WEBOBJECTS
TOOLS AND TECHNIQUES

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This manual describes WebObjects 3.5

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Chapter 1

Setting Up WebObjects Applications

Introduction

To develop WebObjects applications, you use two primary tools: Project Builder and WebObjects Builder. These tools help you perform the major tasks required to develop your application

Project Builder is an integrated software-development application. It contains a project browser, a code editor, build and debugging support, and many other features needed to develop an application. It helps you to:

- Create and manage your project.
- Write code to provide behavior in your application.
- Build and launch your application.

This chapter discusses the main features of Project Builder that you use when developing WebObjects applications. For more information on Project Builder's other features, refer to its on-line help.

WebObjects Builder is described in the chapters "Editing With WebObjects Builder" and "Working With Dynamic Elements".

This document refers to example projects located in the <*DocumentRoot*>**/WebObjects/Examples/** directory.

Creating WebObjects Application Projects

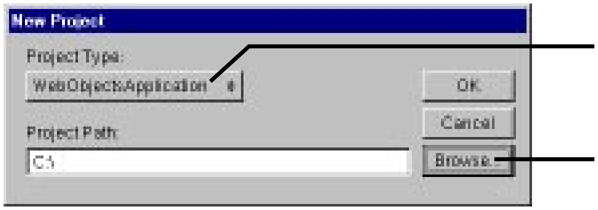
A WebObjects application project contains all the files needed to build and maintain your application. You use Project Builder to create a new project.

1. Launch Project Builder.

   To do this, launch **ProjectBuilder.app**, which is found in the **NextDeveloper/Apps/** directory. On Mach systems, this directory is under the root directory**/**. On Windows NT, it is under *%NEXT_ROOT%*, an environment variable defined when you installed WebObjects (**C:\NeXT** by default).

   On Windows NT, you can launch Project Builder from the WebObjects program group in the Start menu.

2. Choose Project ▸ New.



Project Type: WebObjectsApplication

Project Path: C:\

Set the project type here.

Click to choose directory in which to create your project.

The New Project panel has a Project Type pop-up list that lets you choose the type of project you want to create. WebObjectsApplication is shown by default.

3. In the Project Type pop-up list, make sure WebObjectsApplication is selected.

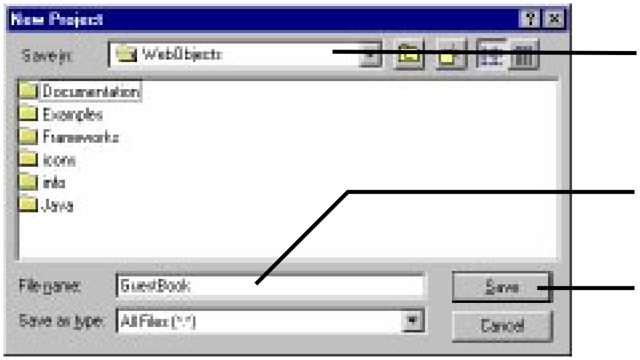
   Another type of project you may want to create is WebObjectsFramework. See “Frameworks” for more information.

4. Click Browse to specify your project’s location.

   Note: You can also type your project’s location and name directly in the Project Path text field.

5. Navigate to the directory in which to create your project.

   During development, you typically create a project in the <*DocumentRoot*>**/WebObjects** directory. <*DocumentRoot*> is your HTTP server’s document root, which you specified when you installed WebObjects. It is convenient to have your entire project under this directory so project resources can be located without going through the installation process (see “Installing Your Application”*)*. However, when deploying your application, you can place parts of your project elsewhere, so that only those files needed by the web server are accessible to users.



Save in: WebObjects

File name: GuestBook

Save as type: All Files (*.*)

Choose **WebObjects** under the server’s document root.

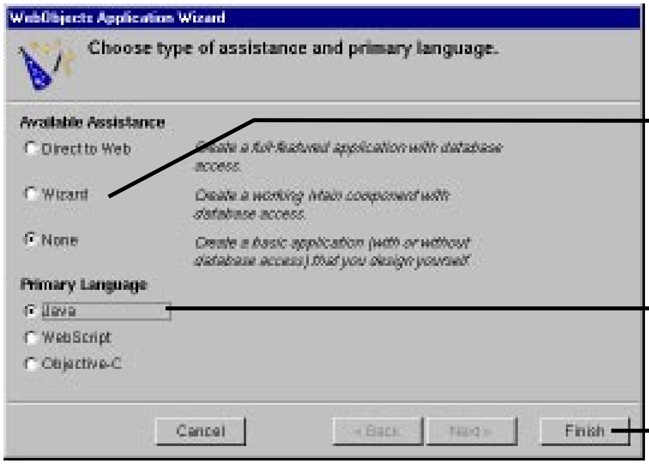
Type the project name here.

Click here when finished.

6. Type the name of the project you want to create.
7. Click Save.

   The New Project panel shows the path you specified.
8. Click OK.

   The WebObjects Application Wizard starts.



WebObjects Application Wizard

Choose type of assistance and primary language.

Available Assistance

○ Direct to Web — *Create a full-featured application with database access.*

○ Wizard — *Create a working Main component with database access.*

● None — *Create a basic application (with or without database access) that you design yourself.*

Primary Language

● Java

○ WebScript

○ Objective-C

Choose level of assistance.

Choose programming language.

Click to proceed.

Choosing Assistance

If your application doesn't access a database, you always choose None for Available Assistance.

If your application accesses a database, you also choose None if you want to develop the entire application yourself. However, you may wish to use one of the levels of assistance that WebObjects provides. These forms of assistance are described in other documents:

- Information about Direct to Web.
- Information about the Database Wizard is found in "Creating a WebObjects Database Application" in *Getting Started With WebObjects*.

Choosing the Programming Language

WebObjects supports three languages:

- Java
- Objective-C
- WebScript

Java and Objective-C are *compiled* languages. WebScript, which is based on Objective-C, is a *scripted* language. A scripted language allows you to make changes to your application while it is running. When you use compiled code, your application runs faster, but you must build your application before running it.

Java files have the extension **.java**, Objective-C files have the extension **.m**, and WebScript files have the extension **.wos**.

The language you choose in the Wizard applies to the following files:

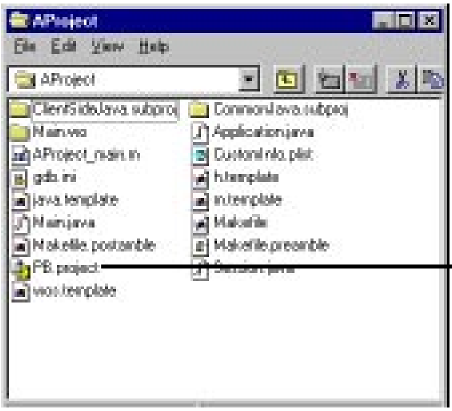
- The Main *component*. A component in WebObjects represents a page in your application (or possibly part of a page). When you create your project, Project Builder provides you with an initial component called Main. The component's code file implements the behavior of the component.

- The *application* and *session* code files. Application code contains variables and methods that affect the entire application. Session code contains variables and methods that affect a single user's session.

If, for example, you specify Java as your primary language, the Wizard will create the files **Application.java**, **Session.java**, and **Main.java** for you. You can mix languages in a project by choosing a different language when you create other components.

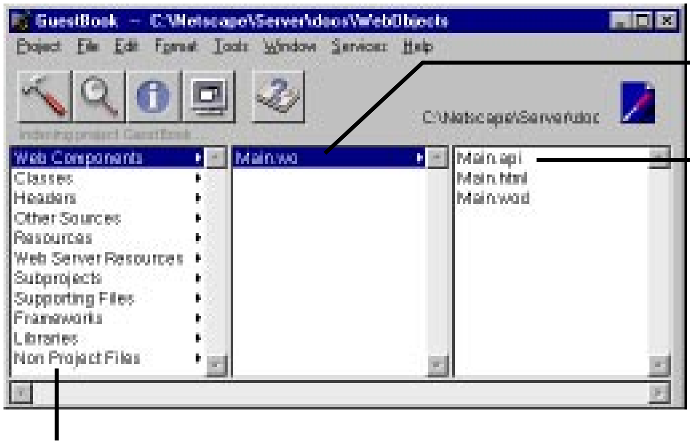
The Structure of a WebObjects Application Project

On disk, your project is a folder whose name is the project name. The project folder contains all the files in your project. The file **PB.project** is the *project file*. You can open a project by double-clicking this file.



Double-click here to open your project.

Project Builder displays a browser showing the contents of your project. The first column lists several categories of files that your project may contain. The following sections describe these categories.



Your project's components. Double-click to edit in WebObjects Builder.

Files in the selected component. Click to display their contents in Project Builder.

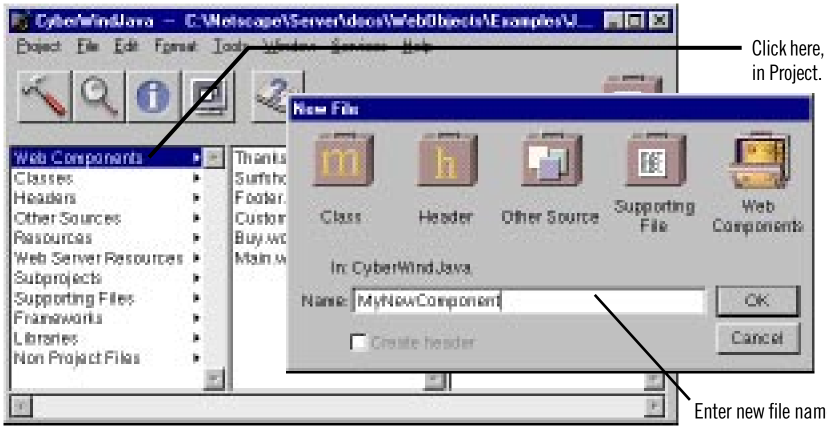
Categories ("suitcases") of project resources.

Adding or Deleting Items From a Project

As you work with your project, you'll use Project Builder to create new items (such as components or classes) or to add files (such as images) that you created with other programs to the project. For items in certain suitcases (such as subprojects and frameworks), there's a specific command to add them, discussed in the section about the suitcase. For other suitcases, you use the following procedures.

To create a new item of a particular kind:

1. Select the appropriate suitcase in first column of the browser.
2. Choose File ▸ New in Project.



Click here, then choose File->New in Project.

Enter new file name here.

The New File panel comes up with the suitcase you selected open by default.

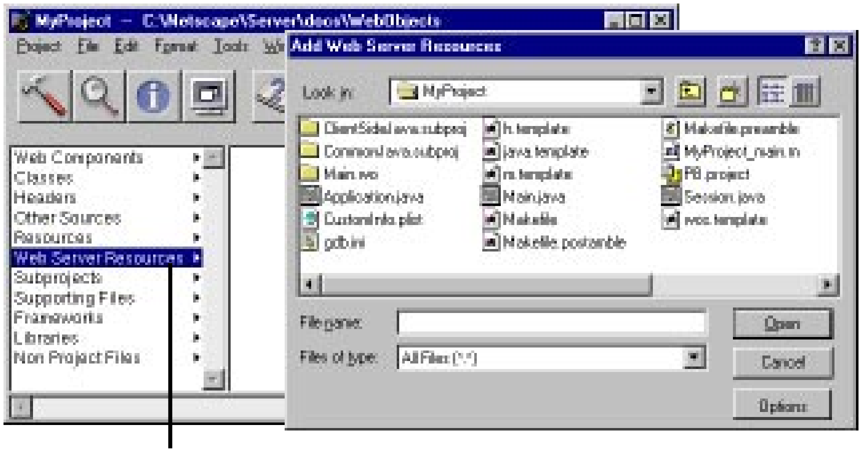
3. Type the name of the item and click OK.

   The new item is added to your project.

To add an existing item (for example, a component, a framework, or a source file) to a suitcase, first select the suitcase in the first column of the browser. Then either:

- Double-click the suitcase.
- Double-click the suitcase icon at the top right of the browser window.
- Choose Project ▸ Add Files.

A panel called Add *SuitcaseName* appears, allowing you to find an item to be added to the suitcase.



Double-click to add existing files to this suitcase.

In addition, you can drag a file directly onto the suitcase icon in the browser, and the file is copied into the project and added to the suitcase.

To delete items from a project:

1. Select one or more items in the browser.
2. Choose Project ▸ Remove Files.

   A panel appears, giving you the option of removing the files from the project only or from the disk as well.

Web Components

A *component* represents a page, or part of a page, in your application. An application can have one or more components.

Every application starts with a component called Main, which is shown in the second column of the browser as **Main.wo**. All components have the **.wo** extension.

If you double-click a component, WebObjects Builder opens the component for editing. "Editing With WebObjects Builder" shows how to edit your component using WebObjects Builder.

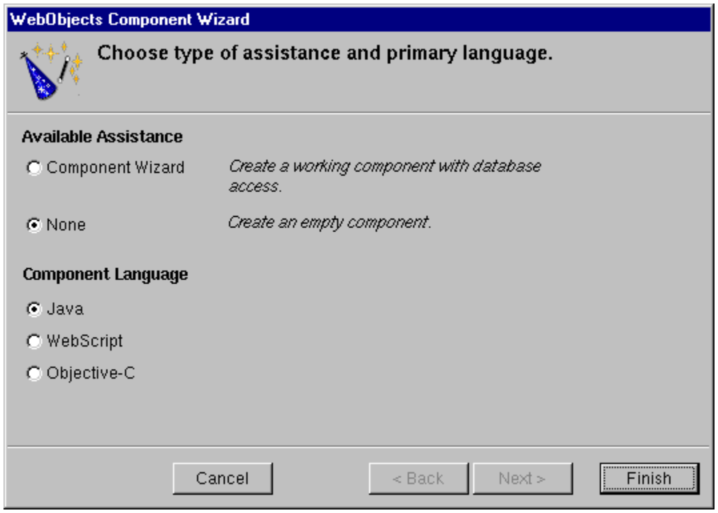
On disk, a component is represented as a folder with the **.wo** extension. Every component has several files that specify the component's look and behavior. The name of each one is the component's name followed by a specific file extension. These are the files in the Main component:

- **Main.html** is the HTML template for the component. This file contains HTML tags, just like any web page; in addition, it typically contains tags for dynamic WebObjects elements.
- **Main.wod** is the *declarations file* that specifies bindings between the dynamic elements and variables or methods in your code.
- **Main.api** is used for components that are reused by other components (see "Reusable Components").
- **Main.woo** is used to store information about display groups (if your project accesses a database) and encodings for HTML templates. You should never edit this file (it does not appear in Project Builder's browser).

To create a new component:

1. With Web Components selected in the first column of the browser, choose File ▸ New in Project.
2. In the New File panel, type the name of your project and click OK.

   The WebObjects Component Wizard appears.



WebObjects Component Wizard

Choose type of assistance and primary language.

Available Assistance

○ Component Wizard — *Create a working component with database access.*

● None — *Create an empty component.*

Component Language

● Java

○ WebScript

○ Objective-C

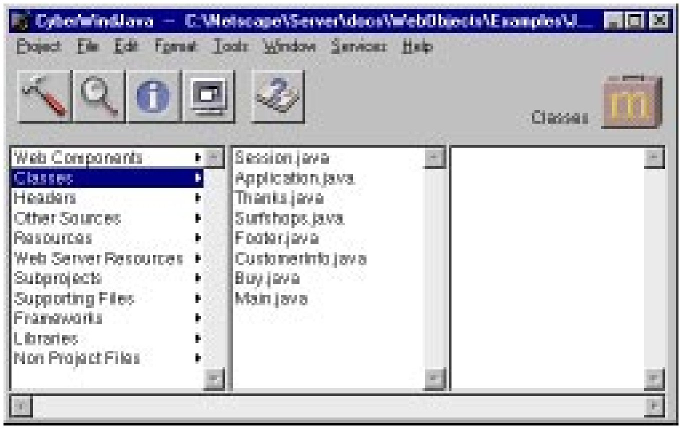
3. If you want the Wizard to assist you in creating a component with database access, choose Component Wizard from Available Assistance; otherwise choose None. See "Creating a WebObjects Database Application" in *Getting*

Started With WebObjects for more information on using the Wizard with databases.

4. Specify the language for your component and click Finish.

Classes

The Classes suitcase contains Java and Objective-C classes. If your application's primary language is Java, this suitcase contains the**Application.java** and **Session.java** files. If the primary language is Objective-C, it contains the files **Application.m** and **Session.m.** There is a class file for each component that uses Java or Objective-C, as well as any other classes you add to the project.



You can specify that Java classes are client-side, server-side, or common classes. See "Subprojects" for more information on how to do this.

Headers

The Headers suitcase contains header files for projects that use Objective-C.

Other Sources

The Other Sources suitcase contains compiled code that doesn't belong to a particular class.

Resources

The Resources suitcase contains files that are needed by your application at run time, but which do not need to be in the web server's document root (and hence will not be accessible to users). It includes:

- The **Application.wos** and **Session.wos** files, if your application's primary language is WebScript
- Configuration files
- EOModel files
- Scripted classes

Web Server Resources

The Web Server Resources suitcase contains files, such as images and sounds that must be under the web server's document root at run time. When developing your application, you place these files in your project directory and add them to the project (see "Adding or Deleting Items From a Project"). When you build your project, Project Builder copies the files in this suitcase into the WebServerResources folder of your application wrapper (see "The Application Wrapper").

Subprojects

A subproject has the same structure as a WebObjects Application project. You can use subprojects to divide large projects into manageable chunks.

When you create a new project, ProjectBuilder creates two subprojects (ClientSideJava and CommonJava) in your project folder. By default, they are not added to the Subprojects suitcase. If you need to use them, you must add them to the project. Then you can add your Java classes to the appropriate project as follows:

- Add server-side Java classes to your top-level project.
- Add client-side Java classes to the ClientSideJava subproject.
- Add Java classes that are common to both client and server to the CommonJava subproject.

Note: These subprojects have the makefile variables `JAVA_IS_CLIENT_SIDE` and `JAVA_IS_SERVER_SIDE` set in **Makefile.preamble** so that the appropriate Java code is generated when you build your project.

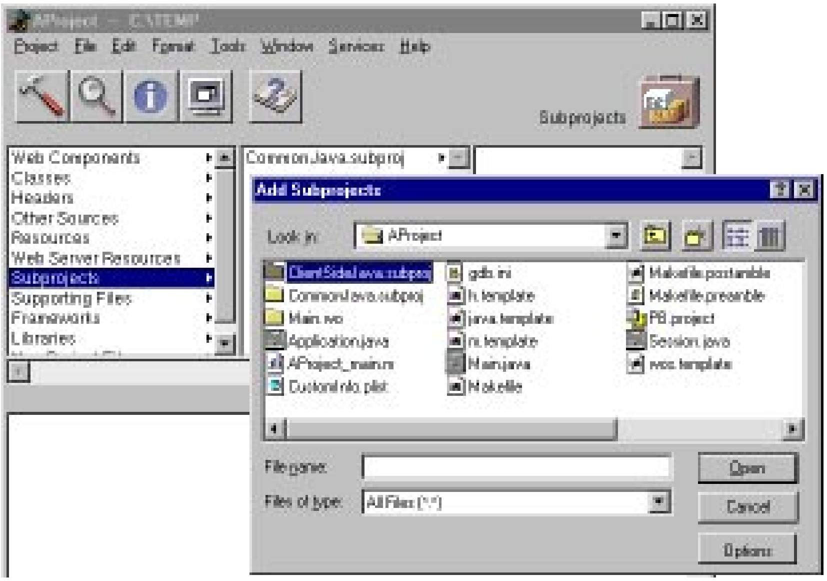
To create a subproject:

1. Choose Project ▸ New Subproject.
2. Specify the name of your subproject in the New Subproject panel and click OK.

   A subproject is created inside the project, with a similar structure to the top-level project. You can add items to the subproject in the same way that you add items to the top-level project.

To add an existing subproject (such as ClientSideJava or CommonJava) to your project:

1. Double-click Subprojects in the first column of the browser.



2. In the Add Subprojects panel, navigate to the directory of the subproject you want to add and click Open.

3. Double-click **PB.project** to add the subproject to your project.

Supporting Files

The Supporting Files suitcase contains your project's *makefile* (which you should not edit), as well as **Makefile.preamble** and **Makefile.postamble**, which you can modify in order to customize the makefile. You can add other files your project may need (such as Read Me documents) to this suitcase so that they can be edited in Project Builder.

Frameworks

A *framework* is a collection of classes and resources that an application can use. By storing items such as components and images in frameworks, you can reuse them in multiple projects without having to create multiple copies.

Every WebObjects Application project includes several frameworks by default. When you build, your application links with these frameworks. They are:

- WebObjects: The basic WebObjects classes.
- WOExtensions: Extensions to the WebObjects framework.
- Foundation: Basic object classes that most applications use.
- EOAccess: The Enterprise Objects Access Layer.
- EOControl: The Enterprise Objects Control Layer.

You can include additional frameworks in your project if you need to. To add an existing framework to your project:

1. Double-click Frameworks in the first column of the browser.
2. In the Add Frameworks panel that appears, select a framework to add and click Open.

   Frameworks are generally installed in the directory *NeXT_ROOT*/**NextLibrary/Frameworks.**

In addition, you can create your own frameworks in order to share WebObjects components and resources across multiple applications. To create a WebObjects Framework:

1. Choose Project ▸ New.
2. Select WebObjectsFramework from the pop-up menu.
3. Select the path where you want to create the framework.

Once you have created a framework, you can add components, images, and other items to it in the same way that you would add them to a project. To have your framework be accessible by other applications, you must install it (see “Installing Your Application” for more information). See “Reusable Components” for more information on using components that live in frameworks.

Libraries

The Libraries suitcase contains libraries that your application links to.

Non Project Files

The Non Project Files suitcase is used for files that you have opened that aren’t part of the current project.

Opening an Existing Project

To open an existing project from Project Builder:

1. Choose Project ▸ Open.
2. In the Open Project panel, navigate to the project folder and click Open.
3. Select the **PB.project** file and click Open.

To open an existing project from the file system, double-click the **PB.project** file in the project directory. Project Builder launches (if it is not already running) and opens the project.

Editing Your Project's Source Files

Every component in your project has a code file whose name is the name of the component followed by the appropriate extension (**.java** for Java, **.m** for Objective-C, and **.wos** for WebScript). Your project may use different languages for different components.

Each component's code specifies the component's behavior. Each component is actually a subclass of the class WOComponent (or WebComponent, in Java). This class has standard methods (such as **awake** and **init**) that you may want to override (see *WebObjects Developer's Guide* for more information on these methods). You can also write your own methods and bind them to dynamic elements in your component (see "Working With Dynamic Elements", as well as the *Dynamic Elements Reference*, for information on binding dynamic elements).

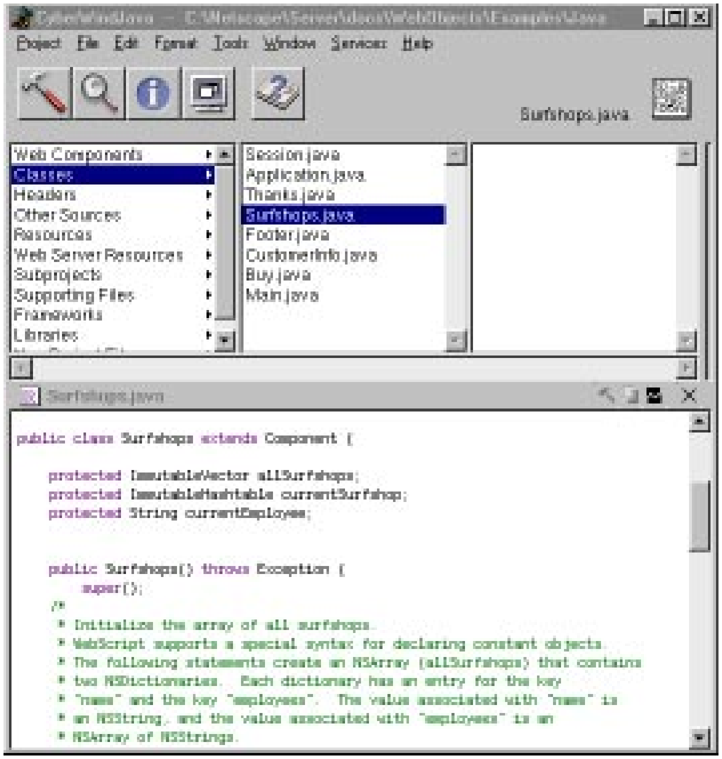
In addition to the component's code, each project has an *application code file* (**Application.java**, **Application.m**, or **Application.wos**) and a *session code file* (**Session.java**, **Session.m**, or **Session.wos**). These files implement

When you first create your project using the Wizard, you specify the language you want to use (see "Choosing the Programming Language"). This language applies to the application and session code, as well as to the code for your initial component, Main. Other components may be written in different languages.

The location of your code in the project suitcases varies somewhat depending on the language used:

- If you use Java or Objective-C, all code files appear in the Classes suitcase. On disk, they live at the top level of the project directory.
- If you use WebScript, the **Application.wos** and **Session.wos** files appear in the Resources suitcase. On disk, they live a the top level of the project directory. The component scripts (*ComponentName*.**wos**) appear in the component (*ComponentName*.**wo**) in the project and on disk.

To edit your code, select the file name in the project browser. The code appears in the bottom pane of the browser.



```
public class Surfshops extends Component {

    protected ImmutableVector allSurfshops;
    protected ImmutableHashtable currentSurfshop;
    protected String currentEmployee;


    public Surfshops() throws Exception {
        super();
    /*
     * Initialize the array of all surfshops.
     * WebScript supports a special syntax for declaring constant objects.
     * The following statements create an NSArray (allSurfshops) that contains
     * two NSDictionaries.  Each dictionary has an entry for the key
     * "name" and the key "employees".  The value associated with "name" is
     * an NSString, and the value associated with "employees" is an
     * NSArray of NSStrings.
```

To save changes in your code, choose File► Save.

Note: WebObjects Builder gets information from Project Builder about variables and methods in your code. If you add or delete a variable or method, WebObjects Builder doesn't get the updated information until you save the file.

Editing Your Component's HTML and Declarations Files

While you must use Project Builder to edit your components' code or script files, you typically use WebObjects Builder's graphical interface to generate the HTML and declarations files. You can, however, also edit these files using Project Builder.

To edit a component in WebObjects Builder:

1. Select Web Components in the first column of Project Builder's browser.
2. Double-click the component name (for example, **Main.wo**) in the second column.

   WebObjects Builder launches and opens your component in a window. See "Editing With WebObjects Builder" for information on using WebObjects Builder to edit your component.

To edit a component in Project Builder:

1. Select Web Components in the first column of Project Builder's browser.
2. Select the component you want to edit in the second column.
3. Select *ComponentName*.**html** or *ComponentName*.**wod** in the third column.

   The text of the file appears in the lower pane of the browser, where it can be edited.
4. Alternatively, you can double-click the file name or its icon at the top right of the browser, and the file opens in a separate window.

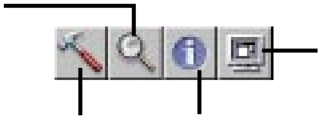
Building Your Application

You must build your application if your project contains any compiled code (Java or Objective-C). If your application uses WebScript only, you do not need to build. In this case, Project Builder runs a default executable (**WODefaultApp**) when you launch your application.

Once you have built your application, you do not need to rebuild unless you have made changes to your compiled code. You can make changes to your components (the **.html**, **.wod**, or **.wos** files) and test them without rebuilding.

Note: When you are developing a framework, you must rebuild after any change, even for changes to scripts or images. Therefore, when developing a framework, it is probably best to develop it as an application project, and once it has been tested, move its reusable pieces into a framework.

Project Builder has a toolbar with buttons you use to build and launch your application.



Click here to open the Project Find panel.

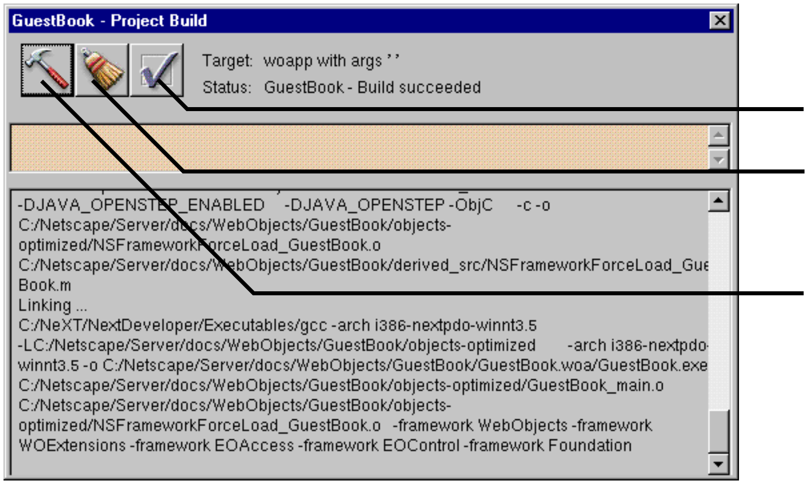
Click here to open the Launch panel.

Click here to open the Project Build panel.

Click here to open the Project Inspector.

1. Click 🔨 in the toolbar to open the Project Build panel.

2. Click 🔨 in the Project Build panel to build your project.



GuestBook - Project Build

Target: woapp with args ''

Status: GuestBook - Build succeeded

```
-DJAVA_OPENSTEP_ENABLED   -DJAVA_OPENSTEP -ObjC    -c -o
C:/Netscape/Server/docs/WebObjects/GuestBook/objects-
optimized/NSFrameworkForceLoad_GuestBook.o
C:/Netscape/Server/docs/WebObjects/GuestBook/derived_src/NSFrameworkForceLoad_Gue
Book.m
Linking ...
C:/NeXT/NextDeveloper/Executables/gcc -arch i386-nextpdo-winnt3.5
-LC:/Netscape/Server/docs/WebObjects/GuestBook/objects-optimized      -arch i386-nextpdo-
winnt3.5 -o C:/Netscape/Server/docs/WebObjects/GuestBook/GuestBook.woa/GuestBook.exe
C:/Netscape/Server/docs/WebObjects/GuestBook/objects-optimized/GuestBook_main.o
C:/Netscape/Server/docs/WebObjects/GuestBook/objects-
optimized/NSFrameworkForceLoad_GuestBook.o  -framework WebObjects -framework
WOExtensions -framework EOAccess -framework EOControl -framework Foundation
```

Click here to set build options.

Click here to “clean” the project (delete derived files).

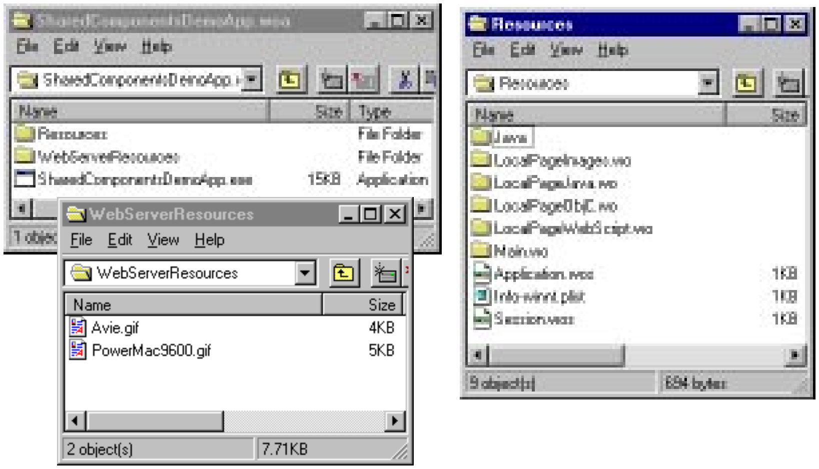
Click here to build your project.

The Project Build panel displays the commands that are being executed to build your project. If all goes well, it displays the status message “Build succeeded.”

3. Close the panel.

The Application Wrapper

When you build your project, Project Builder creates an *application wrapper*, which is a folder whose name is the project name plus the extension **.woa**.



Name	Size	Type
Resources		File Folder
WebServerResources		File Folder
SharedComponentsDemoApp.exe	15KB	Application

1 objec

Name	Size
Avie.gif	4KB
PowerMac9600.gif	5KB

2 object(s) 7.71KB

Name	Size
Java	
LocalPageImages.wo	
LocalPageJava.wo	
LocalPageObjC.wo	
LocalPageWebScript.wo	
Main.wo	
Application.wos	1KB
Info-winnt.plist	1KB
Session.wos	1KB

9 object(s) 694 bytes

The application wrapper has a structure similar to that of a framework. It consists of the following:

- The executable application.
- The application's resources.

  These include the application's components as well as other files that are needed by your application at run time.
- The application's web server resources.

When you build and install your application, Project Builder copies all the files from your Web Server Resources suitcase to a folder called WebServerResources inside the application wrapper. If you have client-side Java components in your project, these are also copied to the WebServerResources folder.

Launching Your Application

To launch your application:

1. Click 🖥 in the toolbar to open the Launch panel.
2. Click 🖥 in the Launch panel to launch your application.

When you launch your application, your machine's web browser is launched by default and it accesses your application. To turn off this feature:

1. Click ✓ to bring up the Launch Options panel.
2. Select Environment and Command-Line Arguments from the pop-up menus.
3. Enter `-browser OFF` as a command line option.

You can also launch your application directly from a command line. See*Serving WebObjects* for more information on command line options.

Also, on Windows NT systems, you can launch your application by double-clicking its executable file. When you build your application, Project Builder creates an executable file (*ProjectName*.**exe**) inside your application wrapper (**.woa**) directory.

Installing Your Application

Some files in a web application (such as images and sounds) must be stored under the web server's document root in order for the server to access them. The remaining files (such as your components and source code) must be accessible to your application but not necessarily by the web server itself.

In previous versions of WebObjects, it was typical to store the entire project under the web server's document root. This practice has advantages for turnaround time during development. However, in deployment, it presents the possibility of allowing users access to your source code. WebObjects 3.5 has a "split installation" feature that allows you to install only those files (such as images) that the web server must have access to under the document root. The remaining files can be stored elsewhere.

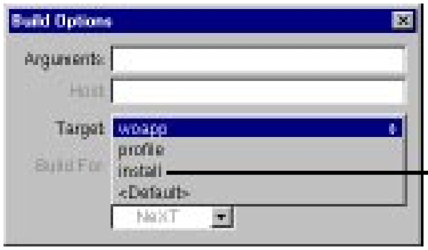
The same procedure applies to installing WebObjects applications and WebObjects frameworks. To install:

1. Click ℹ to open the Project Inspector.
2. Under "Install In:", set the path where the application wrapper will be installed. This should be *NEXT_ROOT*/**NextLibrary/WOApps** for applications and *NEXT_ROOT*/**NextLibrary/Frameworks** for frameworks.
3. In **Makefile.preamble** (in the Supporting Files suitcase), set the make variable `INSTALLDIR_WEBSERVER` to the path where your WebObjects applications

will reside under the document root, usually *DocumentRoot*/**WebObjects**. The file contains a line you can uncomment for this purpose.

4. In Project Builder's Build panel, click ✓.

5. From the Target pop-up menu, choose **install**. (By default, the target is set to **woapp**.)



Select "Install."

6. Click 🔨 in the Build panel to install your application.

   The full application wrapper is copied into the "Install In:" directory, and a wrapper containing only the Web Server Resources is copied into the document root.

See *Serving WebObjects* for more information about installing your application.

Converting Old Projects

Under version 3.5 of WebObjects, projects are organized differently than under previous versions. This section describes how to convert your old projects to the new organization so that you can work with them in WebObjects 3.5 and beyond.

If your existing project is already a WebObjectsApplication project (that is, it was created by Project Builder and has a **PB.project** file), you can use Project Builder to convert your project. If your project does not have a **PB.project** file, you must create a new project and add your existing files to the appropriate suitcases.

In version 3.5, the **.woa** extension is reserved for the application wrapper. Previously, the project directory itself had the **.woa** extension. Before converting your project, you should rename its folder to remove the **.woa** extension.

Performing the Conversion

To convert your project, open it in Project Builder. (It's a good idea to create a backup of your project before converting.) If your project was created prior to WebObjects 3.5, Project Builder detects that a conversion needs to be done. It reassigns the files in your project to new suitcases, as appropriate. It uses the file extension to determine what action to take; if there are files whose extensions it doesn't recognize, it reports these at the end of the conversion, and you must manually assign those files to the appropriate suitcases.

The following list summarizes the conversions that take place:

- Components (with a **.wo** extension) are added to the Web Components suitcase. **Note:** Only components found in the top level of the project and each subproject are moved automatically.

- Java code (**.java**) files are moved from the components into the Classes suitcase and stored at the top level of the project on disk. **Note:** Keep in mind that this may affect your source/revision control system.

  In addition, you are asked if you want to add two optional subprojects (ClientSideJava and CommonJava) to your project. You can use these to divide your Java code into client-side, server-side or common Java. See "Subprojects" for more information.

- Resources (previously in the Other Resources suitcase) are put into two new suitcases. Images with known extensions are assigned to the Web Server Resources suitcase. Other resources are assigned to the Resources suitcase. Files with unrecognized extensions are left out and you are notified.

- **WOProject.plist** is no longer used and is deleted if it is in the project.

- Several new makefile variables have been added and are appended to your existing **Makefile.preamble** with default values assigned.

- All existing subprojects are recursively converted in the same manner as the top-level project.

In the conversion process, you are prompted to confirm each type of operation. In general, you should accept the default action for each prompt; otherwise, you will have to perform the action manually.

Once the conversion has begun, there is no way to cancel it. If you choose not to convert at all, you may not be able to view some of your files, since they are assigned to suitcases that aren't visible.

Moving Your Images

After the project is converted, there are additional changes you may want to make in order to take advantage of the new features of WebObjects 3.5. In previous versions, images were stored inside the components themselves. To support the new "split installation" procedure, images should be stored in the Web Server Resources suitcase, so that the web server can access them at run time. (When you build your project, the items in this suitcase are copied to the **WebServerResources** directory inside the application wrapper.)

When using the dynamic elements WOImage and WOActiveImage, you use their **filename** attribute to reference images inside the **WebServerResources** directory. You may also have images in a framework that can be shared by multiple applications. To access these images, use the **framework** attribute to specify the framework name. See "Working With Dynamic Elements" in this document and the *Dynamic Elements Reference* for more information.

Chapter 2

Editing With WebObjects Builder

Introduction

WebObjects Builder is an application that provides graphical tools for creating dynamic web pages (*components*). This chapter describes the basic procedures of creating your components' content with WebObjects Builder.

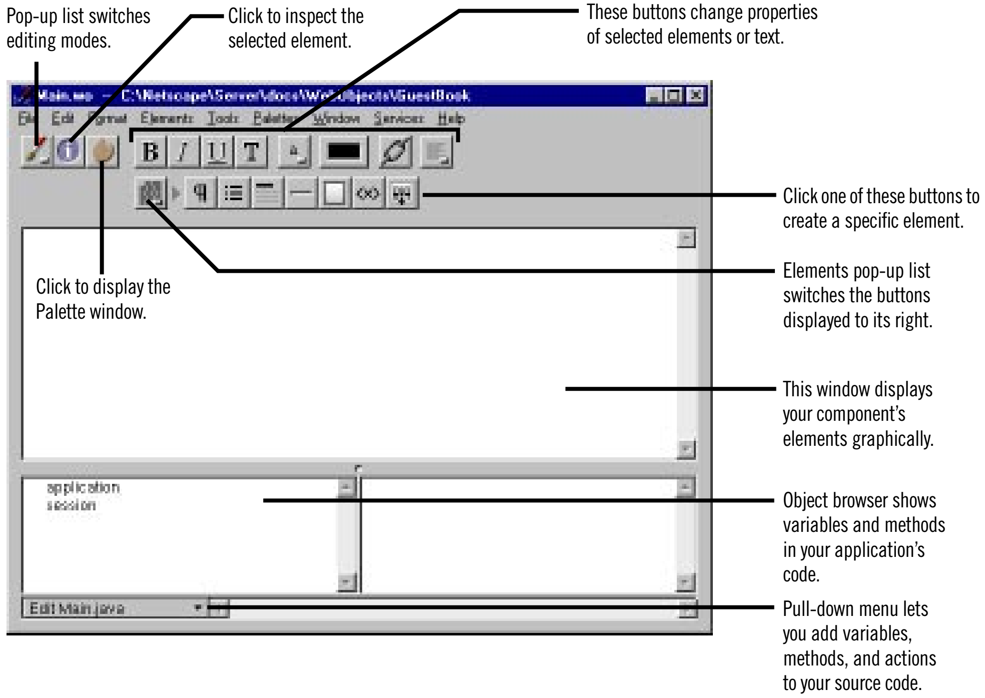
A web page consists of *elements*. WebObjects Builder allows you to add most of the common HTML elements to a component by using its graphical editing tools. You can type text directly into a component window and you can add additional HTML elements by using the buttons in the toolbar (or their menu equivalents).

In addition, WebObjects allows you to create *dynamic elements*, whose look and behavior are determined at run time. This chapter focuses on basic editing tasks and the use of standard HTML elements. The next chapter, "Working With Dynamic Elements", provides more specifics on using dynamic elements.

The Component Window

When you open a component, WebObjects Builder displays it in a *component window.* You create your component's appearance graphically in the upper pane of the component window. The browser at the bottom of the window (known as the *object browser)* displays variables and methods your component uses.

The toolbar at the top of the window contains several buttons you use to create the content of your component. WebObjects Builder also has menu commands corresponding to these buttons.


Main.wo — C:\Netscape\Server\docs\WebObjects\GuestBook
File Edit Format Elements Tools Palettes Window Services Help
B I U T
application
session
Edit Main.java

Pop-up list switches editing modes.

Click to inspect the selected element.

These buttons change properties of selected elements or text.

Click one of these buttons to create a specific element.

Click to display the Palette window.

Elements pop-up list switches the buttons displayed to its right.

This window displays your component's elements graphically.

Object browser shows variables and methods in your application's code.

Pull-down menu lets you add variables, methods, and actions to your source code.

Note: Depending on the width of the window, the toolbar may appear in two rows or one.

The WebObjects Builder Toolbar

At the left of the toolbar are three buttons:

The ✎ pop-up list allows you to switch editing modes. See "Editing Modes".

The ⓘ button brings up the Inspector window, which allows you to set various attributes of the currently selected element. The sections describing each type of element go into more detail on the Inspector.

The 🎨 button brings up the Palette window. See "Palettes" for more information on creating and using palettes.

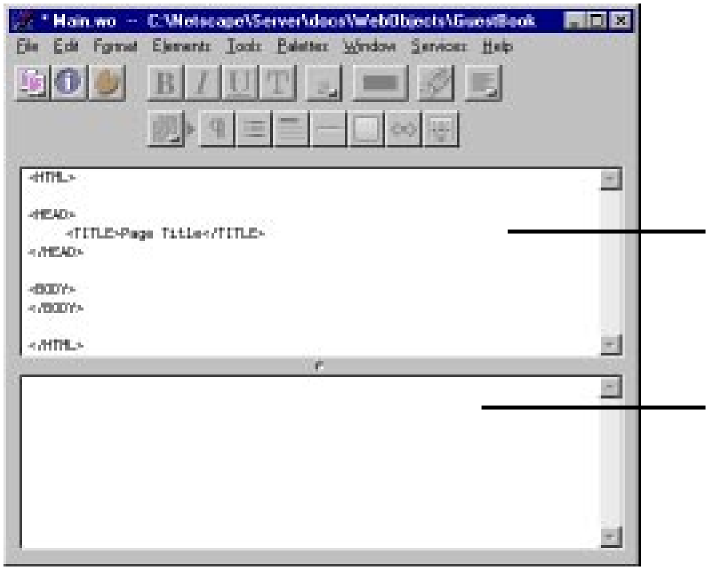
Editing Modes

WebObjects Builder allows you to view and edit your page in two modes:

- *Graphical mode* shows a visual representation of your component, including its dynamic elements. The bottom pane, the object browser, lists the variables and methods that are defined in your scripts or code files.

- *Source editing mode* shows the text of your component's HTML template in the upper pane and the text of your declarations (**.wod**) file in the lower pane. In this mode, you can enter any HTML code. For example, you can include HTML elements that are not directly supported by WebObjects Builder's graphical tools.

The pop-up list at the left of the toolbar allows you to switch between graphical editing mode and source editing mode. When you choose source editing mode, the text of your HTML template (*ComponentName*.**html**) appears. When you add elements graphically, their corresponding HTML tags appear in this file.



```
<HTML>

<HEAD>
    <TITLE>Page Title</TITLE>
</HEAD>

<BODY>
</BODY>

</HTML>
```

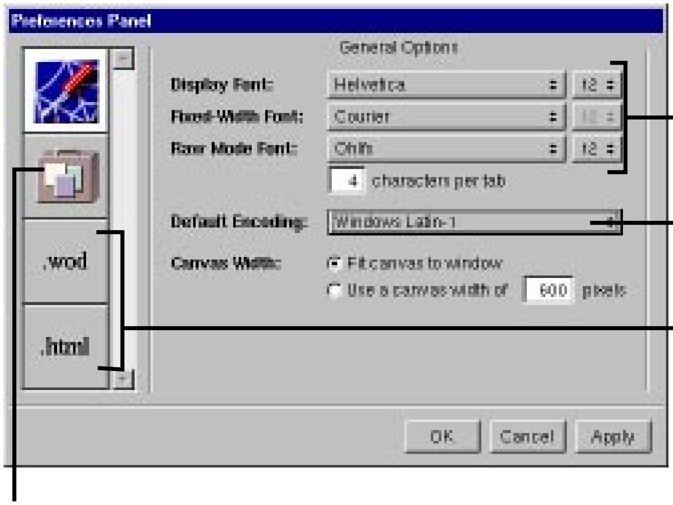
The HTML source for your component.

Information about bindings is displayed here.

As you can see, when you begin with a blank page, WebObjects Builder automatically inserts the necessary elements such as `<HTML>`, `<HEAD>`, and `<BODY>` for you.

The bottom pane shows your declarations (**Main.wod**) file. When you bind variables to your dynamic elements, this file stores the information. Normally, you don't edit this file directly. "Working With Dynamic Elements" shows how you use WebObjects Builder to create bindings. Refer to the *WebObjects Developer's Guide* for more information on working with the declarations file.

The Preferences panel provides several options for how text is displayed in both graphical and source editing modes. Choose Tools ▸ Options to bring up the panel. For information on resource-handling preferences, see "Dragging Elements into the Component Window".



Preferences Panel

General Options

Display Font: Helvetica 12

Fixed-Width Font: Courier 12

Raw Mode Font: Ohfs 12

4 characters per tab

Default Encoding: Windows Latin-1

Canvas Width: ● Fit canvas to window

○ Use a canvas width of 600 pixels

Set default fonts here.

To change the encoding of your HTML document, choose one from this pop-up list.

Click here to display formatting preferences for HTML and declarations files.

Click here to display resource-handling preferences.

Entering Text

When you begin to edit a new component, the cursor (insertion point) appears at the upper left of the screen. You can begin typing text directly, and the text appears in the default font and size. If you press Enter, a line break (`<BR>` element) is inserted after the line. If you want a paragraph element (`<P>`), press Shift-Enter. See "Structure Elements" for information on other types of text elements.

The top row of the toolbar contains a set of buttons that operate on the currently selected text. If no text is selected, they change the setting for any text typed in at the insertion point.

B I U T: These buttons allow you to toggle the style of the currently selected text. You can set any combination of bold (`<B>`), italics (`<I>`), underline (`<U>`) and typewriter (fixed-width) font (`<TT>`). **Note:** The user's web browser determines how these elements will actually be displayed when the application is running.

a: This pop-up list allows you to set the font size of the currently selected text.

: This color well allows you to set the color of the currently selected text. To change the color, click on the border of the color well and select a color from the Colors panel. See "Setting Colors" for more information.

: This button changes the selected text to a hyperlink.

: This pop-up list allows you to center or justify text.

Note: Version 3.5 of WebObjects Builder does not support Undo. It is recommended that you save components frequently as you are working. If you make a mistake and want to undo it, you can revert to the last saved version of the component.

Creating Elements With the Toolbar

To create HTML elements, you use the buttons on the bottom row of the toolbar (or at the right of the toolbar if your window is large). There are four groups of buttons, only one of which is displayed at a time. The pop-up list lets you switch the group of buttons that are displayed to its right. The groups are:

- **Structures** . Use these buttons to create paragraphs, lists, images, and other static HTML elements. See "Structure Elements" for more information.

- **Tables** ⊞. Use these buttons to create and manipulate HTML table elements. See "Working With Tables" for more information.

- **Dynamic form elements** . Use these buttons to create form elements in which users enter information. WebObjects gives your application access to the data entered by users by allowing you to associate, or *bind*, these elements to variables in your application. See "Creating Form-Based Dynamic Elements" for more information.

- **Other WebObjects** . Use these buttons to create other dynamic elements, which you can bind to variables and methods in your program to control how they are displayed. Some of these (such as hyperlinks) have direct HTML equivalents. Others are *abstract dynamic elements*, such as repetitions and conditionals, which determine how many times an element is displayed or whether it is displayed at all. See "Creating Other WebObjects" for detailed information.

The general procedure for creating an HTML element is:

1. Place the cursor where you want the element to appear on the page.
2. Click the toolbar button representing the element you want.

   The element is placed at the cursor position.
3. Select the element (see “Selecting Elements”). In most cases, the element is already selected when you create it.
4. Bring the Inspector to the front by clicking it. If it is not open, click ⓘ.

   In the Inspector, you can set various properties of the element. For example, you can change a paragraph’s type from plain to preformatted.

It’s useful to be aware of what happens when you have text or other elements selected and you create a new element:

- If the new element is a *container* element (that is, it can contain other elements), the selected elements are “wrapped” or contained inside the new element.
- If the new element cannot contain other elements (for example, a horizontal rule or image), the new element replaces the selection.

Menu Equivalents For Toolbar Commands

All the toolbar buttons have menu equivalents. This document refers to the toolbar buttons, but of course you can use the menu commands as well:

- The Elements menu contains equivalents for all the buttons that create elements (that is, the switchable toolbar).
- The Format menu contains equivalents for the buttons that affect the selected text.
- The Tools menu contains commands to open the Inspector and Palette windows (and other commands).

Selecting Elements

There are several operations you perform in WebObjects Builder that require you to select an element, such as copying, deleting, inspecting, or “wrapping” one element inside another.

You select text elements as you would in most text-editing applications: by dragging, or by double-clicking words, or by triple-clicking lines, or by Shift-clicking. The selected text appears with gray shading.

Some elements (such as text fields and text areas) can be selected simply by clicking them; they appear with a gray line underneath.

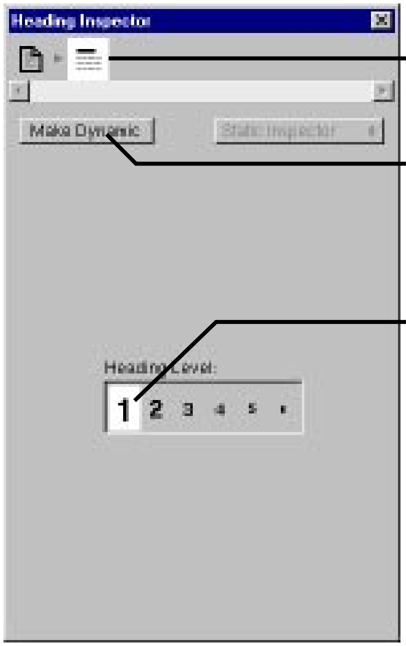
Other elements (such as tables) require you to click outside the element and drag across it in order to select it.

To select a range of elements, drag across them, or press the Shift key while clicking at the end of the range.

The Inspector

You use the Inspector to set HTML attributes of the elements in your component.

To open the Inspector, click ⓘ. The Inspector's title and contents reflect the element you've selected in the component window. Each element has its own Inspector that allows you to set properties appropriate for the element. For example, the Heading Inspector shown here allows you to set the level of a heading element. Other elements have different properties that you can set.



The element path. Click to inspect different elements in the hierarchy.

Click here to make static elements dynamic and vice versa.

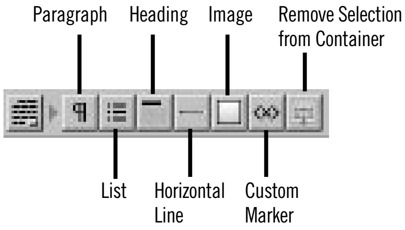
Click here to set the heading level.

The top of the window shows the *element path* to the selected element. Any element can be contained in a hierarchy of several levels of elements and can in turn contain other elements. Here, the element path shows that the heading element is contained in the page element, which is the top level of the hierarchy. When you click an icon in the element path, the appropriate Inspector for that element appears. In this case, if you click the page icon, the Page Attributes Inspector appears. (**Note:** If no element is selected, the Inspector shows Page Attributes by default.)

The Make Dynamic button in the Inspector allows you to convert an HTML element into a dynamic WebObjects element. Dynamic elements have a Make Static button, which allows them to be converted to their static counterparts. This feature is discussed in more detail in "Dynamic and Static Inspectors".

Structure Elements

By default, the switchable toolbar displays the Structure elements.



The following sections describe the elements you can create with these buttons.

Paragraphs

Click ¶ to create a new paragraph. If there is a text selection, the entire selection becomes a paragraph.

You can use the Inspector to set the paragraph to one of the following tags:

- Plain (`<P>`)
- Preformatted (`<PRE>`)
- Address (`<ADDRESS>`)
- Block quote (`<BLOCKQUOTE>`)
- Division (`<DIV>`)

Lists

Click ☰ to create a new list. If there is a selection, each line in the selection becomes a list item (`<LI>`). By default the list is an unordered (bulleted) list (`<UL>`). You can use the Inspector to change the list to an ordered list (`<OL>`). You can also change the way in which lists appear; for example, displaying an ordered list in Roman numerals (on browsers that support this feature).

When typing in a list:

- Press Shift-Enter to create a new list item. (If you simply press Enter, you will create a line break but no new list item.)
- Press Tab to create a new list nested inside the original list.
- Press Shift-Tab to move the nesting out one level.

Headings

Click ▤ to create a heading. By default, an `<H3>` element is created. You can use the Inspector to change the level of the heading to between `<H1>` and `<H6>`.

Horizontal Rule

Click — to create horizontal rule (`<HR>`) element. You can use the Inspector to vary its height and width, and whether it is displayed in 3D.

Images

Click □ to add a static image (`<IMG>`). A Select Image panel appears, allowing you to select an image file to display at the insertion point. The Inspector allows you to change the image's properties, including its size, file path, and whether it uses an absolute or relative reference.

Note: Any selected elements are replaced by the image.

With static images, you must specify a known file path. You can also create a *dynamic image*, which refers to an image file that lives in your project or in a framework. See “Dynamic Images” for more information.

To set an image for the page background, see “Setting Page Attributes”.

Custom Marker

Not all legal HTML elements can be created directly using WebObjects Builder's buttons or menu commands. However, you can create any type of element using the custom tag.

To create an HTML element using a custom marker:

1. Place the cursor where you want the element.

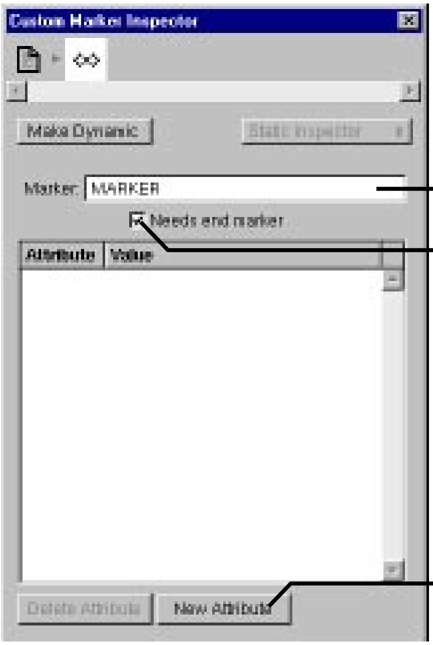
2. Click ⟨⟩.

   Custom Marker appears in the component window. You can replace the text "Custom Marker" with the content of the element (if any).

3. In the Inspector, enter the tag's name in the Marker field.

4. If the element doesn't require an end tag, uncheck "Needs end marker."

5. If the element has attributes you want to specify, click New Attribute, then enter the attribute's name and value.



Marker: MARKER

☒ Needs end marker

Enter the element's tag.

Check if element requires end tag.

Click to add an element attribute, then enter its value.

For example, if you want to create a `<DL>` element, you would create a custom marker and enter `DL` for its name in the Inspector's Marker text field. Because "Needs end marker" is checked, the `</DL>` end tag is inserted for you.

You can also enter source editing mode and type the marker and its text directly.

Tip: To save a custom element so you can use it again, save it on a palette. See “Palettes”.

Removing Elements or Text From a Container

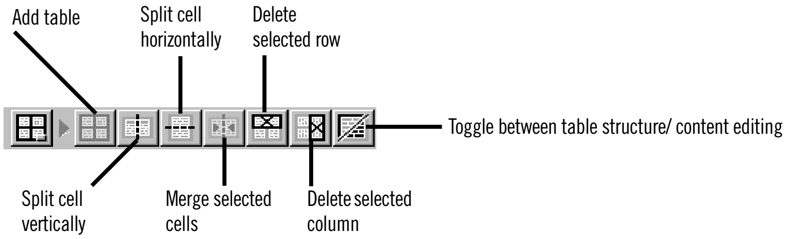
You can remove an element or text from a containing element. For example, if you’ve typed some text inside a form, but you decide you want the text to be *outside* the form:

1. Select the text.
2. Click <x> or choose Elements ▸ Promote Selection.

   This causes the text to be removed from the form.

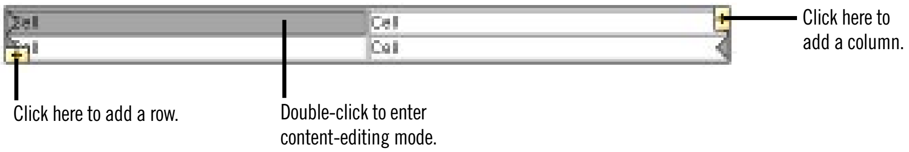
Working With Tables

To work with tables, you use the Tables section of the switchable toolbar (or the equivalent commands in the Elements ▸ Table menu).



Creating Tables

To create a table, click ⊞ from the toolbar. A 2x2 table is created at the insertion point. Its width is 100% of the window.


Cell
Cell
Cell
Cell
Click here to add a column.
Click here to add a row.
Double-click to enter content-editing mode.

To add a column, click the ⊞ icon at the upper right of the table. The column is added at the right of the table.

To add a row, click the ⊞ icon at the lower left of the table. The row is added at the bottom of the table.

Table Editing Modes

There are two “modes” that you can be in when working with tables. When you first create a table, you are in “structure editing” mode, indicated by the gray handles and ⊞ icons. In this mode, you can select cells, groups of cells, or the entire table, and perform operations on them.

The other mode is “content editing” mode, in which you can insert text or other elements (including other tables) inside table cells. In this mode, the gray handles and ⊞ icons are not present.

To change from structure editing to content editing mode, double-click in a cell. The cell’s contents are selected, and you can type or select an element from the toolbar to replace them. To change from content editing to structure editing mode, press Control and click in any cell other than the one that was selected.

Alternatively, you can switch from one mode to the other by clicking ▦ in the toolbar. Also, after you’ve clicked anywhere outside a table, clicking in the table puts you in content editing mode; Control-clicking puts you in structure editing mode.

In structure editing mode, you can:

- Select an individual cell by clicking it.
- Select a row by clicking one of the gray handles at the end of the row.
- Select a column by clicking the top cell in a column and dragging to the bottom.
- Select additional cells by clicking them while holding down the Shift key.
- Select the entire table, or any group of contiguous cells by clicking and dragging.
- Delete a row by selecting it (or any cell in the row) and clicking ⊠.
- Delete a column by selecting any cell in the column and clicking ⊠.

- Split a selected cell horizontally by clicking ⊟ or vertically by clicking ◫.

- Merge a group of selected contiguous cells into a single cell by clicking ⧓. **Note:** This command isn't enabled unless the selected cells make up a group that could logically be merged into one cell.

- Wrap an abstract dynamic element (conditional or repetition) around a selected row or cell (see "Repetitions") by clicking dynamic element's icon in the toolbar.

In content editing mode, you can:

- Type text in the cell.

- Add another element inside a cell (by clicking its toolbar icon or using a menu command).

In either mode, you can press Tab to move to the next cell to the right (or the first cell of the next row if in the rightmost column). Pressing Shift-Tab moves in the opposite direction through the table.

A special case arises when you have embedded a table within a table cell. In this case:

- To edit text in a cell in the embedded table, just click in the cell.

- To select the embedded table or one of its elements, first click in the cell surrounding the embedded table, and then Control-click the embedded table to select it.

Sizing Tables

By default, the size of a table is determined by the contents of the table's cells. If you type text (or insert other elements) inside a table cell, the cell's width expands as necessary to fit the data. The width of any column, therefore, will be that of the widest cell in the column. **Note:** In WebObjects Builder, a cell does not resize until you have completed editing the cell and tabbed to another cell or moved out of the table.

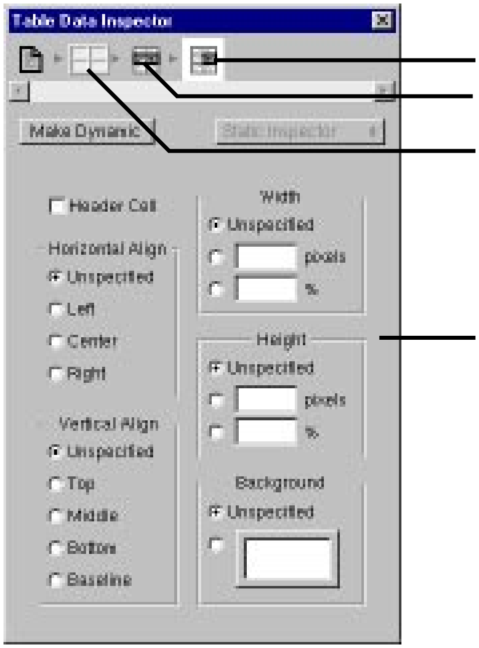
If you want to set the size of a table or cell explicitly, use the Inspector:

- To set the width or height of a table, select the table and use the Table Inspector. You can enter values that correspond to HTML attributes controlling the size of the table.

- To set the width or height of a cell, select the cell and use the Table Data Inspector. Changing a cell's size affects the size of the column or row containing the cell.

Inspecting Tables, Rows, and Cells

An HTML table (<TABLE>) is a hierarchical structure, which contains rows (<TR>); rows in turn contain cells (<TD>). When you select any of them, the Inspector shows the path from the selected element up through the page, and you can inspect any element in the path by clicking its icon. For example, if you select a table cell, you can inspect the cell (with the Table Data Inspector), the row, or the table itself.



☐ Header Cell

Horizontal Align
● Unspecified
○ Left
○ Center
○ Right

Vertical Align
● Unspecified
○ Top
○ Middle
○ Bottom
○ Baseline

Width
● Unspecified
○ pixels
○ %

Height
● Unspecified
○ pixels
○ %

Background
● Unspecified
○

This icon denotes the table cell.

Click here to inspect the table row.

Click here to inspect the table.

Use these fields to set the table cell's HTML properties.

You can set the HTML properties of any table element (for example, its height or width) using the Inspector.

Note: When you type a value (such as number of pixels) in one of the Inspector's fields, you must press Enter for the change to take effect. In other words, if you simply type the value and move to another field, the change does not take place.

Creating Hyperlinks

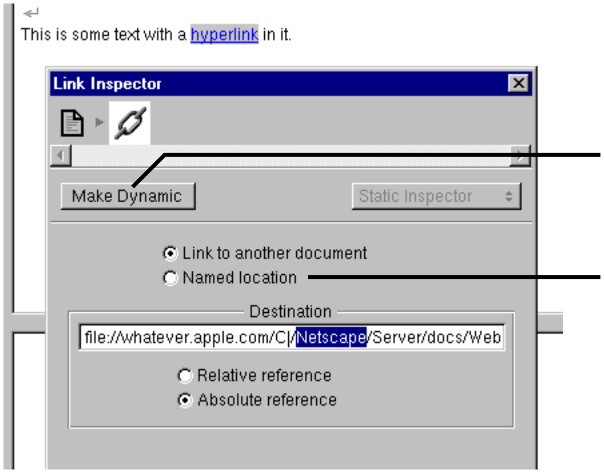
There are two types of hyperlinks that you can use in a WebObjects application:

- A static hyperlink (which uses the HTML `<A>` tag), whose destination is constant.
- A dynamic hyperlink (WOHyperlink), whose destination can be specified at run time. See "Dynamic Hyperlinks" for more information about these.

To create a static hyperlink:

1. Click 🔗 on the toolbar.
2. Type the text that the hyperlink should contain. As you type, the text is underlined.
3. Click 🔗 again.

   Alternatively, you can select existing text and then click 🔗 once to convert the text to a hyperlink.
4. Use the Inspector to set the destination of the link.



This is some text with a hyperlink in it.

● Link to another document
○ Named location

Destination: file://whatever.apple.com/C|/Netscape/Server/docs/Web

○ Relative reference
● Absolute reference

Click to make hyperlink dynamic.

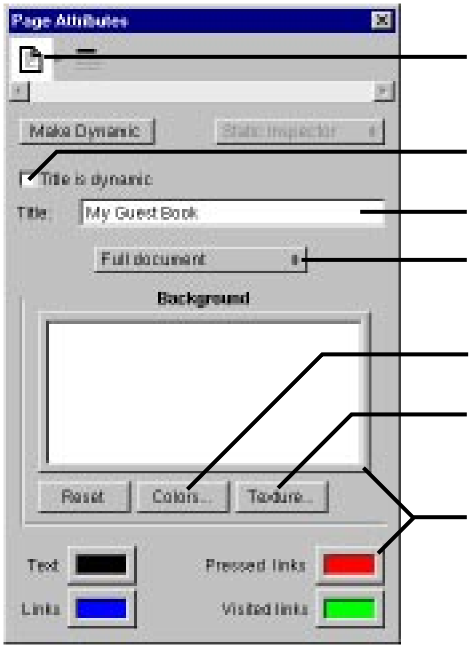
Click to make this element an anchor that can be the destination of a link.

Note: While the destination of a static link cannot change, it's possible to vary its text at run time by using a dynamic string (see "Dynamic Strings") inside the hyperlink.

Setting Page Attributes

The top level in the element hierarchy is always the page itself. To inspect a page's attributes:

1. Select any element in the page.
2. In the Inspector, click the leftmost icon in the element path. (If necessary, click the Inspector button in the toolbar to display the Inspector.)



Title: My Guest Book

Full document

Click here to display Page Attributes.

Click here to make the title a dynamic string.

Enter the page title (or the binding if the title is dynamic)

Select Partial document if the component is designed for reuse within other components.

Click to open the Colors panel.

Click to choose a background image.

Click borders to open the Colors panel and set the color.

The Title text field allows you to set the title of the document. If you click the "Title is dynamic" checkbox, the title becomes a dynamic string whose value is determined at run time. You enter its binding in the Title field. See "Dynamic Strings" for more information.

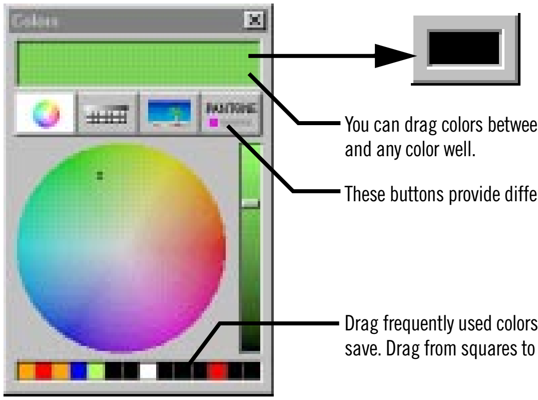
You can set the colors to be displayed for the page's background, text, or links by clicking in the border of the appropriate color well (or by clicking Colors). (See "Setting Colors" for more information on using the Colors panel.) To select an image to use as the page's background, click Texture.

Setting Colors

WebObjects Builder allows you to set the colors for a page's background, selected text, and hyperlinks.

To set the color of selected text in the component window, click in the border of the color well in the toolbar. To set other colors, use the Page Attributes Inspector.

Clicking the border of any color well brings up the Colors panel.



You can drag colors between this panel and any color well.

These buttons provide different ways to select colors.

Drag frequently used colors to these squares to save. Drag from squares to a color well to apply.

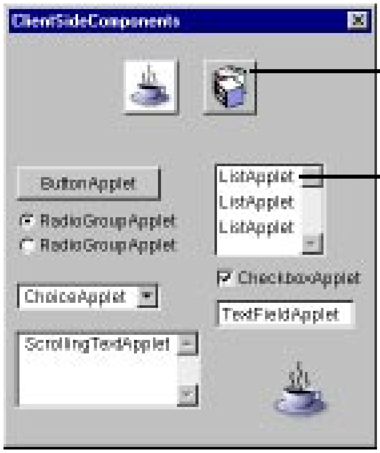
The Colors panel provides several methods of selecting colors. When you select a color, it appears in the currently selected color well.

You can drag colors from one color well to another, to the window at the top of the Colors panel, or to one of the squares at the bottom of the Colors panel to save it.

Palettes

A palette is a collection of resources (such as images, static or dynamic HTML elements, and components). You can drag elements from a palette to a component to use them. You can also drag elements from a component to a palette to store them.

Palettes appear in WebObjects Builder's palette window. To open the palette window, click on the toolbar or choose Tools► Palette.



Click to display this palette.

Drag an item onto the window to insert into the component.

The icons at the top of the palette window show the available palettes. To select a palette, click its icon. Two pre-configured palettes are provided: Java client-side components and components from the WOExtensions framework.

You can create your own palettes to store frequently-used items, such as custom forms, tables, or images, and you can load palettes created by someone else.

To create a new palette, choose Palettes ▸ New Palette. A panel appears, asking you to specify a location to save the palette. (A palette is represented on disk as a folder with the extension **.wbpalette**.) The palette appears in the palette window with the default palette icon . To change the palette's icon, see "Changing a Palette Icon".

To add an existing palette to the palette window:

1. Choose Palettes ▸ Open Palette.
2. Navigate to the palette's location and click Open.

To remove a palette from the palette window:

1. Select the palette in the palette window.
2. Choose Palettes ▸ Close Palette.

Creating and Using Palette Items

To add an item from a component to a palette:

1. Make the palette editable.

If the palette’s background is gray, you can’t make any changes to it. To enable editing, choose Palettes ► Make Editable. The palette's background changes to white and its title says “Alt-drag to insert item.” **Note:** When you first create a palette, it is editable until you save it.

2. In the component window, select the element or elements that you want to add to the palette.

3. Hold down the Alt key and drag the selection to the palette.

   The cursor changes to html and displays in the palette when you are done dragging. You can change the title of the item by selecting its name and typing. To change the item's icon, see “Changing a Palette Icon”.

You can also add any item from the file system to a palette (including such things as a component, an image, or an EOModel). To do so:

1. Make the palette editable.

2. Locate the item in the file system.

3. Drag the item onto the palette.

   For example, to add a component to a palette, you would drag its **.wo** folder to the palette.

   Note: On Windows NT, you can't drag an item directly to the palette, because the palette window doesn't appear unless a WebObjects Builder window is in the foreground. Therefore, you must drag the item to WebObjects Builder's icon in the taskbar at the bottom of the screen and hold it until the palette window appears. With the mouse button still down, drag the item to the palette.

When you are done adding elements to your palette, choose Palettes► Save Palette. The background changes to gray, indicating that the palette is no longer editable.

To copy an item from a palette to the component window:

1. Make sure the palette is not editable (if its background is white, choose Palettes ► Make Editable).

Note: If the palette is editable, you can drag the item to the window, but it will disappear from the palette.

2. Drag the item from the palette to the location in the component window where you want it to appear.

Changing a Palette Icon

You can replace the icon of any palette, or any item in a palette, with an image of your own choosing. To do so:

1. Open the palette window and select the palette whose icon you want to change.

2. Make the palette editable.

3. Drag an image from the file system onto the palette's icon.

   You can use any image file recognized by WebObjects Builder (such as a **.gif**, **.tif** or **.jpg** file) to change the icon of a palette or of any item in the palette.

   Note: The same caveat for dragging items to the palette on Windows NT applies (see "Creating and Using Palette Items").

4. Save the palette.

Chapter 3

Working With Dynamic Elements

Introduction to Dynamic Elements

A *dynamic element* is an element whose exact HTML representation isn't determined until run time. Dynamic elements are represented in the HTML template by the tag `<WEBOBJECT>`.

There are several types of dynamic elements that you can use in your WebObjects applications. Some of them (such as dynamic forms or images) have counterparts in standard HTML (`<FORM>` and `<IMG>`) and are always translated into those counterparts at run time. Others (such as conditionals and repetitions) are *abstract* dynamic elements, which don't translate directly into HTML but control the generation of other elements.

This chapter describes the techniques you use to add dynamic elements to your components and to bind them to variables and methods in your code. For more information on programming with dynamic elements, see "Dynamic Elements" in the *WebObjects Developer's Guide.* For details about specific dynamic elements, see the *Dynamic Elements Reference.*

Attributes

Every dynamic element has one or more *attributes.* These attributes are used for several purposes:

- Some attributes are used to determine the exact HTML to be generated when the element is displayed.

  For example, the **value** attribute of a dynamic string element (WOString) determines what text is generated in its place. At run time, WebObjects replaces the WOString with the value of the variable or method that is bound to it.

- Other attributes are used to capture information provided by users. In particular, form elements are used for this purpose.

  For example, when the user submits a form, text typed by the user into a dynamic text area (WOText) inside the form is assigned to the variable bound to the **value** attribute of the text area.

- Other attributes are used to specify actions to be taken when an event occurs.

For example, a dynamic hyperlink (WOHyperlink) has an **action** attribute that specifies an *action method* in the application that is executed when the user clicks the link.

The process of associating an attribute with a variable or method in your code is called *binding*. WebObjects Builder provides tools to make it easy for you to create bindings. Information about your bindings is stored in the declarations (**.wod**) file in your component.

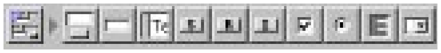
Most dynamic elements have a number of attributes that you can bind. Some are required and others are optional. For complete information about WebObjects' dynamic elements and their attributes, see *Dynamic Elements Reference.*

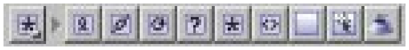
Creating Dynamic Elements

There are several methods of adding dynamic elements to your component.

Using the Toolbar

You create dynamic elements in the same way that you create other elements: by clicking buttons in the toolbar or using the menu commands. In WebObjects Builder, there are two groups of buttons in the switchable toolbar that allow you to create dynamic elements:

- The Forms toolbar  allows you to create dynamic form elements. (You can also create standard HTML form elements using this toolbar.) See "Creating Form-Based Dynamic Elements" for more detailed information about working with forms.

- The Other WebObjects toolbar  allows you to create all other types of dynamic elements. See "Creating Other WebObjects" for more detailed information about each type of element.

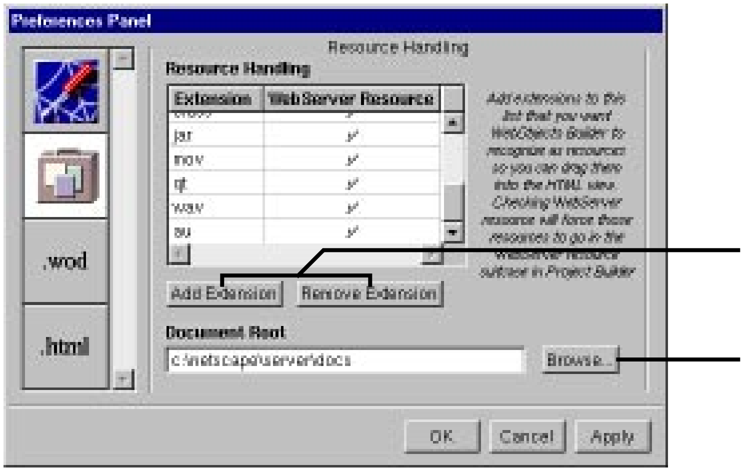
Dragging Elements into the Component Window

Some elements can be created by dragging an item from the file system into a component window. These include:

- Components (see "Reusable Components")
- Client-side Java components (see "WOApplets")
- Image files and image maps (see "Dynamic Images")

In addition, you can also drag a model file (of type **.eomodeld**) into a component to create a variable of type WODisplayGroup (see “Adding Display Groups”).

Certain file types (such as **.gif**, **.jpeg**, **.tif**, **.eps**, and **.bmp**) are automatically recognized by WebObjects Builder. The Preferences Panel (which you display by choosing Tools ▸ Options) shows a list of file extensions that WebObjects Builder accepts. You can drag any item with one of those file extensions into a component window, and the item will be added to your project. You can add file types if you need them.



Resource Handling

Resource Handling

Extension	WebServer Resource
jar	✓
mov	✓
qt	✓
wav	✓
au	✓

Add extensions to this list that you want WebObjects Builder to recognize as resources so you can drag them into the HTML view. Checking WebServer resource will force those resources to go in the WebServer resource suitcase in Project Builder

Document Root

c:\netscape\server\docs

Click here to add or remove extensions that WebObjects Builder recognizes.

If you’ve changed your document root, click here to inform WebObjects Builder.

Using the Add WebObject Panel

The Add WebObject panel is an advanced feature for those who wish to work in source editing mode. It allows you to add a dynamic element and set its bindings by hand.

1. In source editing mode, place the cursor at the point in the HTML template where you want to add the element.

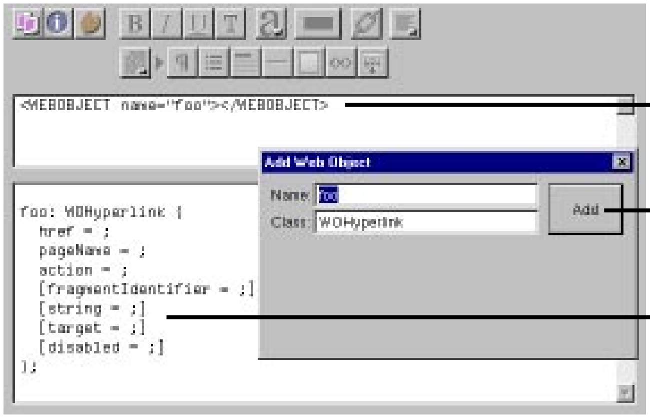
2. Choose Tools ▸ Add WebObject.

   A panel appears that allows you to create a dynamic element by entering its class and its name. The name is used by the HTML template and declarations (**.wod**) file to uniquely identify the element. (Normally, you allow WebObjects Builder to generate names for you, but if you add elements in source editing mode, you must specify their names.)

3. Click Add.

The element appears in the HTML template. A template appears in the lower pane (the declarations file) showing the bindable attributes of the element. Elements in brackets are optional. See "Binding Elements" for more information on bindings.

Note: You must type in the bindings of all the attributes you want to bind, and delete the others. Otherwise, you will not be able to switch back to graphical editing mode or save the file.



```
<WEBOBJECT name="foo"></WEBOBJECT>
```

```
foo: WOHyperlink {
  href = ;
  pageName = ;
  action = ;
  [fragmentIdentifier = ;]
  [string = ;]
  [target = ;]
  [disabled = ;]
};
```

Add Web Object

Name: foo

Class: WOHyperlink

Element appears in HTML source view.

Click here to add element at cursor position.

Template for element's bindings appears in declarations file.

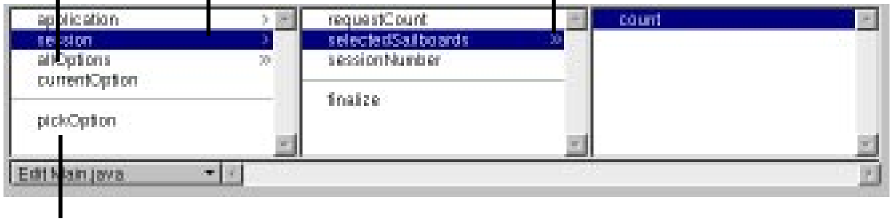
The Object Browser

The bottom part of the component window is the *object browser*, which displays your application's variables and methods. This display provides a graphical method of binding objects in your code to dynamic elements in the component.

Keys (variables and methods) appear above the line.

Select key to display its keys and actions in next column (indicated by ">".

">>" indicates an array. Select it to show its **count** method in next column.



Actions appear below the line.

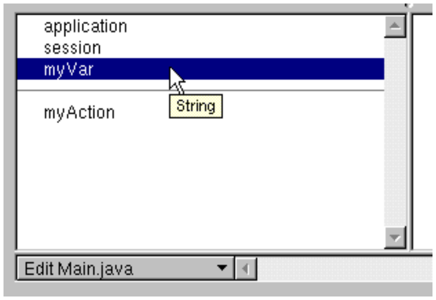
The first column of the object browser displays two types of objects:

- *Keys* are displayed above the horizontal line. A key can be either an instance variable or a method that returns a value.
- *Actions* are displayed below the line. An action (or action method) is a method that takes no parameters and returns a component (the next page to be displayed).

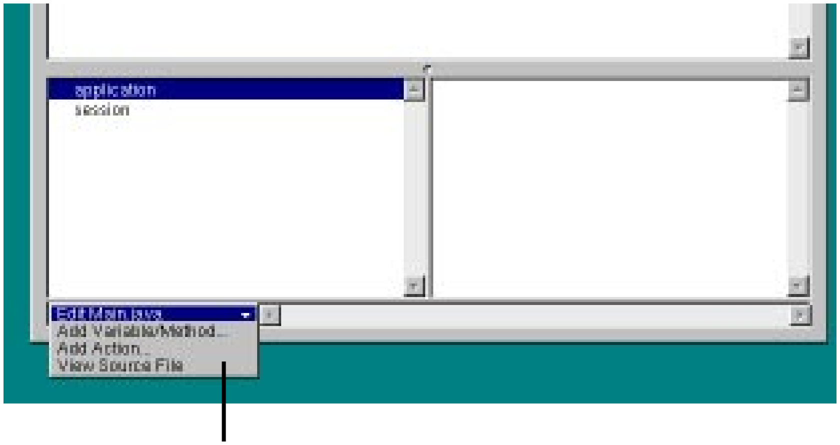
A ">" next to an object's name in the browser indicates that it contains additional keys and actions, which are displayed in the next column when you select it.

In the figure, for example, the **session** object is selected, showing that there are keys and actions defined in the session code. One of these, **selectedSailboards**, is an array (indicated by the ">>"), and the array's **count** method is displayed in the next column.

Note that if you point to a key, WebObjects Builder displays its type.



When you create a new project, the only items that appear in the object browser are **application** and **session** (unless you use the Wizard to create a database application). These are methods that allow you to access variables in your application and session code.



Choose a command from this menu to add objects to your source code or view the code.

There are several ways to add items to the object browser:

- Use Project Builder to add keys and actions to your component's source file.

  When you save changes to a source file, WebObjects Builder parses the file, detects items that have been added and deleted, and updates the object browser's display to reflect the changes. The source code can be written in any of the languages that WebObjects supports (Java, Objective-C, or WebScript).

- Use the menu at the bottom of the object browser to add items to your code directly from WebObjects Builder. See the next section, "Creating Variables and Methods in WebObjects Builder", for more information.

- Drag a *model file* into the browser to create a *display group* variable. See "Adding Display Groups" for more information.

Creating Variables and Methods in WebObjects Builder

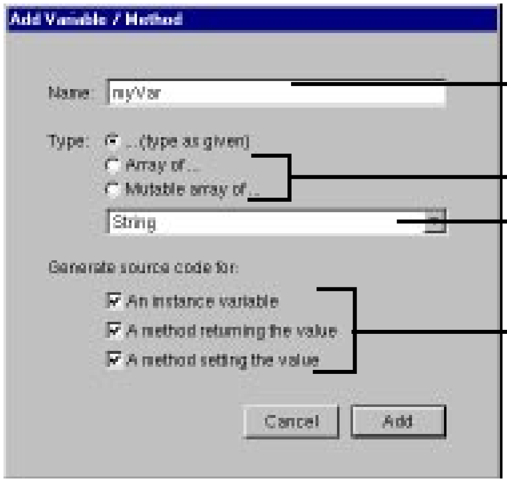
At the bottom of the object browser, there is a pull-down menu called Edit *sourcefile*. It has three items:

- **Add Variable/Method** allows you to add a key (an instance variable or a method that returns a value) to your source file.

- **Add Action** allows you to add the template for an action (a method that takes no parameters and returns a component).

- **View Source File** opens the source file in a Project Builder window.

When you choose Add Variable/Method, the following panel opens:



Name: myVar

Type: ● ...(type as given) ○ Array of... ○ Mutable array of...

String

Generate source code for:

☑ An instance variable

☑ A method returning the value

☑ A method setting the value

Type the variable name here.

Click one of these buttons if your variable is an array.

Choose the variable's type from this pop-up list.

Check one or more of these boxes.

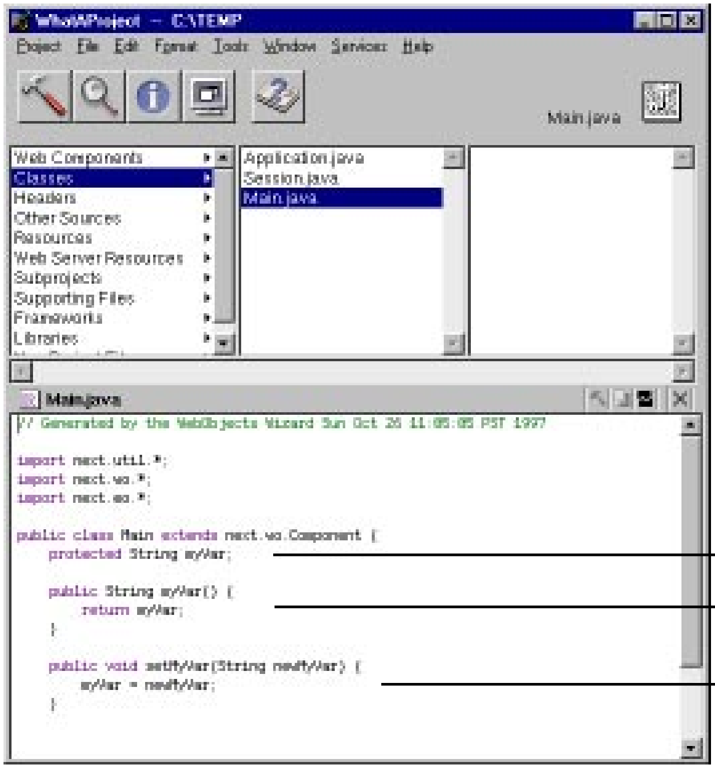
In this panel, you specify:

- The name of the key.
- Its type.

  You can choose the type from the pop-up list or type it in directly. You can also use the radio buttons to specify whether the variable is an array.
- How the key is implemented.

  The key can be an instance variable whose value is accessed directly, or a method that returns a value (not necessarily associated with an instance variable). You can also create a method that sets the value of an instance variable.

When you click Add, the key's name appears in the object browser (below **application** and **session**). To see what was added to your source code, choose View Source File from the pop-up menu in the object browser. You'll see something like the following:



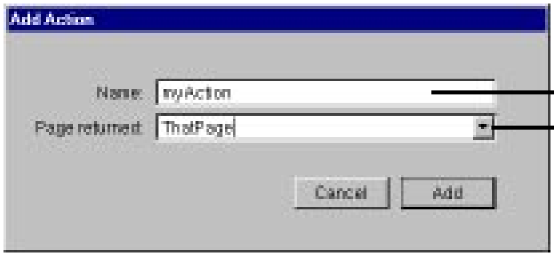
```
// Generated by the WebObjects Wizard Sun Oct 26 11:05:05 PST 1997

import next.util.*;
import next.wo.*;
import next.eo.*;

public class Main extends next.wo.Component {
    protected String myVar;

    public String myVar() {
        return myVar;
    }

    public void setMyVar(String newMyVar) {
        myVar = newMyVar;
    }
```

Instance variable.

Method returning value of instance variable.

Method setting value of instance variable.

When you choose Add Action, the following panel appears:



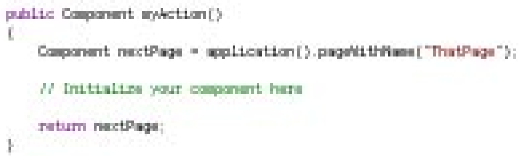
Name: myAction

Page returned: ThatPage

Enter the action method’s name here.

Select response page name from pop-up menu (use **null** or **nil** to return same page).

When you click Add, the following code is added to your source file:



```
public Component myAction()
{
    Component nextPage = application().pageWithName("ThatPage");

    // Initialize your component here

    return nextPage;
}
```

WebObjects Builder provides these ways to add variables and methods for your convenience. Of course, you can add variables and methods directly to your component’s code by editing them in Project Builder.

Note: To delete a key or action, you must delete it from the source code in Project Builder. Also, the Add Variable/Method and Add Action commands apply only to a component's code file. To add variables and methods to the application and session code files, or to any other code files, you must edit them directly in Project Builder.

Adding Display Groups

A *display group* is an important type of variable that you use in WebObjects applications that access databases. A display group is an object that can fetch, insert, delete, display, update and search records in a database.

This section describes the mechanics of adding display groups to a WebObjects project. For detailed information about display groups, see the DisplayGroup (Java) or WODisplayGroup (Objective-C) class specification in the *WebObjects Class Reference*. To learn more about how to create a WebObjects database application, see "Creating a WebObjects Database Application" in *Getting Started With WebObjects*.

WebObjects applications access databases through the Enterprise Objects Framework, which represents database rows as *enterprise objects*. Enterprise object classes typically correspond to database tables, and an enterprise object instance corresponds to a single row or record in a table. For detailed information on enterprise objects, read the *Enterprise Objects Framework Developer's Guide.*

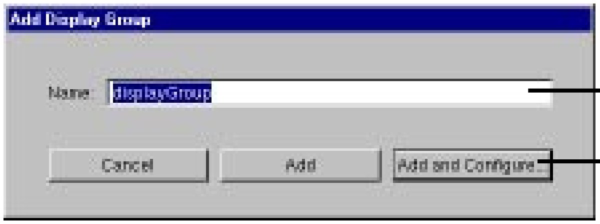
In a database application, you use *entity-relationship models*. A model associates database columns with instance variables of objects. You create a model with the EOModeler application, or you can specify one when you use the Wizard to set up your application (when you add a model to your project, it is added to the Resources suitcase). A model is stored in a *model file*. For more information on creating models, see the chapter "Using EOModeler" in *Enterprise Objects Framework Developer's Guide.*

A model contains *entities*, *attributes*, and *relationships*. An *entity* associates a database table with an enterprise object class. Display groups manage objects associated with a single entity. An *attribute* associates a database column with an instance variable. A *relationship* is a link between two entities that's based on attributes of the entities.

If you used the Wizard to set up your application, a display group was set up for you based on the model you specified. There are several other ways to create a display group:

- Drag a model (a folder with the extension **.eomodeld**) from the file system into the object browser in your component window, or drag an entity from the EOModeler application into the object browser.

  When you do this, a panel asks you if you want to add the model to your project. If you reply Yes, the Add Display Group panel appears.

  Enter the display group's name.

  Click here to add the display group and configure it.

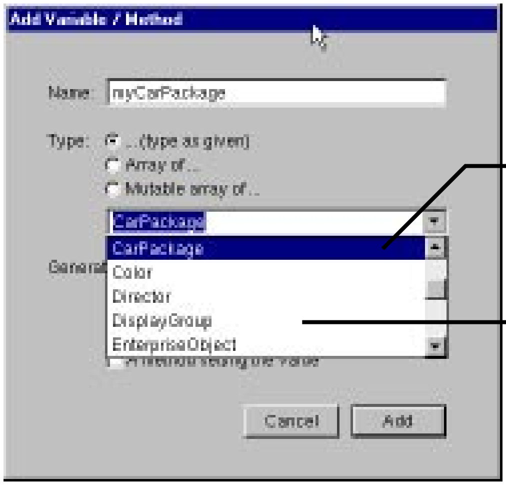
  It allows you to specify a name for your display group and decide if you want to simply add the display group, or configure it as well. "Configuring the Display Group" describes the configuration process.

- Use Add Variable/Method to define a variable of type DisplayGroup (Java) or WODisplayGroup (Objective-C or WebScript), or declare the display group directly in your code:

  ```
  protected DisplayGroup myDisplayGroup; //this is a Java example
  ```

  When you add a display group this way, you are responsible for making sure your project contains the appropriate model file. (For example, once a model file has been added, you can create any number of display groups based on it). In addition, you need to configure the display group.

When you use the Add Variable/Method panel, you can create not only display group variables, but also enterprise objects associated with any of the entities in your project's models.



Add Variable / Method

Name: myCarPackage

Type: ● ...(type as given)
○ Array of...
○ Mutable array of...

CarPackage

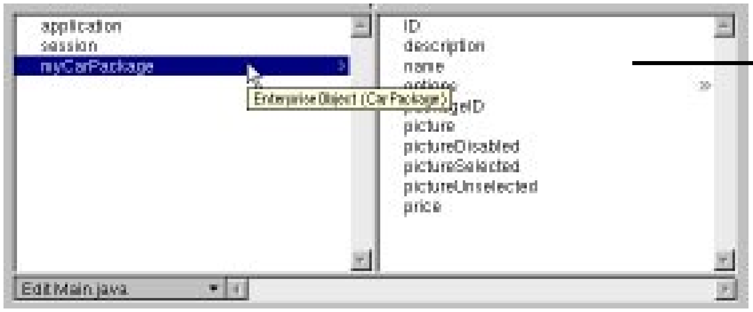
Choose an entity from the project's models to create an enterprise object based on that entity.

Choose this item to create a display group object.

In the figure, if you choose the entity CarPackage as the variable's type, the following code gets added to your source file:

```
/** @TypeInfo CarPackage */
protected EnterpriseObject myCarPackage;
```

The variable **myCarPackage** is declared as type EnterpriseObject. The comment `/** @TypeInfo CarPackage */` is a *structured comment* that WebObjects Builder uses to identify the entity associated with the object. It is then able to display the attributes in the object browser as shown here:



The browser displays the attributes of the entity (CarPackage).

Configuring the Display Group

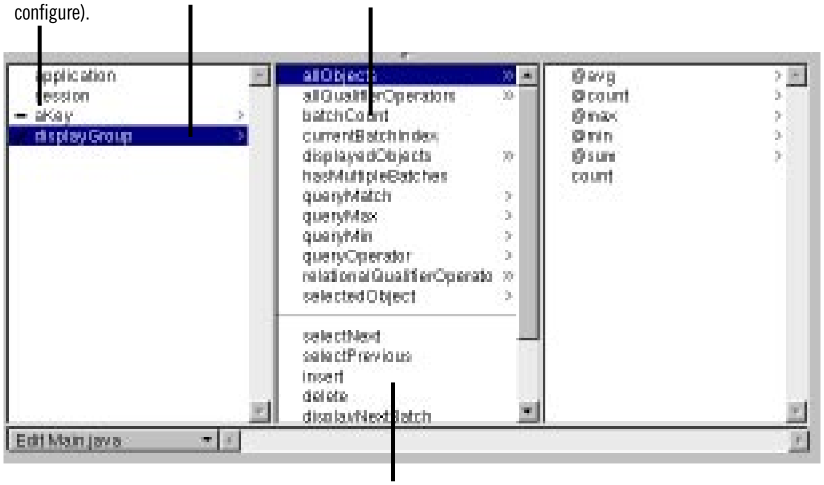
A display group must be configured in order for it to be created and initialized automatically when the component is initialized. Display groups are instantiated from an archive file (with the extension **.woo**) that's stored in the component. You shouldn't edit **.woo** files by hand; they're maintained by WebObjects Builder.

In the object browser, ✓ means that the display group has been configured. A ⊟ means that it has not been configured, and so the variable isn't automatically created. A configured display group shows its keys and actions in the second column of the object browser. You can bind them to elements in your program.

Unconfigured display group (double-click to configure).

Configured display group

Display group's keys



application
session
aKey
displayGroup

allObjects
allQualifierOperators
batchCount
currentBatchIndex
displayedObjects
hasMultipleBatches
queryMatch
queryMax
queryMin
queryOperator
relationalQualifierOperato
selectedObject

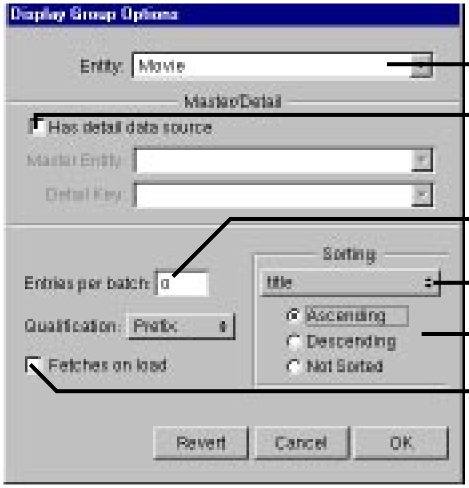
selectNext
selectPrevious
insert
delete
displayNextBatch

@avg
@count
@max
@min
@sum
count

Edit Main.java

Display group's actions.

To configure a display group (or change its configuration), double-click its name to open the Display Group Options panel.



Display Group Options

Entity: Movie

Master/Detail

☐ Has detail data source

Master Entity:

Detail Key:

Entries per batch: 0

Qualification: Prefix

☐ Fetches on load

Sorting

title

● Ascending

○ Descending

○ Not Sorted

Revert Cancel OK

Select entity name

Check to create detail display group.

Enter non-zero value to batch records.

Specify attribute to sort by.

Specify sort order.

Check to fetch records when component is loaded.

In this panel, you specify the following information:

- *Entity:* The Entity combo box has a list of entities from the models in your project. You can select one from the list or type the name.
- *Has detail data source:* Check this to create a detail display group. See "Creating a Detail Display Group" for more information.
- *Entries per batch:* Set a non-zero value here to specify the number of records to be displayed at once. When the value is zero, all records are displayed.
- *Qualification:* When displaying records according to a query, this setting determines whether to display records that begin with, end with, or contain the item specified.
- *Fetches on load*: When you check this option, the display group fetches all its objects as soon as the component is loaded into the application.
- *Sorting:* You select an attribute by which to sort your displayed objects from the pop-up list, and use the radio buttons to select the order of sorting.

Creating a Detail Display Group

While a display group manages objects associated with a single entity, you can access other kinds of objects through an entity's relationships. In a *master-detail* configuration, a master display group holds enterprise objects for the source of a relationship, while a detail display group holds records for the destination. As individual records are selected in the master display group, the detail display group gets a new set of enterprise objects to correspond to the selection in the master.

To create a detail display group, you can use the Display Group Options panel:

1. Check "Has detail data source."

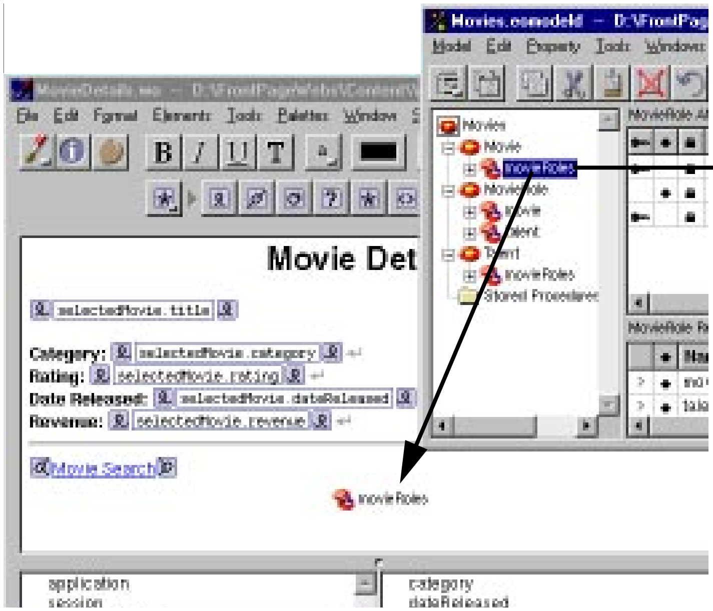
   The Master Entity pop-up list is enabled. It lists the all entities in the models in your project.

2. Select the Master Entity from the pop-up list.

   The Detail Key pop-up list now contains the keys representing the master entity's relationships.

3. Select the Detail Key from the pop-up list.

You can also create a detail display group by dragging a to-many relationship from EOModeler into your component.


Movies.eomodeld – D:\FrontPag
MovieDetails.wo – D:\FrontPage\Webs\Content\
Movie Det
selectedMovie.title
Category: selectedMovie.category
Rating: selectedMovie.rating
Date Released: selectedMovie.dateReleased
Revenue: selectedMovie.revenue
Movie Search
movieRoles
Movies
Movie
movieRoles
MovieRole
Talent
Stored Procedures
application
session
category
dateReleased

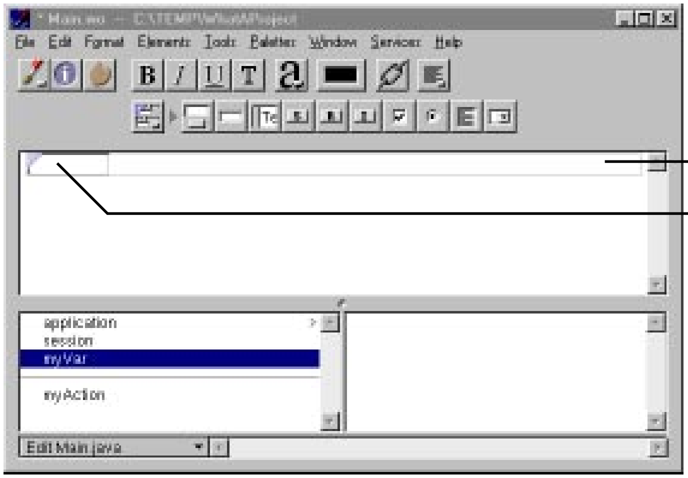
Drag relationship from EOModeler into component to create detail display group.

This example creates a detail display group based on the **movieRoles** relationship, with **Movie** as the master entity and **MovieRole** as the detail entity.

As with other display groups, you can use the Display Group Options panel to immediately configure the newly created display group.

Binding Elements

This section discusses the basic techniques you use to bind elements. Further detail is presented in the sections that discuss specific dynamic elements.


* Main.wo – C:\TEMP\WhatAProject
File Edit Format Elements Tools Palettes Window Services Help
application
session
myVar
myAction
Edit Main.java

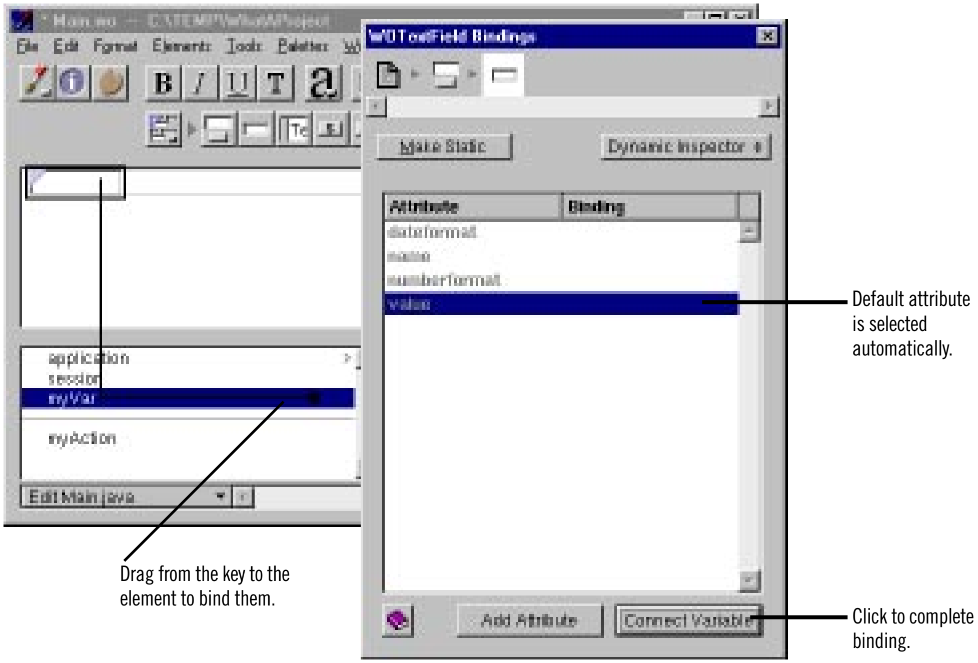
Form containing text field.

Dynamic text field.

In the figure, you have added a dynamic text field (WOTextField) to your component. Note the blue triangle in the top left corner, which distinguishes the dynamic text field from a static HTML text field. The long rectangle surrounding the text field represents the form of which it is a part.

To bind the text field to the variable **myVar**:

1. Click **myVar** in the object browser and drag to inside the text field.



Default attribute is selected automatically.

Drag from the key to the element to bind them.

Click to complete binding.

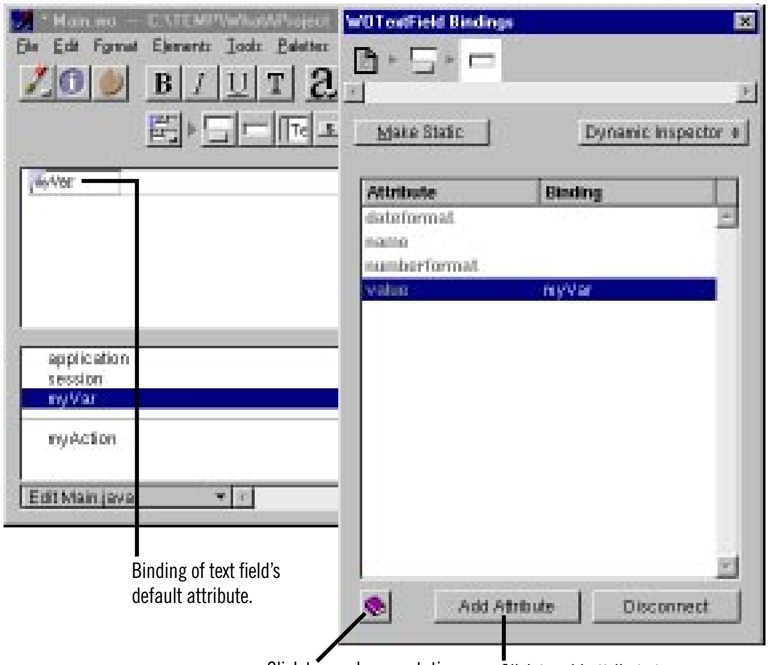
A black line appears as you drag, and a black border appears around the text field, indicating that you can bind to it.

2. Release the mouse button.

The Inspector for that element appears, listing its attributes. The **value** attribute is selected by default. (This attribute represents the value that the user enters into the text field.) If this isn't the attribute you wish to bind, click another attribute to select it.

3. To complete the binding, click the Connect Variable button.

The name of the variable appears in the Binding column next to the attribute. Note that it also appears inside the text field in the component window. Some (not all) dynamic elements display the binding for their default attribute inside the element itself.



Attribute	Binding
dateformat	
name	
numberformat	
value	myVar

Binding of text field's default attribute.

Click to see documentation on this dynamic element.

Click to add attribute to element.

4. If you change your mind, you can click the Inspector's Disconnect button (which changed from Connect Variable) to undo the binding.

There are two other buttons on the bottom of the Inspector window:

- Click 📕 to view documentation on this dynamic element.

  The relevant page from the *Dynamic Elements Reference* is displayed in your web browser.

- Click Add Attribute to create a new attribute for this element.

  Typically, you don't add attributes for standard dynamic elements such as WOTextField or WOString. You use this feature when working with your own custom WebObjects (see "Custom WebObjects").

To create an additional binding for the same element:

1. Drag from an item in the object browser to the element as before.

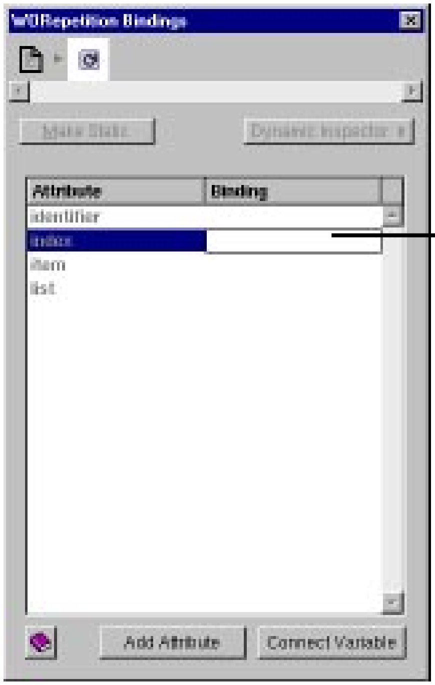
This time, a different attribute is selected, since the default attribute has already been bound.

2. Click Connect Variable to bind the selected attribute.

3. If, instead, you want to bind an attribute that has already been bound, double-click its row, and the old binding is replaced with the new one.

You can also bind an element's attributes by typing in the Inspector without going through the dragging procedure. To do this:

1. Double-click in the binding column of the row for the attribute you want to set.



Double-click here to get a cursor, then type the binding.

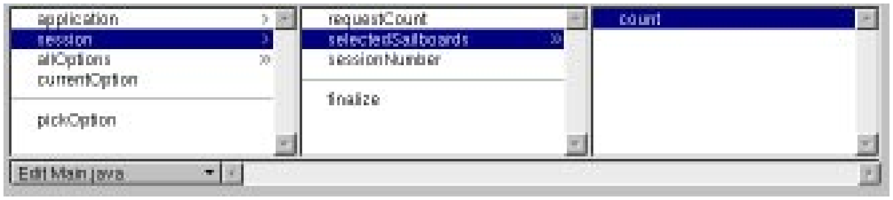
A cursor appears in the Binding column, allowing you to type.

2. Type the binding in the text field, then press Enter.

When entering bindings this way, the following rules apply:

- Constant strings (such as `"Joe"`) must be in quotes.
- Variable and method names (such as **Joe**) must not be in quotes.
- Symbolic constants (such as `YES` and `NO`) must not be in quotes.

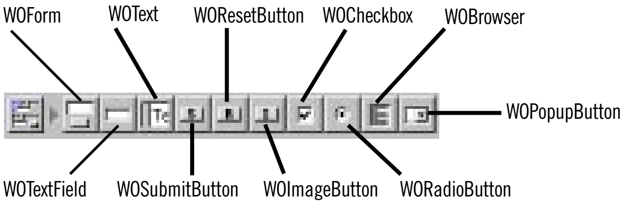
- Keys must specify their full *key path*. For example, to bind the key that is selected in the following figure, you would type `session.selectedSailboards.count`



Creating Form-Based Dynamic Elements

In HTML, a form is a container element (one that can contain other elements). Typically, forms contain input elements (such as text fields, radio buttons and checkboxes) to capture user information, a button or active image to submit the form data, as well as display elements such as text and images.

In WebObjects Builder, you create form elements by clicking one of the buttons in the Form Elements portion of the switchable toolbar (or using their menu equivalents).



All the form elements you create in the toolbar are dynamic equivalents of standard HTML elements. You can convert any dynamic form element to its static equivalent (and vice versa) by using the Inspector (see “Dynamic and Static Inspectors”).

If you add form elements without creating a WOForm first (for example, if you add a text field to an empty page, or if you add form elements outside of the form) WebObjects Builder assumes you want to create a new form and places a `<FORM>` tag before and a `</FORM>` tag after the element.

Most form elements have a **value** attribute that represents the information entered by the user. You bind this attribute to a variable so that your application can work with it. Others, such as WOSubmitButton, WOImageButton, or

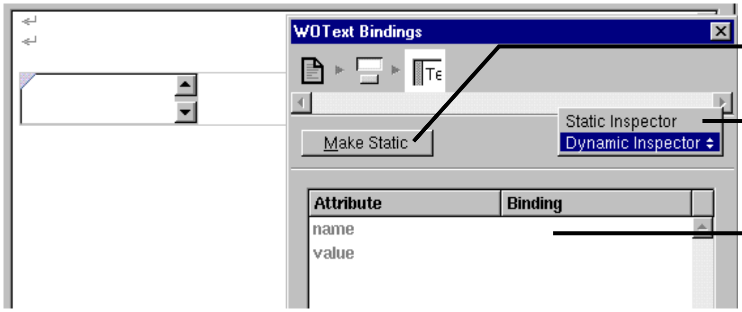
WOForm itself, don't receive information but contain an **action** attribute representing an action to be taken when the form is submitted. You bind form-based elements by the process described in "Binding Elements".

Tip: HTML forms don't allow you to have multiple submit buttons in a single form, but the WebObjects WOForm element does. If you want multiple submit buttons in a form, bind the **multiplesubmit** attribute of WOForm to the value `YES` (by typing it in the Inspector).

Dynamic and Static Inspectors

Most dynamic elements have static HTML counterparts. (The exceptions are the abstract dynamic elements: WOString, WORepetition, WOConditional, and WOCustom.) The Inspector for these elements has two states:

- The Dynamic Inspector, which you use to set the bindings for the element (see "Binding Elements").
- The Static Inspector, which you use to set the HTML attributes for the element's static counterpart.

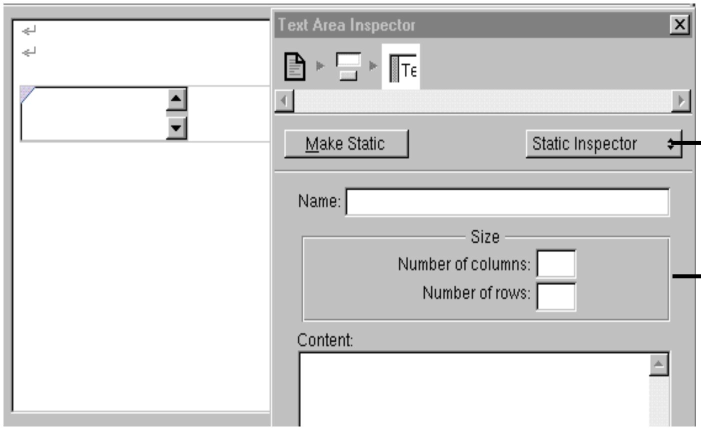


Click here to convert WOText to a static text area.

Select Static Inspector to edit HTML attributes.

Set bindings for the WOText element here.

This example shows the Inspector for a dynamic text area element. It displays the bindable attributes for this element. If you select Static Inspector from the pop-up list, the Text Area Inspector appears. This is the same Inspector you would see for a static text area element (`<TEXTAREA>`) and allows you to set its HTML attributes (such as `COLS` or `ROWS`).



Select Dynamic Inspector to set the WOText's bindings.

Set HTML attributes of text area here.

To switch back to the WOText Inspector, select Dynamic Inspector from the pop-up list.

In addition, you can convert any dynamic element into its static counterpart, or vice versa:

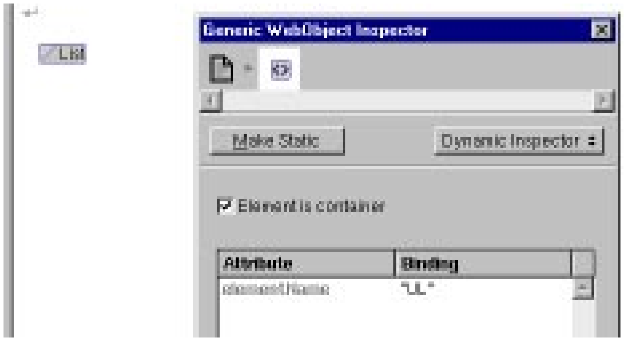
- When inspecting a dynamic element, if you click Make Static, the element becomes its static counterpart (if it has one), and the Static Inspector appears.
- When inspecting a static element, if you click Make Dynamic, the element becomes its dynamic counterpart. Both the Static and Dynamic Inspectors are now available.

The following table shows the dynamic counterpart for each static element.

Static Element	Dynamic Counterpart
Image	WOImage, WOActiveImage
Form	WOForm
Textfield	WOTextField
Text Area	WOText
Button	WOSubmitButton, WOResetButton, WOImageButton
Checkbox	WOCheckBox
Radio Button	WORadioButton

Static Element	Dynamic Counterpart
Select	WOBrowser, WOPopupButton
Hyperlink	WOHyperlink
Applet	WOApplet
Other	Generic WebObject

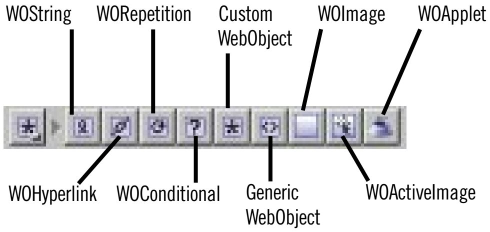
If you convert a static element to its dynamic counterpart by clicking Make Dynamic, and there is no direct counterpart, the element becomes a generic WebObject whose element name is the HTML tag for the static element (see “Generic WebObjects”). In this figure, a list element (<UL>) has been converted to a generic WebObject element.



☑ Element is container

Attribute	Binding
elementName	"UL"

Creating Other WebObjects



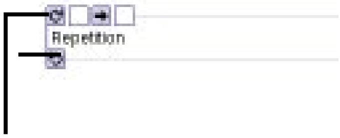
You use this toolbar to create all dynamic elements other than form-based elements. This section provides some general information about using these elements. Each element is described in more detail in its own section.

To create a dynamic element, you click its toolbar icon. One thing to be aware of is what happens when there are already elements selected when you create the element:

- Some dynamic elements (WOHyperlink, WOConditional, WORepetition, custom WebObjects and generic WebObjects) can contain other elements. In this case, the selected elements appear with the new element "wrapped" around it.

- Other dynamic elements (WOString, WOImage, WOActiveImage, and WOApplet) can't contain other elements. When you create one, it replaces whatever was selected.

The first six dynamic element types (all those except for WOImage, WOActiveImage, and WOApplet) display with a pair of icons surrounding the element (and possibly other icons in between). For example, when you create a repetition, it appears like this in the component window:



Drag from the object browser to one of the outer icons to bind (brings up Inspector).

Double-click icon to collapse or expand.

To bind a dynamic element, you drag from an item in the object browser to one of the outer icons. The Inspector appears, allowing you to complete the binding. See "Binding Elements" for more information.

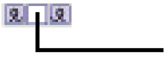
You can double-click one of the icons to collapse the element into a single icon:

Collapsing can be desirable when you have dynamic elements that contain other elements and take up a lot of space on the screen. You can double-click again to expand the element. In addition, you can use the menu commands Elements▸ WebObjects▸ Expand All or Elements▸ WebObjects▸ Collapse All to expand or collapse all the dynamic elements in the window.

Dynamic Strings

A WOString element represents a dynamically generated string. You bind the **value** attribute of a WOString to a variable or method that returns a string at run time. A WOString is abstract in that it doesn't represent any specific element, but it can be contained in any other HTML element that can contain text.

WebObjects Builder provides a shortcut for binding the **value** attribute of a WOString, since it is by far the most common attribute you bind.



Drag to here to bind **value** attribute directly.

Instead of dragging to one of the icons, drag to the center binding box. The binding appears directly in the box, and the Inspector doesn't come to the front.

Dynamic Hyperlinks

Dynamic hyperlinks (WOHyperlink) allow you to specify the link's destination at run time rather than at compile time. There are several ways to do this:

- You can specify the name of a page in your application as the destination of the link. To do this, bind the name to the WOHyperlink's **pageName** attribute. This is useful since pages in a WebObjects application don't have predictable URLs that you can specify in an HTML hyperlink.

- You can specify an action to be performed when the hyperlink is clicked by binding WOHyperlink's **action** attribute to an action method in your code. This method can perform any sort of action, as well as returning a page as the destination.

- You can also specify a URL as the destination by binding to the **href** attribute.

To create a dynamic hyperlink:

1. Click in the toolbar.
2. Replace the word `Hyperlink` with the text of the link.
3. Create the element's bindings.

To learn how to create a static hyperlink, see "Creating Hyperlinks".

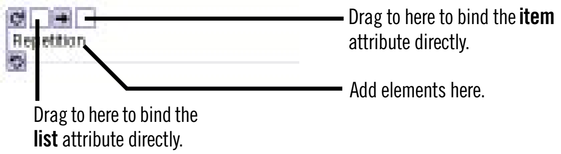
Repetitions

A repetition (WORepetition) is a container element that repeats its contents a certain number of times. It is like a loop in a structured programming language. Repetitions are one of the most important elements in WebObjects, since it is quite common for applications to display repeated data (often from databases) when the amount of data to be displayed isn't known until run time. Typically, a repetition is used to generate items in a list, multiple rows in a table, or multiple tables.

To create a repetition:

1. Click ⟳.

   The repetition appears in the component window.



Drag to here to bind the **item** attribute directly.

Add elements here.

Drag to here to bind the **list** attribute directly.

2. Add elements inside the repetition (replacing the word "Repetition").

   A repetition can contain any other elements, either static HTML or dynamic WebObjects elements.

3. Alternatively, you can select existing elements, then click ⟳ to wrap the repetition around the elements. This is necessary in some cases, such as wrapping a repetition around a table row.

You usually bind two attributes of a repetition: **list** and **item**. The **list** attribute must be bound to an array. WebObjects generates the elements in the repetition once for each item in the array. Each time through the array, the **item** attribute points to the current array object. Typically, you bind **item** to a variable and then use that variable in the bindings of the elements inside the repetition.

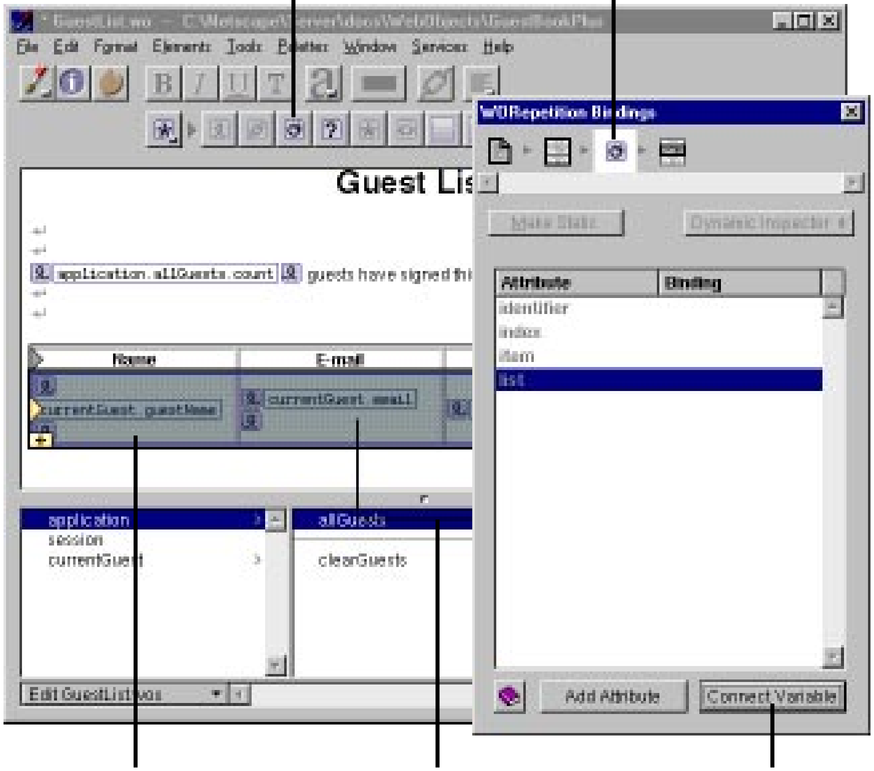
When you drag an item from the object browser to the WORepetition to bind it, the default attribute shown in the Inspector depends on whether the item is an array. If it is, **list** is the default attribute; otherwise, **item** is the default attribute.

In addition, as with WOStrings, WebObjects Builder provides a shortcut for binding repetitions so that you don't have to use the Inspector. Drag to the first binding box to bind the **list** attribute; drag to the second box to bind the **item** attribute.

When you wrap a repetition around a table row, the repetition symbol doesn't appear. Instead, a blue border appears around the row. To bind the repetition, drag from the object browser to anywhere in the row (but not to a dynamic element inside the row). The Inspector appears, allowing you to complete the binding as usual.

Select a table row, then click here to create a repetition around the row.

Element path shows that the WORepetition is contained by the table and contains a table row.



The blue border and background means the row is in a repetition.

Drag variable to the table row to bind to the repetition.

Click here to bind **allGuests** to the repetition's **list** attribute.

Note: You can also wrap a repetition around a single cell in a table. In addition, this same procedure of wrapping a repetition around a table row or cell also works for conditionals (see next section).

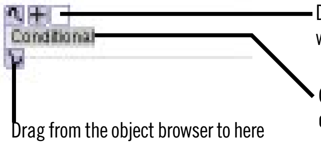
Conditionals

A conditional (WOConditional) is a dynamic container element that displays its contents only if a particular condition is true. WOConditional's main attribute is **condition**, which takes a Boolean value. If **condition** is true (1), the WOConditional's contents are displayed. If **condition** is false (0), the contents aren't displayed.

condition can be bound to a variable or to method that returns a Boolean value. (WebScript and Objective-C use the constants **YES** and **NO**; Java uses **true** and **false**.) To bind **condition** (or any other attribute that takes a Boolean) to a constant value, enter `YES` or `NO` in the bindings Inspector.

To create a conditional, click ? in the toolbar.

Note: Any selected elements will be contained within the conditional.



Drag from the object browser to this box to bind the **condition** attribute without opening the Inspector. The binding appears inside the box.

Contents of the conditional display if **condition** is true.

Drag from the object browser to here to bind (opensthe Inspector).

To bind to a conditional, click a variable or method and drag to one of the conditional's outer icons. The Inspector appears, displaying the bindings for the WOConditional, with the **condition** attribute selected by default. Complete the binding by clicking Connect Variable, or choose a different attribute to bind.

There is a shortcut for binding the condition attribute. Drag from a key in the object browser to the binding box in the conditional.

Sometimes, you want the equivalent of an "if-then-else" structure; that is, "if the condition is true, display this text; if not, display this other text." To accomplish this, you can use the **negate** attribute. If **negate** is true, then the contents of the conditional are displayed only if **condition** is false. To create an if-then-else structure, do the following:

1. Create two WOConditionals.
2. Bind the **condition** attribute of both of them to the same variable or method.
3. Bind the **negate** attribute of the second one to `YES` (true).

   By default, **negate** is false, so you do not explicitly need to bind the first conditional's negate attribute.

As with repetitions, you can "wrap" a conditional around a table row (see "Repetitions"). When you do this, the conditional symbol doesn't appear but the row appears with a blue background.

Custom WebObjects

You use custom WebObjects for two main purposes:

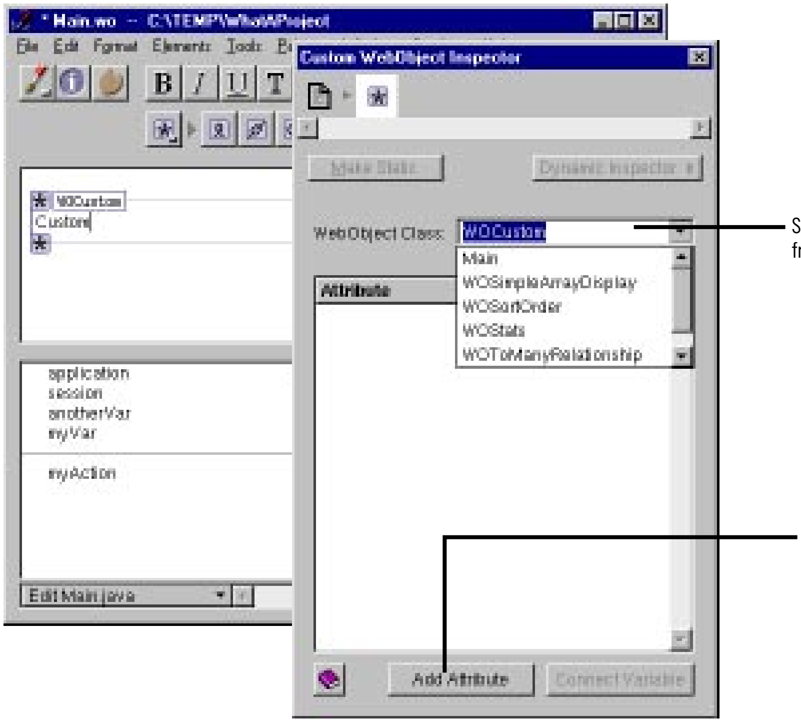
- To implement WebObjects element classes not directly supported by WebObjects Builder.
- To implement reusable components (see “Reusable Components” for more details).

To create a custom WebObject:

1. Click ✱ in the toolbar.

   A template for a custom WebObject appears at the insertion point.

2. In the Custom WebObject Inspector, specify the element class.



Select class name from the list or type it.

Click to add the element’s attributes.

The WebObject Class combo box allows you to type the class name or select it from the components listed in the pop-up menu. This menu lists all components that are in the current project and frameworks. For example, the components listed in the menu above (WOSimpleArrayDisplay, WOSortOrder, and so forth) are defined in the WOExtensions framework, which is included in your project by default.

If WebObjects Builder recognizes the element class, it automatically displays its attributes. Otherwise, you can add them by clicking Add Attribute.

The WOExtensions palette (see “Palettes”) contains several pre-defined custom WebObjects elements you can use in a component.

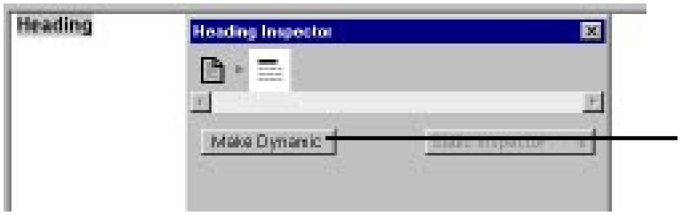
Generic WebObjects

You can use the generic WebObject element to create a dynamic version of any HTML element.

To create a dynamic version of a standard HTML element):

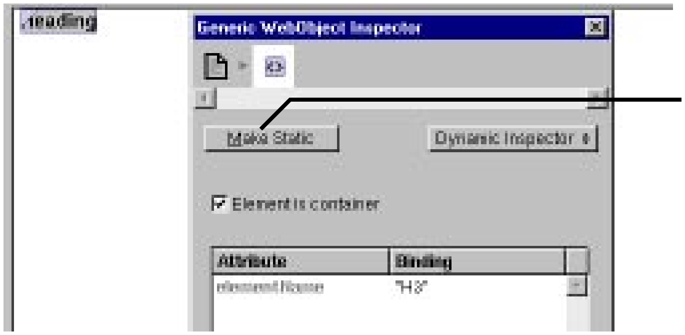
1. Create the element (say, a heading).

2. In the Inspector, click Make Dynamic.



Click here to convert the heading to a dynamic element.

If the element has no specific dynamic counterpart, it becomes a generic WebObject element.



☑ Element is container

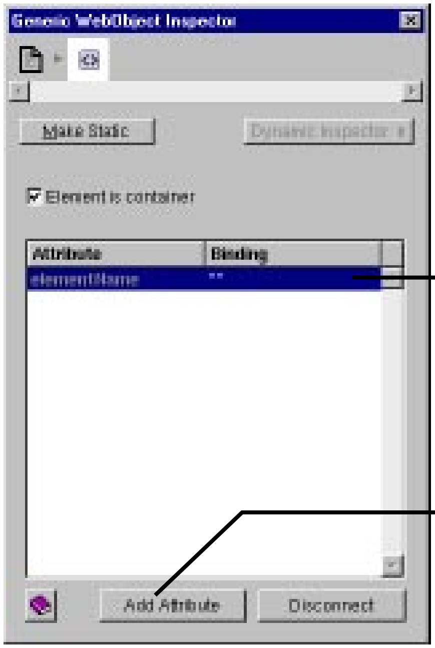
Attribute	Binding
elementName	"H3"

Click here to convert back to a heading.

To create a generic WebObject corresponding to any HTML element (even ones not supported by WebObjects Builder):

1. Click <> in the toolbar.

2. Bring up the Inspector.



Enter the element name here.

Click to add attributes.

A generic WebObject element has one required attribute, **elementName**, which specifies what type of element should be generated at run time.

For example, imagine that a future version of HTML adds a container element called `<BLOB>`, which you would like to generate dynamically in your component. You would:

3. Type `BLOB` between the quotes in the Binding column.

   If the name isn't in quotes, WebObjects assumes it is a binding that should be resolved at run time. You might use that technique if you wanted to choose the type of element programmatically rather than specifying it in advance.

4. Check "Element is container".

5. Use the Add Attribute button to specify any additional properties of the element.

Dynamic Images

The elements WOImage and WOActiveImage are dynamic images. At run time, WOImage is rendered as a passive image and WOActiveImage as a mapped, active image. To create them, click or in the toolbar, respectively.

A static image element requires you to specify its pathname directly in the HTML. With dynamic images, you bind the **filename** attribute to specify the name of an image file in your project, or in a framework. You can bind this attribute to a variable or method so that the filename is dynamically generated at run time.

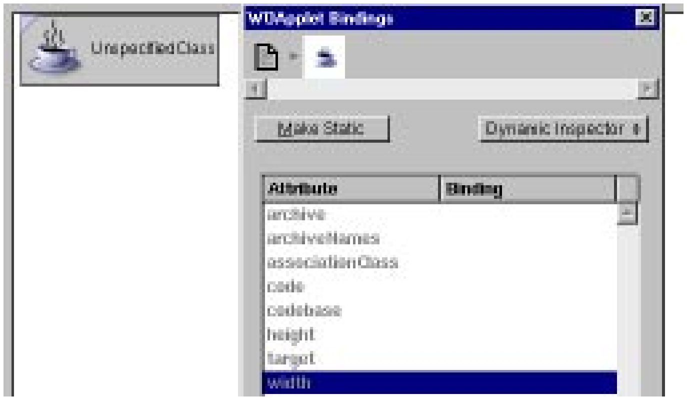
You can also create a WOImage by dragging an image from the file system into your component (see “Dragging Elements into the Component Window” for more information). An alert appears, asking whether you want to add the image to the project (if it is not already in the project). If you do, the file is added to the Web Server Resources suitcase of your project.

WOApplets

The WOApplet dynamic element represents a Java applet or client-side component. There are several ways to create a WOApplet. You can:

- Click in the toolbar.

  This creates a WOApplet, whose bindings you must set.



Attribute	Binding
archive	
archiveNames	
associationClass	
code	
codebase	
height	
target	
width	

- Drag a file of type **.class** into your component.

  You are asked whether you want to add the **.class** file to your project. If you reply Yes, it is added to the Web Server Resources suitcase. A WOApplet appears in your component, with its **code** attribute set to the name of the file.

- Drag an element from the Client-Side Components palette to your component (see "Palettes").

Reusable Components

One of the strengths of the WebObjects architecture is its support of reusable components. Any component that you define, whether it represents an entire page or part of a page, can be reused by any WebObjects application. A component can be used in multiple pages or even multiple times in the same page. Reusable components can be used for such items as headers, footers, and navigation bars.

When a reusable component is used inside another component, it is referred to as a *child component*; the containing component is called the *parent component*.

To reuse a component, you can:

- Add the component to a framework and include the framework in any project that wants to use the component. The component is a *shared component* and doesn't need to be copied into each application that uses it.
- Add the component directly to your project (in the Web Components suitcase).

See "Frameworks" for information on creating frameworks and adding them to a project. To add a component directly to a project, you can:

- Drag a component (a folder with the **.wo** extension) from the file system onto a component window.

  You are asked whether you want to add the component to your project. If you respond Yes, the component is copied to the project and placed in the Web Components suitcase, along with all the other components.

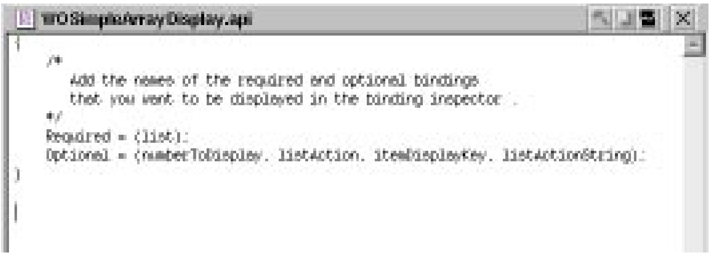
  The child component then appears in the window at the insertion point. It is displayed graphically inside a custom WebObject element.

- Use the toolbar to add a custom WebObject element (see “Custom WebObjects”) to your page, then use the Inspector to set its type to the name of the reusable component.

- Drag a component that has been stored on a palette to the component window (see “Palettes”).

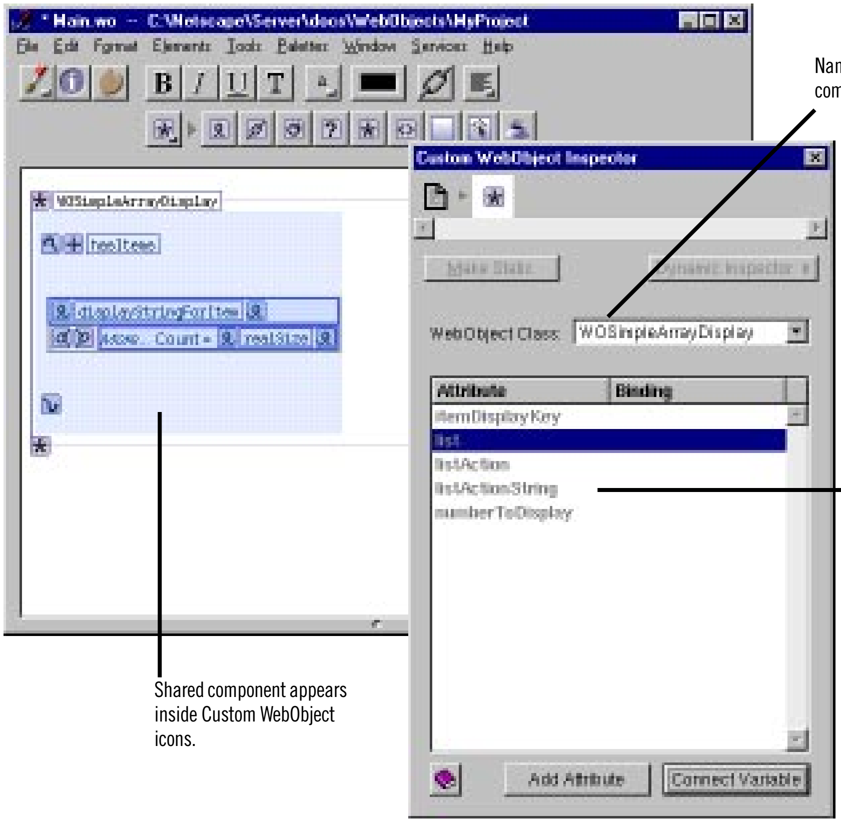
A component that is designed for reuse can *export* keys and actions, which become attributes that the parent component can bind, just as it would set the attributes of any other dynamic element. When the component is added to a parent component, these attributes show up in the Custom WebObject Inspector. The attributes must be enumerated in the **.api** file for the component.

For example, the WOSimpleArrayDisplay shared component that lives in the WOExtensions framework exports the following attributes, as defined in its **.api** file:



```
{
    /*
       Add the names of the required and optional bindings
       that you want to be displayed in the binding inspector .
    */
    Required = (list);
    Optional = (numberToDisplay, listAction, itemDisplayKey, listActionString);
}
```

When you use this component in one of your pages, it looks like this:


* Main.wo -- C:\Netscape\Server\docs\WebObjects\MyProject
File Edit Format Elements Tools Palettes Window Services Help
WOSimpleArrayDisplay
Custom WebObject Inspector
Make Static
Dynamic Inspector
Add Attribute
Connect Variable

WebObject Class: WOSimpleArrayDisplay

Attribute	Binding
itemDisplayKey	
list	
listAction	
listActionString	
numberToDisplay	

Name of shared component.

Parent component can bind to these attributes.

Shared component appears inside Custom WebObject icons.

The Inspector shows the child component's attributes. As with any other dynamic element, you can bind the child component's attributes to keys and actions in the parent component's code.

Note: When you create a component that is specifically designed to be used within other pages, specify "Partial document" in the Page Attributes Inspector popup list (see "Setting Page Attributes"). This way WebObjects Builder does not wrap `<HTML>`, `<HEAD>`, and `<BODY>` tags around your component.

For more information, see "Reusable Components" in the *WebObjects Developer's Guide.*