



Step 1

Welcome to WDSC!

And welcome to *WDSC: Step by Step*.

About the time this book goes to editing, the next version of WebSphere Development Studio Client for iSeries (WDSC) will be getting ready for release. The biggest additions to Version 5.1.2 are new support for JavaServer Faces and the integration of Enterprise Generation Language (EGL), a feature borrowed from WebSphere Studio Enterprise Developer. You'll also see enhancements to the various Web-enablement tools, such as WebFacing and HATS. I consider most of these to be "advanced" features, dealing specifically with the integration of Web applications and legacy systems. As with any other release, there are minor changes to the UI as well. Wherever changes have been made to the tool, I'll address them in the text. I have also included a complete addendum on the CD-ROM that includes screen shots for areas that have changed. SideStep 5 of the book addresses this addendum in detail.

But WDSC is much more than that. WDSC is like an amalgam of all the tools required to build a great application, from Web site design to application deployment. Combine FrontPage and Dreamweaver, mix in VisualAge for Java, and add a dash of Paint Shop Pro, and you begin to get an idea of the capabilities that WDSC brings to the table. Include on top of that the unique capabilities of the built-in CSS and XML editors, the ability to syntax check Java code within a JavaServer Page (JSP), and the flexibility of the template language, and you've got more than a Web site designer; you've got a Web application development environment that allows you to build all of your pieces in one coherent environment.

If that weren't enough already, you then add the unique testing and deployment capabilities of WDSC—from integrated JUnit testing to the WebSphere Test Environment, from hot deployment to WAR/EAR creation—and now you've got an unsurpassed Web development environment.

But that's only what WDSC brings to the table itself. WDSC is built on the Eclipse platform, so it's also able to include all of the great Eclipse plug-ins currently available—things ranging from high-end UML editors to SQL tools to editors for other languages.

So how can one book possibly teach you all of that? Well, it can't. What a book can do, though, is guide you through every step needed to create a dynamic, data-oriented Web site and make you comfortable and productive using the tool. For green-screen programmers especially, that means being able to use WDSC in place of the old green-screen and being introduced to the brave new world of GUIs and browsers.

Prerequisites

In order to do all this, there are a few prerequisites. Most importantly, you need to have WDSC installed on your machine. During the installation, you must also install the WebSphere Test Environment. So the machine needs to be a good-sized machine. These are the minimum requirements to run a full-blown WDSC session (including the WebSphere Test Environment):

1. A CPU of 2GHz or better
2. 1GB of RAM
3. 2GB of disk space
4. 1024×768 screen resolution *highly* recommended
5. Windows 2000 or better for Windows machines

That might look like a hefty machine, but if you plan to do development using today's generation of tools, that's a minimum (technically, you may squeak by on half the RAM and a slightly slower CPU, but you'll occasionally be dissatisfied with response times). Personally, I find that 1280×1024 is necessary if I plan to use the tools on a daily basis, but the specs I posted above are enough to get started.

With some judicious shopping on the Internet, you can find a machine with those specifications for under \$1,000 US. It could be a little more if you go with a flat-screen monitor, which I find indispensable, but I write for a living.

As I said, you'll need to have WDCS installed on your machine, including the WebSphere Test Environment. That's where the 2GB of disk space goes. Not only that, you need to have everything up-to-date. As of this writing, the latest version of WDCS is Version 5.1.0.3. If you aren't quite sure how to upgrade WDCS, don't worry about it; I was confused, too. However, SideStep 1 provides documentation on the upgrade process.

For the client/server development, you'll need the following:

1. An iSeries at V5R1M0 or later
2. A value in your HOSTS file that points to the machine (the book assumes a name of WDSCHOST)
3. A user profile on the iSeries (the book assumes a name of WDCUSER with a password of WDCUSER) that is authorized to
 - a. CRTLIB
 - b. STRSRVJOB, ENDSRVJOB, STRDBG, ENDDBG
 - c. The program Q5BATTACH in QSYS

Please note that these requirements are only necessary for the client/server portions of the book, starting at Step 11. Prior to that step, you don't even need to be connected to an iSeries; you can do all your development and testing right on your workstation.

Since a prerequisite is that you have already installed WDCS, I am going to assume that you have tried to load it. When you do load it, you get the following dialog:

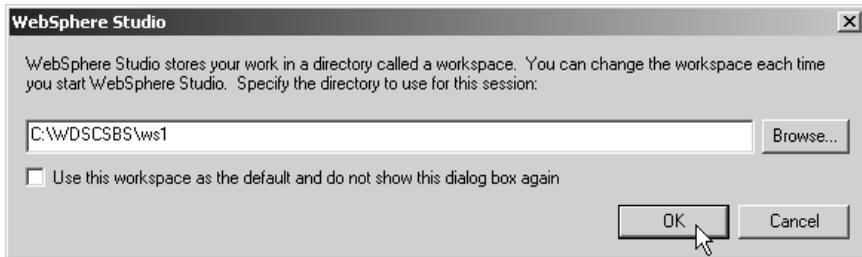


Figure 1-1: This is the startup dialog for WDSC.

I highly recommend the above setting. It will create a folder in your hard drive root called WDSCSBS, and then it will create a workspace called “ws1” within that folder (a workspace is just a hierarchy of folders). I suggest this because if you choose to use Checkpoints later, you want to know exactly where to copy those Checkpoints to, and if you follow the suggestion, you will always copy them to C:\WDSCSBS. (If you don’t have enough room on your C: drive, substitute another drive letter, but still add WDSCSBS to the root.)

Warning: Do *not* check the “Use this workspace as the default...” box. If you do, you’ll have a hard time using different workspaces, and the ability to use different workspaces is one of the key productivity features of WDSC. It’s also a requirement for the Checkpoint capabilities of this book.

Note: If you do *not* get the above dialog, that means you’ve already started WDSC at some point in the past and checked the box “Use this workspace as the default...”. Because of this, WDSC will not show the workspace prompt again. In order to re-enable this prompt, you must change the Windows Registry. This is not a simple process, nor is it recommended for those who are not Windows experts. However, without this change, it is difficult to use different workspaces, which I believe is a key to using WDSC. So, I highly recommend that you get the key changed; either do it yourself or have someone knowledgeable in Windows help you out. This is the key to change: HKEY_CURRENT_USER\Software\IBM\WebSphere Studio\Workspace. In that key, you should see several values. One will be named wdsc510_status or wdscadv510_status, depending on whether you have WDSC Standard Edition or WDSC Advanced Edition installed. The data for this key will be Disable. If you change this value to Enable, the next time you start WDSC, you will see the prompt in Figure 1-1.

How It Works

The *Step by Step* books are very simple in format. The entire book is broken down into a series of sequential steps that are meant to be followed in order. Each Step will have a checklist. The checklist will look something like this:

❑ **1.1(a) Place toothpaste on the toothbrush.**

❑ **1.1(b) Brush teeth vigorously for two minutes.**

The number on the left refers to the Step (1.1, 1.2, 2.1...) and the task within that step (a, b, c...). The number on the right refers to the page where that particular task can be found.

Step 1.1 – Brushing Your Teeth

Goal: In this step, you will brush your teeth.

NOTE: If you have dentures, please use the dentures SideStep.

— 1.1(a) Place toothpaste on the toothbrush



Figure 1-1: Putting toothpaste on the toothbrush.

Each Step will start on a new page and will have a heading and a goal statement. There may be a paragraph or two of additional information as well. Each task will have detailed instructions and one or more associated illustrations (occasionally, several tasks will refer to the same image—for example, when you're being instructed how to fill out the fields of a dialog box).

Some of the steps may seem very simple, especially if you already have some experience in a given area, but I wanted to be sure not to leave anything out. If you follow all the Steps to the letter, by the time you finish the book, you will have completed the goal of creating a complete client/server Web application using WDSC.

SideSteps and InSteps

SideSteps are the *Step by Step* equivalent of appendices. These chapters are found at the end of the book, and they outline various procedures that are somewhat peripheral to the actual topic: upgrading WDSC, for example, or deploying an EAR file to WebSphere Express. InSteps, on the other hand, are detailed explanations of topics—explanations that aren't crucial to your finishing the book but provide additional insight to the topic.

What I'll Cover

In keeping with the spirit of the *Step by Step* series, *WDSC: Step by Step* will walk you through all of the areas of WDSC you would use to build a real, working application. Everything from basic Web site design to client/server programming will be covered. And it will all be done within the context of what you would encounter in your daily programming endeavors. By the end of the book, you will have created a working application that provides a Web interface to an RPG back-end on the iSeries, completely designed, written, and tested within the WDSC environment.

Web Site Development

Any good Web application development platform will provide the ability to create pages, manage them, and publish them. Web page development has become very complex, and a number of techniques are available, from ColdFusion to Perl. However, IBM's direction (and that of a good segment of the Web application world) is Sun's J2EE development paradigm, which centers on servlets and JSPs.

In addition, to create professional Web sites, you need to know how to create graphics, how to implement style sheets, and how to create a standard look and feel for your entire site. WDSC has tools for these areas, and you'll be introduced to all of them.

In the first section of the book you will:

1. Create a Web project for your Web site
2. Add Web pages
3. Organize your Web site
4. Apply a template
5. Create a logo
6. Modify your style sheets
7. Customize your navigation links

All of these steps will be done within the WDCS workbench, and by the time you're done, you'll have all the pieces for a working Web site.

Web Site Testing

Next, you'll be briefly introduced to one of the most powerful features of WDCS, the WebSphere Test Environment (or WTE). The WTE allows you to actually test your Web site right on your desktop *as if you had published it to a production Web application server*. This is a crucial productivity enhancement because it means you can actually test your entire Web site without having to go through the time-consuming process of deploying your application to a server. Not only that, but you can then debug the application right there on your desktop, setting breakpoints in the various pieces of your application. While you will only get a short initiation into the WTE, you'll be using it throughout the book, so rest assured that you'll become acquainted with it in as much detail as you need.

The productivity gains of the WTE alone are worth more than the cost of the tool, much less this book. By the way, I feel the need to mention that WDCS sells for about \$2,400 US for a single-user license, but iSeries developers get it for free. It's *good* to be an iSeries developer!

Dynamic Web Sites

The next section of the book will cover dynamic Web site design. As I mentioned earlier, there are a number of designs, but I will introduce you to perhaps the most powerful design technique, JSP Model II.

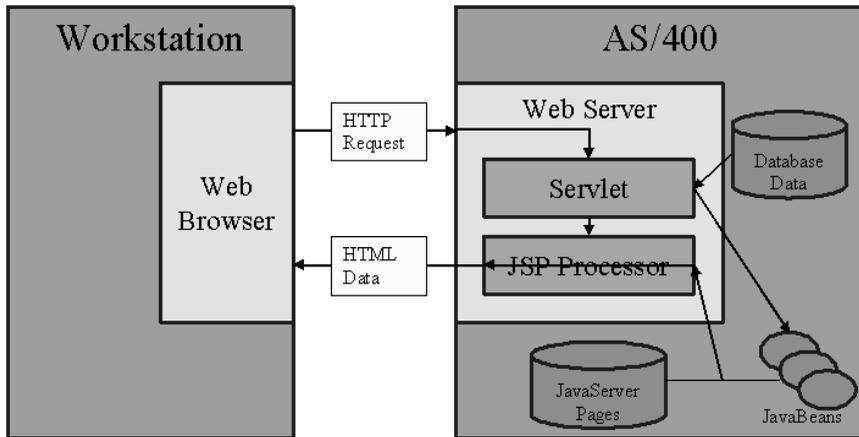


Figure 1-2: The JSP Model II architecture is very powerful.

In JSP Model II development, the servlet receives a request, reads database data to build Beans, and then passes the Beans to a JSP to render the data for the user. Sound familiar? It should, because it's basically the same thing we've been doing with green-screens since the early days of the midrange. You get a request from the user, you read data from the database and stick it into screen variables, and then you output a display file record to the user.

And while there are many ways to build Web sites, with lots of third-party and open-source tools and template engines to help you, in this book you'll do it all from the ground up, using the basic J2EE technology and WDSC. I'll explain each piece of the architecture so that you not only know how something works, but why it works the way it does. I'll also spend some time discussing the architecture so that you have a firm understanding of the pros and cons of the JSP Model II approach.

In addition, you'll be introduced to another facet of the WTE: the debugging mode. This is where the WTE becomes invaluable. You can set breakpoints in either the servlet or the JSP, and you can then do all the things you're used to doing in debugging: inspect variables, set watch points, even change variables on the fly. This is a far cry from the days of logging problems to "stdout" and digging through server execution dumps to try to find an error.

The iSeries Extensions

What really sets WDSC apart from its various ancestors is its rich set of extensions specific to the iSeries. Integration with various iSeries functions—from editing to compiling to debugging—continues to improve with each release. At this time, you can pretty much develop an entire application without having to ever sign on to a green-screen. There are some shortcomings—spooled file and native database viewers would be nice features to have—but WDSC is a formidable successor to the green-screen development tools we've come to love.

In *WDSC: Step by Step*, you'll run through the paces of editing, verifying, compiling, and debugging a simple program in order to get you familiar with these extensions. And after all of this, you're just getting started!

Multi-Language Development

One of the problems with tutorials is that they tend to be simple in nature and not very business-oriented. By the time you get around to applying this knowledge to a business application, you've forgotten what you learned. But the iSeries is all about business, and thus, so is WDSC. And the crowning achievement of this book is to take all the introductory material that you learned in the previous steps and *immediately* use it to create a real (albeit simple) business application. But unlike other tutorials, where the examples are somewhat standalone, in *WDSC: Step by Step* the object of the entire book is to have a single, cohesive Web site that has both static and dynamic information connected to an RPG back-end for business logic. You can then build from this foundation to make your own Web site, without having to worry about how you will integrate the various pieces. I've done all the integration for you!

Deployment

And finally, while I don't spend a lot of time on this particular subject, I do go through the basics of deploying a Web site like the one you'll build. The reason I don't spend a lot of time on this topic is because many different factors come into play when you are deploying Web applications. So rather than try to address every possible occurrence, I simply provide the basics. However, even though it's impossible to guess what your network configuration will be, I have included a couple of SideSteps that walk you through deployment on the server you are most likely to use: WebSphere Express on the iSeries. But please note that the rest of the book is entirely independent of what Web application server you use.

A Different Look

The MC Press *Step by Step* book series employs a technique of walking the reader through each step of a process visually via screen shots. But in *WDSC: Step by Step*, we've added something called "InSteps," which provide additional detail on a specific topic. If you're following the book's lessons step by step, you can just skip these InSteps. Then, at your leisure, you can read them to get more information on the topic or a detailed look at the actual code.

In order to fit everything I've mentioned into one book, I must assume a certain degree of Integrated Development Environment (IDE) knowledge. For example, I'm going to assume you're relatively familiar with Windows and a mouse. While previous IDE experience is unnecessary, I'm also going to assume that you understand how pop-up menus work and what a right-click is. If these terms are foreign to you, you might want to pick up a copy of *Eclipse: Step by Step*. The first book in this series, *Eclipse: Step by Step* leaves *nothing* to the imagination and is a perfect introduction to the WDSC/Eclipse environment.

Additional Materials

WDSC: Step by Step includes a CD-ROM that contains hundreds of megabytes of supplementary materials.

Checkpoints

First are the Checkpoints. Please take the time to review SideStep 2 prior to beginning the book. In it, I explain the Checkpoint concept. But in a nutshell, Checkpoints are places where you can "restart" the book. That is, even if you haven't done all the preceding steps, by loading the appropriate Checkpoint data from the CD-ROM, you can start the book at (nearly) any arbitrary point.

There are two sets of Checkpoint data: workspaces, which are located in the folder Workspaces, and save files, which are located in the folder Savefiles.

Imports

These are the various source files in text form that you can copy and paste into your workbench at various points in the process. I suggest that you open the file in the text editor of your choice and then simply copy and paste the data into the appropriate source member as directed in the book.

Movies

These are short MPEG movie clips for some of the more involved procedures. This is a new and unique concept, and we're really looking for feedback from you, the readers.

jtopen_4_1_3

This folder contains the complete unzipped release of the latest JTOpen software at the time this book went to print. The JTOpen project is one that I am proud to be affiliated with. For more information, please stop by the Web site:

<http://www-124.ibm.com/developerworks/oss/jt400/>

We hope you enjoy *WDSC: Step by Step!* It's been a labor of love to write, and I only hope it's as productive to read as it was challenging to write.

Step 1.1—What Is WDS?

Before I jump into the working of the product, I'd like to get one task out of the way, which is to get the product family straight. Dozens of products out there bear the WebSphere moniker, but the only ones that relate to this discussion are the WebSphere Studio tools. All are built on Eclipse, and all are related.

WebSphere Studio Site Developer (WSSD): This product provides a wide assortment of Web development tools, ranging from the Site Designer to the Image Designer. It turns Eclipse into a true Web application development environment.

WebSphere Studio Application Developer (WSAD): WSAD is essentially WSSD with EJB support added.

WebSphere Development Studio Client for iSeries (WDS): WDS is a free tool that all iSeries developers get, provided they have the WebSphere Development Studio product (currently 5722WDS) on the host box. This is WSSD plus the iSeries Extensions.

WDS Advanced Edition (WDS/AE): WDS/AE is basically WDS plus EJB support, although there are a few extras thrown in, such as enhanced WebFacing functionality.

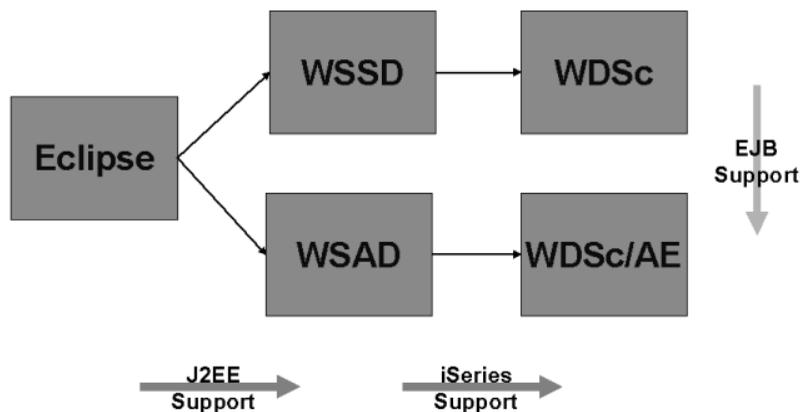


Figure 1-3: This shows the relationships between the various WebSphere Studio products.

Note that there is also a product on your iSeries called 5722WDS, which contains all the host-side pieces of the software. This replaced the individual compilers a few releases ago, and it contains all of the compilers as well as the host servers that support WDSC.