



An Introduction to ASP.NET 2.0

WHEN MICROSOFT RELEASED the .NET Framework 1.0 Technology Preview in July 2000, it was immediately clear that Web development was going to change. The company's then current technology, Active Server Pages 3.0 (ASP), was powerful and flexible, and it made the creation of dynamic Web sites easy. ASP spawned a whole series of books, articles, Web sites, and components, all to make the development process even easier. What ASP didn't have, however, was an application framework; it was never an enterprise development tool. Everything you did in ASP was code oriented—you just couldn't get away without writing code.

ASP.NET was designed to counter this problem. One of its key design goals was to make programming easier and quicker by reducing the amount of code you have to create. Enter the declarative programming model, a rich server control hierarchy with events, a large class library, and support for development tools from the humble Notepad to the high-end Visual Studio .NET. All in all, ASP.NET was a huge leap forward.

What's Wrong with ASP.NET 1.x?

So if ASP.NET 1.0 and 1.1 are so great, what's wrong with them? Well, nothing, actually, but when developing software there is always a trade-off between how much can be done, how many resources you have, and how

much time you have to do it. There is an almost never-ending supply of features you can add, but at some stage you have to ship the product. You cannot doubt that ASP.NET 1.0 shipped with an impressive array of features, but the ASP.NET team members are ambitious, and they not only had plans of their own but also listened to their users.

ASP.NET 2.0, code-named “Whidbey,” addresses the areas that both the development team and users wanted to improve. The aims of the new version are listed below.

- **Reduce the number of lines of code required by 70%.** The declarative programming model freed developers from having to write reams of code, but there are still many scenarios where this cannot be avoided. Data access is a great example, where the same `Connection`, `DataAdapter/DataSet`, and `Command/DataReader` code is used regularly.
- **Increase developer productivity.** This partly relates to reducing the amount of code required but is also affected by more server controls encompassing complex functionality, as well as providing better solutions for common Web site scenarios (such as portals and personalized sites).
- **Use a single control set for all devices.** Mobile devices are becoming more pervasive, with an increasing number of new devices. Many of the server controls render appropriately for small screens, but there are two major problems with the current support for mobile devices: (1) having a separate set of server controls purely for mobile devices is not only confusing but also costly, and (2) adding support for new devices requires additional development work and maintenance. ASP.NET 2.0 will provide a single set of controls and an extensible architecture to allow them (and other controls) to support multiple devices.
- **Provide the fastest Web server platform.** Although ASP.NET 1.0 offers a fast server platform, ASP.NET 2.0 will improve areas such as application start-up times and provide better application tracing and performance data. Innovative caching features will enhance application performance, especially when SQL Server is used.
- **Provide the best hosting solution.** With the large number of Internet applications being hosted, it’s important to provide better solutions for hosters. For example, better management features to

identify and stop rogue applications will give hosters more control over their current environment. More control can also be given to hosted companies by use of the new Web-based administration tool, allowing users to easily control the configuration of applications remotely.

- **Provide easier and more sophisticated management features.** Administration of ASP.NET applications under version 1.x required manual editing of the XML configuration file, which is not a great solution for administrators. Version 2.0 brings a graphical user interface-based administration tool that is integrated with the Internet Information Services (IIS) administration tool.
- **Ease implementation of entire scenarios.** The better management features are built on top of a management application programming interface (API), allowing custom administration programs to be created. Along with application packaging this will provide support for easily deployable applications, with or without source.

Even from this broad set of aims you can see that ASP.NET 2.0 is a great advance from 1.x for both developers and administrators.

New Features

This chapter isn't an in-depth look at any specific feature—instead we are going to give you a taste of what's to come so you can see how much easier Web development is going to be. For this outlook we've broken down the new features into rough end-to-end scenarios.

Templates for a Consistent Look and Feel

ASP.NET 1.x provides an easy way to develop Web sites, but one thing that has become apparent is the lack of an architecture for applying a consistent look and feel. Several workaround techniques emerged:

- Creating a custom class object that inherits from `Page` and having this custom page preload controls
- Creating a templated server control, where the templates provide the layout areas for each page, and using this control on every page
- Having User Controls for common areas of the site, such as headings, menus, and footers

Of these, the first two require knowledge of creating server controls, and while this is a topic most ASP.NET developers could master, it may not be one they've had experience with. Therefore a solution using custom server controls tends to be avoided. The last option, though, is a simple solution, easy to create and implement. User Controls were created to provide reusable functionality, and this is a great use for them. However, to apply a consistent look and feel you need to first place the User Controls on each page, then ensure that they are placed in the same place on each page. In other words, you really need a page template, and in reality this manifests itself as an ASP.NET file that you simply copy for each new page. The danger of this approach is that it's too easy to modify a page and change the layout for that single page.

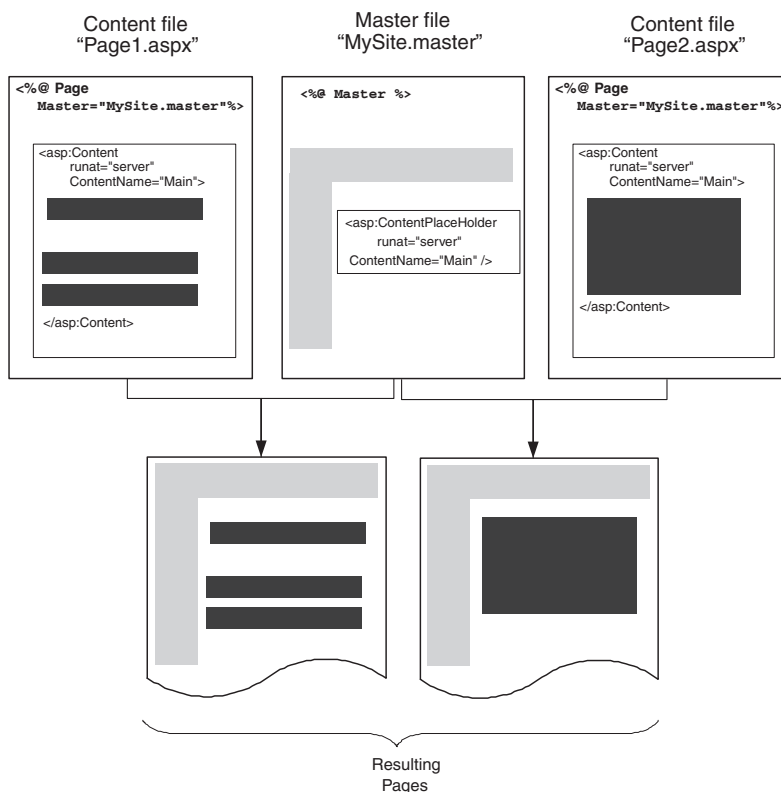


FIGURE 1.1. Combining a master page and a child page

To provide a templating solution, ASP.NET 2.0 has the concept of master pages, which provide a template for the look and implementation of a page. A **master page** is an ASP.NET page that provides a template for other pages, giving shared page-level layout and functionality. The master page defines placeholders for the content, which can be overridden by child pages. The resultant page is a combination of the master page and the child page, as shown in Figure 1.1.

Master pages are covered in Chapters 2 and 5.

Styles for Controls

The second major feature of ASP.NET 2.0 that deals with the look and feel of a site is that of themes. Theming, or skinning, has become very popular, allowing users to create a customized look for applications. On the Windows desktop two of the most popular themed applications are audio players (WinAmp and Windows Media Player), and with some additional software, even Windows XP can be themed.

The popularity of theming is due to the nature of humans—we like to choose the way things look, and we like to express our individuality. This is easy on the desktop, where users generally have a single machine each. With Web sites, however, theming becomes a harder issue because of the number of users. Tracking which users have which themes and managing those themes becomes an overhead that site administrators don't want to get involved with.

Some Web sites provide forms of theming, but these are relatively limited in terms of customization, perhaps allowing only a choice of color scheme. Other sites provide a selection of stylesheets for users to pick from, assuming their browsers support this feature, or alternatively change the stylesheet on the server. This allows not only color schemes to be selected but also complete style choices, such as fonts, style of borders, and so on.

In ASP.NET 2.0 the goals for theming are quite simple.

- Make it simple to customize the appearance of a site or page, using the same design tools and methods used when developing the page itself. This means there's no need to learn any special tools or techniques to add themes to a site.

- Allow themes to be applied to controls, pages, and even entire sites. For example, this allows users to customize parts of a site while ensuring that other parts (such as corporate identity) aren't customized.
- Allow all visual properties to be customized, thus ensuring that when themed, pages and controls can achieve a consistent style.

The implementation of this in ASP.NET 2.0 is built around two areas: skins and themes. A **skin** is a set of properties and templates that can be applied to controls. A **theme** is a set of skins and any other associated files (such as images or stylesheets). Skins are control specific, so for a given theme there could be a separate skin for each control within that theme. Any controls without a skin inherit the default look. The implementation is simple because a skin uses the same definition as the server control it is skinning, and themes are just a set of files in a directory under the application root. For example, consider the sample directory structure shown below:

```
default.aspx
\Themes
  \MyTheme
    MySkin.skin
  \YourTheme
    YourSkin.skin
```

Each theme consists of a directory under the `Themes` directory. Within each theme there is a file with a `.skin` suffix, which contains the skin details for that theme. For example, `MySkin.skin` might contain:

```
<asp:Label SkinID="Normal" runat="server"
  Font-Bold="True" BackColor="#FFC080" />
<asp:Label SkinID="Comic" runat="server"
  Font-Italic="True" Font-Names="Comic Sans MS" />
```

This defines two skins for the `Label` control, each with different visual properties. The theme can be chosen by setting a page-level property, and the skin is chosen by setting a control-level property, as demonstrated below.

```
<%@ Page Theme="MyTheme" %>

<form runat="server">

  <asp:Label SkinID="Comic" Text="A Label" />

</form>
```

Both of these can be set at runtime as well as design time, so this provides an extremely powerful solution, especially when connected with the new Personalization features.

Personalization and themes are covered in Chapter 7.

Securing Your Site

With the large amount of business being done on the Web, security is vitally important for protecting not only confidential information such as credit card numbers but also users' personal details and preferences. Thus you have to build into your site features to authenticate users. This was easy to do in ASP.NET 1.x, although you still had to write code. Security was created by picking your preferred security mechanism (most often Forms Authentication) and then adding controls to your page to provide the login details—user name, password, “remember me” checkbox, and so on. There was no built-in mechanism for storing personal details, so this was a roll-it-yourself affair.

With ASP.NET 2.0, the pain has been taken out of both areas. For login functionality, there is now:

- A `Login` control, providing complete functionality for logging into a site
- A `LoginStatus` control, which indicates the login status and can be configured to provide automatic links to login and logout pages
- A `LoginName` control to display the current (or anonymous) name
- A `LoginView` control, providing templated views depending on the login status
- A `PasswordRecovery` control, encompassing the “I forgot my password” functionality

For example, to add login features to your page all you need to do is add the following code:

```
<form runat="server">
  <asp:Login runat="server" />
</form>
```

Log In

User Name:

Password:

Remember me next time.

FIGURE 1.2. The Login control

This gives us the simple interface shown in Figure 1.2.

This could be achieved easily in previous versions of ASP.NET, but not with such simplicity. You needed labels, text entry boxes, buttons, and validation, whereas it's now all rolled into one control. Sure it looks raw, but this is the basic unformatted version. Using the design tool Visual Studio .NET (more on that in Chapter 2), you can auto-format this for a better look. You can also skin the interface, as shown in Figure 1.3, or even template it to provide your own customized look. Along with the other login controls you get a complete solution for handling user logins.

The user interface isn't the only part of logging into a site; there's also the code needed to validate the user against a data store. With ASP.NET 1.x this required not only code to be written but also knowledge of what that data store was and how it stored data. ASP.NET 2.0 introduces a new `Membership` API, whose aim is to abstract the required membership functionality from the storage of the member information. For example, all of the data handling we'd have done in previous versions to validate a user can now be replaced with the code shown in Listing 1.1.

LISTING 1.1. Validating User Credentials

```
Sub Login_Click(Sender As Object, E As EventArgs)

    If Membership.ValidateUser(Email.Text, Password.Text) Then
        FormsAuthentication.RedirectFromLoginPage(Email.Text, False)
    Else
        LoginMessage.Text = "Invalid credentials. Please try again."
    End If

End Sub
```

FIGURE 1.3. A skinned Login control

What's even better is that when using the `Login` control you don't even have to do this—the control handles it for you.

The great strength of the `Membership` API is that it is built on the idea of Membership Providers, with support for Microsoft SQL Server and Access supplied by default. To integrate custom membership stores you simply need to provide a component that inherits from the Membership interface and add the new provider details to the configuration file.

The Membership API has some simple goals.

- Offer an easy solution for authenticating and managing users, requiring no knowledge of the underlying storage mechanism.
- Provide support for multiple data providers, allowing data stored about users to come from different data stores.
- Provide comprehensive user management in a simple-to-use API, giving an easy way for developers to store and access user details.
- Give users a unique identity, allowing integration with other services such as the Personalization and Role Manager features.

Security, membership, and role management are covered in Chapter 6.

Personalizing Your Site

One of the areas driving changes on the Internet is that of communities. People like to belong, and the Internet is a big, lonely place. Community sites give you a home, a sense of belonging. Part of that comes from being in contact with like-minded people, and part comes from the features some of these sites offer. Our houses are decorated to our style, and many of us customize our Windows desktop, so why shouldn't our favorite Web sites offer the same opportunity?

Hand in hand with the Membership API lie the Personalization features. These provide a simple programming model for storing user details (including those of anonymous users), with easy customization. Like Membership, Personalization can be configured to work with multiple data providers and provides an easy way to define custom properties for each user. This leads to a user profile with strong types, allowing easy access within ASP.NET pages. For example, you can create a profile with `Name`, `Address`, and `Theme` as properties and a page that allows the user to update them, as shown in Listing 1.2.

LISTING 1.2. Using the Profile Custom Properties

```
<script runat="server">

    Sub Page_Load(Sender As Object, E As EventArgs)

        Name.Text = Profile.Name
        Address.Text = Profile.Address
        Theme.Text = Profile.Theme

    End Sub

    Sub Update_Click(Sender As Object, E As EventArgs)

        Profile.Name = Name.Text
        Profile.Address = Address.Text
        Profile.Theme = Theme.Text

    End Sub

</script>

<form runat="server">
    Name: <asp:TextBox id="Name" runat="server" /> <br />
    Address: <asp:TextBox id="Address" runat="server" /> <br />
    Theme: <asp:TextBox id="Theme" runat="server" /> <br />
    <asp:Button Text="Update" onClick="Update_Click" runat="server" />
</form>
```

The simplicity of this method means we only have to deal with the user profile. We don't need to know how it stores the data—we just deal with the properties each profile has. This personalization also allows us to easily use the theming capabilities, changing the theme when the page is created, as demonstrated below.

```
Sub Page_PreInit(Sender As Object, E As EventArgs)

    Me.Theme = Profile.Theme

End Sub
```

To ensure that the theme customization is applied before the controls are created we use the new `PreInit` event.

Personalization is covered in Chapter 7.

Creating Portals

As if customization of a site's look weren't enough, ASP.NET 2.0 also brings a way to alter the structure with its new portal framework.

The success of the ASP.NET IBuySpy portal application and its offshoots shows that customized sites are popular. The trouble has always been how to provide a consistent look while still allowing user customization not only of the style but also of the content and placement of content. Microsoft has already implemented solutions to provide this functionality, including SharePoint Server and Outlook Web Parts.

In ASP.NET 2.0, Web Parts become the underlying technology for all Microsoft portal applications, allowing a single easy-to-use, extensible framework. The concept revolves around two key controls—the `WebPartZone` and the `WebPart`. The `WebPartZone` identifies areas on the page in which content can be changed, and the `WebPart` identifies the part (or module) within the zone. There are different types of `WebPart` controls for different purposes, for example:

- `ContentWebPart`, for arbitrary controls and content
- `CatalogPart`, which contains a catalog of parts not currently on the page
- `EditorPart` controls, such as `AppearanceEditorPart` and `LayoutEditorPart`, allowing customization of the parts

For example, consider an intranet site that needs a selection of areas of content—links, announcements, and so on. Figure 1.4 shows a sample site.

This site has two main areas of content—the left area with the welcome message and the announcements, and the right area showing weather and links. Each of these main areas is a `WebPartZone` and the content with them a `ContentWebPart`. The code for this page appears in Listing 1.3.

Listing 1.3. Sample Intranet Site Using Web Parts

```
<table>
  <tbody>
    <tr>
      <td valign="top" align="left">
        <asp:WebPartZone id="LeftZone" runat="server"
          Title="Left Zone" partFrameType="TitleOnly"
          lockLayout="False" borderColor="White">
          <ZoneTemplate>
            <asp:ContentWebPart id="ContentWebPart1"
              title="Welcome" runat="server">
            </ContentTemplate>
          </asp:WebPartZone>
        </td>
      </tr>
    </tbody>
  </table>
```

continues

```

        This project ...
    </ContentTemplate>
    </asp:ContentWebPart>
    <uc1:Announcements id="Announcements1" runat="server" />
</ZoneTemplate>
</asp:WebPartZone>
</td>
<td valign="top" align="left">
    <asp:WebPartZone id="RightZone" runat="server"
        title="Right Zone" width="100%"
        partFrameType="TitleOnly" lockLayout="False"
        borderColor="White">
        <ZoneTemplate>
            <sample:WeatherWebPart runat="server" id="WeatherWebPart"
                Title="My Weather" width="250px" />
            <uc1:dailylinkswebpart id="DailyLinksWebPart1"
                runat="server" title="Daily Links" />
        </ZoneTemplate>
    </asp:WebPartZone>
</td>
<td valign="top" align="left">
</td>
</tr>
</tbody>
</table>

```

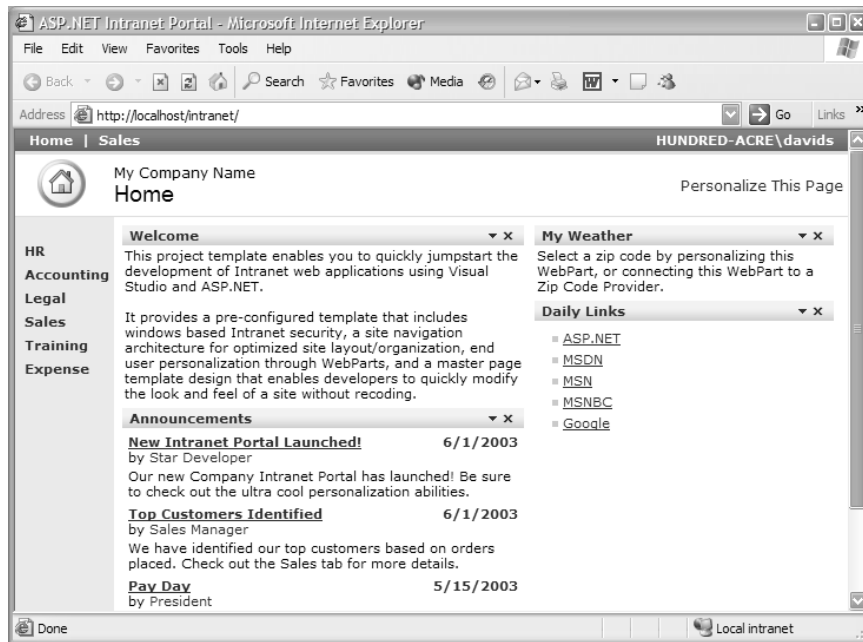


FIGURE 1.4. Sample intranet site using the portal framework

Here you can see two `WebPartZone` controls separating the left and right content. Within each there is a mixture of content, including static text, user controls, and custom server controls.

At first glance this doesn't look like much improvement over existing layout methods such as user controls—in fact, it looks more complex. However, the framework on which Web Parts is built is great for developers and users alike. Developers only have to drop user controls or server controls into a `ZoneTemplate` to automatically receive Web Parts functionality. To enhance this functionality you can add verbs to the `WebPartZone` to indicate which features the framework should add to each part within the template. Listing 1.4 shows an example.

Listing 1.4. Web Part Verbs

```
<WebPartCloseVerb checked="False"
  imageUrl="images/CloseVerb.gif"
  enabled="True" text="Close"
  description="Closes the WebPart"
  visible="True" />

<WebPartRestoreVerb checked="False"
  imageUrl="images/RestoreVerb.gif"
  enabled="True" text="Restore"
  description="Restores the WebPart"
  visible="True" />

<WebPartMinimizeVerb checked="False"
  imageUrl="images/MinimizeVerb.gif"
  enabled="True" text="Minimize"
  description="Minimizes the WebPart"
  visible="True" />

<WebPartHelpVerb checked="False"
  enabled="True" text="Help"
  description="Shows help for the WebPart"
  visible="True" />

<WebPartEditVerb checked="False"
  imageUrl="images/EditVerb.gif"
  enabled="True" text="Edit"
  description="Edits the WebPart"
  visible="True" />
```

Here there are verbs that allow minimizing and maximizing the `WebPart` controls, editing, help, and so on.

For the user, the Personalization features allow each `WebPart` to be moved to other `WebPartZone` controls or edited. For example, moving a

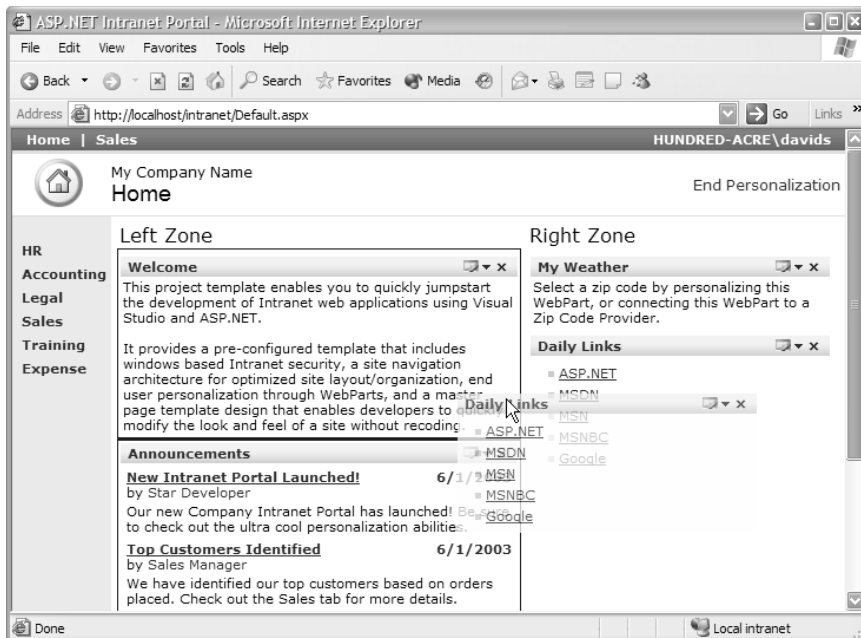


Figure 1.5. Dragging a *WEBPART* to another location

WebPart is simply a matter of drag and drop, as shown in Figure 1.5, where the Daily Links section is being moved to the Left Zone.

Editing of WebPart controls is also part of the portal framework, where by default the user can alter the title, height, width, and frame style. Each WebPart can also provide custom properties that can be edited. For example, the WebPart for the My Weather section allows the zip code to be set, upon which the weather for that zip code is displayed. Editing of WebPart controls is provided by the inclusion of an `EditorZone`, which details what can be edited. For example, for our sample intranet site, the `EditorZone` might include the code shown in Listing 1.5.

Listing 1.5. Adding Editor Parts to an EditorZone

```
<asp:EditorZone id="EditorZone1" title="Edit WebParts"
  runat="server" partFrameType="TitleOnly"
  cssClass="EditorZoneBody">
  <ZoneTemplate>
  <asp:AppearanceEditorPart id="AppearanceEditorPart1"
    runat="server" font-size="8pt" font-bold="true" />
  <asp:PropertyGridEditorPart id="PropertyGridEditorPart1"
    title="Custom Settings" font-size="8pt" runat="server" />
```

```
</ZoneTemplate>
</asp:EditorZone>
```

FIGURE 1.6. Editing the My Weather *WEBPART*

This indicates that there are two editor parts—one for the appearance, and one for the property grid—for properties of the `WebPart` that are marked as personalizable. Selecting the edit button invokes the editing features and the `EditorZone` is made visible, as shown in Figure 1.6. Once edited for zip code 02116, the `WebPart` shows the weather for Boston (Figure 1.7).

The portal framework is covered in Chapter 8.

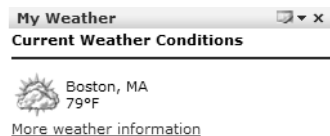


FIGURE 1.7. The My Weather *WEBPART*

Setting Up and Managing Your Site

ASP.NET 1.x made deployment of Web sites easy with its xcopy deployment model. This removed the need for some administrative tasks, such as registering COM components, but still left other tasks, such as site administration, as more manual affairs. The XML-based configuration file obeyed the xcopy rule, but there are three major problems with it. First, there is no easy-to-use administration tool, meaning you must have knowledge of the

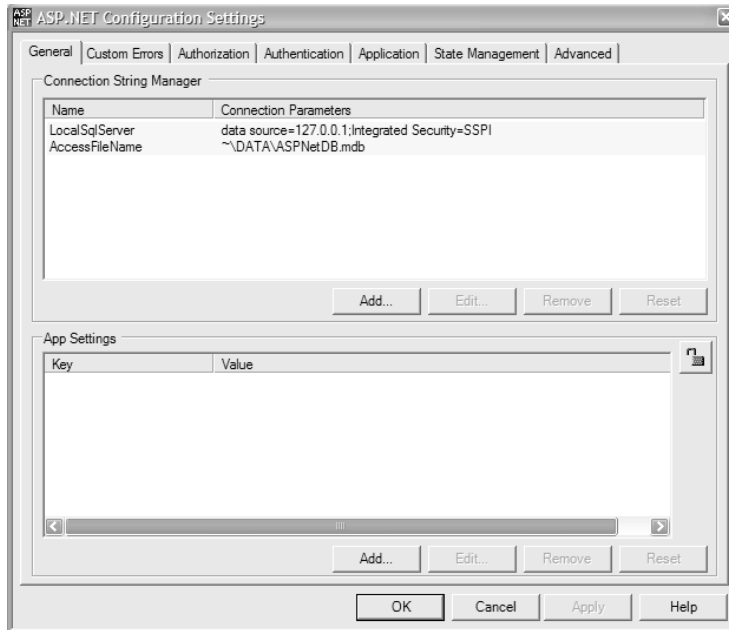


Figure 1.8. ASP.NET Configuration MMC Snap-in

XML schema before you can modify it. Second, you need some way to actually fetch the file, edit it, and then upload it. This is a problem particularly for hosted scenarios, where users are always remote, and administration of many sites can become a management nightmare. Finally, you cannot create a Web Application, which is required for sites that require security.

Three features in ASP.NET 2.0 help solve these issues. The first is the Microsoft Management Console (MMC) Snap-in for configuration, as shown in Figure 1.8.

The second feature is a Management API, providing a programmable interface to manage a site. For example, Listing 1.6 sets the authorization mode using the API.

Listing 1.6. Setting the Authorization Mode

```
Dim cfg As Configuration
Dim ms As AuthenticationSection

cfg = Configuration.GetConfigurationForUrl(Request.ApplicationPath)
ms = CType(cfg.GetConfigurationSection("system.web/authentication"),
    AuthenticationSection)
ms.Mode = HttpAuthenticationMode.Windows
cfg.Update()
```

The Management API provides access to all areas of the configuration, both at the machine level (`machine.config`) and the application level (`web.config`). This allows utilities to be written not only to manage a single site but also to manage all sites.

The third aspect of site management is the creation of a Web-based tool, wrapping much of the Management API. This provides a simple way to remotely administer a site, as shown in Figure 1.9.



FIGURE 1.9. The Web management tool

Here you have a simple Web interface that allows configuration of all aspects of a site. The interface is designed to be customized, so corporations and hosts can give it a company look.

Administration is covered in Chapter 13.

Using Images on Your Site

Using images isn't a particularly difficult area of site design, but their use has been eased with two new server controls. First, the `ImageMap` control provides easy support for image maps, as demonstrated on the next page.

```

<asp:ImageMap runat="server"
    onClick="Map_Click"
    imageUrl="images/states.jpg">
  <asp:CircleHotSpot X="100" Y="100" Radius="25"
    Value="Other State" />
  <asp:RectangleHotSpot Top="200" Left="150" Right="200" Bottom="150"
    Value="More State"/>
  <asp:PolygonHotSpot Coordinates="3,4, 15,18, 45,18, 15,70, 3,4"
    Value="State 1" />
</asp:ImageMap>

```

The detection of the hot spot is handled in the postback event:

```

Sub Map_Click(Sender As Object, E As ImageMapEventArgs)

    Select Case e.Value
    Case "State 1"
        ' ...
    Case "Other State"
        ' ...
    Case "More States"
        ' ...
    End Select

End Sub

```

The second new image-handling feature is that of dynamic images, designed specifically to render images appropriate to the calling browser. This is necessary because images displayed in Web browsers generally aren't suitable for smaller devices, such as PDAs or phones. The new `DynamicImage` control uses an `HttpHandler` to sniff the browser type and render the appropriate image. For example, consider the following code:

```

<form runat="server">
  <asp:DynamicImage DynamicImageType="ImageFile"
    ImageFile="car.gif" runat="server" />
</form>

```

For a standard Web browser the image is rendered as expected, but for a Wireless Access Protocol (WAP) phone, the image is rendered as a Wireless Bitmap (WBMP). This removes any need for the developer to specifically target images to browser types.

Images are covered in Chapter 12.

Using Data on Your Site

It's probably no exaggeration to say that most, if not all, Web sites use some form of data to drive them. Whether XML files, a database, or another dynamic form of storage, the data allows a site to respond to the user and to be up to date. ASP.NET 1.x provided some great data binding capabilities, but they always involved code, often the same code used over and over. One of the key goals of ASP.NET 2.0 is to reduce code and to ease the use of databases, especially for beginner programmers. To achieve this a new set of data controls has been introduced, removing the need for in-depth knowledge of ADO.NET.

Data source controls provide a consistent and extensible method for declaratively accessing data from Web pages. There are several data source controls, including `AccessDataSource`, `SqlDataSource`, `XmlDataSource`, and `ObjectDataSource`, and it's likely that others (perhaps for Excel and Exchange Server) will appear as ASP.NET 2.0 nears release, along with third-party data sources. The use of data controls is simple, as shown below.

```
<asp:SqlDataSource id="ds1" runat="server"
  ConnectionString="localhost;database=pubs;Trusted_Connection=True"
  SelectCommand="SELECT * FROM authors"/>

<asp:DataGrid DataSourceId="ds1" runat="server" />
```

This just encapsulates the code everyone used to put in the `Page_Load` event—it connects to the database, fetches the data, and binds the grid. The contents of the `SelectCommand` can be a stored procedure as well as a SQL command, thus preserving the separation of data access from the page itself. There are commands for updating, inserting, and deleting.

This model is extended by use of a parameter collection, allowing parameters to be passed into the command from a variety of sources. For example, the code in Listing 1.7 automatically takes the value from the `TextBox` control `txtState` and feeds this into the parameter `@state`.

Listing 1.7. Using a ControlParameter

```
<asp:SqlDataSource id="ds1" runat="server"
  ConnectionString="localhost;database=pubs;Trusted_Connection=True"
  SelectCommand="SELECT * FROM authors WHERE state=@state">
  <SelectParameters>
    <ControlParameter name="@state" ControlID="txtState" />
  </SelectParameters>
</asp:SqlDataSource>

<asp:TextBox id="txtState" runat="server" />

<asp:DataGrid DataSourceId="ds1" runat="server" />
```

There are also other parameter types, allowing parameter information to be taken directly from Session variables, Cookies, the Request (QueryString), and the HTML Form.

Data Binding

Data binding in ASP.NET 1.x was simple, but it did cause confusion in some areas. For example, should you use early binding, for which you have to know the underlying data structure? Or should you take the development shortcut and use late binding, like this:

```
<%# DataBinder.Eval(Container.DataItem, "au_lname") %>
```

With ASP.NET 2.0 this syntax has been simplified:

```
<%# Eval("au_lname") %>
```

There is also an equivalent XPath syntax for XPath expressions when binding to XML documents:

```
<%# XPath("@au_lname") %>
```

Binding to Objects

One of the most requested features has been the ability to bind data directly to objects. Good design dictates that you separate your data access layer from your presentation layer, and this is often done as a set of classes. The new `ObjectDataSource` allows you to simply bind directly to existing objects, such as classes, thus allowing you to have a strongly typed data layer but still participate in the easy data binding that ASP.NET 2.0 brings.

Data source controls and data binding are covered in Chapter 3.

Adding Mobility Support

Mobile devices are becoming more pervasive. It seems everyone has a mobile phone, many people have PDAs, and some great devices now combine the functionality of both. From the development perspective the problem with these devices is their screen size and rendering capabilities. Not only do many of them not accept HTML, but with their tiny screens some also can't display images, tables, and so on.

In ASP.NET 1.x, the Microsoft Mobile Internet Toolkit (MMIT in version 1.0 and ASP.NET Mobile Controls in version 1.1) provided this support, including separate controls for building Web pages suitable for small-screen browsers. In ASP.NET 2.0, the MMIT is no longer required because mobile support is built into all controls. This reduces not only the amount of code required but also the need for specialist knowledge about mobile platforms. This might seem relatively unimportant while the number of sites that target mobile browsers is small, but this is bound to increase as the features of small devices improve and prices drop.

The really important part of the changes is to the infrastructure of the ASP.NET server controls. All controls are now built on a control adapter architecture, where there is an adapter for each specific device. The adapters have knowledge of each device and perform the rendering appropriate for its markup language and screen size. Since the controls are derived from adapters, they don't need to perform any special action to choose what to render—the adapter intelligently renders the appropriate content based on the calling device. New devices are easily supported because they require only the addition of an adapter, which the controls can then take advantage of.

Device Filters

This architecture is taken further by allowing adapter-specific attributes for controls, enabling the page designer to provide different content for specific devices. For example, the following code shows how different text and cascading style sheet (CSS) styling can be defined for a mobile device.

```
<asp:Label id="MyLabel" runat="server"
    Text="Welcome to our site"
    Nokia:Text="Time to upgrade your Nokia phone!"
    cssClass="StandardStyleClass"
    Nokia:cssClass="SpecialNokiaStyleClass" />
```

Device Templates

Along with modified attributes, we also have the ability to provide templates for specific devices. We know that mobile devices have a small screen size, so repeated controls such as grids and lists either aren't appropriate or need different output. By using specific templates for devices we can now provide different content to different devices, as shown in Listing 1.8.

Listing 1.8. Filtered Templates for Mobile Devices

```

<asp:Repeater runat="server" ..>

    <HtmlBrowsers:HeaderTemplate>
        <table>
            <tr><td>UserName</td><td>Address</td><td>Phone</td></tr>
        </HtmlBrowsers:HeaderTemplate>

    <HtmlBrowsers:ItemTemplate>
        <tr>
            <td><%= Container.DataItem("UserName") %></td>
            <td><%= Container.DataItem("Address") %></td>
            <td><%= Container.DataItem("Phone") %></td>
        </tr>
    </HtmlBrowsers:ItemTemplate>

    <WmlBrowsers:ItemTemplate>
        <asp:Panel runat="server">
            <%= Container.DataItem("UserName") %>
            <%= Container.DataItem("Phone") %>
        </asp:Panel>
    </WmlBrowsers:ItemTemplate>

    <HtmlBrowsers:FooterTemplate>
        </table>
    </HtmlBrowsers:FooterTemplate>

</asp:Repeater>

```

These mechanisms provide a way for developers to override the built-in rendering for mobile devices. Along with automatic mobile support with the standard controls, there are controls specifically designed for mobile devices, such as `PhoneLink` (to launch a phone call) and `Pager` (to provide paging support). Standard controls also support the `SoftKeyLabel` attribute to allow specific text to be targeted to soft keys on phones.

Mobility is covered in Chapter 10.

Compilation and Deployment

Since the release of ASP.NET 1.0 there's been a fairly standard approach to Web site architecture. In general there has been a separation of business logic into separate assemblies, often in a separate directory with a make file. Using Visual Studio .NET 1.0 and 2003 for this approach is fine since it provides

the compilation step for you, but stand-alone tools (such as Web Matrix) don't, so you have to handcraft a batch file to make your assemblies.

ASP.NET 2.0 provides automatic compilation for satellite code by supporting a **code** directory. All files within this directory will be compiled on the first run, thus removing the need for separate compilation scripts. Files within the code directory don't have to be just pure code, such as Visual Basic .NET or C# files. Support is also included for Web Services Description Language (WSDL) files and strongly typed DataSets (XSD) files. For WSDL files the proxy will automatically be created, and for XSD files the appropriate classes will be created.

Along with automatic compilation comes pre-compilation—an entire site (Web pages and code) can be pre-compiled. This not only provides a way to deploy compiled applications but also removes the performance hit taken by the compilation process on the first run. In addition, since only compiled files are deployed, intellectual property is protected.

Another automatic feature is that of resources, such as those used for globalization. The **resources** directory provides a place for these, which are included as part of the compilation process.

Compilation is covered in Chapter 2.

Development Tools

Having a whole raft of new features in ASP.NET is great, but what about design tools? Version 2.0 of the .NET Framework will introduce the latest version of Visual Studio .NET—Visual Studio .NET “Whidbey.” When ASP.NET 1.0 was released it quickly became apparent that a development tool targeted at Web developers was required. Visual Studio .NET provides great project and design features targeted at corporate developers. Web Matrix was released to appeal to ASP.NET developers who don't have access to Visual Studio .NET. It's a small stand-alone tool, specifically targeted at ASP.NET development, and provides some features that aren't in Visual Studio .NET.

With ASP.NET 2.0, Visual Studio .NET “Whidbey” has undergone some major enhancements and now provides a far superior environment for developing Web applications than previous versions. While the design environment is very familiar, the feature set has improved, making it a premier Web development tool.

Key design features for Visual Studio .NET “Whidbey” include the following:

- Traditional in-line coding approach, plus a new code-behind model
- Support for all managed languages
- Ability to edit any file anywhere (FTP, File System, Front Page Extensions, and so on)
- Support for data controls, drag and drop, and database access, with a rich design surface
- Support for visual inheritance through master pages
- No project files, allowing projects to be manipulated outside of the tool
- Integrated Web Administration Tool
- IntelliSense included
- Debugging support
- No “build” step—ability to compile on first run

This feature set is really a combination of features from Visual Studio .NET and Web Matrix.

Visual Studio .NET “Whidbey” is covered in Chapter 2.

SUMMARY

Of course, there are many changes within ASP.NET 2.0—too many to mention in this introduction, although some highlights were covered in this chapter. The remainder of the book covers these changes (including items such as changes to existing controls, changes to page attributes, new controls, and so on) in detail.

It’s important to remember that this is a preview technology, still evolving and still in testing. Despite that, the initial feature set is extremely impressive and provides a leap in productivity for Web site developers.