



# IBM<sup>®</sup> WebSphere Host Access Transformation Server Getting Started

*Version 4*





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**Note**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 35.

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# Chapter 1. Introducing Host Access Transformation Server

This book provides the information you need to understand the Host Access Transformation Server (HATS) product, install HATS, and use HATS Studio to produce simple applications. After you have familiarized yourself with the concepts in this book and used HATS, you can find more advanced information in the *HATS Developer's Guide*.

Throughout this book you will see key terms in *italic* text the first time they are used. The term is explained in the chapter where it appears and defined in the Glossary.

---

## What is HATS?

Your company has a substantial investment in legacy applications on host systems, yet more and more of your end users—customers, suppliers, and internal staff—are using workstations rather than host-connected terminals. With HATS, you can protect your investment in host applications by transforming them into Web applications.

HATS transforms the screens of a host application into Web pages that are part of a WebSphere® application running on a Web server. End users access the pages from their Web browsers and use the pages to send and receive data from the host application. The end users might not even be aware that they are interacting with a host application; from their perspective, everything is taking place on the Web server.

HATS has two components:

- HATS Studio, running on a client. Using HATS Studio, the application developer creates a Web application in which host screens are transformed into Web pages. The developer can start by building a simple HATS project and then customize it iteratively. HATS Studio runs in the WebSphere Studio workbench. HATS Studio is installed in the same directory path as WebSphere Studio and appears as a perspective in the WebSphere Studio workbench window.
- The HATS run-time code, running inside one or more HATS applications deployed on WebSphere Application Server and sending data back and forth between the user and an application on the host. End users interact with the HATS application through their Web browsers. After you have developed a HATS application, you deploy it on the WebSphere Application Server the same way you deploy applications developed using other

WebSphere tools. A WebSphere system administrator can monitor HATS applications using the WebSphere Administrative Console.

This figure shows the HATS application developed in HATS Studio, deployed to WebSphere Application Server, and used by an end user to access a host application:

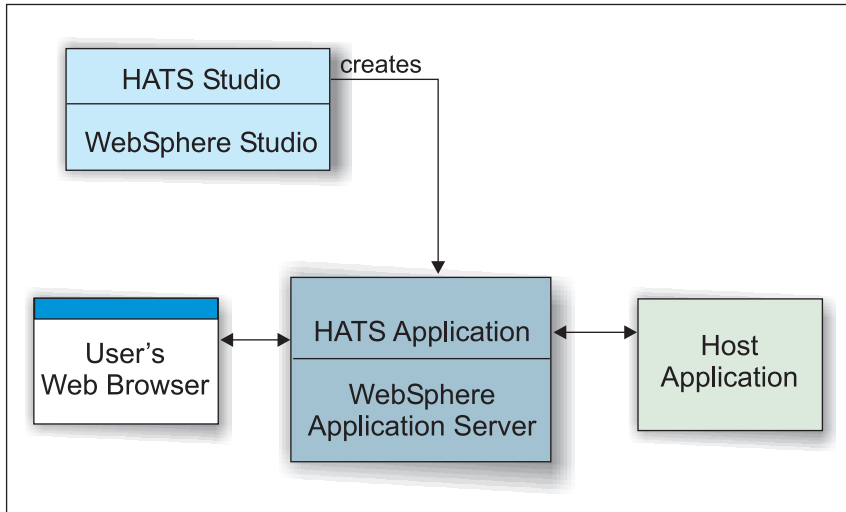


Figure 1. Use of a HATS Application

---

## A HATS example

Let's look at an example of using HATS. Imagine that your manager asks you to transform a host application to Web pages. Here is a screen from the host application:



```
MAIN                                OS/400 Main Menu

Select one of the following:

  1. User tasks
  2. Office tasks
  3. General system tasks
  4. Files, libraries, and folders
  5. Programming
  6. Communications
  7. Define or change the system
  8. Problem handling
  9. Display a menu
 10. Information Assistant options
 11. Client Access/400 tasks

 90. Sign off

Selection or command
=====> _____

F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel  F13=Information Assistant
F23=Set initial menu
_____
```

*Figure 2. A host terminal screen*

Now you use a wizard to create a simple HATS project. You give your project a name and specify the host machine where the host application runs. You take all the defaults and add no customization. After just a few minutes, you use the preview function to see the host screen transformed to this:

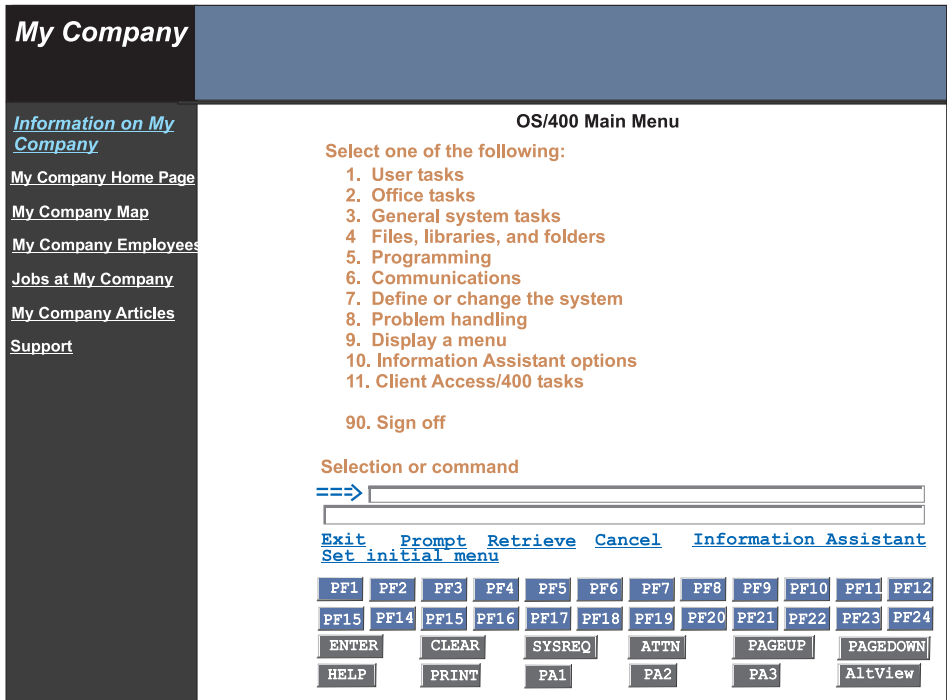


Figure 3. A default transformation

As you can see, HATS has added a banner across the top of the screen and a navigation area on the left. HATS has also provided an on-screen set of host keys, but has made minimal changes to the original host screen. This default Web page is not yet what you want to show to your users. Now you do some customization. After each change you make, you preview the screen to evaluate your changes. Soon your page looks like this:



Figure 4. A customized Web page

After a very short time, you have transformed the host screen into an attractive Web page that provides all the function of the host screen and more, and is accessible through a Web browser. You decided to switch to a template more suited to your business. You eliminated the on-screen PF keys to simplify the Web page, since you plan to enable your users to use the keyboard. You might decide that this is enough customization, but with HATS you can add much more. For example:

- You can use HATS *macro support* to provide programmed navigation through multiple host screens. For example, you can take your users directly to the first screen that you want them to use, bypassing other screens. You can combine data from several host screens into one HATS Web page.
- You can use *business logic* and *global variables* to integrate your host applications with other back-end systems in your company, as well as your business partners' systems.

We'll look at how to add these and other types of customization in the coming chapters.

You can run a HATS application through a portlet on Portal Server, a component of WebSphere Portal. Portal Server has sophisticated desktop management and security features that offer administrators more control over user access rights and end users control over the appearance and arrangement of the portal desktop. For more information and to download the HATS

portlet, visit the WebSphere Portlet Catalog at <http://www.ibm.com/websphere/portal/portlet/catalog>.

---

## Where can I find information about HATS?

You can find the following documentation online after you have installed HATS:

- PDF versions of *HATS Getting Started* and *HATS Developer's Guide* are accessible from the Windows Start menu.
- HTML versions of both books are accessible from within the WebSphere Studio Help menu, and also from the Windows Start menu.
- The *HATS Readme file* is accessible from the Windows Start menu.
- Context-sensitive help is available on all fields in the HATS wizards and editors. Press the F1 key to see the help.
- Tips are provided at key points in the process of developing a HATS project. You can control whether you want to continue to see tips.

To view the documentation before you install HATS, insert the HATS CD and choose **View Documentation** from the Welcome screen.

Find the most up-to-date versions of this document, frequently asked questions (FAQs), white papers, and additional information at the product Web site: <http://www.ibm.com/software/webservers/hats>.

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## Chapter 2. Installing HATS

With the information in this chapter you can:

- Review hardware and software prerequisites and plan for the installation of HATS
- Install HATS Studio on your workstation
- Install HATS Studio silently if you prefer
- Uninstall HATS.

---

### Prerequisites

There are hardware and software prerequisites for the machine where you install HATS Studio, the machine where you deploy HATS applications, and the browsers with which your users will interact with HATS applications. All of these prerequisites are described in this chapter.

#### Prerequisites for HATS Studio

The only HATS component that you must install is HATS Studio. HATS Studio runs as a plugin to WebSphere Studio, which must be installed before you install HATS Studio. This section lists the requirements for the machine on which you install HATS Studio.

##### Hardware

HATS Studio requires the following hardware:

- Pentium II or higher processor, 500 MHz or faster (Pentium III, 1 GHz recommended)
- A minimum of 384 MB RAM (512 MB recommended)
- 200 MB free disk space (1 GB recommended)
- A high-resolution graphic display with a minimum screen resolution of 1024 x 768

##### Software

HATS Studio requires the following software:

- Operating system: Windows 2000 Professional with Service Pack 2, or Windows XP Professional.
- At least one of these versions of WebSphere Studio:
  - WebSphere Studio Site Developer Advanced Version 4.03
  - WebSphere Studio Application Developer Version 4.03
  - WebSphere Studio Application Developer Integration Edition Version 4.1

Check the HATS Web site at <http://www.ibm.com/software/webservers/hats> for the current list of supported versions.

### **Prerequisites for HATS applications**

HATS applications created in HATS Studio are deployed to WebSphere Application Server. HATS applications can be deployed to:

- WebSphere Application Server Advanced Edition Version 4.0, fix pack 3 or higher
- WebSphere Application Server Advanced Edition Single Server Version 4.0, fix pack 3 or higher

All hardware, operating system, and other software requirements for HATS applications are the same as those for WebSphere Application Server. Each HATS application that you deploy requires additional disk space. The minimum space required for each HATS application is:

- Windows NT, Windows 2000: 40 MB per HATS application
- AIX: 23 MB per HATS application
- Solaris: 21 MB per HATS application

If you add large graphics, business logic, or other components, your HATS application will require more disk space.

### **Prerequisites for user browsers**

Users interact with HATS applications through a browser. These browser types are supported:

- Windows: Netscape 6.0 or higher, Internet Explorer 5.0 or higher
- AIX: Netscape 4.72 or higher
- Solaris: Netscape 4.72 or higher

Note that the keyboard support feature is not supported on versions of Netscape prior to version 6.0. Bi-directional applications (such as Hebrew and Arabic) are not supported on Netscape browsers.

---

## **Installing HATS Studio**

You will need to supply this information when you install HATS Studio:

- The number of licenses you have purchased. Consult your Proof of Entitlement, if necessary, for the number of licenses purchased.
- If you have more than one version or copy of WebSphere Studio installed on your machine, you will need to identify the copy where you want to install HATS.

To install HATS Studio:

1. You must be logged on with Administrator privileges.

2. If HATS is already installed on your machine, you should uninstall it before re-installing. See “Uninstalling HATS Studio” on page 11 for information about uninstalling HATS.
3. Verify that your machine meets all the prerequisites described above, especially having a supported version of WebSphere Studio installed. Check the HATS Web site at <http://www.ibm.com/software/webservers/hats> for the current list of supported versions. You need to confirm the directory where WebSphere Studio is installed during installation.
4. If WebSphere Studio is running, save all your work and exit.
5. Insert the HATS CD into the CD-ROM drive. If you do not have auto-run turned on, execute setup.exe from the root directory of the CD.
6. The Welcome window appears. From this window you can check the HATS prerequisites, view HATS documentation, explore the CD, visit the HATS Web site, or install the product. IBM recommends that you choose **View Documentation** and review the Readme file, which contains last-minute information. When you are ready to install HATS Studio, click **Install**.
7. In the Installer window click **Next**.
8. The product’s license information appears. You must accept the license terms to install HATS. After you have read the license text, select **I accept the terms in the license agreement** and click **Next**.
9. Enter the number of licenses, for either Registered Users or Concurrent Users, that you have purchased. If you have purchased an unlimited number of licenses, enter **-1**. Click **Next**.
10. The installation program displays the directory path where WebSphere Studio is installed. If the installation program cannot find a valid version of WebSphere Studio, it displays a message and enables you to browse to a directory containing a valid version of WebSphere Studio. You should specify the parent directory of the plugins directory. If the installation program cannot confirm that WebSphere Studio is installed, the installation of HATS will not continue. Once you have identified the correct install directory, click **Next**.
11. Click **Next** to confirm the directory path.
12. The summary panel presents the installation information. Click **Back** if you need to change any of the displayed information, or click **Next** to proceed. The installation program installs HATS and creates Start menu items. You will see a progress bar as the installation proceeds.
13. The registration panel asks whether you want to register your copy of HATS. IBM suggests that you click **Yes** to begin the Web-based registration process.
14. The completion summary panel informs you that HATS has been installed successfully.

15. If existing files must be overwritten, it might be necessary to reboot your computer. If a reboot is required, you will be asked whether to restart the computer immediately or later. Make your selection and click **Finish**.

## Installation log file

The installation process creates a log file, `$TEMP\installHATSstudio.log`, where `$TEMP` is the value of the environment variable `TEMP`. You can examine this file if an error occurs while installing HATS.

---

## Using silent installation

As an alternative to using the graphical installation wizard, you can use the command line to install HATS silently from the CD. A sample response file is provided, which you can edit to match your configuration, or you can accept the default values supplied with HATS. The sample file on the CD is `\instmgr\silenthats.txt`. The file contains comments that explain its use. The value specified for each parameter must be enclosed in double quotes.

The response file includes these parameters, which you can modify to suit your machine:

### **-W LicenseNumber.numberPurchased**

Enter the number of licenses you purchased. If you purchased an unlimited number of licenses, enter `"-1"`.

### **-P productHatsStudio.installLocation**

Enter the location of the plugins directory for WebSphere Studio. In order to reuse the response file, WebSphere Studio must be installed in the same location on each machine.

### **-G replaceNewerResponse**

Specify whether you want to overwrite any existing files that have dates newer than the date of the corresponding file on the installation CD. This could happen if you have installed service or otherwise modified HATS files after installing. If you specify any answer other than `"yesToAll"`, the silent installation process will issue Java errors and will not run to completion. If you are concerned about overwriting files, do not use silent installation.

The response file is not copied to your machine during installation. Once you have edited your response file, you can copy it to be used on several machines.

To start silent installation from a command prompt:

1. Enter the drive letter of the CD drive.
2. Change to the `instmgr` directory: **cd instmgr**



3. Copy `silenthats.txt` to your hard drive and modify it if necessary to match your configuration.
4. To install silently with default values, type `setupwin.exe -is:silent -silent`.
5. To install silently using a response file, type `setupwin.exe -is:silent -silent -options path\responsefilename`, where `path` and `responsefilename` specify the location of the modified response file. For example, `setupwin.exe -is:silent -silent -options C:\temp\silenthats.txt`.

The silent installation process does not issue messages if it cannot find your response file or if the contents of the response file are invalid. If you use silent installation, be sure to review the installation log file to verify that the installation completed successfully. See “Installation log file” on page 10 for information about the installation log file.

---

## Uninstalling HATS Studio

If you need to uninstall HATS Studio, you must be logged on with Administrator privileges. Close the HATS perspective and exit from WebSphere Studio, then use the **Add/Remove Programs** applet from the Control Panel. The uninstallation process creates a log file, `$TEMP\uninstallHATSstudio.log`. To uninstall HATS silently, change directory to the directory where WebSphere Studio is installed and enter this command: `plugins\com.ibm.hats\uninstall\studiouninstaller.exe -is:silent -silent`.

When you uninstall HATS, the files for HATS projects and their resources are not deleted. If you re-install HATS you will be able to work with projects that you have created. To eliminate HATS files, you can delete each project before you uninstall HATS. If you want to delete HATS files after uninstalling HATS, refer to *HATS Developer's Guide* for information about file names and locations.

When you start WebSphere Studio, it always tries to reopen the last perspective that was open. If you plan to uninstall HATS, be sure to close the HATS perspective before you exit WebSphere Studio. If HATS was the last perspective open, and you uninstall HATS, WebSphere Studio will issue error messages because it cannot find the files necessary to reopen the HATS perspective.



---

## Chapter 3. Creating a basic HATS project

Your company has application programs that run on a host computer. Your company has decided to "Web-enable" those applications—in other words, create new applications that exchange data with the host but can be accessed by users through a Web browser. Your company's investment in the host applications is protected while customers, business partners, and employees can access them easily on the Web.

You've been assigned the task of Web-enabling an application program. You might be relatively new to designing and developing application programs; perhaps you have no experience using Java or even HTML. HATS gives you the tools you need to do the job.

The information in this chapter gets you started. By following the procedure in this chapter, you'll create a simple, working HATS application that uses default values provided with the product. The chapter contains:

- An introduction to two concepts that are helpful to understand as you create your application:
  - "Introducing the WebSphere Studio environment"
  - "Introducing the HATS Welcome page" on page 14
- A step-by-step procedure: "Developing your HATS project" on page 17

After completing this chapter, you can update, or *customize*, the application to make it fit the specific needs of your business.

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### Introducing the WebSphere Studio environment

All of the steps in developing a HATS application are performed using the WebSphere Studio workbench. The workbench is the user interface and integrated development environment (IDE) from which you launch wizards to create resources, view lists of resources, and use editors to modify resources. It also contains help information about both HATS and WebSphere Studio.

When you start WebSphere Studio, you see a single window in which one or more *perspectives* are displayed. A perspective is a collection of views and editors that allow you to create, edit, view, and run resources which belong to a specific type of project—in this case a HATS project. More than one perspective can be open at a time, although you can only view and work with one at a time.

At the far left of the WebSphere Studio window is a shortcut bar that allows you to open new perspectives and move between perspectives that are already open. The name of the active perspective appears in the title of the window, and the toolbar contains icons associated with the active perspective.

---

## Starting HATS Studio

The command to start the HATS Studio differs according to your operating system:

- On Windows 2000, click **Start > Programs > IBM WebSphere HATS > HATS Studio**.
- On Windows XP, click **Start > All Programs > IBM WebSphere HATS > HATS Studio**.

This starts WebSphere Studio with the HATS perspective open. The HATS perspective includes two main areas:

- The HATS Project View, which lists your HATS projects in an expandable tree view
- The editor window, which initially contains the HATS Welcome page. You will also use editors in this window to work with HATS resources. Below the editor window is a task list, which records information about the tasks you perform, and which can be useful for debugging.

The first time you start the HATS Studio, you will see a HATS tip, welcoming you to HATS and giving pointers about getting started. You can use the check boxes on the tip windows to control how many tips you see.

If you start WebSphere Studio and the HATS perspective does not appear, you can open the HATS perspective by clicking **Perspective > Open > Other** and selecting Host Access Transformation Server from the list of available perspectives. If you close or rearrange some of the windows in the HATS perspective, your arrangement is saved. When you return to HATS Studio later, it will be restarted the way you left it. To restore the original HATS windows, close the HATS perspective and reopen it.

---

## Introducing the HATS Welcome page

The HATS Welcome page tutorial guides you through the process of developing a Web application using HATS. As you develop the application and customize it, it is known as a *project*. When you assemble the project into a J2EE-compliant .ear file, it becomes a WebSphere *application*. The application is transferred to WebSphere Application Server and deployed there.

Each section on the Welcome page can be expanded by clicking the plus-sign icon. Each section contains links that start HATS functions, as well as links to relevant information in *HATS Getting Started* and represents a stage in the process:

1. **Create your first project** links to the Create Project wizard and introduces the Run on Server function, which enables you to preview the project. The preview screen is described in detail in “Previewing your project” on page 18.
2. **Modify the template** helps you update the template you chose as your project default.
3. **Customize a screen** introduces the host terminal screen and the Create Screen Customization wizard. You can create a simple transformation to see how it changes your host screen.
4. **Explore advanced functions of HATS** deepens your knowledge about basic HATS concepts and introduces the project editor.
5. **Prepare your project for production** shows you how to assemble the project into a WebSphere application and transfer it to WebSphere Application Server.
6. **View the library of online information for HATS** provides links to the HATS documentation as well as the HATS Web site.

As you use other HATS functions, the Welcome page is covered by editors or other tools. Each page in the editor window is given a tab at the top to enable you to move from one page to another. You can return to the Welcome page by clicking the **Welcome to HATS** tab, or by clicking the Welcome page icon in the main toolbar. You can double-click any tab to toggle that tab’s page between its initial size and a full-screen view.

---

## Starting HATS functions

HATS Studio provides several ways to start each HATS function. You can:









- Right-click a HATS resource and select the function you want from the context menu.
- Click a HATS icon on the main Studio toolbar or on the toolbar associated with an editor. These icons are described here.
- Click a link on the Welcome page.

In many cases, you can start a HATS function in a way that creates linkage between HATS resources. For example, you can create a screen customization based on a screen capture by right-clicking on the screen capture and selecting **New>Screen Customization**. The screen customization’s properties will default to those of the screen capture.

## Using HATS icons

This table shows the HATS icons that are placed into the WebSphere Studio main toolbar.

*Table 1. HATS toolbar icons*

	Create a new HATS project
	Open the host terminal for the selected HATS project
	Create a new HATS screen customization in the current project
	Create a new HATS transformation in the current project
	Create a new HATS template in the current project
	Use the Run on Server function to preview the selected HATS project
	Assemble a project into a HATS application
	Return to the HATS Welcome page

Other icons are available from certain windows, such as the host terminal window. Those icons will be identified in the sections that describe those windows.

## HATS tips

To guide new users through the flow of creating a project and its resources, HATS provides tips when you do certain tasks. After using HATS for a while, you might decide that you do not want to see these tips. You can use the check boxes at the bottom of the tip window to specify whether you want to see that particular tip in the future and whether you want to see any tips. You can also control whether or not tips are shown by following these steps:

1. From the main menu, click **Window > Preferences**.
2. In the Preferences window, click **Host Access Transformation Server** in the tree on the left.
3. On the right panel, locate the check box labeled **Show HATS tips**. Check this box if you want tips to appear, or clear it if you do not want tips.
4. Click **OK** at the bottom of the Preferences window.

---

## Developing your HATS project


The following examples guide you through the process of developing a HATS project using default values. As you follow the examples, you will perform these steps:

1. You'll create a HATS project, with default values, using a wizard in the HATS Studio.
2. You'll preview the project using the preview window.
3. After creating the HATS project and previewing it, you'll want to make changes. This process is known as *customization*. Common customization tasks are described in Chapter 4, "Customizing your HATS project" on page 21.
4. You'll preview the project again, and do more customization.
5. Finally, when you're satisfied with the project, you'll assemble it into an application and transfer the application to a server. These steps are described in Chapter 5, "Preparing your HATS project for use as a Web application" on page 33.

### Creating a HATS project

Begin on the Welcome page. If the Welcome page is not displayed, click the **Welcome to HATS** tab at the top of the editor pane.

Table 2. HATS Welcome page icon

	HATS welcome page icon
---	------------------------

1. Click the link to launch the Create HATS Project wizard.
2. In the New Project window:
  - a. Type the name of the application you are creating.
  - b. Type a description of the application. This is optional; you can keep notes here or use it however you want.
  - c. Leave the **Use default location** and **Use default project** boxes checked.
  - d. Click **Next**.
3. In the Connection Settings window:
  - a. Type the name of the host where the host application is located. This can be a hostname, a domain name (such as myhost.mycompany.com), an alias, or an IP address.
  - b. If your host is an iSeries™ machine, change the type to 5250.
  - c. Accept the default values for the other fields on this panel.
  - d. Click **Next**.

4. In the Select Default Template window, use the drop-down list to review the templates that are provided with HATS. Choose one to use as a starting point for your project. Click **Finish**. You will see a progress bar as HATS creates the project.

You have created a simple HATS project. Next we will preview a Web page generated by your HATS project.

### Previewing your project

Begin on the Welcome page. If the Welcome page is not displayed, click the **Welcome to HATS** tab at the top of the editor pane.

1. In the HATS Project View on the left side of the screen, single-click the name of the project you just created.
2. In the Welcome page, click **Preview your HATS project**.

WebSphere Studio creates an internal server to show your project. You will see a progress bar as the server is established. When you preview your project, you are using the WebSphere Studio **Run on Server** function. This function runs your project on your local machine, on a copy of the WebSphere Application Server product that is embedded in WebSphere Studio. This server is also called the **WebSphere Test Environment**.

HATS displays a Web page on which you can see what your application will look like. The Web page is divided into two main areas:

- The *template*, which usually covers the top and left sides of the Web page, comprising a graphical banner and navigation links. The template area usually remains the same for all or most of the Web pages in your project, giving your users a consistent appearance.
- The *application area*, which presents the transformed host application. The application area is different on each Web page in the project.

When you preview a newly created HATS project, you see what your host application looks like when the default transformation is applied. This transformation is part of each project and provides a default conversion of your host application pages into Web pages. Part of what you will do with the HATS Studio is to design transformations that will improve the conversion of your host application pages into meaningful, usable Web pages.

The first time you preview your project, the Web browser opens in the server perspective. If you run your project again after the server has been started, the Web browser opens in the HATS perspective. If you make changes to your project, do not open another Run on Server window to view the updates; instead, click the Refresh button on the Web page that is already displayed. To view the application as the end user would see it, copy the URL from the HATS browser into an Internet Explorer or Netscape browser. The Web



browser in the HATS Studio opens with a URL similar to the following: `http://localhost:8080/myapp/`. To enable other users to see the Web page from a different machine, give them a URL containing the TCP/IP address of the machine that is running HATS Studio. For example, change the URL `http://localhost:8080/myapp/` to `http://myworkstation.mycompany.com:8080/myapp/`.

Next, you'll want to modify your HATS project. For example, you'll want to put your own company name into the template, and you'll want to define widgets (fields, input areas, and other GUI controls) in the application area. As you develop your HATS application, you can use the preview screen to test it and to see how it will look to an end user. Here's the sequence of steps you'll typically follow:

1. Create the HATS project.
2. Preview it.
3. Make changes based on what you saw in the preview.
4. Refresh the preview screen.
5. Repeat until you're satisfied.

Return to the HATS perspective by clicking the HATS icon on the far left side of the WebSphere Studio window. Continue with the instructions in Chapter 4, "Customizing your HATS project" on page 21.



---

## Chapter 4. Customizing your HATS project

After following the steps in Chapter 3, “Creating a basic HATS project” on page 13, you have a HATS project that looks a lot like the original host application. Now it’s time to customize the project. By performing customization, you can:

- Give the Web pages a graphical “look and feel” that appeals to your end users and is compatible with your company’s image. For example, you can add your company name and logo and create a navigation area. See “Updating your project’s template” on page 24.
- Display data from the host screens in a way that is tailored to the end users of your particular application. See “Working with transformations” on page 26.
- Convert text strings from the host to different strings in the Web pages. For example, the name of the host application (such as *hostapp*) can be rendered as a different name (such as *webapp*). See “Replacing text strings from the host screen” on page 30.

There are other, advanced customization tasks you can do as well. They are summarized in “Performing advanced customization tasks” on page 31 and described more fully in the *HATS Developer’s Guide*.

---

### Understanding how a HATS application works

To understand the purpose of the customization techniques described in this chapter, and how they work together, let’s look at how a HATS application processes a host screen to convert it to a Web page. When a user enters the URL of a HATS application into a browser, the request is sent to the HATS application, running on WebSphere Application Server. The HATS application forwards the request to the host application and receives a host screen. The HATS application converts the host screen into a Web page, using the customization you have designed in the HATS project, and sends the Web page to the user. Each time the user clicks a link or interacts with the application, the process is repeated.

How does the HATS application know how to convert each host screen into a Web page? You do not have to specify how to convert every single screen from your host application. Instead, the HATS application uses a *rules-based* approach to determine how to convert each host screen.

Each HATS application contains a list of *screen customizations*, which specify criteria used to match host screens. We will look at some examples in

“Working with screen customizations” on page 25. Each screen customization also lists actions to be taken when a match is found, to convert the host screen into a Web page. Your HATS application compares each host screen to its screen customizations, and when a match is found, it converts the host screen by applying the specified actions.

## Understanding HATS resources

Each HATS project contains a set of different types of resources. You can see the resource types listed under the project name in the HATS Project View in the HATS Studio. These are the key resource types and how they are used:

### Template

A *template* defines the appearance of areas that are common on most of your Web pages, such as a banner and a navigation area. Templates are described in “Updating your project’s template” on page 24

### Screen customization

A *screen customization* has two parts: a set of criteria for matching host screens, and a list of actions to be taken when a host screen matches these criteria. Screen customizations are described in “Working with screen customizations” on page 25

### Transformation

A *transformation* specifies how to convert components on the host screen into widgets on the Web page. Transformations are described in “Working with transformations” on page 26

**Macro** A *macro* automates interactions with the host. It can send commands to the host, enter data into entry fields, or extract data from the host. Macros are described in the *HATS Developer’s Guide*.

---

## Using the host terminal screen as you work

As you develop your HATS project, much of your work will involve screens from your host application. You will use the HATS host terminal to connect to and interact with your host application and use it for these tasks:

- Capturing screen images to work with when you are not connected to the host
- Creating screen customizations
- Creating transformations
- Recording macros.











Each of these tasks is described in the following sections.

To open a host terminal session, select your project in the HATS Project View, then click the **Open HATS Host Terminal** icon on the main tool bar to open the host terminal session. You can also open the host terminal from the context menu by right-clicking any item in the HATS Project View, or by

expanding the **Customize a Screen** section of the HATS Welcome page and clicking **Open the host terminal**. If you leave your host session active, you can move around in it as you customize your project, creating screen customizations and transformations from the active screens. If you prefer, you can navigate to a few screens in your host application and click the **Create Screen Capture** icon on the host terminal tool bar to create screen images that you can use to create screen customizations and transformations.

Table shows the icons that appear on the host terminal screen.

*Table 3. HATS host terminal screen icons*

	Connect this host session (disabled when the host session is connected)
	Disconnect this host session (enabled only when the host session is connected)
	Capture this screen
	Create a new HATS transformation in the current project, based on the current screen
	Create a new HATS screen customization in the current project, based on the current screen. The drop-down list shows the screen customizations whose recognition criteria this screen matches.
	Play a macro. Use the drop-down list to select a macro.
	Start recording a macro
	Stop recording a macro
	Insert a prompt into the current macro (enabled only when recording a macro)
	Insert an extract into the current macro (enabled only when recording a macro)

## Working with screen captures

Another way to work with host screens is to navigate to several screens on your host terminal and use the **Create Screen Capture** icon, shown in the table above, to capture representations of host screens. After you have captured some host screens, you can work with them without being connected to the host computer.

When you create screen captures, they are stored in the Screen Captures folder within your project. To work with a screen capture, expand the folder

in the HATS Project View, then double click the name of the screen capture to start the screen capture editor. The editor shows the host screen; click the **Preview** tab at the bottom to see how this screen would be transformed by your project.

Click the **Host Screen** tab at the bottom to return to the host screen. From this tab you can use the icons at the top of the editor to create a screen customization or transformation based on this screen capture. The name of the screen customization or transformation defaults to the name of the screen capture.

---

## Updating your project's template

In most cases, the pages displayed by your application in a Web browser consist of two elements:

- A *template* containing the static content of the page, such as a company logo, the name of the company, and navigational links
- A transformed screen, representing a screen in the host application, on which an end user enters and views data

A template is a JavaServer Pages (JSP) file that allows you to control the overall appearance of your application. A typical template contains a company logo, other company information, and links to other web pages. The template provides a consistent appearance for the pages in an application and enables you to personalize your HATS application.

Review the example of a transformed screen in “A HATS example” on page 2. In this example, the HATS browser window comprises three main areas: a graphic title banner, a vertical navigation bar, and the host information area. The template provides a coordinated look and feel for your application. You can use the same template in more than one application.

Although every screen in your application will normally use the same template, you can define a screen customization so that it applies a transformation that uses a different template. The new template applies to host screens matching the screen customization. (See “Working with screen customizations” on page 25 for more information about screen customizations.)

To change the template for your HATS project, follow these steps:

1. In the HATS Project View, click the plus sign to expand the resources for the project.
2. Double-click **Project Settings** to open the project editor.
3. Click the **Template** tab at the bottom of the project editor to view the Template page.

4. Review the templates provided with the HATS Studio and select the one that most closely resembles the way you want your application to look.
5. Use the Template Editor to modify the text, graphics, and links in the template.

---

## Working with screen customizations

The *screen customization* is at the heart of the HATS application's rules-based processing of host screens. Each screen customization includes a set of *criteria* that determine which host screens it should be applied to. When a host screen matches these criteria, the HATS application executes the *actions* that are defined in the screen customization. These actions can include:

- Applying a transformation to the host screen
- Extracting, setting, or inserting the value of a global variable
- Running a macro
- Calling Java methods to execute business logic
- Displaying a specified Web page (URL).

### Creating a new screen customization

To create a new screen customization, follow these steps:

1. Select your project in the HATS Project View and expand its resources.
2. To create a new screen customization based on an active host terminal, bring up the host terminal, navigate to the screen you want to use, and click the **Create HATS Screen Customization** icon on the host terminal tool bar. If you want to create a new screen customization based on a screen capture, right-click that screen capture in the tree and select **New > Screen Customization**. Using these methods bases the screen customization on the selected screen capture or host terminal screen, and the name of the screen customization defaults to one built from the name of the screen capture or from text found on the host terminal screen. Either of these methods starts the **Create HATS Screen Customization** wizard.
3. Accept the default name, or enter a new name for this screen customization. Enter a description if you wish.
4. Accept the default location, or, if you are organizing your resources into folders, use the entry field or graphical tree view to select a different location within the project. Click **Next**.
5. If you invoked this wizard from the host terminal or from a screen capture, the source defaults to that screen. You can change to a different screen capture if you wish by selecting it from the drop-down list. The **Use the host terminal screen** option is available only if a host terminal session is active.
6. Use the options on the right side of the page to specify which criteria will be used to match host screens. You can use several criteria to match a

screen specifically, or fewer criteria to match a broader range of screens. Refer to *HATS Developer's Guide* for more information about screen recognition criteria. Click **Next**.

7. Specify the actions to be taken when a host screen matches the selection criteria. By default a new transformation, based on the same screen, is created with the same name as the screen customization. You can change the name of the new transformation, specify that an existing transformation be used, or clear the **Apply a transformation** check box if you do not want to apply any transformation. When you apply a transformation, you can specify a different template to be used with it. If you want to add other actions, check the **Add advanced actions** box.
8. Click **Finish**.

You do not have to define your screen customization completely when you define it. You can edit it later and modify its screen recognition criteria and actions.

## Ordering and enabling your screen customizations

Your HATS application checks each incoming host screen against an ordered list of screen customizations. It is essential to have the screen customizations for your project listed in the correct order. For example, you might have one screen customization that converts a few specific screens, and a second one that converts a more general set of screens. If the second one is listed before the first, it might be applied to one of the screens to which you wanted to apply the first, more specific screen customization.

You can reorder your screen customizations, or review the order in which they are checked, in the Project Settings editor. After you have created your project's screen customizations, double-click **Project Settings** in the HATS Project View. In the editor, click the **Event Priority** tab. Review the list of screen customizations and use the **Up** and **Down** buttons if you want to change the order. The screen customization that you want checked first should be at the top of the list.

You can use the check boxes next to each screen customization in the list to enable or disable the screen customization. When the box is checked, the screen customization is active. If you clear the check box, the HATS application will not use that screen customization. Disabling some screen customizations can be useful during testing and debugging, and will improve performance if you have a lot of screen customizations that you do not use.

---

## Working with transformations

A *transformation* defines the way in which a host screen is converted into a Web page. The transformation specifies how to treat each part of the host screen.



## Understanding host components and widgets

In host applications, data can be presented in many different ways, such as menus, tables, and command prompts. These are known as *host components*. Your HATS application converts them into graphical elements, or *widgets*, for displaying data on a Web page.

HATS comes with a default set of host components, representing the most frequently used methods of presenting data, as well as a set of widgets associated with each one. These host components and widgets are listed in Table 4. As you develop your HATS application, you draw boxes on the host terminal and indicate that the contents of each box should be treated as a specific kind of host component. Then, for each host component, you choose one of the corresponding widgets to present the data or function on a Web page.

For example, if a host application has a menu in which the user is required to select one of the several choices, you can design your HATS application to display the menu in a Web browser as a drop-down list. Alternatively, you can have the menu appear as a list of radio buttons, from which the user makes a choice, or as a list of links or buttons. You can even design a custom component or widget.

*Table 4. HATS host components and their corresponding widgets*

Host component	Widget
Command line	Text input
Default	Default
Field	Field
Field table	Table Horizontal bar graph Vertical bar graph Line graph
Function key	Button Button table Link Option list
Input field	Text input
Menu	Button Button table Drop-down list Link Option list

Table 4. HATS host components and their corresponding widgets (continued)

Host component	Widget
Selection list	Button Button table Drop-down list Link Option list
Subfile	Subfile
Text	Label
Visual table	Table Horizontal bar graph Vertical bar graph Line graph

## How HATS uses transformations

A HATS transformation is a powerful tool, containing all the information needed to convert components from host screens into widgets on Web pages. A transformation can only be used, however, when it is associated with a screen customization. The screen customization, described in “Working with screen customizations” on page 25, includes a list of actions to be taken when a host screen matches its screen recognition criteria. Applying a transformation to the host screen is one of the actions that can be taken.

The easiest way to associate a transformation with a screen customization is to create the transformation at the same time that you create the screen customization.

## Creating a new transformation

There are many ways to create a new transformation. When you create a screen customization, HATS will by default create a transformation with the same name, based on the same host screen, and associate it with the screen customization. Because the transformation is named and associated with a host screen, it is created without the use of a wizard.

You can also create a transformation in other ways:



- To create a new transformation based on a screen capture, right-click that screen capture in the tree and select **New > Transformation**. Or double-click that screen capture in the tree to start the screen capture editor, and click the **Create HATS Transformation** icon.
- To create a new transformation based on an active host terminal, bring up the host terminal and click the **Create HATS Transformation** icon.

Either of these methods starts the **Create HATS Transformation** wizard. If you create a transformation directly from a screen capture or from a host

terminal, you will have to associate it with a screen customization later by editing the screen customization and adding the transformation as an action. This process is described in *HATS Developer's Guide*.



The **Create HATS Transformation** wizard asks you to supply a name for the transformation and to indicate which screen it is based on. The wizard creates the transformation and opens it in the transformation editor so that you can add host components and widgets. Using the transformation editor is described in *HATS Developer's Guide*. While editing a transformation, you will see these icons added to the main toolbar:

Table 5. HATS transformation editor main toolbar icons

	Insert a host component into the transformation. Use the drop-down list to insert a specific component.
	Edit a host component in the Source view of the editor

When you start the transformation editor, the Insert Host Component wizard appears. Select the host screen and the area of the host screen with which you want to work, and click **Next**. The next page shows a list of host components and widgets and includes these icons:

Table 6. HATS IHC wizard icons

	View or modify the settings for a component or widget.
	Enlarge the widget preview window.

---

## Displaying function keys (PF keys)

Many host screens include a list of function keys (PF keys) and their assignments. You can choose to display these lists graphically in your HATS application. To control the keys that will be displayed, follow these steps:

1. In the HATS Project View on the left of your screen, expand the list of resources for your project if it is not already expanded.
2. Double-click **Project Settings** under your project to bring up the project settings in the editor pane.
3. At the bottom of the editor pane, click the **General** tab.
4. In the list of widgets, click **Host Keypad**. The editor will display the host keys that can be included in your application.
5. Check the **Show host keypad** check box to enable the display of host keys.
6. If you want to display most of the host keys, use the **Select All** button at the bottom of the screen to select all the host keys, then click the keys that

you do not want to display in order to clear them. If you want to display fewer than half of the host keys, use the **Clear All** button to clear all the buttons and then click the keys that you want to display in order to select them.

7. Use the **Display as** drop-down list to indicate how you want the host keys displayed.
8. Preview your project to view the display of the host keys. If necessary, make changes and preview again.

To learn about other things you can do to display host components, including information about designing custom components and widgets, refer to *HATS Developer's Guide*.

---

## Replacing text strings from the host screen

Your HATS application can replace text strings on host screens with different strings on Web pages. These text strings must be *protected* text strings, that is, strings that are used only on the screen and never passed to the host application as input. For example, you can replace the text string used as a field label or prompt. If the replacement text is longer or shorter than the text to be replaced, it might cause undesired formatting results on the Web page; be sure to test your text replacements carefully to be sure that they do not give unexpected results.

To replace a text string, follow these steps:

1. In the HATS Project View, locate the name of your HATS project. If the list of resources associated with this project is not already expanded, click the plus sign to expand it.
2. Double-click **Project Settings**.
3. At the bottom of the editor window, click the **Text Replacement** tab. A list appears, showing a list of text strings from host screens. For each string, the list shows:
  - The corresponding string with which it will be replaced on the Web page.
  - Whether the string is replaced only when the case matches exactly (Yes) or regardless of case (No).
4. Click **Add** to add a new text string to the list.
5. In the **Add Replacement** window:
  - a. Type the host string in the **Replace** field.
  - b. Type the corresponding Web string in the **With** field.
  - c. Select **Match case** if you want the replacement to be case sensitive. For example, if your host string is "PORTNUM," and your replacement is

case sensitive, then the string "PORTNUM" will be replaced, but "PortNum" will not, because the case does not match.

- d. Click **OK**.
6. Click **Add** to define another string replacement. To edit an existing string replacement, highlight the line for that string and click **Edit**.

If your application uses a bi-directional code page, refer to *HATS Developer's Guide* for information about handling text replacement on bi-directional screens.

---

## Performing advanced customization tasks

You can also do the following kinds of customization on your HATS project. For more information about each of these topics, refer to the *HATS Developer's Guide*.

### Using macros

You can record a *macro* to list a set of steps to be taken automatically, such as providing information for entry fields or selecting menu options. For more information about recording and using macros, refer to the *HATS Developer's Guide*.

### Defining global variables

You can define *global variables* to hold data from, for example, an area of the screen, and make that data available to business logic, templates, transformations, and macro prompts. For information about global variables, refer to the *HATS Developer's Guide*.

### Applying business logic

You can specify a Java method to be called as one of the actions in a screen customization, to perform *business logic*. To add business logic to your HATS project, right click on the HATS Project View tree and select **New->Business Logic**. A wizard prompts you for a file name and then a skeleton .java file is created in the Source directory in the HATS Project View. For more information about adding business logic to your HATS project, refer to *HATS Developer's Guide*.

### Using print support

You can add support to your HATS project for local viewing and printing of files from the host application. Refer to the *HATS Developer's Guide* for more information.

### Using keyboard support

In addition to representing host-application buttons as part of the screen presentation, you can enable your users to interact with your application by using the keyboard. Refer to the *HATS Developer's Guide* for more information.



---

## Chapter 5. Preparing your HATS project for use as a Web application

After you develop a HATS project, follow these steps to convert the project to a WebSphere application and make it ready for use on a server:

1. Assemble the project into a J2EE application.
2. Transfer the application to a server.

Note: The terms "HATS application", "WebSphere application", and "J2EE application" can be used interchangeably to refer to an application created from a HATS project. It is a HATS application because it was developed in the HATS Studio. It is a WebSphere application because it will be deployed and run on WebSphere Application Server. It is a J2EE application because it conforms to the J2EE standards.

---

### Assembling the project into an application

You have created a HATS project and customized it to provide a usable representation of your host application. Perhaps you even brought in some users to review the application's appearance. Now you're satisfied with the way the project looks and functions, and you're ready to put it into production on a Web server.

Your next step is to *assemble* the project into a *J2EE* application. You must decide whether to store a copy of the application .ear file on your local machine, or export it directly to your WebSphere Application Server machine. To export it directly to your WAS machine, you must map a network drive to that machine so that it appears to be local to your Studio machine.

To assemble the project into an application, follow these steps:

1. Highlight (single-click) the name of your project in the HATS Project View.
2. Click the **Assemble HATS Project** icon on the main tool bar, or right click the project name and select **Assemble HATS Project**.
3. In the Export window, choose an Enterprise Application project from the drop-down list or type the name of an Enterprise Application project in the **What resources do you want to export?** field.
4. Type the name of a directory and file name in the **Where do you want to export resources to?** field (or click **Browse** and then select a directory and file name).
5. If you want to export the project's source files along with the executable files, check the **Export source files** box. If you include the source files,

another developer can extract them from your .ear file. This can make collaboration or service easier, but you must decide whether it creates a security risk.

6. If you have exported this project to this location before, the export process asks whether you want to overwrite the existing files. This is intended to protect you from overwriting files that you might want to keep, perhaps to archive a previous version of your project. If you want to overwrite previous files without being asked for confirmation, check the **Overwrite existing resources without warning** box.
7. Click **Finish**. The project is assembled into a J2EE application, represented by an Enterprise Archive file with extension .ear, with the directory and file name you specified.

---

## Grouping your applications

You can group your HATS applications together in one .ear file, or store each in its own separate .ear file. These options are discussed in *HATS Developer's Guide*. Be sure your HATS applications are grouped in the way you want before you deploy them to WebSphere Application Server.

---

## Deploying the application on a server

If you created the application's .ear file on your Studio machine, you must move it to your WAS machine. Use FTP, shared network drives, or whatever other method is standard in your environment. After the application's .ear file is on your WAS machine, ask your WAS administrator to deploy it as a WebSphere application, using the administrative console and the steps described in the WAS InfoCenter. Once the application has been deployed, test it by bringing up the URL in a Web browser on another computer. Then you can publish the URL to your users.

When you deploy your HATS applications, if you have more than one HATS application in an .ear file, you must configure your application server to set its module visibility to Application. Please refer to *HATS Developer's Guide* for more information.



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## Programming interface information

This Getting Started guide contains information on intended programming interfaces that allow the customer to write programs to obtain the services of HATS.

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## Glossary

This glossary lists some of the terms used in this book along with their meanings.

**action** A step to be executed when an event occurs, such as a host screen matching the screen recognition criteria specified for a screen customization. A list of actions is part of the definition of each event, including the screen customization resource.

**application**  
See **HATS application**.

**application keypad**  
A set of buttons or links representing application-level functions. (Contrast with **host keypad**.)

**assemble**  
To collect the resources of a HATS project, along with the necessary executable code, into an application .ear file in preparation for transferring the application to the server.

**business logic**  
Any Java program invoked as an action in an event, such as a screen customization. Business logic is specific to the application and is not provided as part of HATS.

**component**  
A visual element of a host screen, such as a command line or menu. HATS applications transform host components into widgets.

**deploy**  
To make a HATS application ready for use on the server, using functions in WebSphere Application Server, after transfer has taken place. Note that WebSphere documentation sometimes uses the term *install* as a synonym for this process. (See also **transfer**.)

**developer**  
The person who uses HATS Studio to develop applications; also application developer or Web developer. (Contrast with **user**.)

**.ear file**  
Enterprise Archive. The J2EE-format file containing the project resources and executable code for a HATS application.

**Eclipse**

The open-source implementation upon which WebSphere Studio is built and which is available for download from <http://www.eclipse.org>.

**editor** An application that enables a user to modify existing data. In HATS Studio, editors are used to customize resources that have been created by wizards.

**event** An occurrence of interest to a program, for which a specific response in the form of one or more actions is defined. The matching of a host screen by a screen customization's screen recognition criteria is an event, as are a user connecting to or disconnecting from a HATS application, and the failure of a host screen to match any screen customizations.

**Extensible Markup Language (XML)**

A standard metalanguage for defining markup languages that was derived from and is a subset of SGML.

**global variable**

A variable used to contain information for the use of actions. The values of global variables can be extracted from a host screen or elsewhere, and can be used in templates, transformations, macros, or business logic.

**HATS** See **Host Access Transformation Server**.

**HATS application**

An application that presents a Web-enabled version of a host application to users. A HATS application is created in HATS Studio from a HATS project and deployed to WebSphere Application Server.

**HATS project**

A collection of resources (also sometimes called "artifacts") created and customized in HATS Studio, which can be assembled into a HATS application.

**HATS Studio**

The component of HATS that runs on WebSphere Studio and enables you to work with HATS projects to create HATS applications.

**Host Access Transformation Server (HATS)**

An IBM software product that enables you to present host applications as Web-based applications.

**host component**

See **component**.

**host keypad**

A set of buttons or links representing functions typically available

from a host keyboard, such as function keys or the Enter key.  
(Contrast with **application keypad**.)

**HTML**

Hypertext Markup Language.

**J2EE** Java 2 Platform, Enterprise Edition. An environment for developing and deploying enterprise applications, defined by Sun Microsystems Inc. The J2EE platform consists of a set of services, application programming interfaces (APIs), and protocols that provide the functionality for developing multitiered, Web-based applications.

**JavaServer Pages (JSP)**

A server-side scripting technology that enables Java code to be dynamically embedded within Web pages (HTML files) and executed when the page is served, returning dynamic content to a client.

**JSP** See **JavaServer Pages**.

**macro** An XML script that defines a set of screens. Each screen includes a description of the screen, the actions to perform for that screen, and the screen or screens that can be presented after the actions are performed. A macro can be specified as one of the actions to be taken when a host screen matches the screen recognition criteria of a screen customization.

**perspective**

In the WebSphere Studio workbench, a group of views that show various aspects of the resources in the workbench. The HATS perspective is a collection of views and editors that allow a developer to create, edit, view, and run resources which belong to HATS applications.

**project**

See **HATS project**.

**resource**

Any of several data structures included in a HATS project. HATS resources include templates, screen customizations, transformations, screen captures, and macros. Other WebSphere Studio plugins sometimes call these "artifacts."

**Run On Server**

A function of WebSphere Studio, which enables the developer to test or preview a project using the embedded WebSphere Application Server. Sometimes referred to as "WAS Test Environment."

**screen capture**

An XML representation of a host screen, used to create or customize a screen customization or transformation.

**screen customization**

A HATS resource with two parts: a set of screen recognition criteria used to match host screens, and a list of actions to be taken when a host screen matches the screen recognition criteria.

**screen recognition criteria**

A set of criteria used to determine whether a host screen matches a screen customization and should have that screen customization's actions applied.

**Secure Sockets Layer (SSL)**

A security protocol that provides communication privacy. SSL enables client/server applications to communicate in a way that is designed to prevent eavesdropping, tampering, and message forgery. SSL was developed by Netscape Communications Corp. and RSA Data Security, Inc.

**source** The markup-language files that define a HATS project or one of its resources. Also the name of a folder contained in each HATS project.

**SSL** See **Secure Sockets Layer**.

**template**

A HATS resource that describes the relatively static portion of the Web pages presented by the HATS application, including a banner and navigation area.

**transfer**

To copy an application .ear file to the server, usually by FTP. (See also **deploy**.)

**transformation**

A HATS resource that specifies how to convert components of a host screen into widgets on a Web page.

**user** The end user of an application that runs on the server. (Contrast with **developer**.)

**WebSphere**

A family of IBM software products that provide a development and deployment environment for basic Web publishing and for transaction-intensive, enterprise-scale e-business applications.

**WebSphere Application Server**

An IBM software product that provides the core software needed to deploy, integrate and manage e-business applications. HATS applications, when assembled and transferred to a server, run as WebSphere Application Server applications.



**WebSphere Studio**

Any of several IBM software products that provide an integrated development environment based on the Eclipse open-source platform.

**widget**

A visual element of a Web page, such as a button, entry field, or drop-down list. HATS applications transform host components into widgets.

**wizard**

An interface that enables you to complete a task in defined steps. HATS uses wizards to create projects and their resources.

**workbench**

Synonym for WebSphere Studio.

**XML** See **Extensible Markup Language**.



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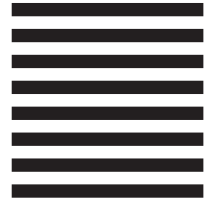
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