

# Web Tools for iSeries Programmers – The Details

By Phil Coulthard and George Farr



Here we continue with the RPG-to-J2EE Roadmap. So far, we've covered the RPG and Cobol tools that comprise the Better Tools step, as well as the IBM WebFacing Tool and the IBM Host Access Transformation tool for the Better User Interface step. Last month, we turned our attention to the Better Architecture step for building properly architected Web applications with RPG or Cobol business logic, and we introduced the open source Struts framework that you can use as the starting point of your new Web application. Here we dive into the Web tools found in WebSphere Development Studio Client to show you the details. We start this month by covering how to create a Web Project from scratch, and then we show you how to set up your iSeries configuration information. We conclude by showing you the "page diagram" that will help you visually create Struts-based iSeries applications.

## Web Tools Perspective

As you know from our previous articles, Web tools, like most other components in the WebSphere Development Studio Client product, has its own project type and its own perspective with a collection of views and editors optimized for the role of developing Web applications. The perspective's main view is the Project Navigator view, which lists all existing Web projects and allows exploration, or drill-down, of those projects.

To open a Web Perspective use Window|Open Perspective|Web. The Web perspective is also opened when you create a Web project. Remember that a Web project is used to capture all your Web resource files that constitute a single Web application, such as HTML, Java ServerPages (JSPs), image files, and servlets. In other words, it is a way of organizing all your Web artifacts.

Now we are ready to create our first Web project.

## Creating a New Web Project

To create a Web project, use the File|New|Other menu item, and select the Web category on the left and the Dynamic Web Project type on the right. This launches the Web project wizard. Enter a project name, such as My Web Project, on the first page of the wizard, and on the third page (Features Page), select the "Add Struts support" and "iSeries Web Components Tag Library" check boxes. The Web project will be created and pre-populated with (1) the folders that are required by the industry standard for Web applications and (2) any files needed by the selected features. Once you have a Web project, you can start to use

the many views provided in the perspective, such as:

- Gallery. The Gallery supplies images, sounds, scripts and other items that you can drop into your Web page.
- Outline. When you're editing an HTML file, the Outline shows the tag hierarchy of the page. You can work directly with the tags from this view, if you prefer.
- Links. For the selected file, the Links view shows all files that use it or link to it, and all files it uses or links to.
- Styles. The Styles view is a specialized editor for Cascading Style Sheets (CSS).

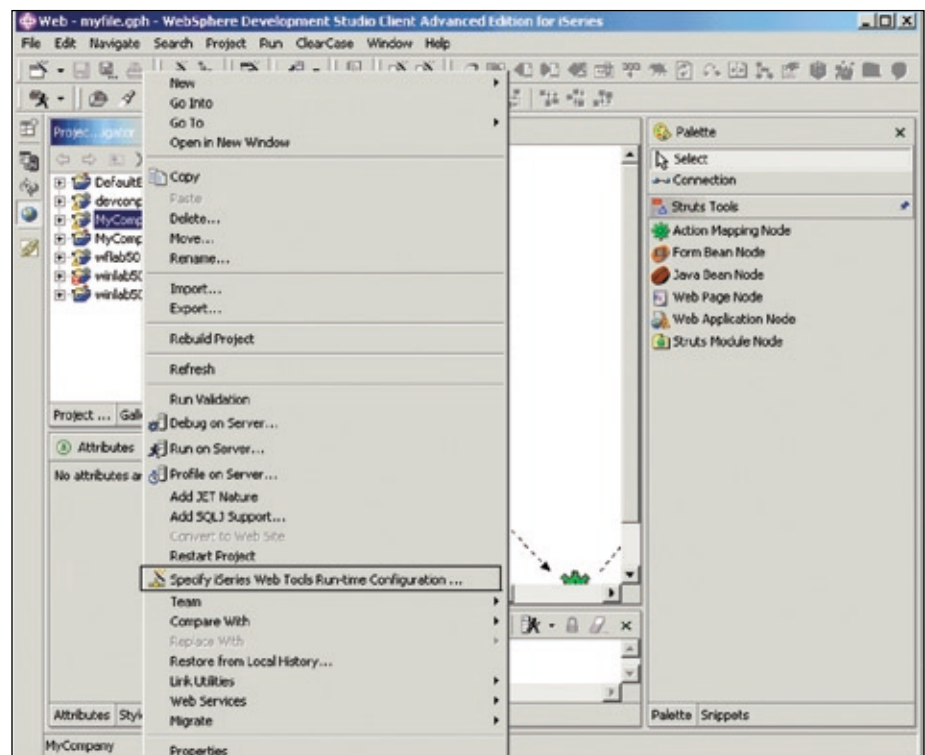


Figure 1: Configuring iSeries runtime information

The Web Tools also have specialized editors for creating logos and animated images. The heart of the Web Tools, however, is the Page Designer editor. This is the editor for your HTML files and JSPs, and it supports both source (SEU-like) editing and What-You-See-Is-What-You-Get (WYSIWYG, like SDA) editing. Tabs at the bottom let you switch between these modes or a Preview mode. We'll cover this key editor in a future article; for now, we discuss how to generate the first pass of your Web pages using an iSeries wizard.

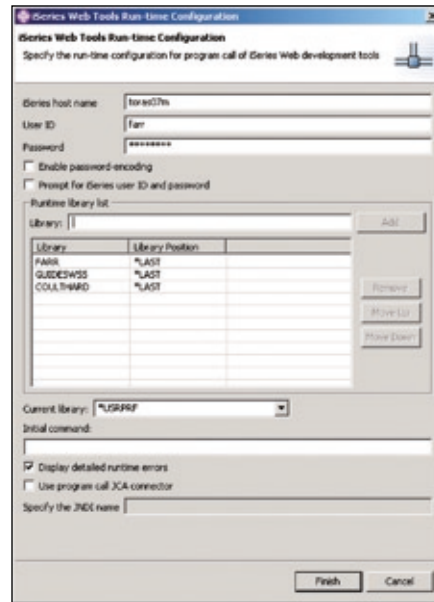
Now that we've created our first new Web project, we can set up the required iSeries configuration information.

### Setting Up iSeries Configuration Information

For Web applications that will call iSeries RPG or Cobol business logic, you must configure the project to identify the iSeries that contains the business logic, and you must configure other information needed when this application is run. Although we could do this step at any time before running our application, it's a good habit to do it at the beginning so you don't forget.

To do this configuration, right-click the project and select "Specify iSeries Web Tools Run-time Configuration" as shown in **Figure 1**, or use the icon highlighted in the toolbar in **Figure 1**. When the iSeries Web Tools Run-time Configuration wizard appears (**Figure 2**), specify the following details:

- The host name of the iSeries that contains your business logic. Note the Web application can either run there or run anywhere that WebSphere Application Server is deployed.
- A user ID and password for making the initial connection to the iSeries (and subsequently used for the rest of the application). Note you can hard-code these or specify to have the user prompted for them. In the former case, these values are stored in the Web.xml application file, and you can choose whether to encrypt the password for security (the downside is that end-user administrators cannot change it).
- Libraries to add to the library list, including current library. You can also



**Figure 2: iSeries Web Tools Run-time Configuration wizard**

specify an initial program to do setup, such as file overrides. All this is done at runtime, before the first program or procedure is called, and it remains in effect for this user until he exits this application.

- Whether to display detailed information to help you find problems. This is useful (and it's the default setting). The information is written to standard output; therefore, it's displayed in the console when you're running from within the tools.
- Whether to use a Java Connector Architector (JCA) connection. This is an advanced feature that's valid only with WebSphere Development Studio Client Advanced Edition.

Once you've configured these settings, click Finish. You can go back and change this information any time. At this point, the wizard is just collecting the information without any physical connection to the iSeries. The real physical connection happens when you run the application and click the Submit button on the first page, assuming you have used the iSeries Web Interaction wizard to generate

the code to call the RPG or Cobol business logic from one or more Web pages. (We will discuss that wizard in detail in our next article.)

We are done setting the iSeries security information. The next step in our Web application development is to use the Web Diagram editor, which will help us build a Struts-based Web application.

### Web Diagrams

A Web diagram is a file that captures the flow of a Web application or part of a Web application. Today, that application must be a Struts application, although in the future IBM hopes to add support for the upcoming JavaServer Faces standard framework. We talked about Struts in last month's article, and we showed how it is a great framework to separate Model from View and Controller. The Web Diagram editor lets you do this with a visual tool. It is an editor for visually creating Web diagrams, making it easy to visualize how the application flows. Note that the flow of a Struts application is externally described in the Struts configuration file, which this editor maintains for you. So, a Web diagram is not only a very useful documentation tool; it's also a live snapshot of all or part of the Struts configuration file.

Think of the Web Diagram editor as a whiteboard. Research has shown us that many Web applications begin on a whiteboard, with developers laying out the Web pages and the flows between them before ever creating anything.

This tool facilitates this process by letting you drag and drop icons representing Web pages and actions (business logic) and draw lines between them to represent flow. Initially, the icons are gray and the

## Upcoming Articles in this RPG to J2EE Series:

**January 2006** – "More Web Tools for iSeries Programmers"

**March 2006** – "Web Services Tools for iSeries Programmers"

connection lines are dotted, indicating the files do not yet actually exist. But as you “realize” or create these files (with wizards and editors), the icons become colored.

How does this apply to you as an iSeries programmer? Let’s take an example: Imagine you’re trying to build a customer inquiry application or an inventory inquiry application. In the case of an inventory inquiry application, you want to have the first JSP display an entry field to allow the user to type a customer ID or an inventory item number. You also want to include a Submit button to let the user display the detailed information for that customer or inventory item.

We call any two Web pages with business logic between them a Web Interaction, so an application is really a collection of interactions, where the output page of one interaction is the input page of another.

In this example interaction, the logic that performs the look-up in between is an existing RPG or Cobol program or service program, designed for re-use. It takes a customer ID as an input parameter and gives a customer data structure as an output parameter. To be Struts-compliant, that logic will be wrapped in a Java bean, and the Java bean will be called from a Struts action (i.e., a Java class that extends the Struts Action class). In our diagram, however, we keep it simple and display a single action icon to represent the business logic.

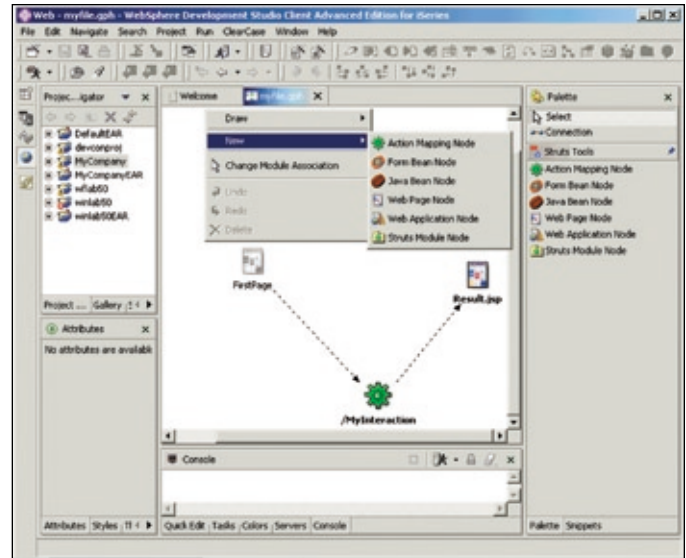


Figure 3: Web Diagram editor with tool buttons

### Web Diagram Editor

To start editing using the Web diagram feature, you need to select the Web project and then, from the main menu, choose File|New|Other. Choose the Web|Struts category on the left, and then choose Web Diagram on the right.

The next screen lets you give your Web Diagram file a name. Just pick an arbitrary name and click Finish. This will create and open the file in the Web Diagram editor and let you start designing your Web diagram. The view that opens up is referred to as a Free Form Surface (FFS). Remember that a Web diagram is simply a file that helps you visualize the flow structure of a Struts-based Web application, or part of an application. You can create as many Web diagram files as you wish. Once you save the file, you’ll notice that the file extension that’s created is “.gph.” You can always return to the Web Diagram editor by double clicking on that file.

Now you’re ready to start editing and designing your application. Before we do that, let’s talk about a few things in that view that you will use. Figure 3 shows the Web Diagram editor and some of the features that you’ll use. On the right side, under the palette, several buttons appear; each button represents a tool that you can use to draw your diagram. Here are some of the options available for you:

- The Select button lets you select the objects on the diagram.
- The Connection button lets you connect two objects (nodes) on the Web Diagram to create a flow in the design.
- The Action Mapping Node button lets you represent a Struts action, which encapsulates the business logic invoked for a button or link on a Web page.
- The Form Bean Node button lets you represent a Form Bean node. As an iSeries Web developer, you won’t need to use this, as the iSeries Web Interaction wizard will create the form bean for you.
- The Java Bean Node button lets you create a Java Bean node for cases where you want to call or use a Java bean. Again, you will not need to use this.
- The Web Page Node button lets you represent a Web page node (i.e., a JSP or a simple HTML file).

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## The 5th Wave By Rich Tennant



“Hello?! Hello, Phillip?! You’re breaking up! Listen, put a penny on the tone arm and turn the speed up to 45 RPM!”

You also will not generally need to use the Web Application Node or Struts Module Node buttons until you reach a more advanced stage. In addition to the Palette, you can easily get to similar options by moving your mouse to the FFS and right-clicking. Select New to display similar options as those shown in **Figure 3**. If we use the customer inquiry application or the inventory inquiry application to illustrate this process, here are the steps you'd follow to build this Struts-based diagram:

1. You first create a Web page node to represent a JSP by right-clicking and selecting New|Web Page Node. Let's call it input.jsp. This produces a gray node that represents what will eventually be a Web page.
2. Next, repeat step 1, but call the second page result.jsp.
3. Now you're ready to create a node representing the action that will execute some logic when a button is pressed on the input page. (In your case, it will probably be an existing RPG or Cobol procedure residing on the iSeries.) To accomplish this, place the cursor between and above the existing nodes, right-click, and select New|Action Mapping Node. As in step 1 and 2, you will be asked to give the action a name. Call it InquiryProcedure.
4. Now we have created nodes representing all the objects for our simple interaction, except for the connections to represent flow. We need to connect the input page to the logic and then connect the logic to the output page. To accomplish this, first select the Connection icon in the palette. Then, move the cursor and select the input.jsp node. Finally, move the cursor to the InquiryProcedure action and click on it to accept the connection. Note that this tool is direction-sensitive, so make sure you follow the steps we describe above in order.
5. Finally, you need to create another connection from the action node called InquiryProcedure to the result.jsp page. Then you're done!


What we've done here is lay out a part of our Web application by identifying the Web pages, the business logic, and the flow between them. Clearly, this sample is trivially simple. Generally, we have many pages and at least one action per input page. Sometimes we also have multiple output pages from one action, which implies there is some controller logic in the action deciding which one to show, usually based on the data that came from calling the business logic. Speaking of which, it's important to know that although we will have an action node per clickable button on each input page (unless the button is handled by JavaScript), the Struts action class itself almost never has the business logic in it directly; rather, it calls it. However, that detail is beyond what we need to capture in the Web Diagram editor to get the "big picture" of our Web application.

The next step is start "realizing" the nodes in the Web diagram by actually creating the files they represent. Generally, this is done by right-clicking on the node and selecting "Open" or by double-clicking on it. This will create the file and open the appropriate editor on it. However, as an iSeries developer, it is a bit easier for you: You need only right-click on the action node and select "Open iSeries Web Interaction Wizard." This wizard will generate all the files for you, including the action class, given an RPG or Cobol

program or procedure to call. Sound good? Indeed it is! But you'll have to come back next month to get the details of this, and other features of the Web tools.

### Until Next Time

WebSphere Development Studio Client offers a rich development environment for the Web, including a dedicated perspective and project type and tools to help you design Web applications as diagrams that can be subsequently realized into real files. The iSeries extensions to these tools (although we've not covered them yet) let you be immediately productive by leveraging existing RPG and Cobol programs or skills while you grow into more advanced e-business functionality.

This article barely scratches the surface of the functionality available in Web Tools. We encourage you to continue tuning in as we go into more detail on these Web Tools and their iSeries extensions. Indeed, we encourage you to find those CDs, and follow along! 

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