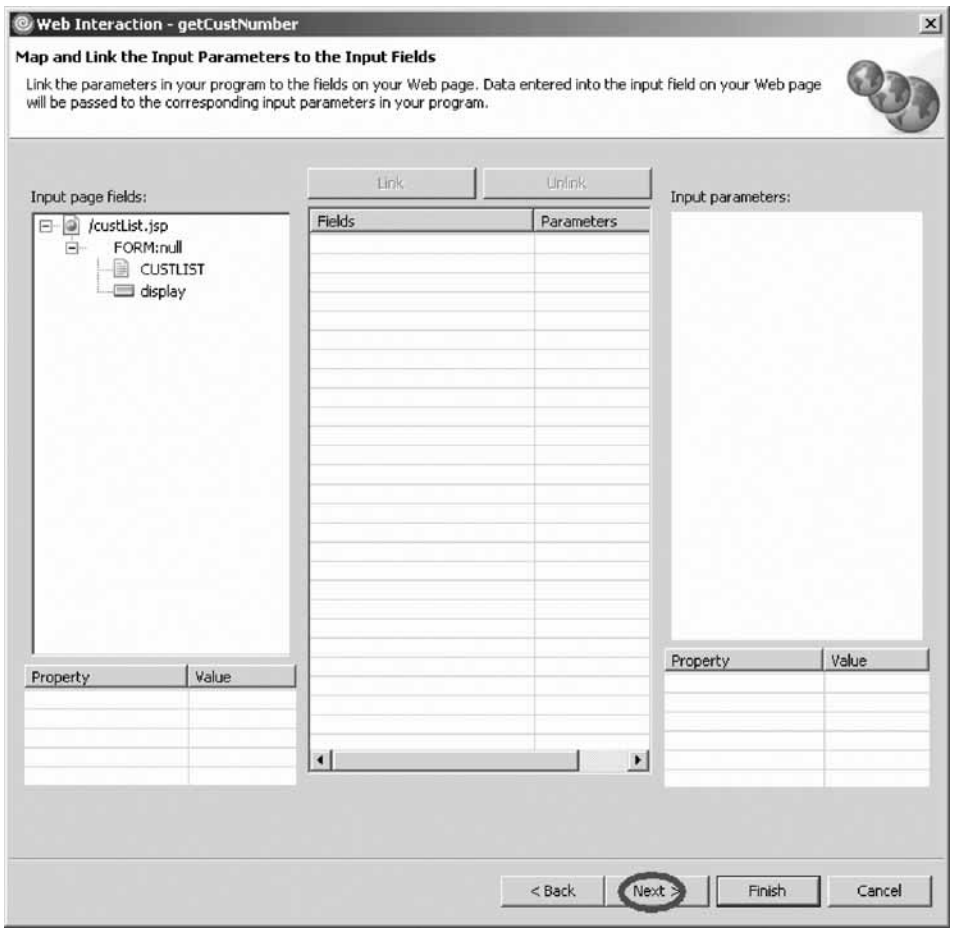
1. Under **Program call definitions**, select the getCustNumber program.
2. Click **Add Parameter**.
3. In the **Parameter name** field, type cnumber.
4. Leave **character** in the **Data type** list selected
5. In the **Length** field, type 7.
6. Select **Output** from the **Usage** list.

   Your wizard should now look like this:

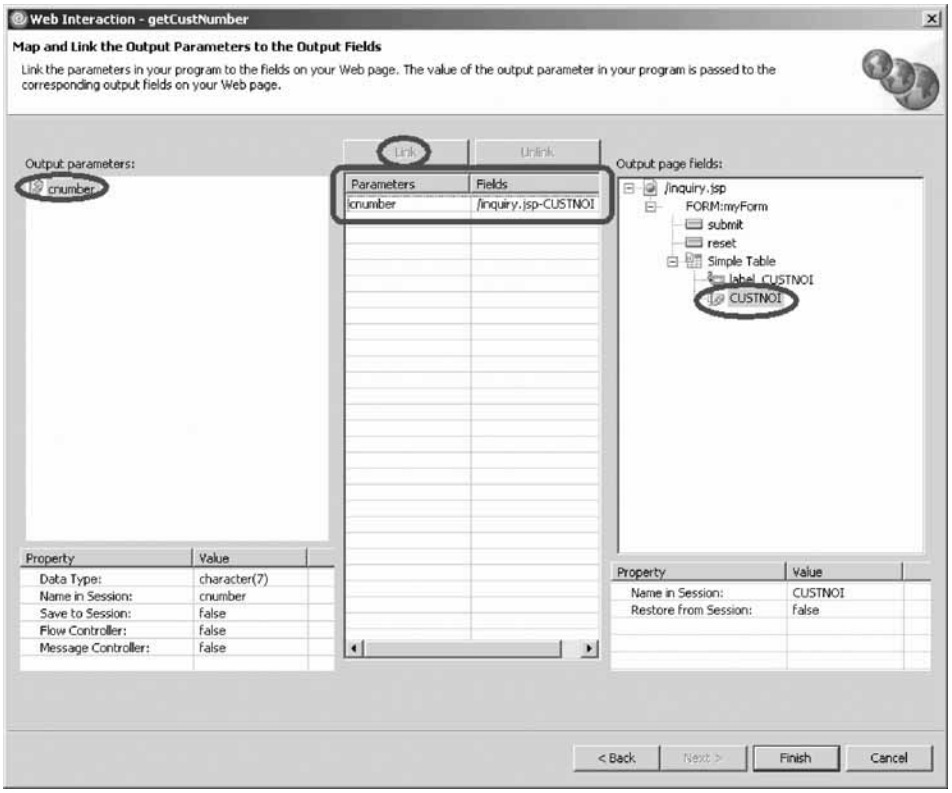


7. Click **OK**.

   You have finished adding program parameters. Now you need to define the binding between the output parameter and the customer number field on the inquiry page.
8. Click **Next**.



9. You have no input parameters, so you don't need to modify this page.
10. Click **Next** again.
11. Under **Output parameters**, select cnumber.



12. Under **Output page fields**, expand /inquiry.jsp > FORM:myForm > Simple Table and select CUSTNOI.
13. Click **Link** in the middle of the page.
14. Click **Finish** to link the output field to the output parameter.

    This tells the wizard to generate code to move the data from the parameter cnumber to the customer number field on the inquiry page.

You have created an iSeries connection, selected the service program, added an output parameter and mapped an output parameter to an output field.

Module recap

You have completed Chapter 3, "Module 3. Creating the customer list input page," on page 19. You have learned how to:

- Start the product
- Set the workspace location
- Check the Web perspective is open
- Create a JSP file
- Add an iSeries table component
- Select properties for the table
- Insert a form on the page
- Add the iSeries button component
- Add iSeries button properties
- Add a heading to the page
- Link the inquiry page to the customer list page
- Create another Web interaction to use the new input page and output pages

- Begin the process to add a program to the Web interaction
- Create an iSeries connection
- Select the service program
- Add an output parameter
- Map an output parameter to an output field

Now that you have created a new input page from a subfile, linked that new input page to the customer inquiry input page and added the iSeries business logic (service program) and additional parameter to the existing Web application in order to process the request to get a customer number, you are ready to begin Chapter 4, “Module 4. Creating the update record output page,” on page 53.

Chapter 4. Module 4. Creating the update record output page

This module teaches you how to create a new output page for your existing Web application. This page will allow end users to update customer information and will be generated from the Web interaction wizard. You will also learn how to handle errors during the update record process and to link the customer details page to the update record page.

In this module, you will:

- Create the update record page
- Add a program
- Add parameters
- Design the output page
- Link the customer details page to the update record page
- Create an error page

Exercises

The exercises in this module must be completed in order.

- "Exercise 4.1: Generating the output page from the Web Interaction wizard"
- "Exercise 4.2: Linking to the update record page" on page 65
- "Exercise 4.3: Creating the update error page" on page 70

Time required

This module will take approximately **25 minutes** to complete.

Exercise 4.1: Generating the output page from the Web Interaction wizard

You will create the update record page using the Web interaction wizard.

Creating the update record page

To create the update record page:

1. Open the Web perspective.
2. Locate your Web project in the Project Explorer.

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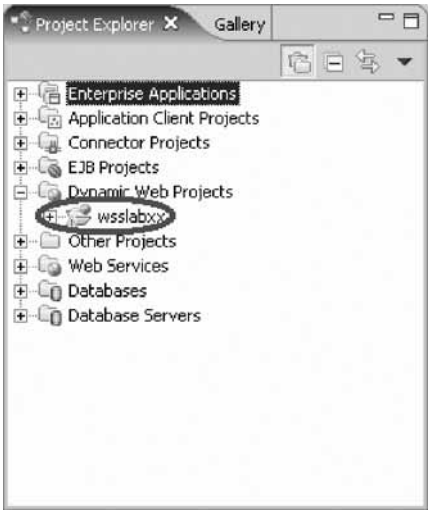
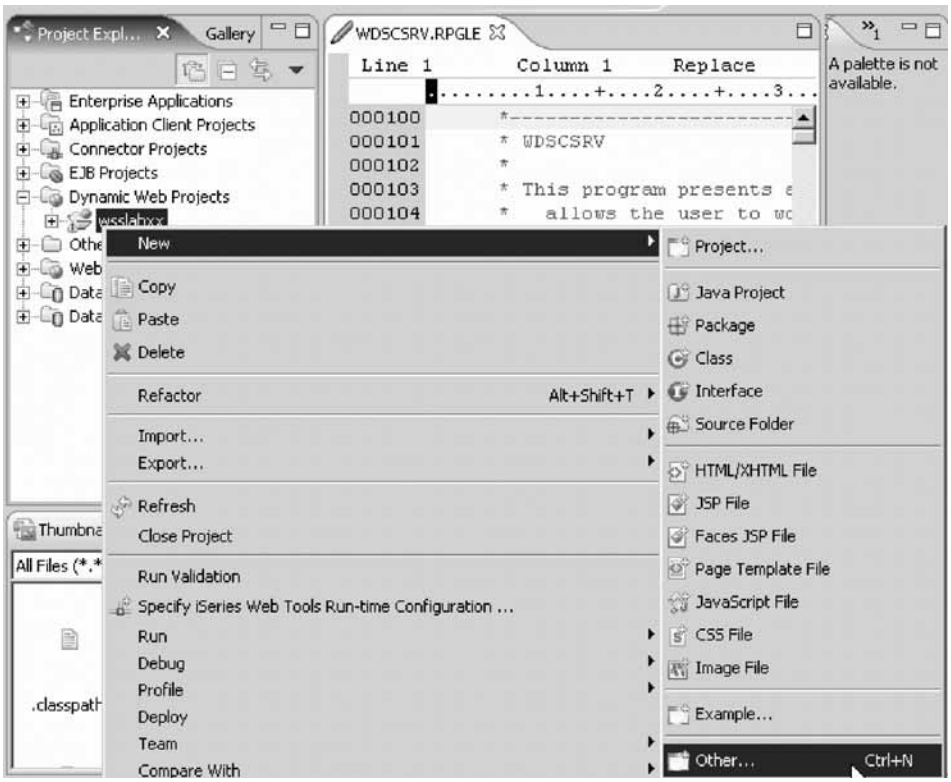
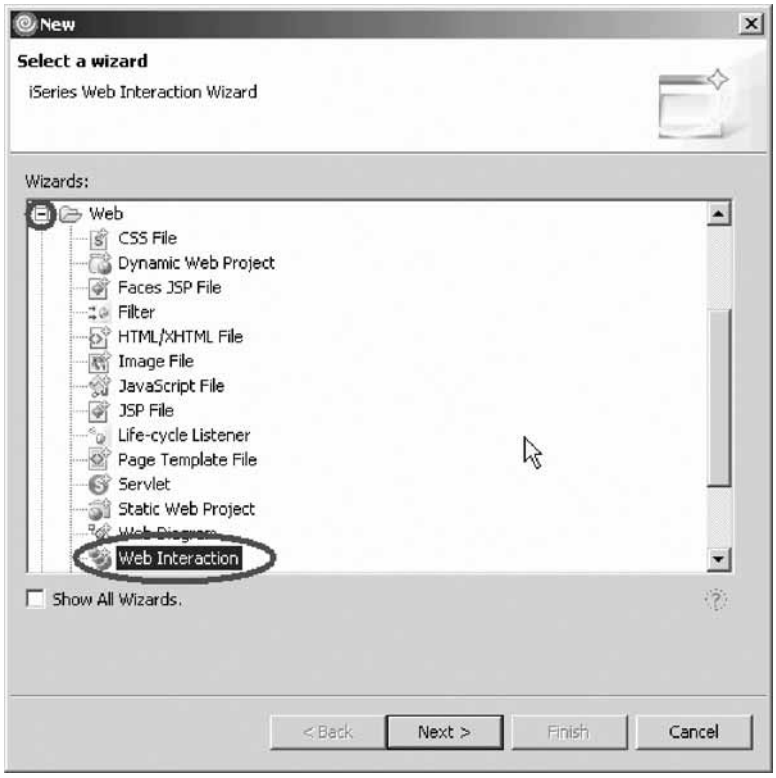


3. Right-click your project and click **New > Other** on the pop-up menu.

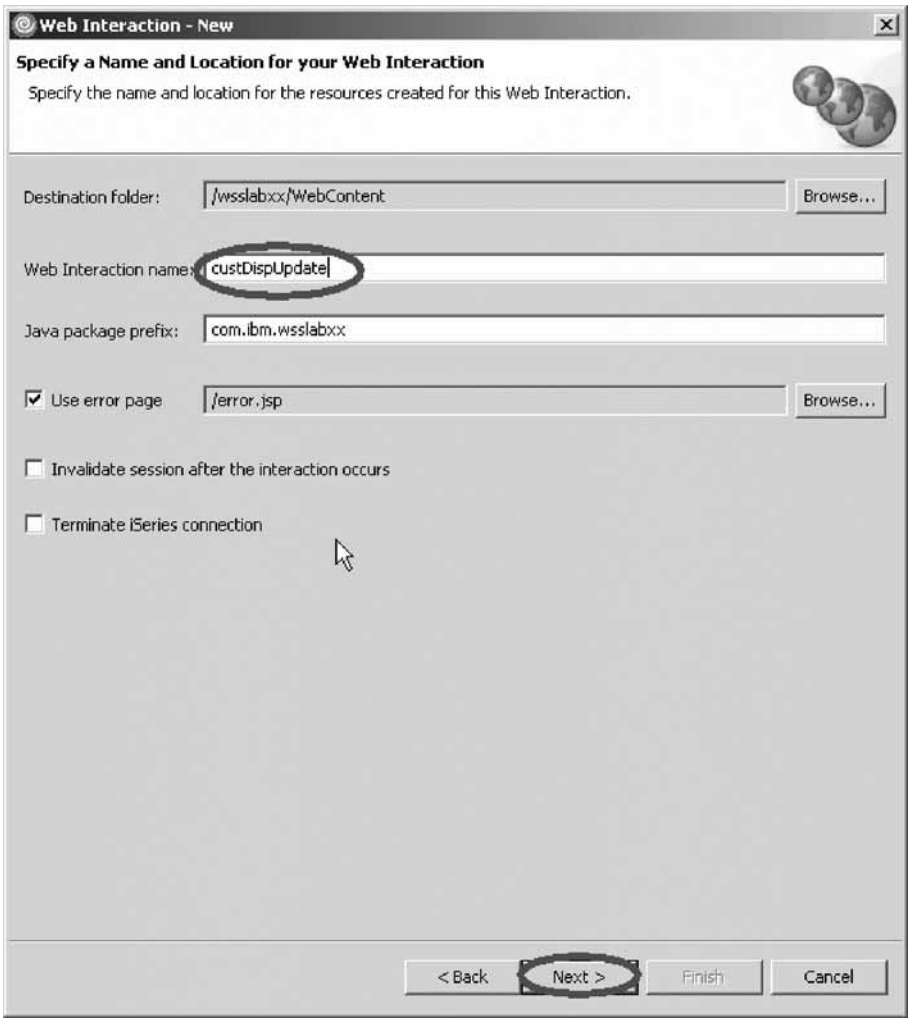


The Select page opens.



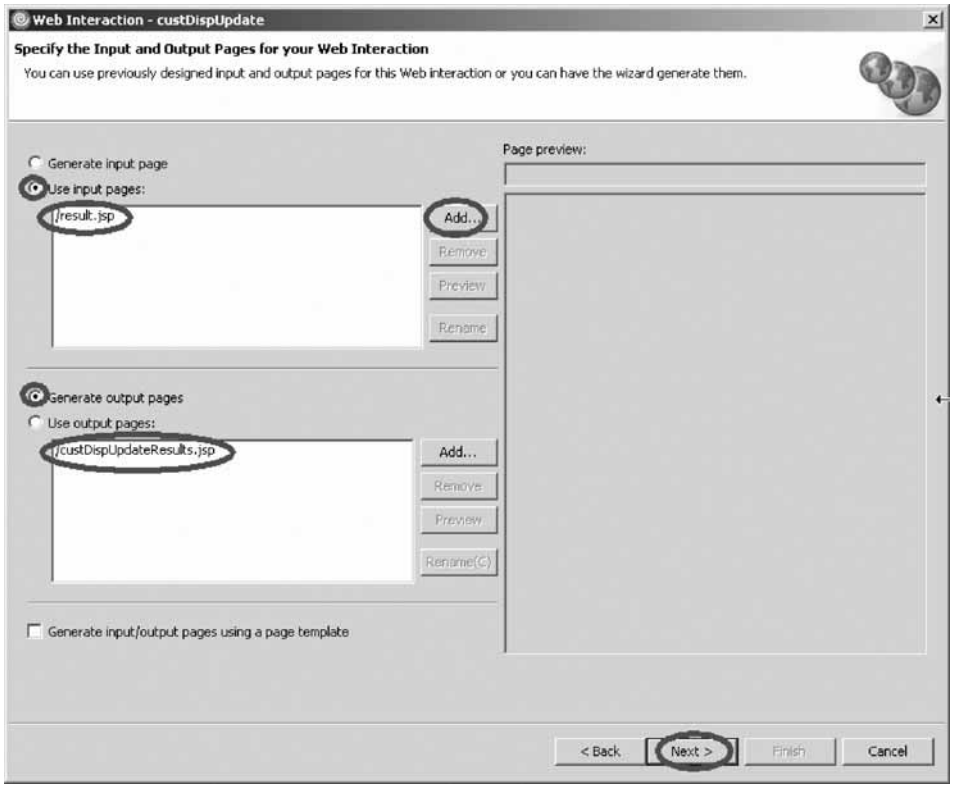
4. In the left pane of the Select page select **Web**.
5. In the right pane of the Select page, select **Web Interaction**.
6. Click **Next**.

   The Web Interaction wizard opens.



7. In the **Web Interaction name**, type `custDispUpdate`.
8. Click **Next**.

   This next page is where you specify the input and output pages.



You want to get from the current results page to the update page. So you use the result page as an existing input page and let the Web Interaction wizard generate an update page for you.

9. Leave the **Use input pages** radio button selected and click **Add**.
10. Select **result.jsp** on the Input dialog and click **OK**.

    This is the page your original Web Interaction generated; you are now linking it with another Web Interaction.
11. Click the **Generate output JSP** radio button to tell the Web Interaction wizard to make an output page.
12. Click **Next**.

    On the next page, you will need to add another program instance and define the input and output parameters for this Web Interaction.

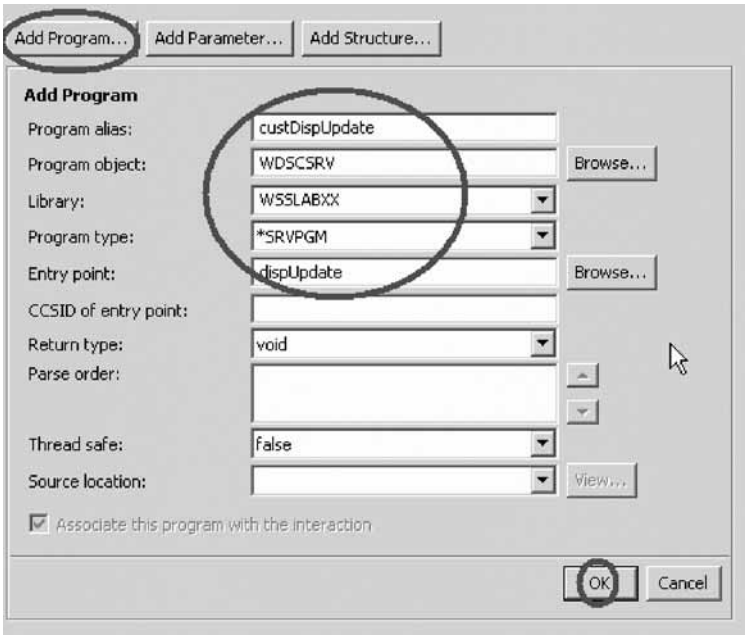
    You will notice that the structure and the program from your previous Web Interaction are visible, and available for your use.

Adding a program

To add a program:

1. Click **Add Program**.

   The service program has several procedures that we have already coded for you. One of these procedures is dispUpdate. It gets the customer detail data from a database file given a customer number.
2. To invoke procedure dispUpdate fill the dialog as shown and click **OK** when finished.



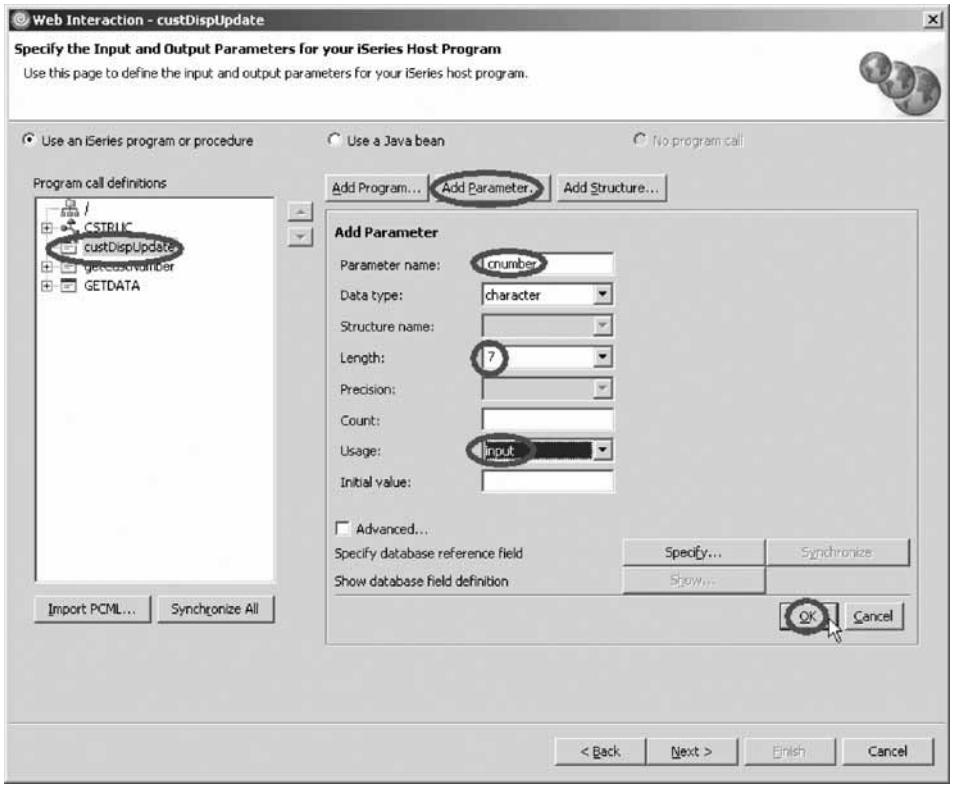
3. Click **OK** when finished.

   You will see that the program has been added under the **Program call definitions**.

Adding parameters

To add parameters:

1. Click **Add Parameter**.
2. The input parameter is customer number. To define this parameter fill in details as shown:

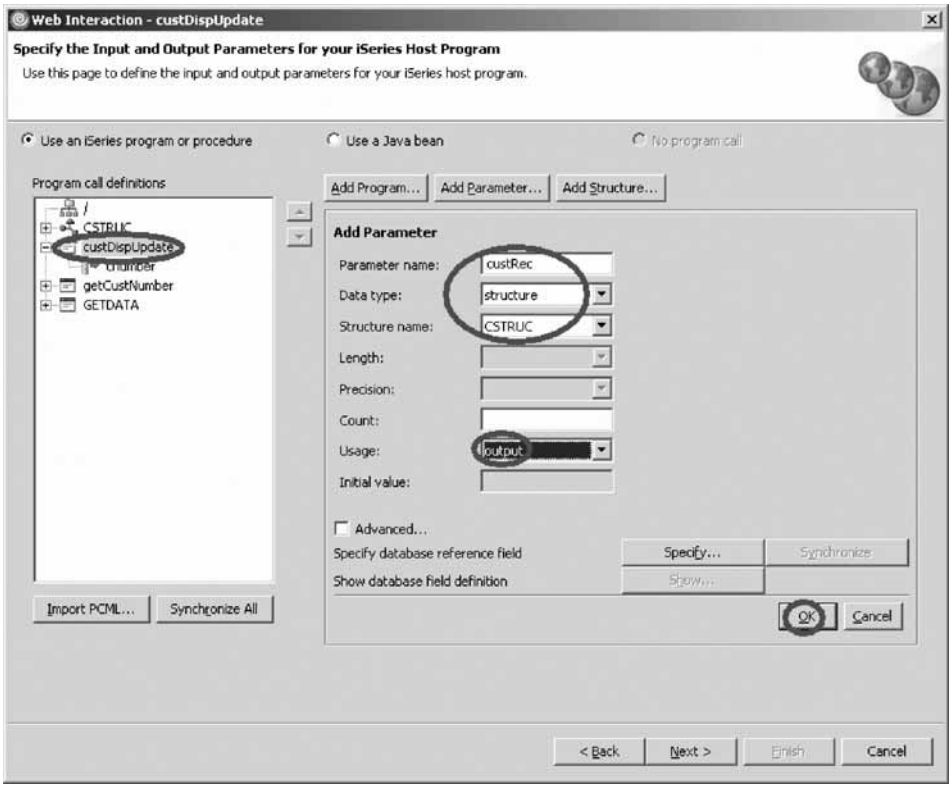


3. Click **OK** when finished.

   Now you need to add the structure you defined earlier.

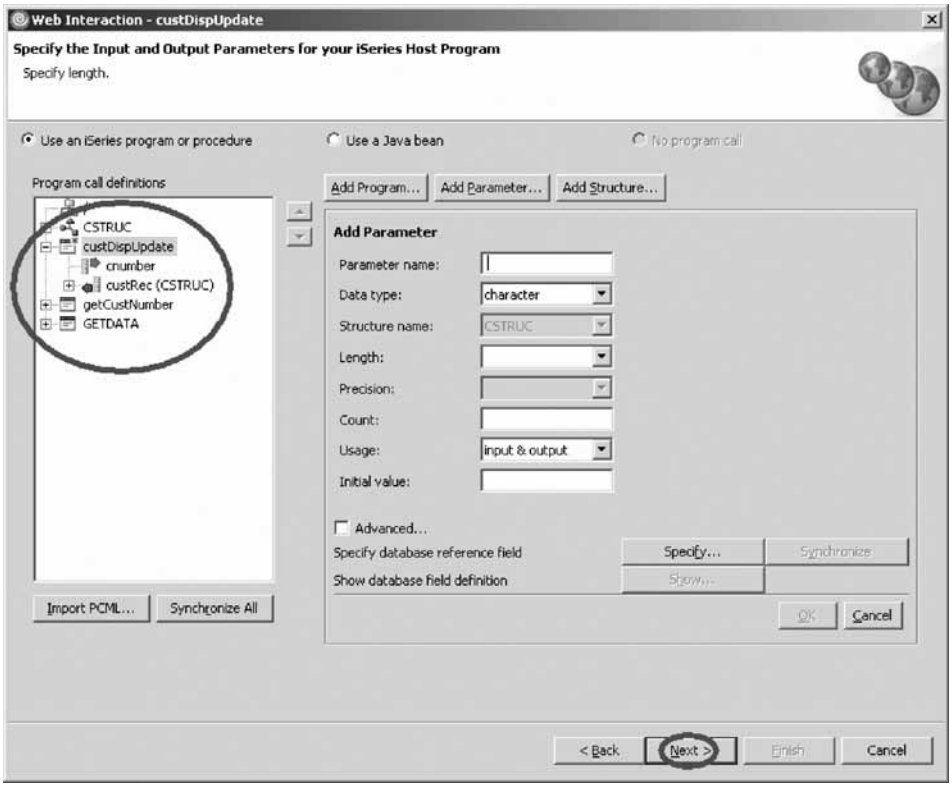
4. Click **Add Parameter**.

5. The procedure returns a structure with detail data. To define this parameter fill in the details as shown:



6. Click **OK**.

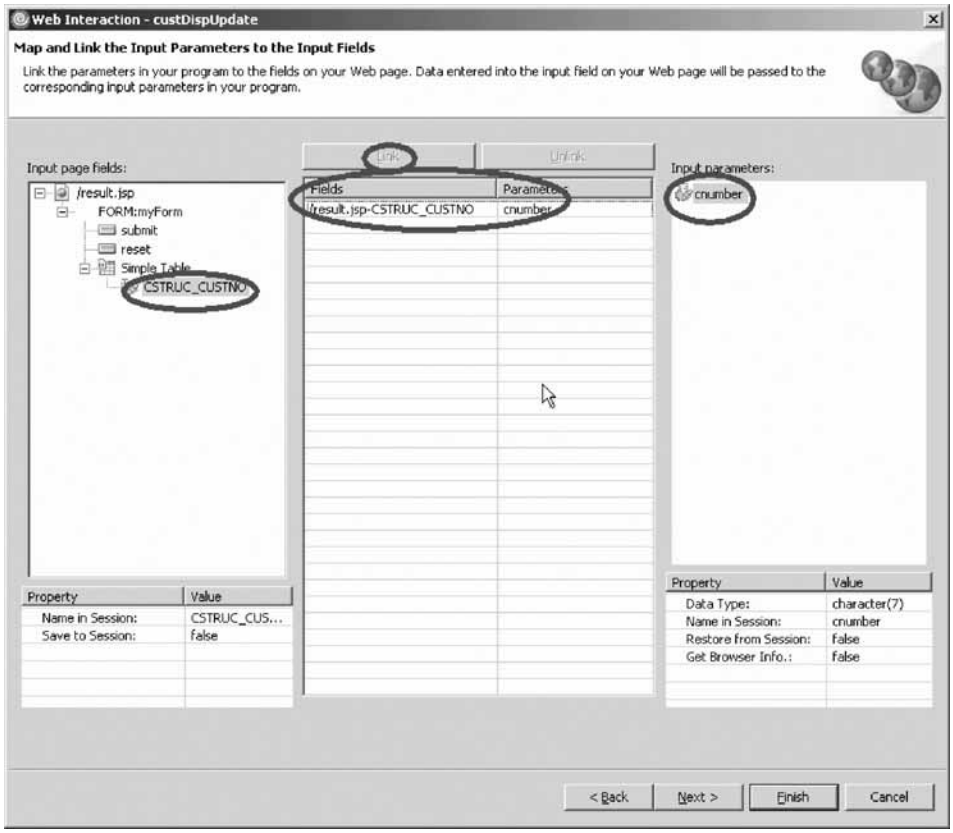
   Your wizard page should now look like this:



   You can see the new parameters you have defined for this interaction.

7. Click **Next**.

The input parameter page opens.

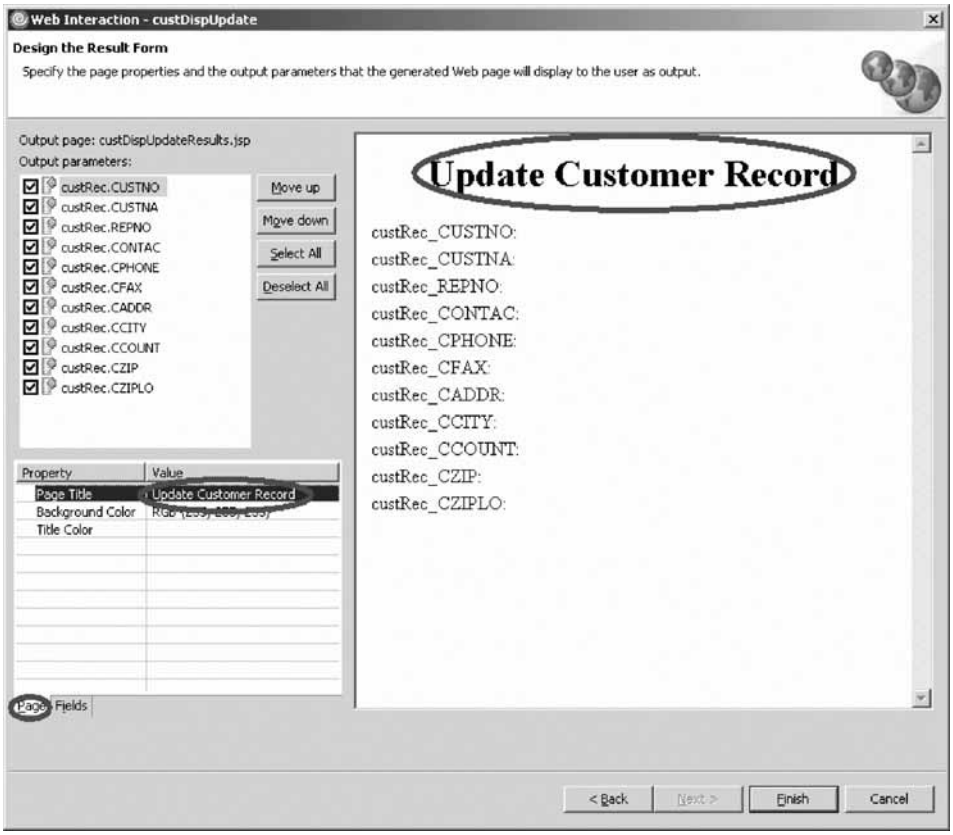


Now you will link the input page field to the program parameter.

8. Under **Input page fields**, select the CSTRUC_CUSTNO parameter.
9. Under **Input parameters**, select the cnumber parameter.
10. Click the **Link** button in the middle of the page.

    You have just linked a field on the input page to the input parameter of our program.
11. Click **Next**.

    Now its time to design the output page.



First you will change the output page title.

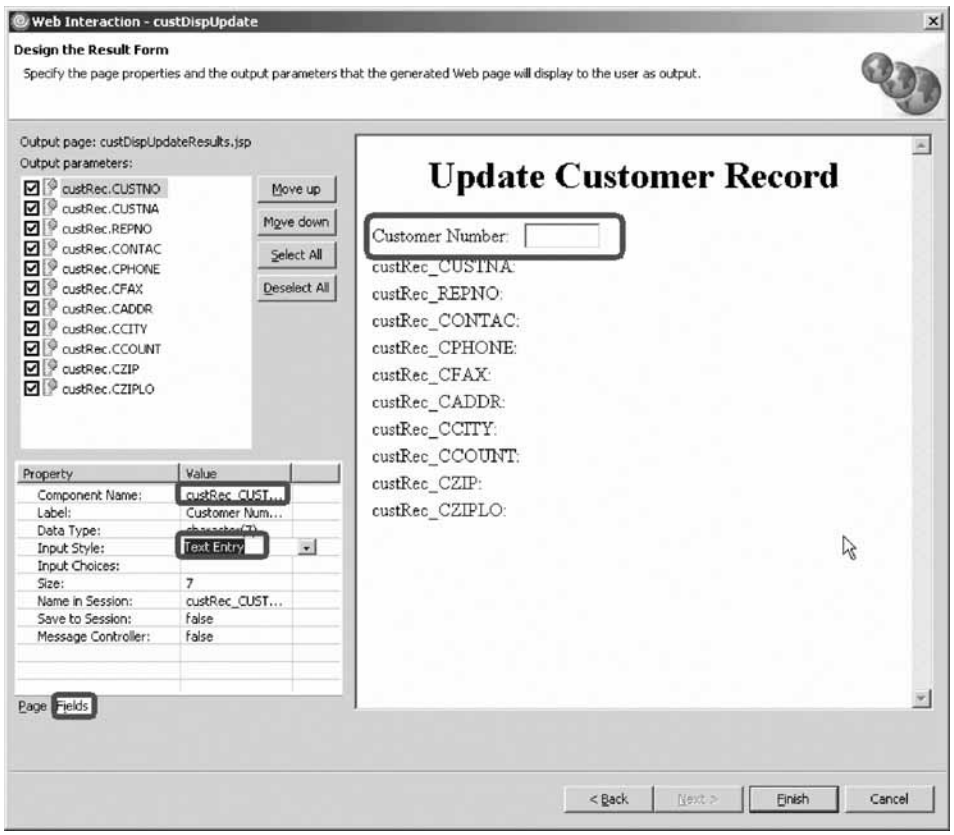
Designing the output page

To design the output page:

1. In the Properties table, select the **Page** tab.
2. Change the value of the Page Title property to `Update Customer Record`.

   Now you need to change the field labels to make sense and to make the fields editable.

   By default the output data is displayed as a label when the Web Interaction wizard generates the html for the page. Since you want to allow changes to the data you need to change all field attributes from Input Style: Label to Input Style: Text Entry.
3. Click the **Fields** tab.



4. Under **Output parameters**, select custRec.CUSTNO.
5. In the Properties table, change the value of the Label property to `Customer Number`.
6. Select **Text Entry** from the **Input Style** list.
7. Repeat for the following by changing their Label fields to their respective names in the table below, and by changing all their Input Style fields to Text Entry.
8. Make sure that the length of the field shown in the Size and Data Type fields are the same.

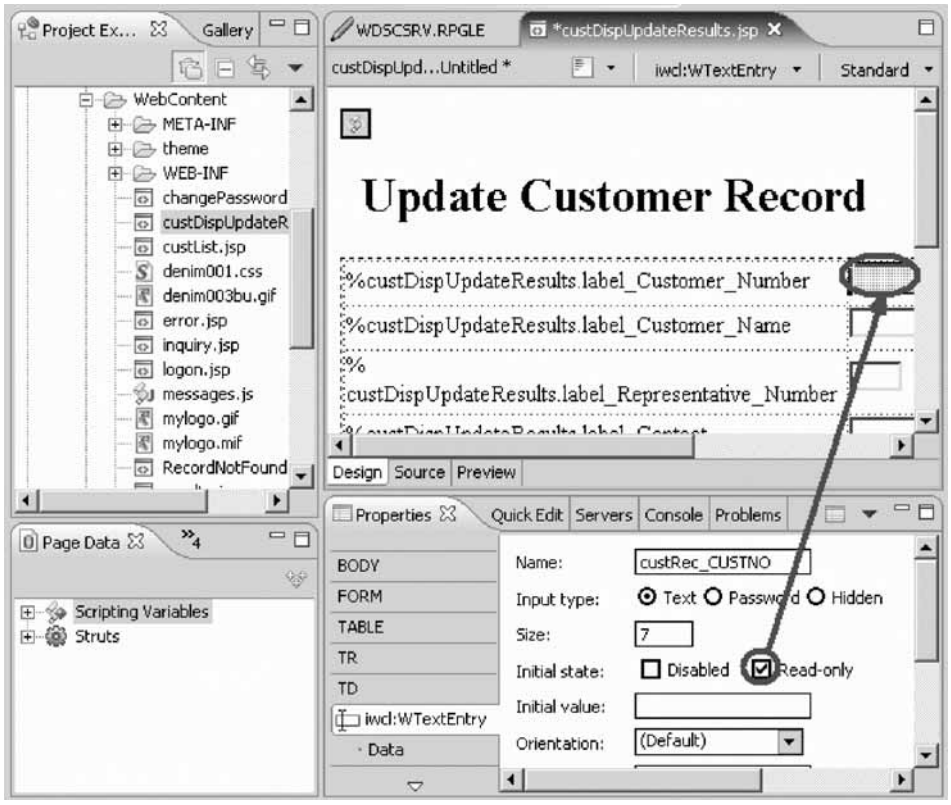
CUSTNA	Customer Name
REPNO	Representative Number
CONTAC	Contact
CPHONE	Phone Number
CFAX	Fax Number
CADDR	Address
CCITY	City
CCOUNT	Country
CZIP	Zip

Your page should now look like this:

9. You don't want to allow the **custRec.CZIPLO** field to be updated. Clear it's check box.
10. Click **Finish**.
11. Navigate to your new page custDispUpdateResults.jsp and double-click the file.

    The Page Designer opens.
12. Select the text field for the Customer Number.

    The customer number field needs to be protected so no changes can be made to it.



13. In the Properties pane, set the field to **Read-only**. Select the **Read-only** check box.

    You don't want to allow the user to change the customer number.

14. **Save** and close the JSP.

You have created the update record page, added a program, added parameters and designed the output page and now you are ready to begin "Exercise 4.2: Linking to the update record page."

Exercise 4.2: Linking to the update record page

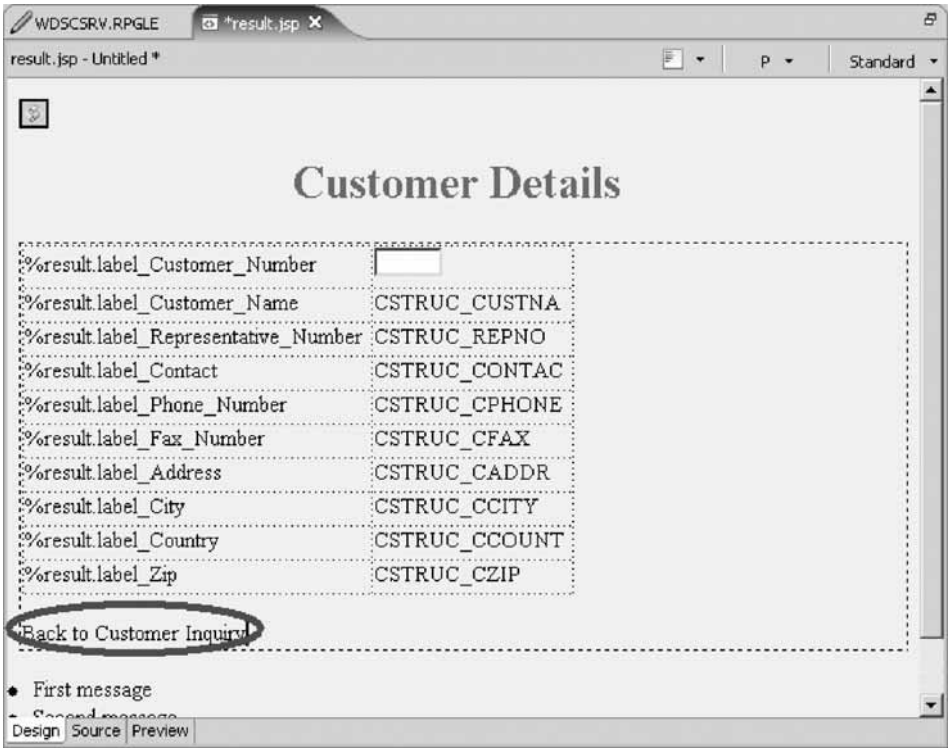
Before you begin, you must complete "Exercise 4.1: Generating the output page from the Web Interaction wizard" on page 53.

Now let's modify the customer details page so that you can link to the update record page.

Instead of having the default Submit and Reset buttons you want to add a link to return to the inquiry page and you want to add a push button to submit a request for invoking the dispUpdate procedure. You did create the Web interaction to generate this request in the previous exercise.

To link to the update record page:

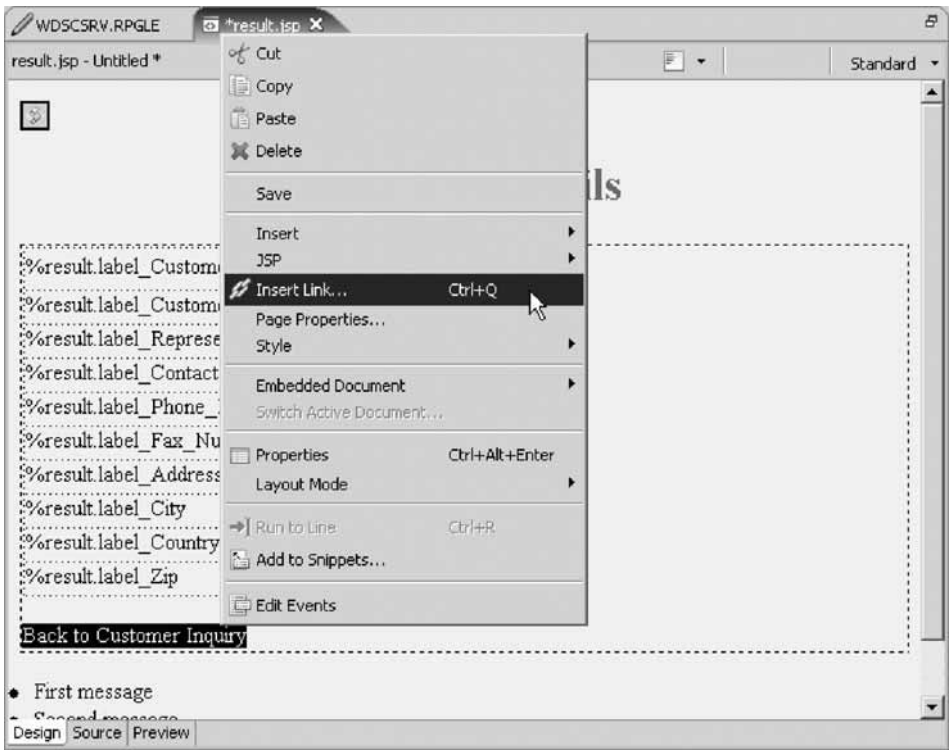
1. In the Project Explorer, drill down to your result.jsp page and double-click.



On the page you will see two push buttons at the bottom of the page, delete both.

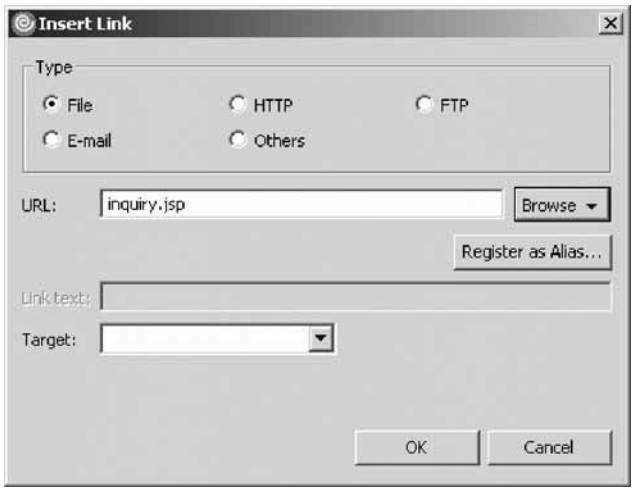
2. Select the **Submit** button and press the **Delete** key.
3. Select the **Reset** button and press the **Delete** key.

   Now you add the link back to the inquiry page.
4. Type `Back to Customer Inquiry`.
5. Highlight the text `Back to Customer Inquiry`, right-click and click **Insert Link** on the pop-up menu.



The Insert Link dialog opens.

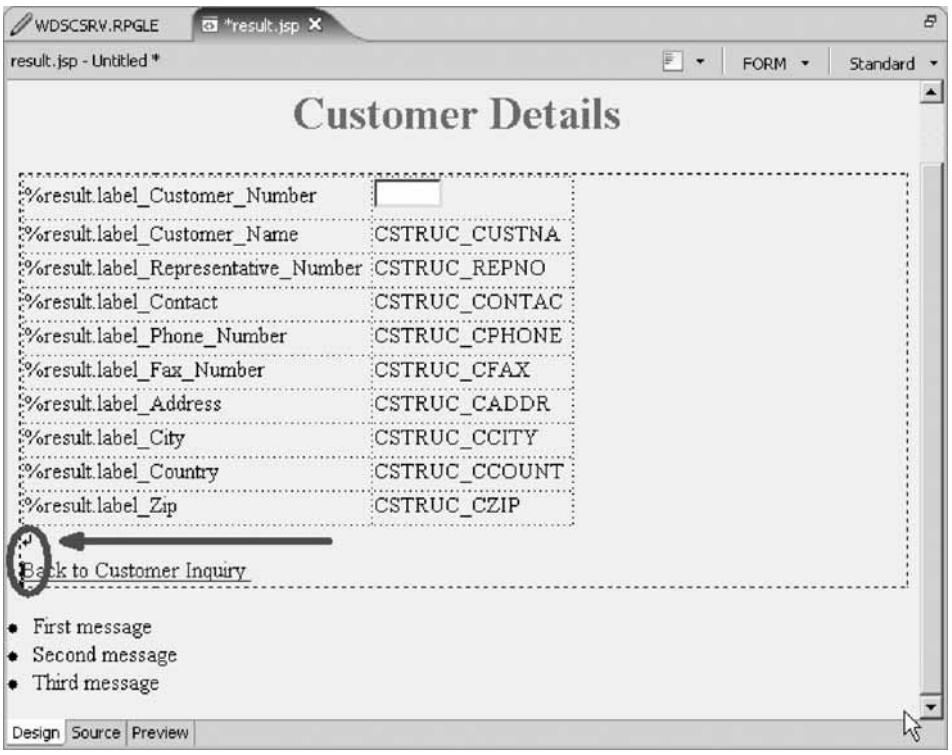
6. In the **URL** field, type `inquiry.jsp`



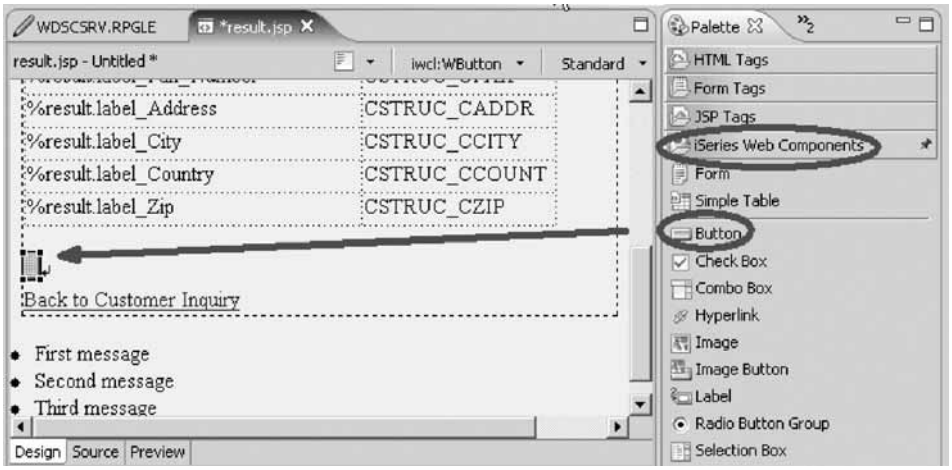
7. Click **OK**.

   Now you add the update push button that when clicked, will send a request to fetch the customer data and display the custDispUpdate page.

8. Put your cursor right before the **Back to Customer Inquiry** link and press **Enter** on your keyboard.

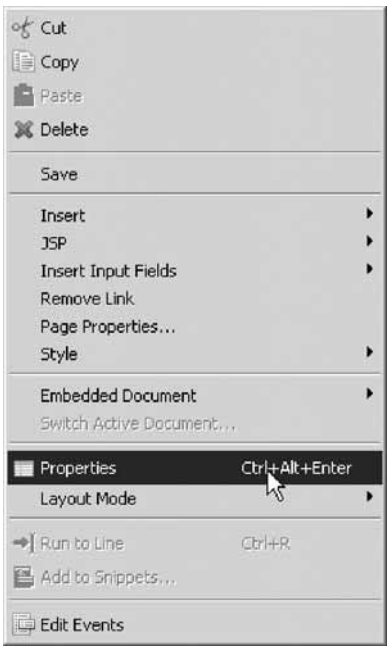


9. In the right pane, click the **Palette** tab and expand **iSeries Web Components** if not already expanded.
10. Click and drag the **Button** component to the location shown.

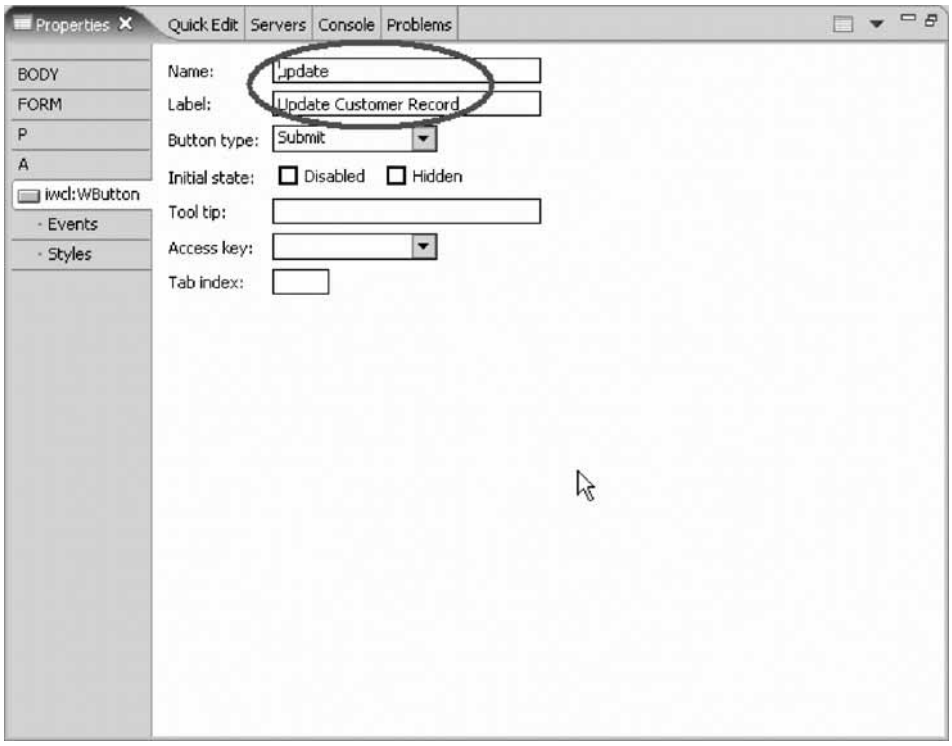


The Properties pane in the bottom left of the workbench should automatically appear.

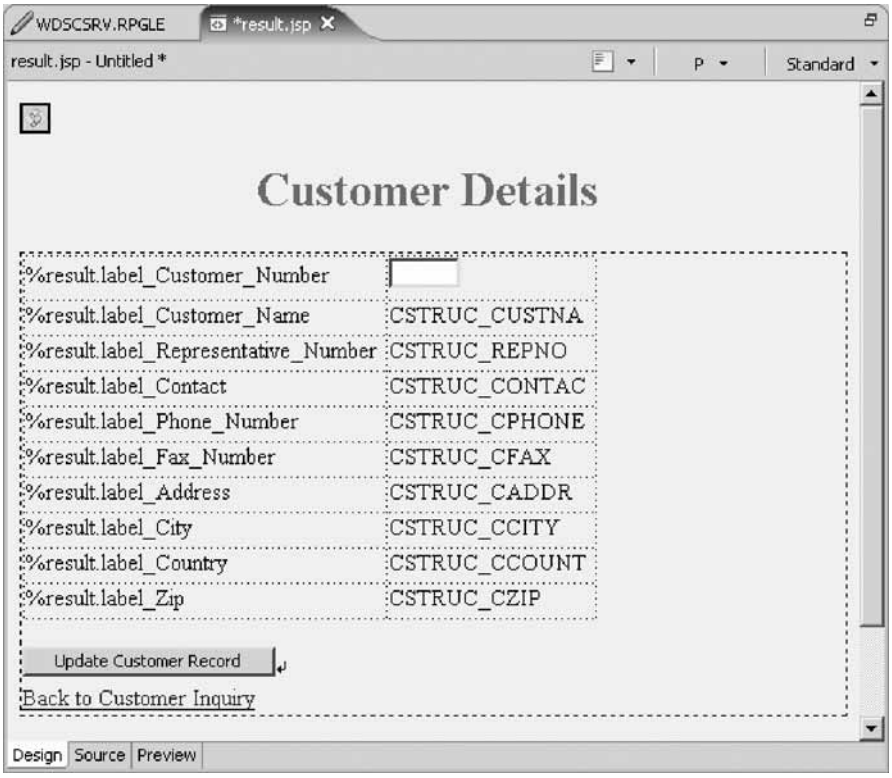
11. If not, right-click the button and click **Properties** on the pop-up menu.



12. Fill in the Button's details as shown below:



Your Customer Details page should now look like this:



13. Save and close the file.

You have linked the customer details page to the update record page and now you are ready to begin "Exercise 4.3: Creating the update error page."

Exercise 4.3: Creating the update error page

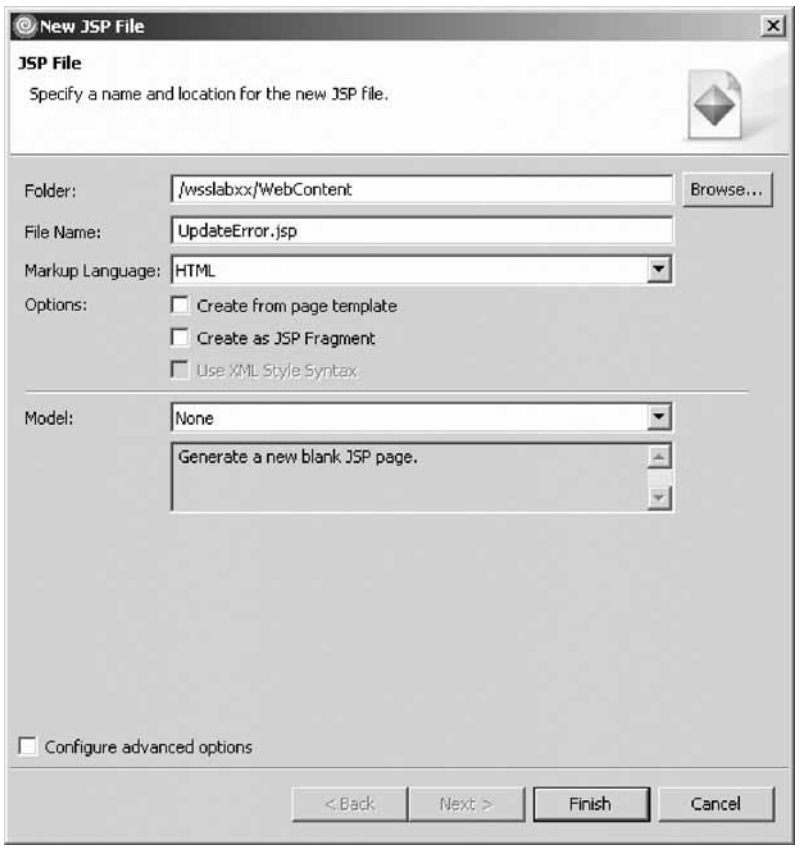
Before you begin, you must complete "Exercise 4.2: Linking to the update record page" on page 65.

Now let's create the error page that will be displayed if there is an error during the update process.

To create the update error page:

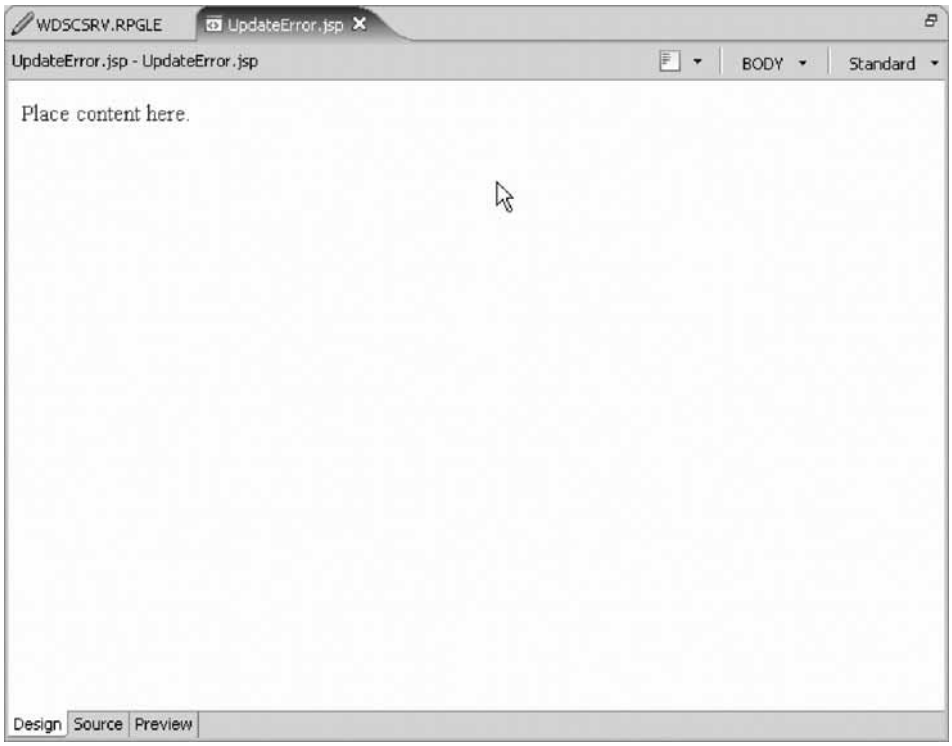
1. In the Project Explorer, expand your project if not already and drill down to the WebContent folder.
2. Right-click the WebContent folder inside your project.
3. Click **New > JSP File** on the pop-up menu.

   The New JSP File dialog opens.



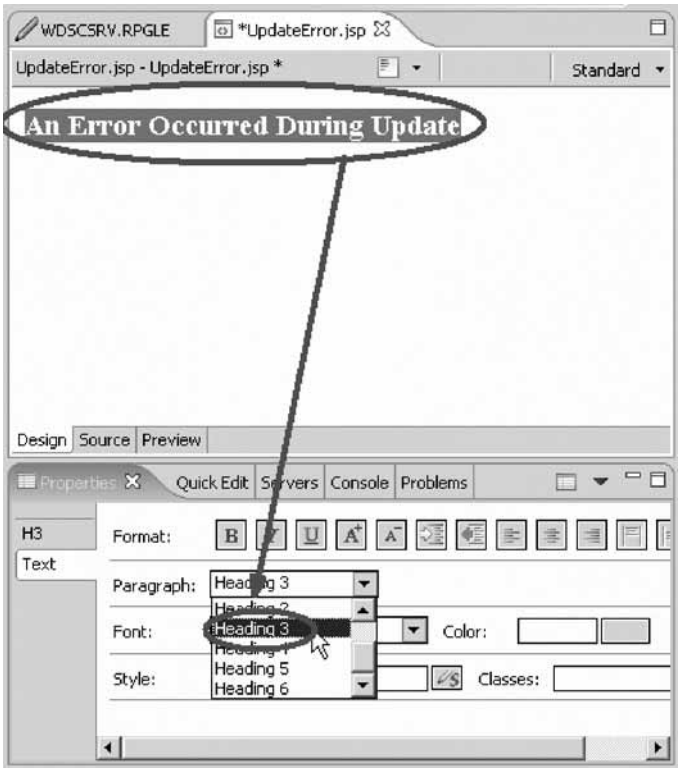
4. In the **File Name** field, type `UpdateError`.
5. Click **Finish**.

   The Page Designer opens. Your window will look like this:



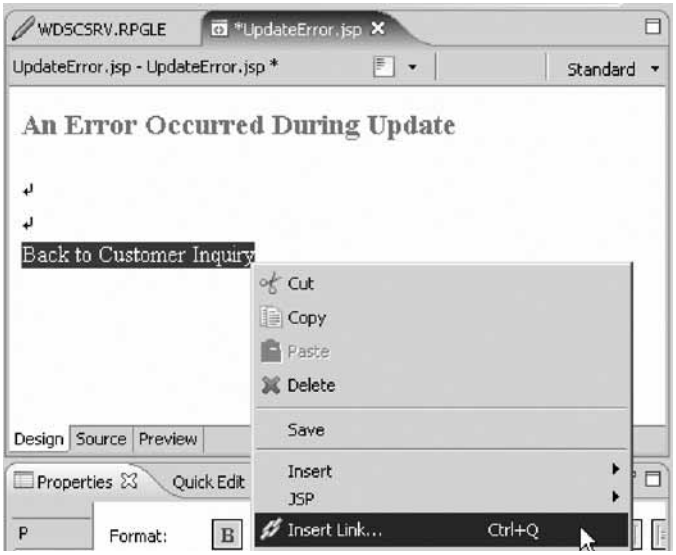
6. Select the words ″Place content here″ and change it to `An Error Occurred During Update`.
7. Highlight your new text.

   This opens the Properties pane. It appears in the bottom right of the workbench.

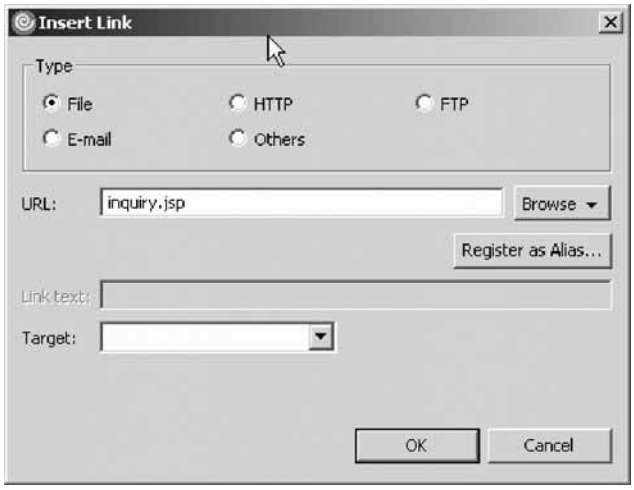


8. Select **Heading 3** from the Properties pane.
9. Place your cursor below the heading you just created, and press the **Enter** key two times.
10. Type the text `Back to Customer Inquiry`.
11. Highlight the text and right-click.

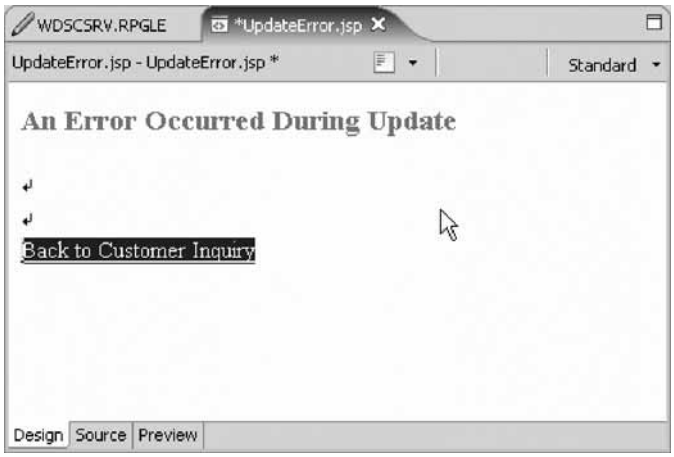
    Now you will define the link.



12. Click **Insert Link** on the pop-up menu.
    The Insert Link dialog opens.
13. In the **URL** field, type `inquiry.jsp`.



14. Click **OK**.
    Your **UpdateError.jsp** should now look like this:



15. Save and close the file.
    You are now ready to use the Web Interaction Wizard to add the flow control parameter.

You have created an error page to handle records during the update record process.

Module recap

You have completed Chapter 4, “Module 4. Creating the update record output page,” on page 53. You have learned how to:

- Create the update record page
- Add a program
- Add parameters
- Design the output page
- Link the customer details page to the update record page
- Create an error page

Now that you have created the update record output page, you are ready to begin Chapter 5, “Module 5. Creating the update complete output page,” on page 75.

Chapter 5. Module 5. Creating the update complete output page

This module teaches you how to create the customer update complete output page and how to invoke the RPG procedure that does the database update. You will also learn how to add an error page in case the RPG procedure can't complete the update successfully and to link the update page to the inquiry page.

In this module, you will:

- Generate another output page
- Add a program
- Add a parameter
- Design the output page
- Add a flow control error page
- Link the update complete page to the inquiry page
- View the flow structure of your Struts-based Web application

Exercises

The exercises in this module must be completed in order.

- "Exercise 5.1: Generating another output page using the Web Interaction wizard"
- "Exercise 5.2: Adding the flow control error page" on page 85
- "Exercise 5.3: Linking the update complete page to the inquiry page" on page 88
- "Exercise 5.4: Visualizing the flow structure of your Web application" on page 90

Time required

This module will take approximately **15 minutes** to complete.

Exercise 5.1: Generating another output page using the Web Interaction wizard

Now you will create the Web Interaction that will actually update the record on the iSeries. It will read the input fields from the custDispUpdateResults.jsp that you created in the previous exercise, pass the data in a structure as a parameter to the procedure doUpdate and display the new data in a Web page. In case of an error an error page gets displayed.

Generating another output page

To generate another output page:

1. Right-click your project and click **New > Other** on the pop-up menu.

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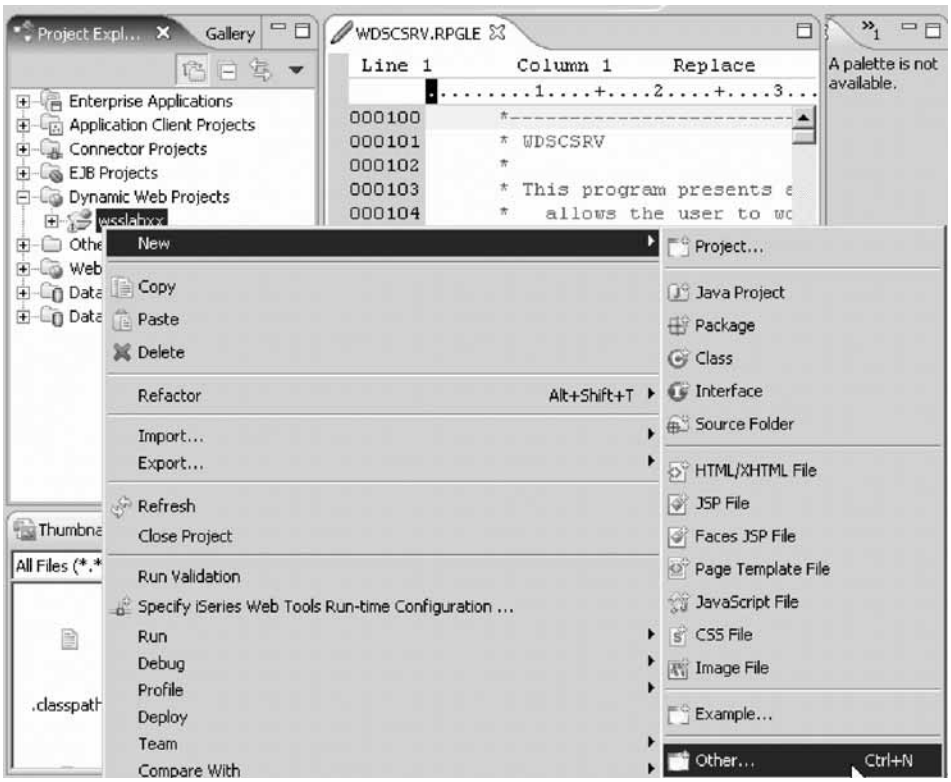
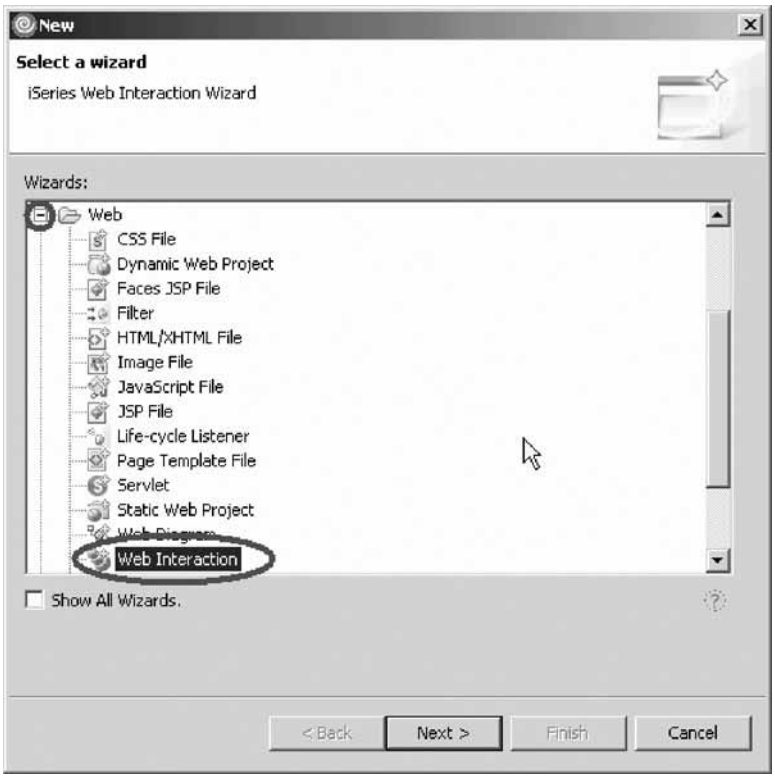


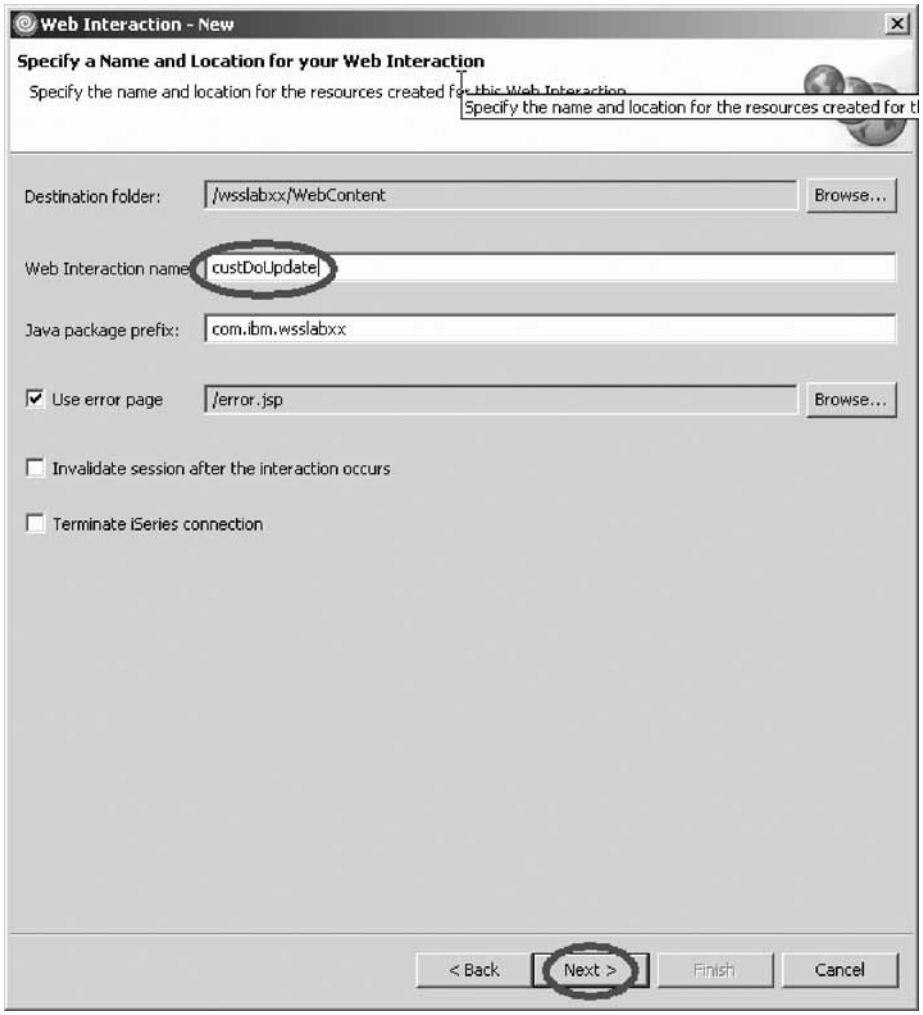
The Select page opens.

2. In the left pane, select **Web**.
3. In the right pane, select **Web Interaction**.



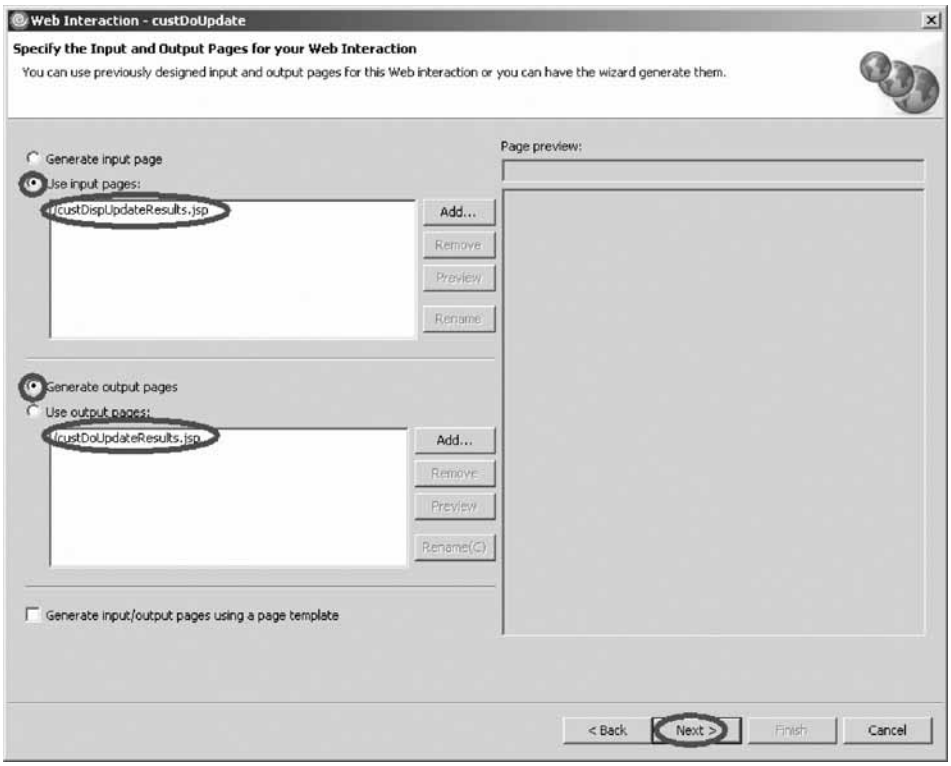
4. Click **Next**.

5. In the **Web Interaction name** field, type `custDoUpdate`.



6. Click **Next**.

   Now you define the input and output pages. You use the page from the previous exercise as the input page.



7. Leave the **Use input pages** radio button selected and click **Add**.

   You let the Web Interaction wizard generate the output page.
8. Select **custDispUpdateResults.jsp** on the Input page dialog. Click **OK**.

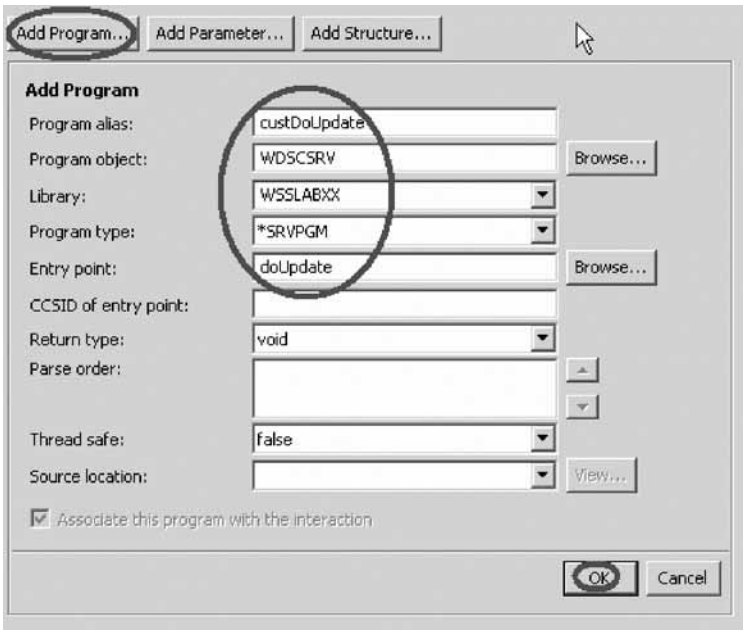
   This is the page your original Web Interaction generated; you are now linking it with another Web Interaction.
9. Click the **Generate output JSP** radio button to tell the Web Interaction wizard to make an output page.
10. Click **Next**.

    Now you will add a program.

Adding a program

To add a program:

1. Click **Add Program**.
2. Fill in the program details as shown.



3. Click **OK** when finished.

   You will see that the program has been added under **Program call definitions**.

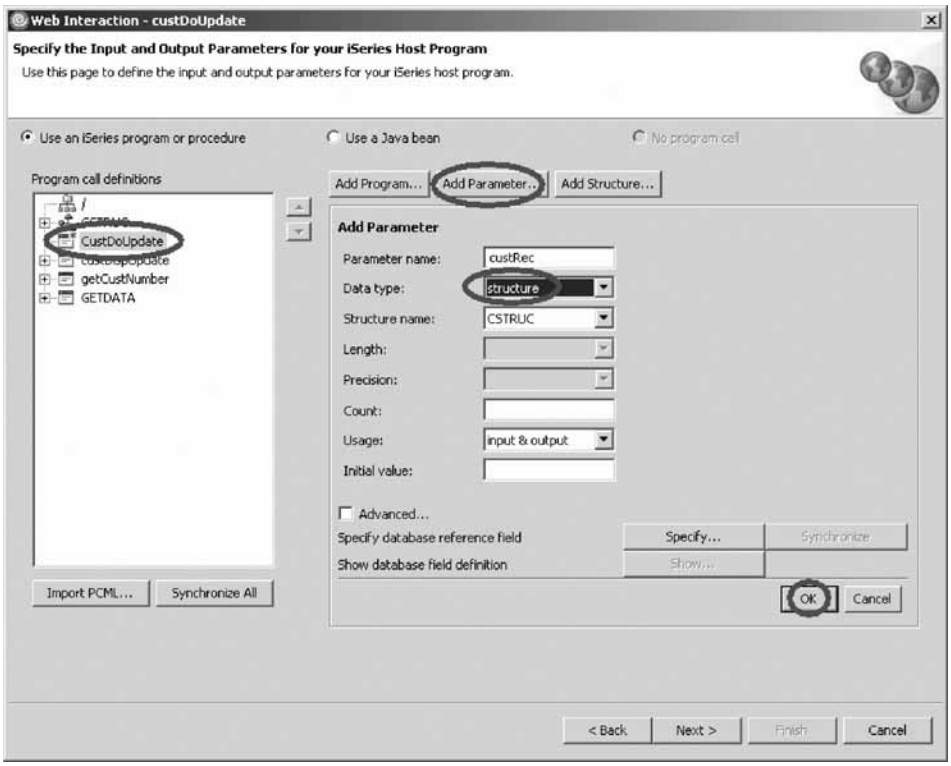
   Now you need to add the structure you defined earlier.

Adding a parameter

The procedure doUpdate is provided to you in WDSCSRV. It receives a structure with the input data from the Web page and updates the customer record. It returns the string 'ok' in the parameter forward if the update completed successfully.

To add a parameter:

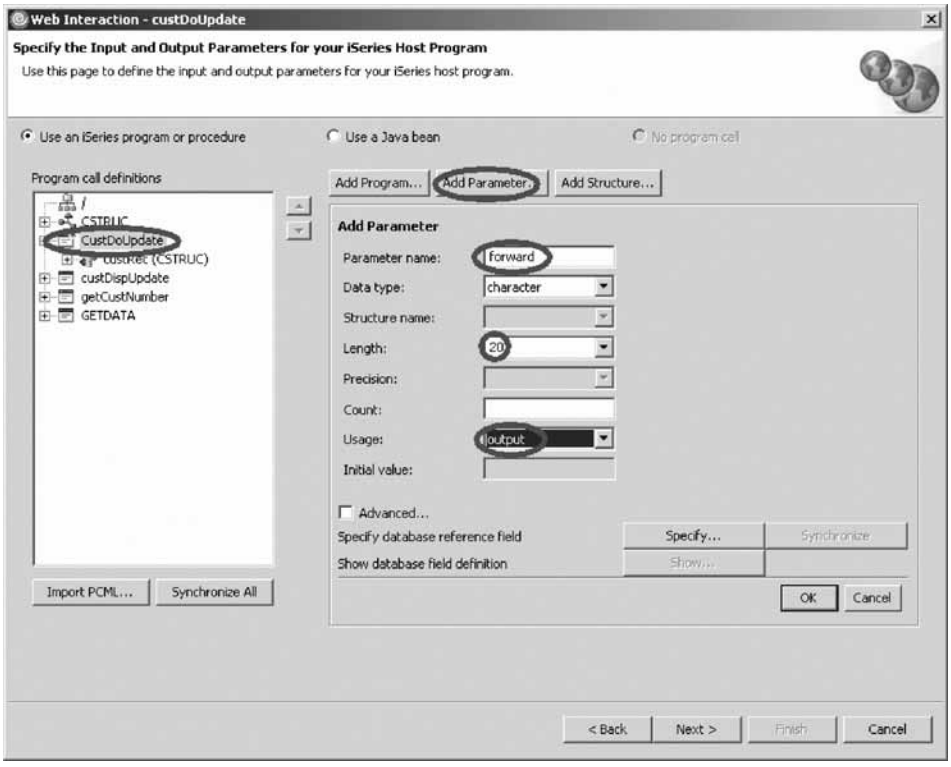
1. Click **Add Parameter**.
2. Define the structure for the customer data as an input/output parameter. Fill in the details as shown:



3. Click **OK**.

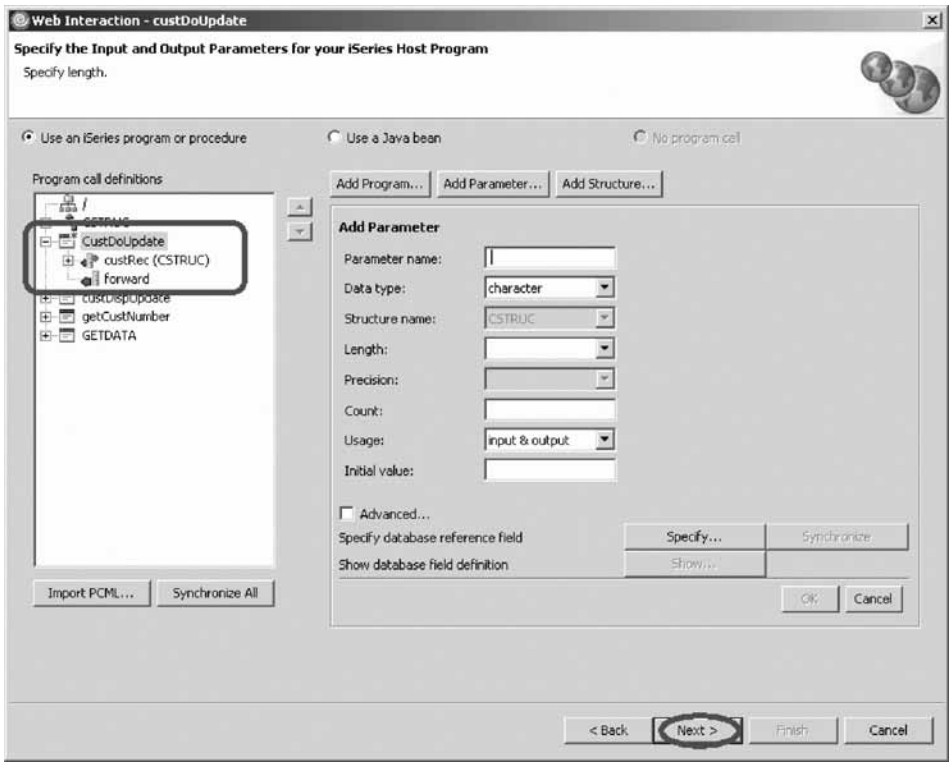
   The feedback from the procedure to indicate success is a 20 character parameter. You use this parameter to decide which page to show next.

4. Fill in the parameter details as shown:



5. Click **OK** when finished.

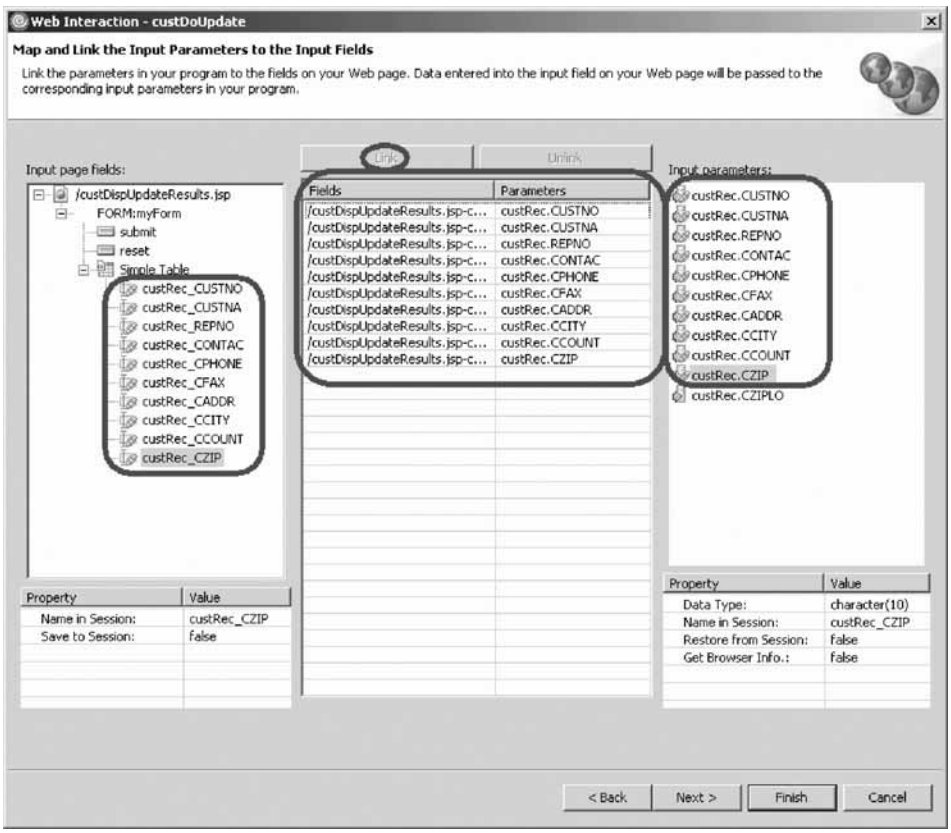
Your wizard page should now look like this:



You can see the new parameters you have defined for this interaction.

6. Click **Next**.

   The input parameter page opens.



To be able to generate the correct code, the Web Interaction wizard needs to know which field on the Web page is correlated to which parameter. You specify this correlation by linking the fields from the Web page to the correct parameter.

Now you will link the input page parameters.

7. Select an input page parameter under **Input page fields**.
8. Select the respective program input parameter under **Input parameters**.
9. Click the **Link** button in the middle of the page

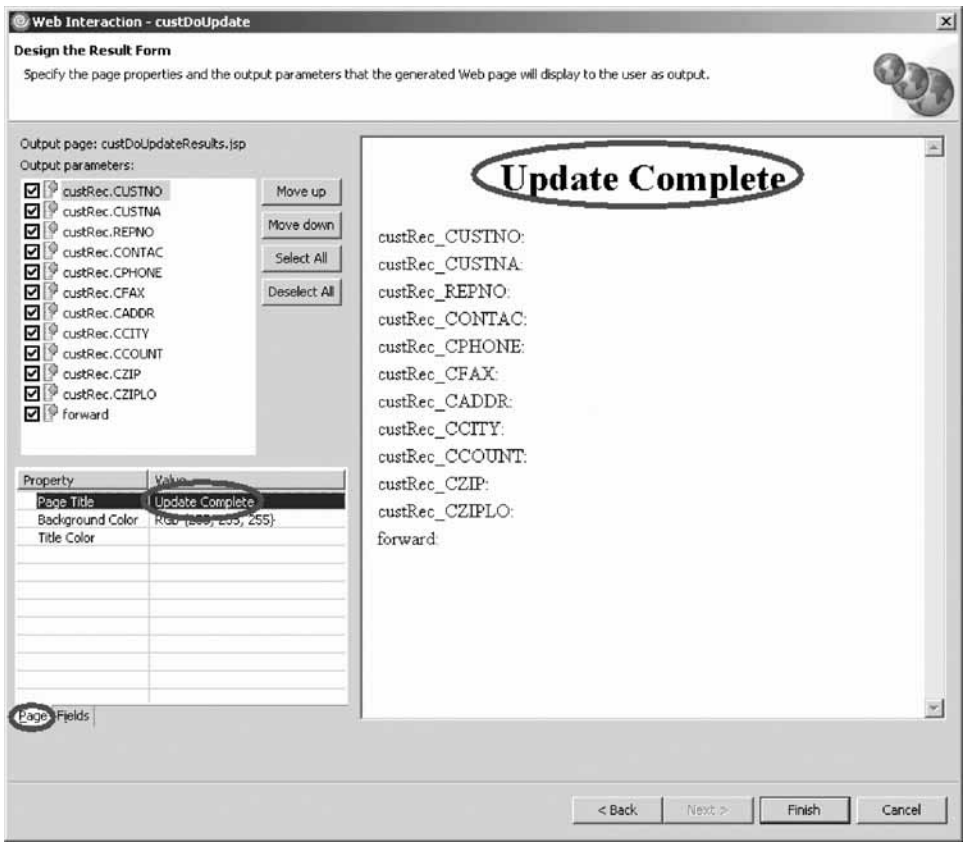
   You have just linked a field from the input page to the input parameter of your program.
10. Repeat for all remaining input page parameters.

Designing the output page

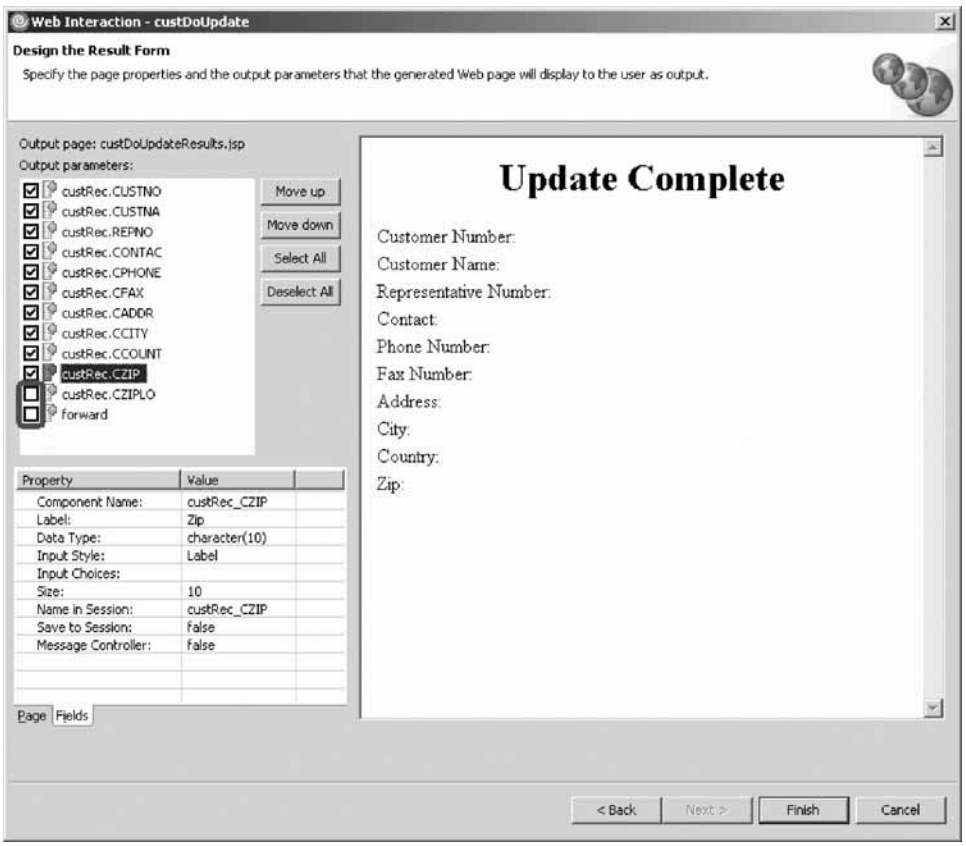
Now you design the output page.

To design the output page:

1. Click **Next**.



2. In the Properties table, click the **Page** tab.
3. Change the value of the Page Title property to `Update Complete`.
   Now change the field labels to be readable.
4. Click the **Fields** tab.

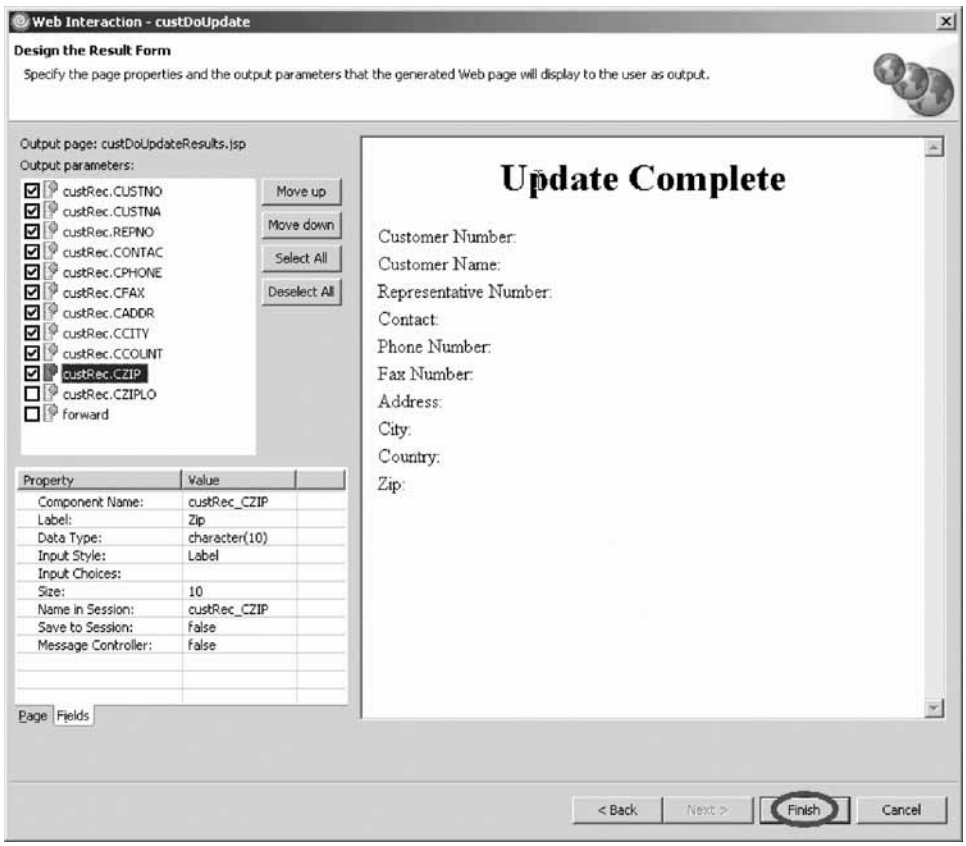


5. Select **custRec.CUSTNO** from the left.
6. Change the value of the Label property to `Customer Number`.
7. Using the table below, change the values of the remaining properties:

CUSTNA	Customer Name
REPNO	Representative Number
CONTAC	Contact
CPHONE	Phone Number
CFAX	Fax Number
CADDR	Address
CCITY	City
CCOUNT	Country
CZIP	Zip

Now, let's disable the values you don't want to be displayed.

As a final step, you choose not to use the CZIPLO field and not to display the forward field.



8. Clear their respective check boxes.
9. Click **Finish**.

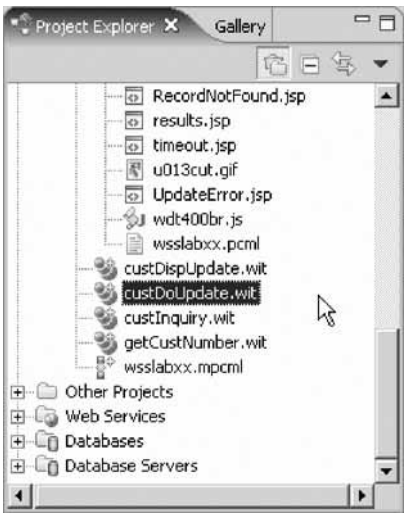
You have generated another output page, added a program, added a parameter and designed the output page and now you are ready to begin “Exercise 5.2: Adding the flow control error page.”

Exercise 5.2: Adding the flow control error page

Before you begin, you must complete “Exercise 5.1: Generating another output page using the Web Interaction wizard” on page 75.

Now that the update complete page (custDoUpdateResults.jsp) is created, you can add the condition to this Web interaction to indicate which page to show next. If the update was successful, the update complete page is shown, otherwise the error page is shown. In order to add this feature you need to change the Web interaction you just created.

1. Drill down through your project and find the Web interaction file named **custDoUpdate.wit**.



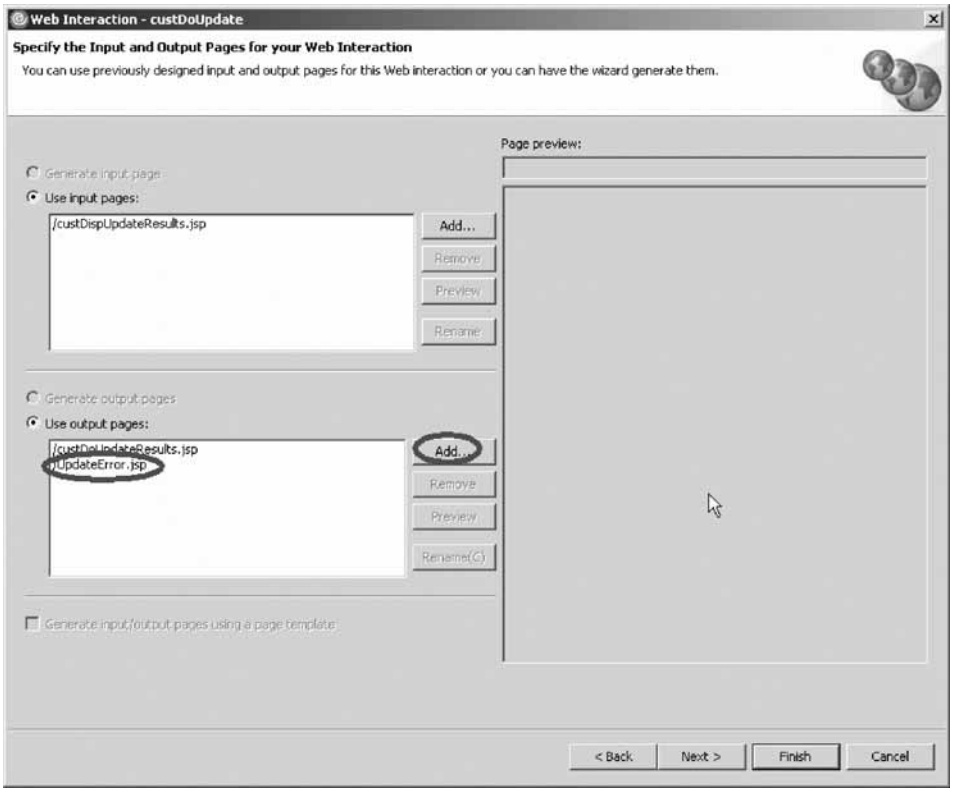
2. Double-click the Web interaction file.

   The Web Interaction wizard opens.

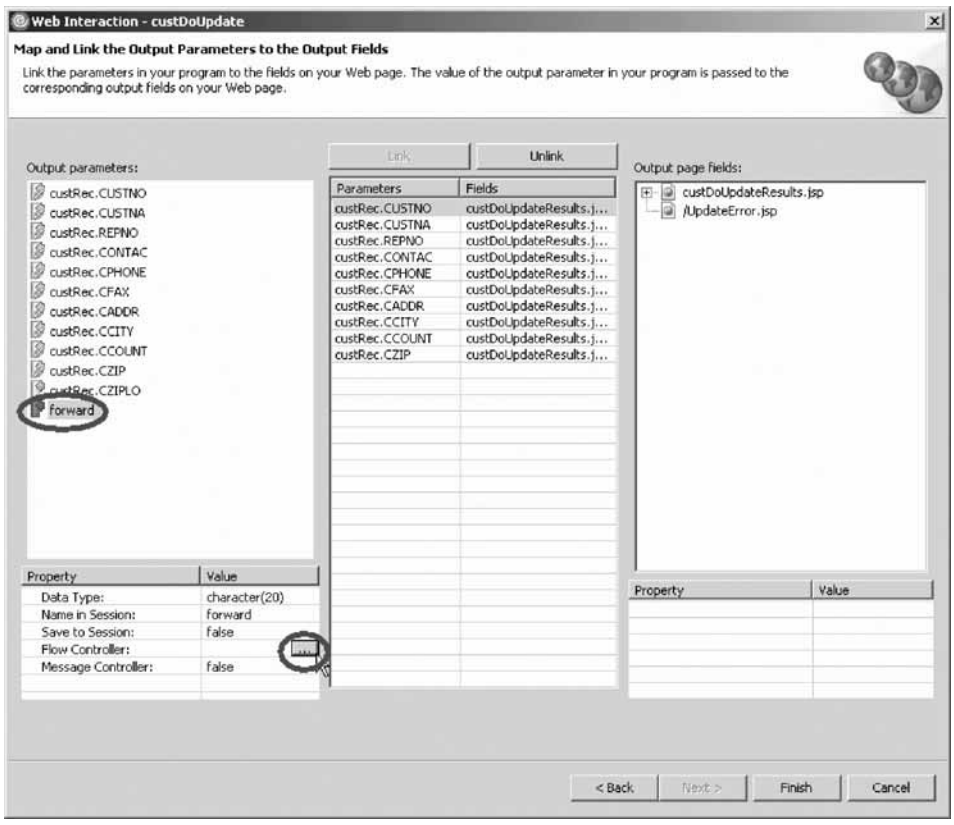
3. Click **Next**.

   Next you add the error page to the possible output pages to be displayed. Now you can define when to display one or the other.

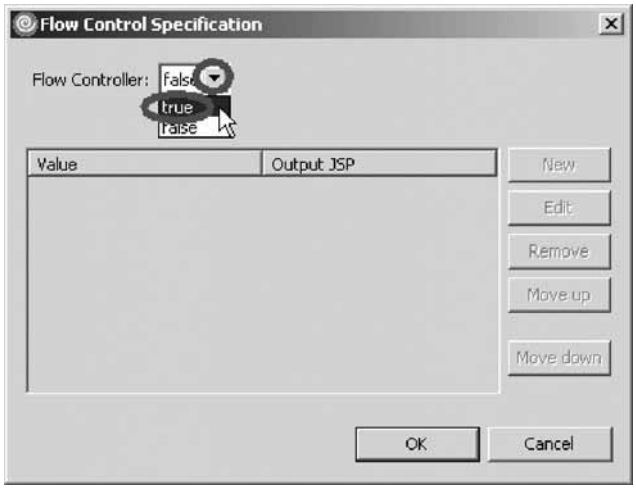
4. Click **Add**.



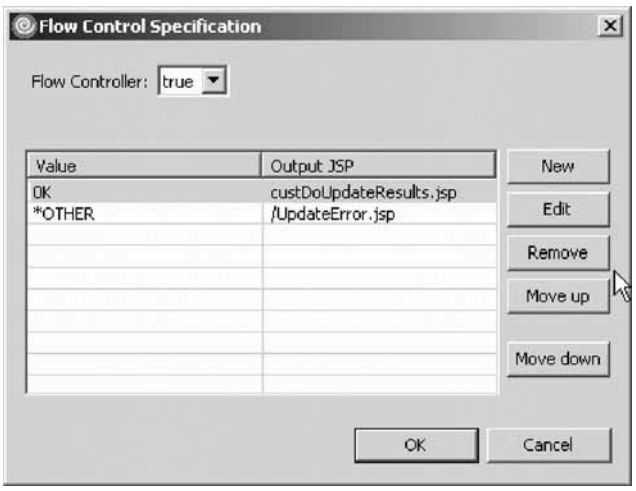
5. Select **UpdateError.jsp** on the Output page dialog. Click **OK**.
6. Click **Next** until you reach the Map and Link the Output Parameters to the Output Fields page.



7. Under **Output parameters**, select the forward parameter.
8. Select the value **true** for the Flow Controller list.



9. In the Flow Control Specification dialog, select **UpdateError.jsp** in the **Output JSP** field.



10. Click **New** .
11. Type OK in the **Value** field and select **custDoUpdateResults.jsp** as the Output jsp
12. Click **OK**.

    You return to the Web Interaction wizard.
13. Click **Finish**.

You have added a flow control error page and now you are ready to begin "Exercise 5.3: Linking the update complete page to the inquiry page."

Exercise 5.3: Linking the update complete page to the inquiry page

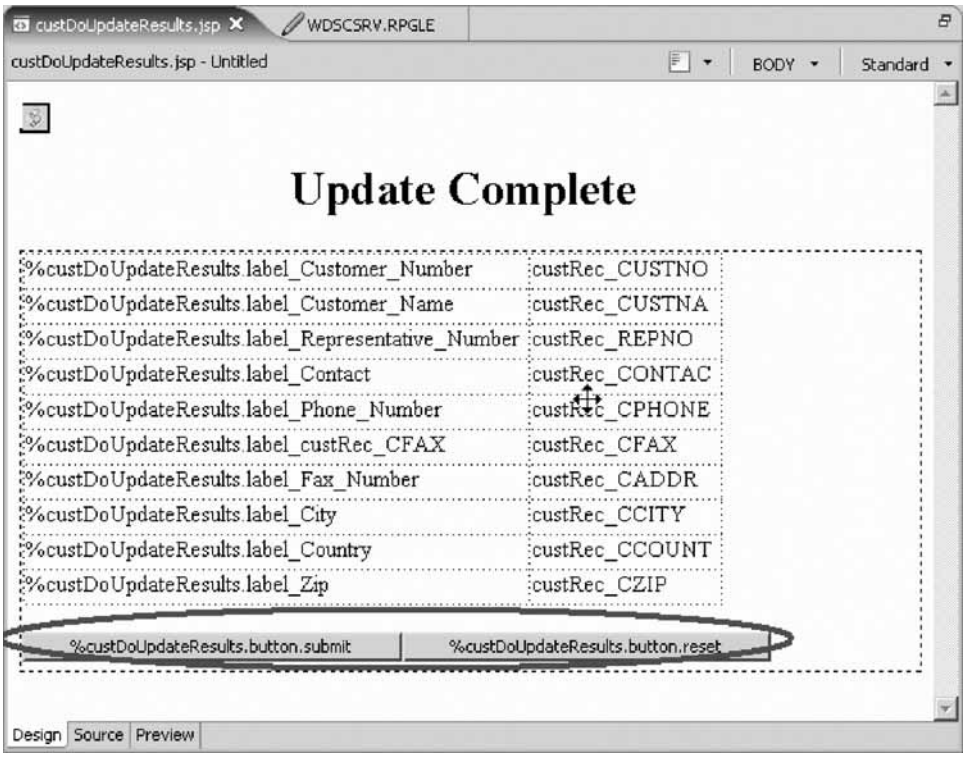
Before you begin, you must complete "Exercise 5.2: Adding the flow control error page" on page 85.

Next you edit the update complete page (custDoUpdateResults.jsp) to add the link to the inquiry page.

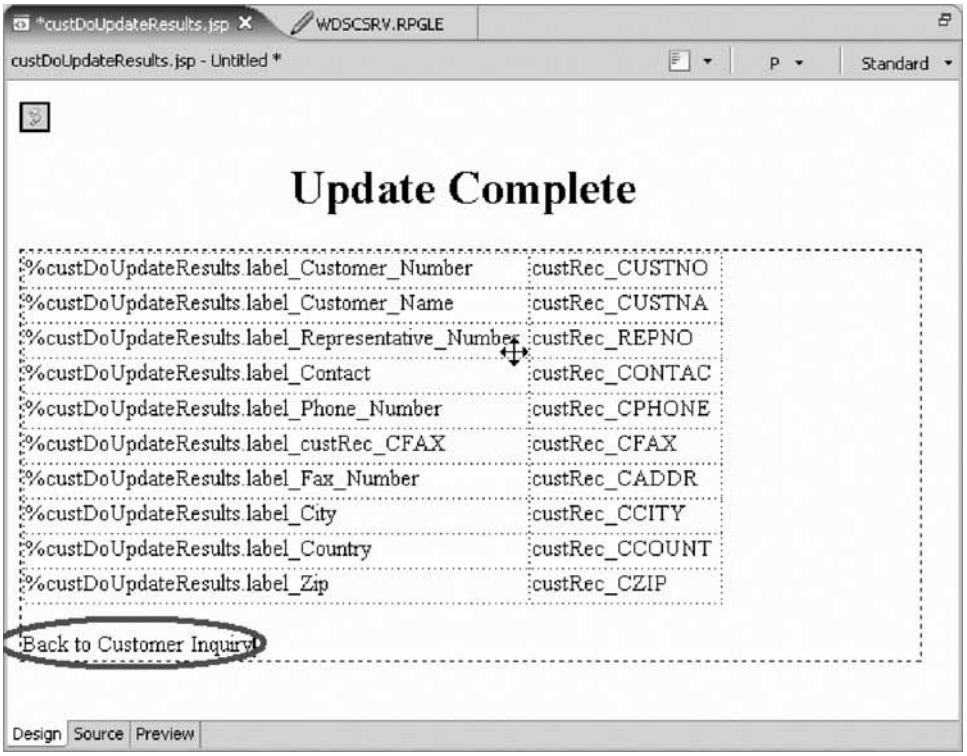
To link the update complete page to the inquiry page:

1. Navigate to your **custDoUpdateResults.jsp** file and double-click.

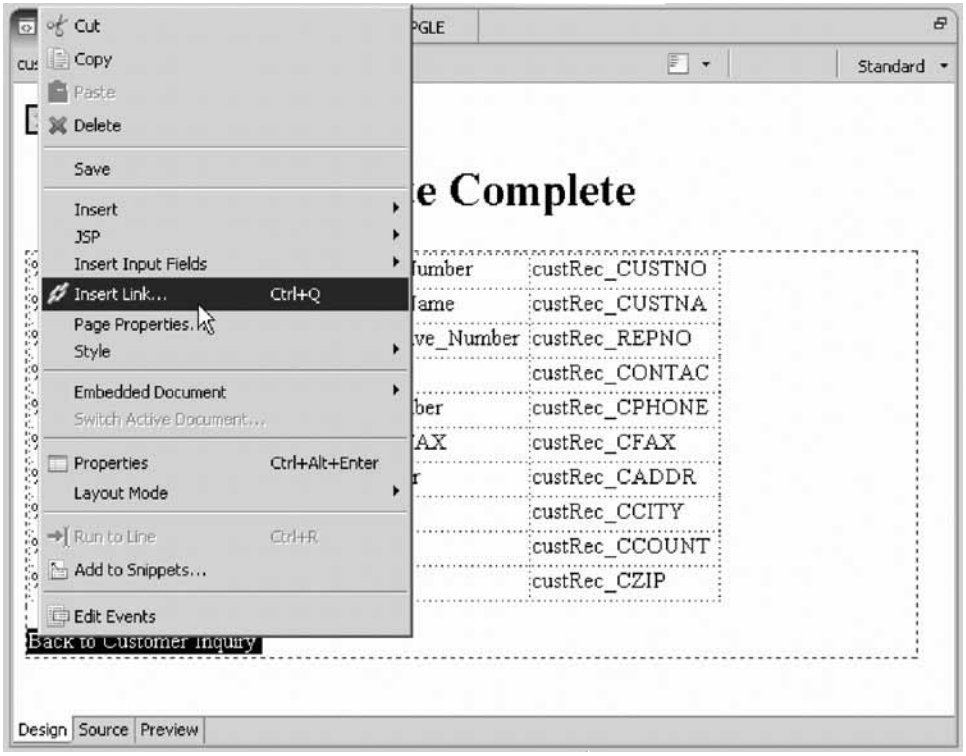
   The Page Designer opens.



2. Select and delete the **Submit** and **Reset** buttons.
3. Type `Back to Customer Inquiry` where the Submit and Reset buttons were shown.

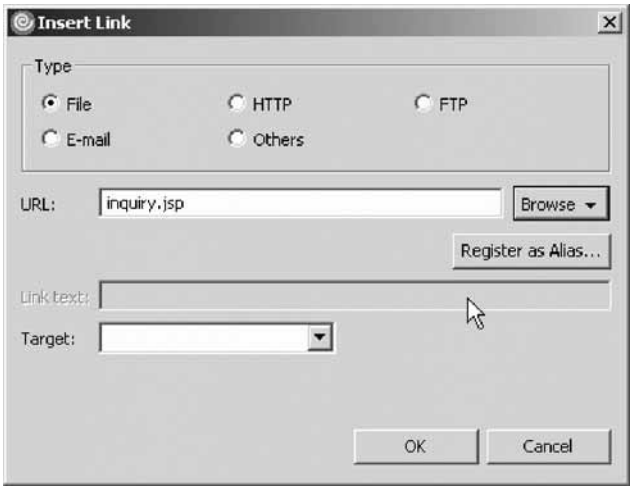


4. Highlight the text and right-click.
5. Click **Insert link** on the pop-up menu.



The Insert Link dialog opens.

6. In the **URL** field, type `inquiry.jsp`.



7. Click **OK**.
8. **Save** and close the JSP file.

You have linked the update complete page to the inquiry page and are ready to begin "Exercise 5.4: Visualizing the flow structure of your Web application."

Exercise 5.4: Visualizing the flow structure of your Web application

Before you begin, you must complete "Exercise 5.3: Linking the update complete page to the inquiry page" on page 88.

A Web diagram is a view that helps you visualize the flow structure of a Struts-Based Web Application. Because of the indirectness involved with a Struts application, being able to visually see the application's flow can help you to better understand the application.

Struts

Before you create a Web diagram, let's first look at what Struts is all about. First, Struts is a set of Java classes and JSP tag libraries that provide a conceptual framework for developing Web applications. The Struts technology is open source and was developed as part of the Apache Software Foundation's Jakarta project.

Second, Struts provides numerous, custom JSP tags that are simple to use but are powerful in the sense that they hide information. The Page Designer does not need to know much about form beans, for example, beyond the bean names and the names of each field in a given bean.

Third, you can use the diagram editor to show all or part of a Struts application. For example, suppose you have a three-part Struts application. One part handles the login process, one part handles product inquiries, and a third part handles product updates. In this case you could draw three diagrams to represent this system, or you could draw the entire system in a single diagram. Because one diagram can be included inside another, it would probably make more sense to represent this Struts application using a set of three diagrams.

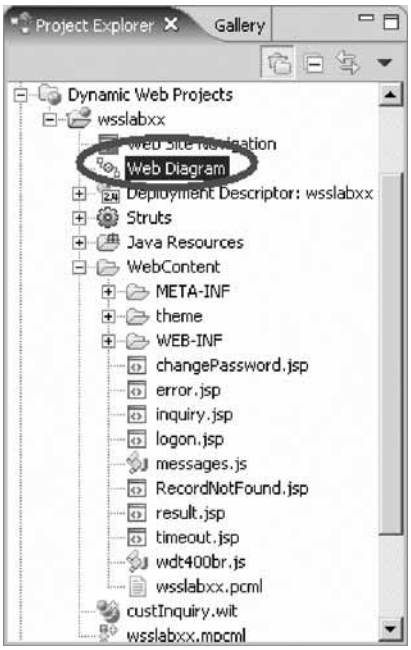
Now, that you know what Struts is, you can go ahead with this exercise.

You will now update the Web diagram from the previous Web Tools tutorial (Build a Web user interface for an RPG application using iSeries Web Tools) to show the new visual components of the Web application you just created.

An empty Web diagram should have been generated for you during project creation.

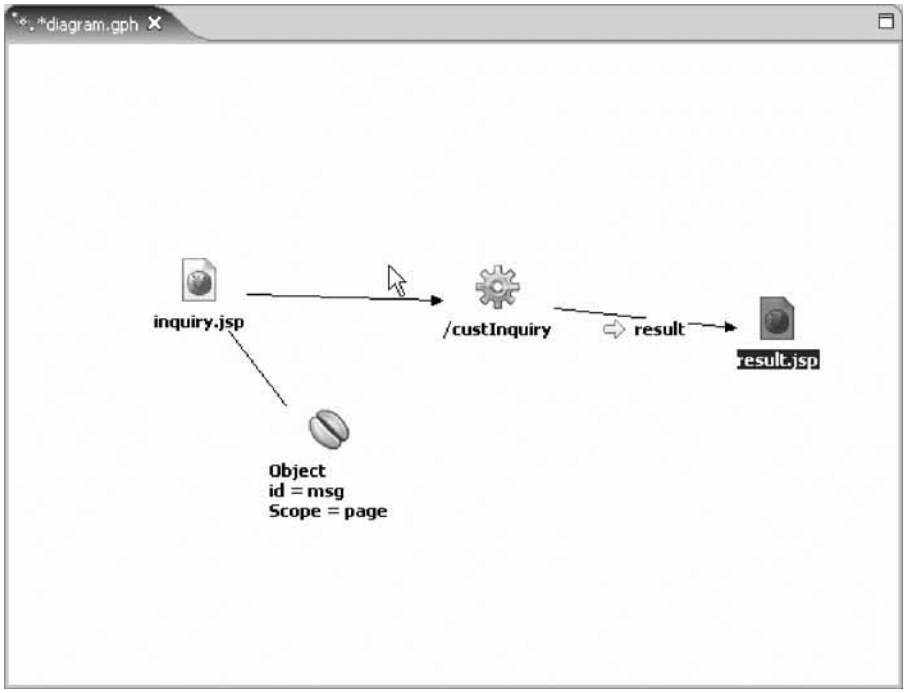
To create a Web diagram:

1. If you don't see Web Diagram in the editor, in the Project Explorer view, expand WSSLABxx.



2. Locate and double-click **Web Diagram**.

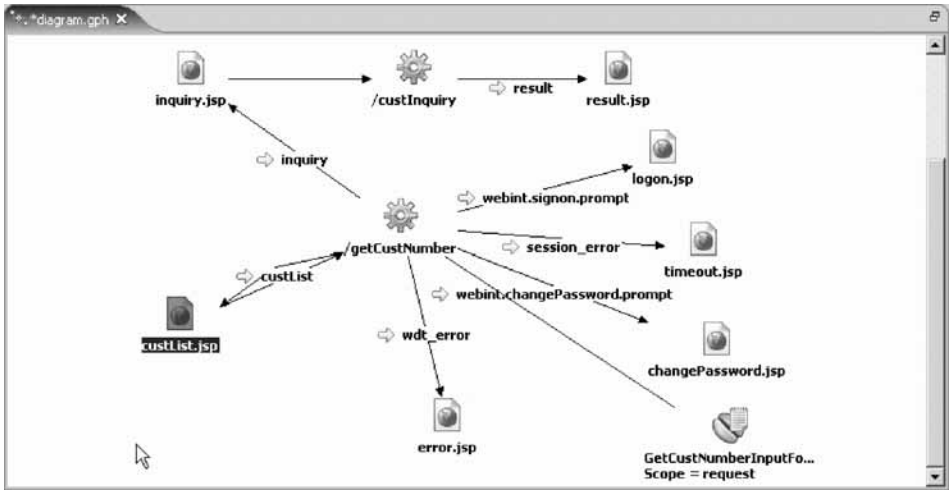
You will now see the Web Diagram in the editor.



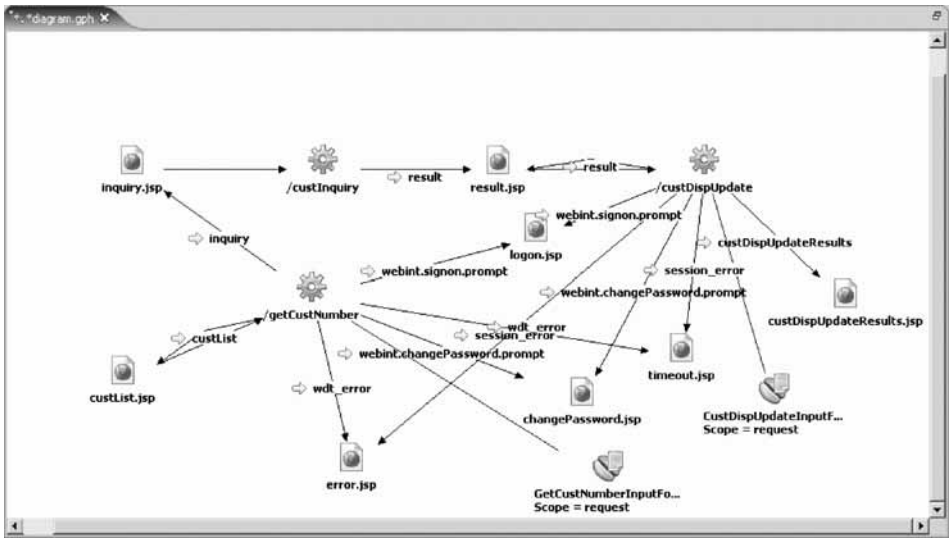
Now, let's update the Web diagram:

1. Locate custList.jsp under WSSLABxx and then WebContent in the Project Explorer.
2. Click custList.jsp and drag it to Web Diagram. You will notice the cursor change from to .
3. In the Web diagram, right click custList.jsp.

4. Click **Draw > Draw All From** on the pop-up menu.
   You will now see the getCustomerNumber interaction.
5. Right-click getCustomerNumber and click **Draw > Draw All From**.



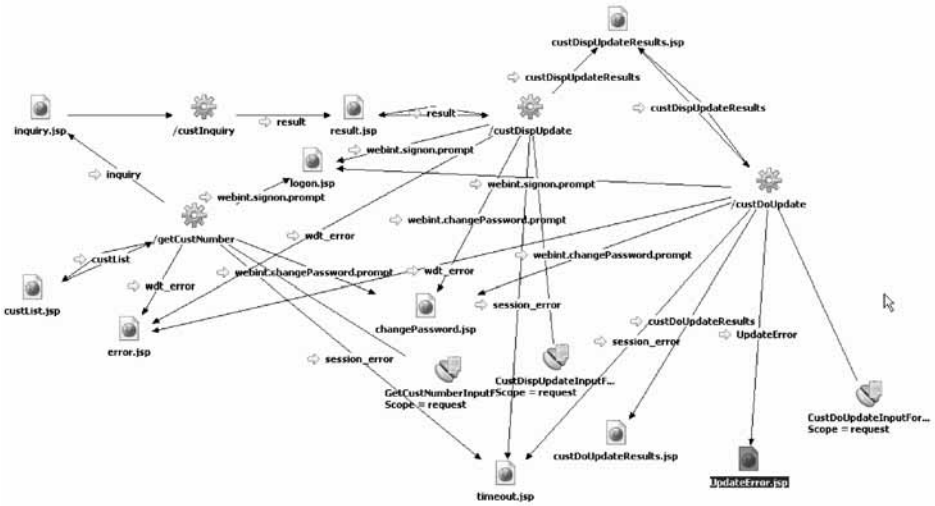
6. Right-click result.jsp.
7. Click **Draw > Selected** on the pop-up menu.
8. Select the custDispUpdate interaction.
   You will now see the custDispUpdate interaction.
9. Right-click custDispUpdate interaction.
10. Click **Draw All From** on the pop-up menu.
    You should now see the following graphical representation of the Web interaction so far.
    You may want to rearrange the objects in the editor if the objects are overlapping.



11. Right-click custDispUpdateResults.jsp.
12. Click **Draw > Selected** on the pop-up menu.
13. Select the custDoUpdate interaction.
14. Right-click custDoUpdate interaction.
15. Click **Draw All From** on the pop-up menu.

You now see the complete graphical representation of all the Web interactions that you created in all the previous exercises.

You may want to rearrange the objects in the editor if the objects are overlapping.



16. Save and close Web Diagram.

You have seen the flow structure of your Struts-based Web application.

Module recap

You have completed Chapter 5, “Module 5. Creating the update complete output page,” on page 75. You have learned how to:

- Generate another output page
- Add a program
- Add a parameter
- Design the output page
- Add a flow control error page
- Link the update complete page to the inquiry page
- View the flow structure of your Struts-based Web application

Now that you have created the update complete output page, you are ready to begin Chapter 6, “Module 6. Running the Web application,” on page 95.

Chapter 6. Module 6. Running the Web application

This module teaches you how to start the application server and test the updated Web application.

In this module, you will:

- Start the application server
- Test the customer list page
- Test the update record and update complete pages

Note: To access iSeries data and resources you will need to have a job description setup and associated with your user profile on your iSeries system.

Exercises

The exercises in this module must be completed in order.

- "Exercise 6.1: Restarting the server"
- "Exercise 6.2: Testing the Web application" on page 96

Time required

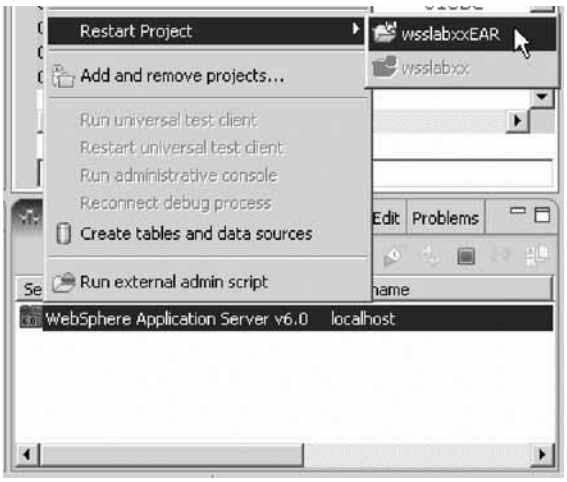
This module will take approximately **10 minutes** to complete

Exercise 6.1: Restarting the server

If the server is still running from the last time you ran the Web application, it needs to be restarted. The server will pick up changes in the Web application only when it is restarted. If the server is not started, then you must start the server before you can restart the project.

1. In the Web perspective locate the Servers view at the bottom of the workbench. Click the **Servers** tab.
2. Right-click the server and select **Start** on the pop-up menu.

   The server will show Started status when the start operation completes.
3. Right-click the server and select **Restart Project** on the pop-up menu.



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4. Then click your project on the pop-up menu.
5. Continue with “Exercise 6.2: Testing the Web application.”

You have started the application server and now you are ready to begin “Exercise 6.2: Testing the Web application.”

Exercise 6.2: Testing the Web application

Before you begin, you must complete “Exercise 6.1: Restarting the server” on page 95.

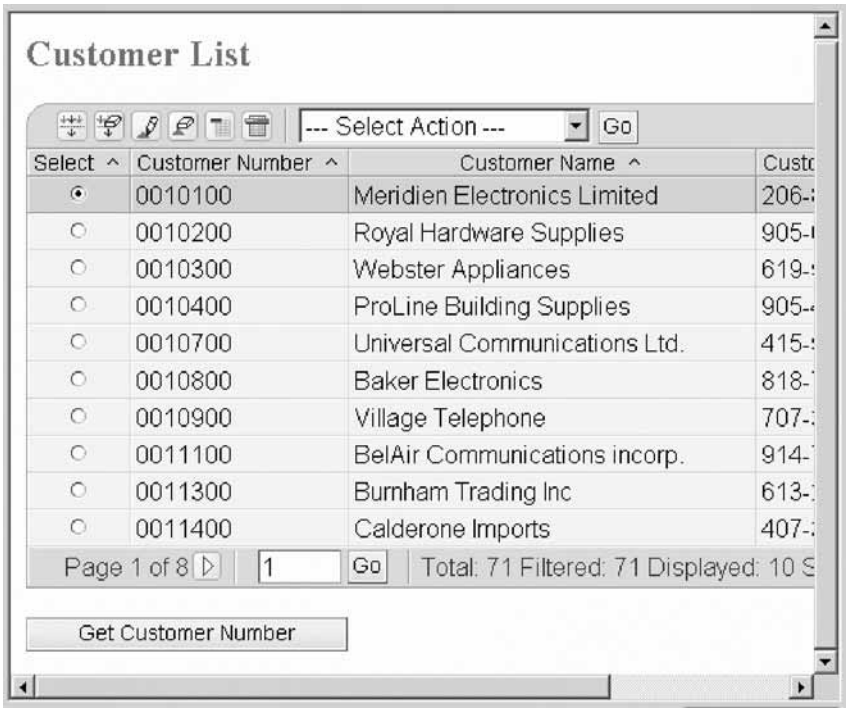
First you test the customer list page and then you test the update record and update complete pages.

Testing the customer list page

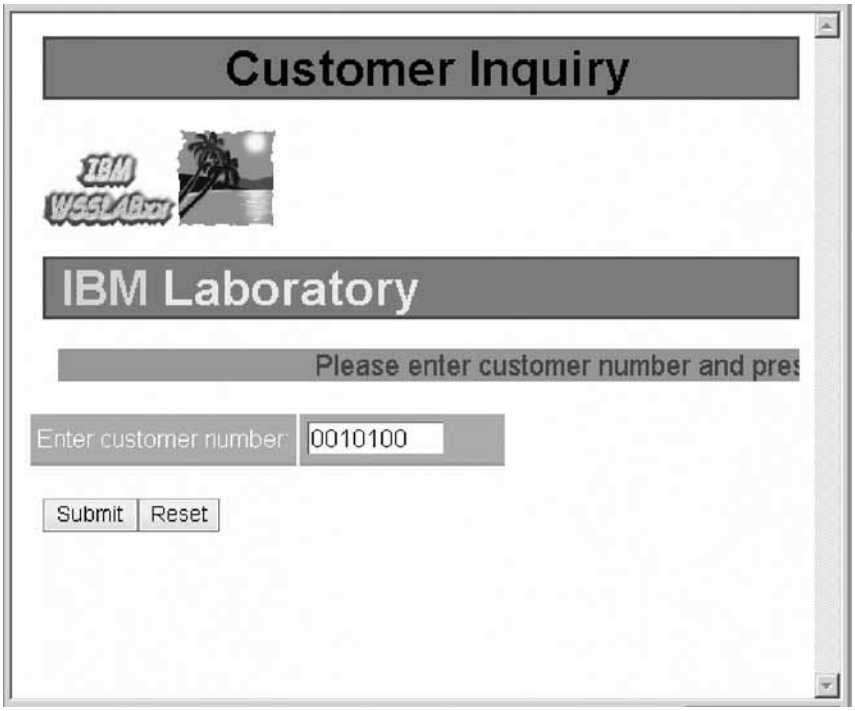
To test the customer list page:

1. Right-click **inquiry.jsp** and click **Run > Run on Server** on the pop-up menu.

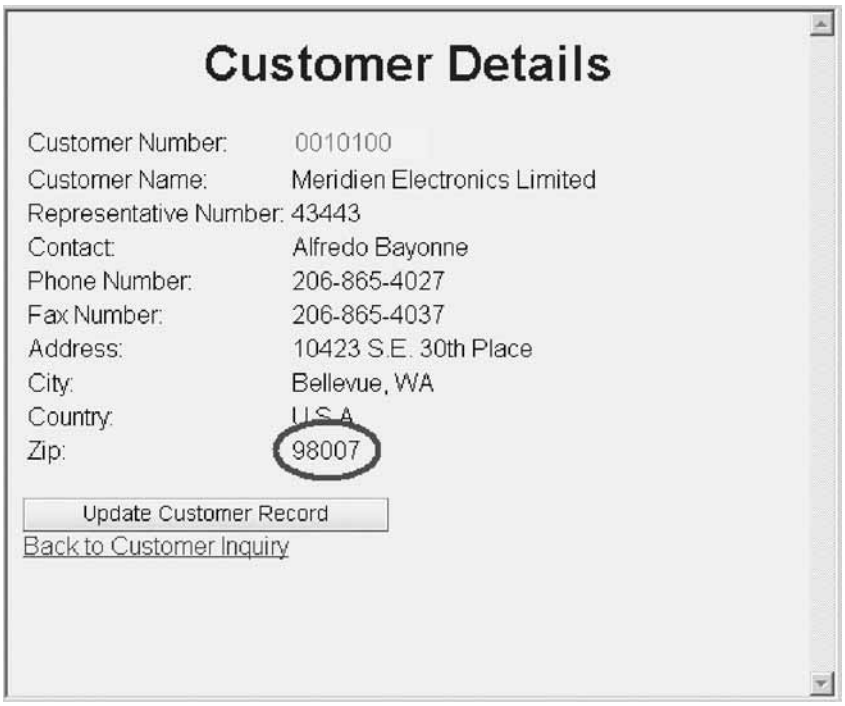
2. Click the **Find** link.
   The Customer list page opens.
3. Select the first entry on the list.



4. Click the **Get Customer Number** button.



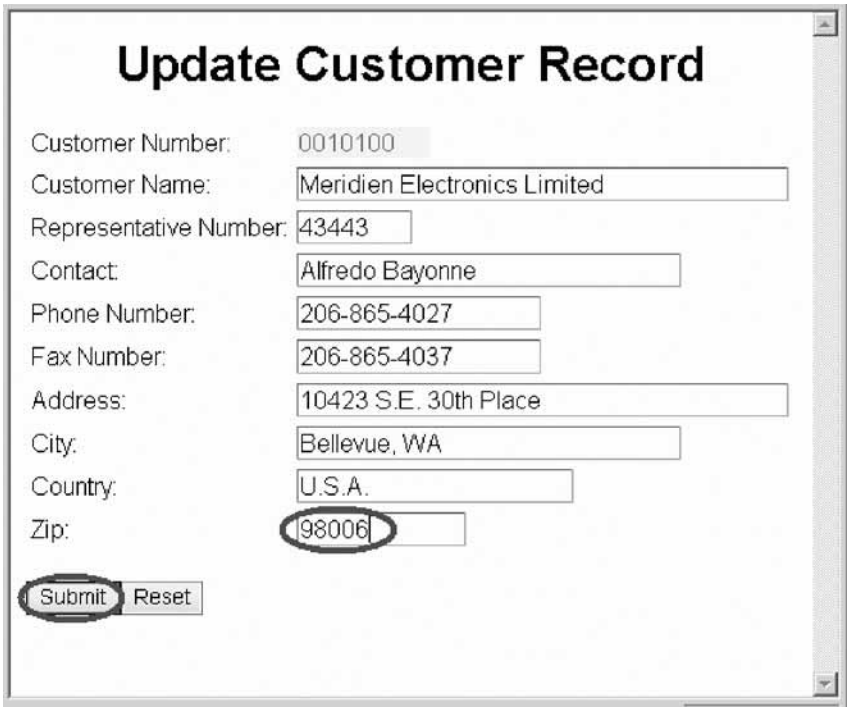
5. Click the **Submit** button.
   The Customer details page opens showing the details of the selected customer.



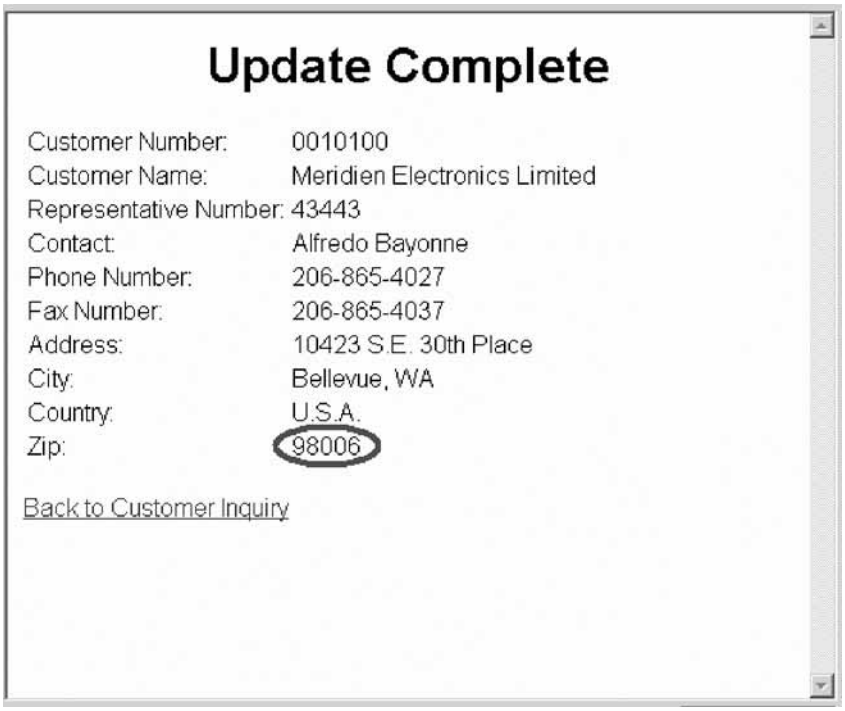
Testing the update record and update complete pages

To test the update record and update complete pages:

1. When the information is displayed, click the **Update Customer Record** button.
2. Change some of the fields and click the **Submit** button.



You should see the confirmation page with the new values.



3. Click the **Back to Customer List** link and you will return to the customer list page.

You have tested the update record page and the update complete page.

Module recap

You have completed Chapter 6, "Module 6. Running the Web application," on page 95. You have learned how to:

- Start the application server
- Test the customer list page
- Test the update record and update complete pages

Finish the tutorial by reviewing the materials in Chapter 7, "Summary," on page 101.

Chapter 7. Summary

In this tutorial, you learned how to create a new Web page containing a table component to list customers (custList.jsp), use an existing output page (result.jsp) to add an additional Web interaction, and create new Web pages to update customer records and confirm updates were completed on the iSeries (custDispUpdateResults.jsp and custDoUpdateResults.jsp) for an existing e-business RPG customer inquiry application. While you created these pages, you learned how to use the iSeries wizards in Development Studio Client to link pages together to form an application with multiple Web interactions. You then learned how to run the updated customer inquiry application in the WebSphere Test Environment that is part of Development Studio Client.

If you have completed all of the modules, you should now be able to:

- Select an RPG service program to work with the Web interactions
- Create a Web input page with a table component using Page Designer
- Create Web output pages using the Web interaction wizard
- Run the updated Web application in the WebSphere Test Environment

More information

For more information on Development Studio Client and the iSeries Web Tools, see http://ibm.com/software/adwtools/iseries.

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