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Beginning ASP.NET 4 in C# and VB

Imar Spaanjaars

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BEGINNING

ASP.NET 4

IN C# AND VB

Imar Spaanjaars

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To my friends

About the Author

Imar Spaanjaars graduated in Leisure Management at the Leisure Management School in th Netherlands, but he quickly changed his career path into the Internet world.

After working in the Internet business at various web agencies for the past twelve years, he recent started up his own company called *De Vier Koeden* (www.devierkoeden.nl), a small Internet agenc specializing in consultancy and development of Internet and intranet applications with Microso technologies such as ASP.NET 4.

Imar has written books on ASP.NET and Macromedia Dreamweaver, all published under the Wro brand. He is also one of the top contributors to the Wrox Community Forum at p2p.wrox.com, whe he shares his knowledge with fellow programmers.

In 2008 and 2009, Imar received Microsoft's Most Valuable Professional (MVP) award for h contributions to the ASP.NET community.

Imar lives in Utrecht, the Netherlands, with his girlfriend, Fleur. You can contact him through hi personal web site at http://imar.spaanjaars.com or by e-mail at imar@spaanjaars.com.

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Acknowledgments

Just as with my prior books, I really enjoyed writing this one. The process from an empty Wor document at the very beginning to a printed copy as the final result is a really interesting one. Alon the way, I discovered, understood and used a lot of the new features that ASP.NET 4 and Visual We Developer 2010 bring. Since this book is a major update on the previous edition — *Beginnin ASP.NET 3.5 in C# and VB* — I have been able to incorporate a lot of reader feedback into this editio While working on this book, I went through the more than 450 threads in the book's forum, lookin for feedback that could improve this edition. This allowed me to add clarification and more detaile instructions where needed. If you have the previous edition and posted a question in the Wrox forum thanks for your valuable feedback; you've really helped to make this book better.

Besides my readers, I owe a lot to other people who helped me write this book.

First of all I'd like to thank Brian Herrmann for his editorial work. Just as before, it was a pleasu to work with you! I also want to thank Michael J. Apostol for his work as a technical editor, and th people from Wrox for their support and contributions to this book.

Another person I owe a lot to is my friend Anne Ward from Blue Violet, a UK-based web an graphic design company. Anne has done most of the new designs used in this book and I high appreciate her input. Thanks again, Anne! The concert pictures you see in this book come from Nig D. Nudds, who kindly let me use pictures from his collection.

Finally, I would like to thank my good friends Joost and René and my lovely girlfriend Fleur f their support during this project.

Foreword

This is a very nice book written by one of ASP.NET's very own Most Valuable Professionals, Ima Spaanjaars. It takes a lot to be a Microsoft MVP — not only do you need expertise in the subje matter, you also need to be a great teacher and a technology philanthropist. Through his blog articles, and books, Imar has given a considerable amount of his time to benefit the web developme community.

Imar has been active in the ASP.NET community for a long time and has written several books o web development, including the previous version of this book, *Beginning ASP.NET 3.5*. What mak this book so special is that it does not assume the reader has any prior knowledge of web developme and at the same time it is a great book for anyone hoping to upgrade to ASP.NET 4. The book uses th free Visual Studio edition, Visual Web Developer Express 2010, starting from a chapter covering ho to get started and then slowly introducing more advanced concepts in a seamless fashion.

In the process of helping create Visual Studio 2010 for Web Developers, I often interacted wit community leaders to collect feedback on how we could make the product better for every we developer. Imar has been using ASP.NET 4 and VWD 2010 Express since their first Beta versions, an has been pouring in feedback on which bugs are important to fix and which features to emphasize. H passion for the technology is reflected in this book and I am positive that the readers of this book wi feel that same passion.

ASP.NET 4 and Visual Studio 2010 have feature improvements in many areas, including buildin standards-compliant web sites, JScript IntelliSense, jQuery integration, Ajax, CSS improvement HTML and markup snippets, Web Deployment, and data integration. I believe ASP.NET 4 and Visua Studio 2010 are great technologies to build fine web sites, and this book will be an excelle companion to these products, helping users excel in the world of web development.

—Vishal R. JoshiSenior Program Manager LeadMicrosoft Web Platform Toolshttp://vishaljoshi.blogspot.co

To build effective and attractive database-driven web sites, you need two things: a solid and fa framework to run your web pages on and a rich and extensive environment to create and progra these web pages. With ASP.NET 4 and Visual Web Developer 2010 you get both. Together they form *the* platform to create dynamic and interactive web sites.

ASP.NET 4 builds on top of its popular predecessors ASP.NET 2.0 and ASP.NET 3.5. Whil maintaining backward compatibility with sites built using these older versions, ASP.NET 4 and Visua Web Developer 2010 introduce new, exciting features and bring many smaller, but much neede changes to the framework and development tools.

With each new release of Visual Studio (which includes Visual Web Developer) since Visual Studi 2003, I am surprised by the sheer amount of new functionality and changes Microsoft has been able put in the product. Visual Studio 2010 is no exception. A major new feature in Visual Studio 2010 i the full integration of the ADO.NET Entity Framework 4 that lets you work with databases with ver little code. Another great change in Visual Studio is the use of Windows Presentation Foundatio (WPF) for the User Interface which brings a better user experience and new behavior in Visual Stud itself.

Although not a new feature by itself, the inclusion of jQuery in Visual Web Developer is a excellent decision that will help you write fancier web sites in less time. jQuery is a compelling clie side, cross-browser JavaScript framework and is discussed in detail in Chapter 11.

If you're familiar with earlier versions of ASP.NET, you'll be happy to find many small gems in th new version of the framework that will make your life as a developer easier. I'll mention and discu these new features throughout this book where appropriate. For a complete list of all new features ASP.NET, check out the following white paper at the official ASP.NET web site:

`http://www.asp.net/learn/whitepapers/aspnet4/`

Probably the best thing about Visual Web Developer 2010 is its price: it's still available for free Although the commercial versions of Visual Studio 2010 ship with Visual Web Developer, you ca also download and install the free Express edition. This makes Visual Web Developer 2010 an ASP.NET 4 probably the most attractive and compelling web development technologies availabl today.

Who This Book Is For

This book is for anyone who wants to learn how to build rich and interactive web sites that run on th Microsoft platform. With the knowledge you gain from this book, you create a great foundation t build any type of web site, ranging from simple hobby-related web sites to sites you may be creatin for commercial purposes.

Anyone new to web programming should be able to follow along because no prior background web development is assumed, although it helps if you do have a basic understanding of HTML and th web in general. The book starts at the very beginning of web development by showing you how obtain and install Visual Web Developer. The chapters that follow gradually introduce you to new technologies, building on top of the knowledge gained in the previous chapters.

Do you have a strong preference for Visual Basic over C# or the other way around? Or do you thin

both languages are equally cool? Or maybe you haven't made up your mind yet and want to learn bo languages? Either way, you'll like this book because *all* code examples are presented in bo languages!

Even if you have some experience with prior versions of ASP.NET, you may gain a lot from thi book. Although many concepts from previous versions are brought forward into ASP.NET 4, you' discover there's a lot of new stuff to be found in this book, including an introduction to the ADO.NE Entity Framework, the inclusion of jQuery, ASP.NET AJAX, the many changes to the ASP.NET Framework, and much more.

What This Book Covers

This book teaches you how to create a feature-rich, data-driven, and interactive web site called Plan Wrox. Although this is quite a mouthful, you'll find that with Visual Web Developer 2010, developin such a web site isn't as hard as it seems. You'll see the entire process of building a web site, fro installing Visual Web Developer 2010 in Chapter 1 all the way up to putting your web site on a liv server in Chapter 19. The book is divided into 19 chapters, each dealing with a specific subject.

- **Chapter 1, "Getting Started with ASP.NET 4."** In this chapter you'll see how to obtain a install Visual Web Developer 2010. You'll get instructions for downloading and installing th free edition of Visual Web Developer 2010, called the Express edition. You are also introduced HTML, the language behind every web page. The chapter closes with an overview of t customization options that Visual Web Developer gives you.
- **Chapter 2, "Building an ASP.NET Web Site."** This chapter shows you how to create a new we site and how to add new elements like pages to it. Besides learning how to create a wel structured site, you also see how to use the numerous tools in Visual Web Developer to creat HTML and ASP.NET pages.
- **Chapter 3, "Designing Your Web Pages."** Visual Web Developer comes with a host of too that enable you to create well-designed and attractive web pages. In this chapter, you see how make good use of these tools. Additionally, you learn about CSS, the language that is used format web pages.
- **Chapter 4, "Working with ASP.NET Server Controls."** ASP.NET Server Controls are one the most important concepts in ASP.NET. They enable you to create complex and feature-ric web sites with very little code. This chapter introduces you to the large number of server contro that are available, explains what they are used for, and shows you how to use them.
- **Chapter 5, "Programming Your ASP.NET Web Pages."** Although the built-in CSS tools a the ASP.NET Server Controls can get you a long way in creating web pages, you are likely to us a programming language to enhance your pages. This chapter serves as an introduction programming with a strong focus on programming web pages. Best of all: all the examples yo see in this chapter (and the rest of the book) are in both Visual Basic and C#, so you can choos the language you like best.
- **Chapter 6, "Creating Consistent Looking Web Sites."** Consistency is important to give yo web site an attractive and professional appeal. ASP.NET helps you create consistent-lookin pages through the use of master pages, which enable you to define the global look and feel of page. Skins and themes help you to centralize the looks of controls and other visual elements your site. You also see how to create a base page that helps to centralize programming code tha

you need on all pages in your site.

- **Chapter 7, "Navigation."** To help your visitors find their way around your site, ASP.NET come with a number of navigation controls. These controls are used to build the navigation structure your site. They can be connected to your site's central site map that defines the pages in your we site. You also learn how to programmatically send users from one page to another.
- **Chapter 8, "User Controls."** User controls are reusable page fragments that can be used multiple web pages. As such, they are great for repeating content such as menus, banners, and s on. In this chapter, you learn how to create and use user controls and enhance them with som programmatic intelligence.
- **Chapter 9, "Validating User Input."** A large part of interactivity in your site is defined by th input of your users. This chapter shows you how to accept, validate, and process user input usi ASP.NET Server Controls. Additionally, you see how to send e-mail from your ASP.NET we site and how to read from text files.
- **Chapter 10, "ASP.NET AJAX."** Microsoft ASP.NET AJAX enables you to create good-looking flicker-free web pages that close the gap between traditional desktop applications and web site In this chapter you learn how to use the built-in Ajax features to enhance the presence of yo web pages, resulting in a smoother interaction with the web site.
- **Chapter 11, "jQuery."** jQuery is a popular, open source and cross-browser JavaScript libra designed to make it easier to interact with web pages in the client's browser. In this chapter yo learn the basics of jQuery and see how to add rich visual effects and animations to your we pages.
- **Chapter 12, "Introducing Databases."** Understanding how to use a database is critical building web sites, as most modern web sites require the use of a database. You'll learn th basics of SQL, the query language that enables you to access and alter data in a database. addition, you are introduced to the database tools found in Visual Web Developer that help yo create and manage your SQL Server databases.
- **Chapter 13, "Displaying and Updating Data."** Building on the knowledge you gained Chapter 12, this chapter shows you how to use the ASP.NET data-bound and data source contro to create a rich interface that enables your users to interact with the data in the database that the controls target.
- **Chapter 14, "LINQ and the ADO.NET Entity Framework."** LINQ is Microsoft's solution fo accessing objects, databases, XML, and more. The ADO.NET Entity Framework (EF) Microsoft's new technology for database access. This chapter shows you what LINQ is all abou how to use the visual EF designer built into Visual Studio, and how to write LINQ to EF queri to get data in and out of your SQL Server database.
- **Chapter 15, "Working with Data — Advanced Topics."** While earlier chapters focused most on the technical foundations of working with data, this chapter looks at the same topic from front-end perspective. You see how to change the visual appearance of your data through the us of control styles. You also see how to interact with the data-bound controls and how to speed u your web site by keeping a local copy of frequently accessed data.
- **Chapter 16, "Security in Your ASP.NET 4 Web Site."** Although presented quite late in th book, security is a first-class, important topic. This chapter shows you how to make use of th built-in ASP.NET features related to security. You learn about a number of application service that facilitate security. You also learn how to let users sign up for an account on your web sit how to distinguish between anonymous and logged-on users, and how to manage the users in yo

system.

- **Chapter 17, "Personalizing Web Sites."** Building on the security features introduced in Chapt 16, this chapter shows you how to create personalized web pages with content targeted individual users. You see how to configure and use ASP.NET Profile that enables you to stor personalized data for known and anonymous visitors.
- **Chapter 18, "Exception Handling, Debugging, and Tracing."** In order to understand, improv and fix the code you write for your ASP.NET web pages you need good debugging tools. Visua Web Developer ships with great debugging support that enables you to diagnose the state of you application at runtime, helping you find and fix problems before your users do.
- **Chapter 19, "Deploying Your Web Site."** By the end of the book, you should have a web si that is ready to be shown to the world. But how exactly do you do that? What are the things yo need to know and understand to put your web site out in the wild? This chapter gives the answe and provides you with a good look at configuring different production systems in order to ru your final web site.

How This Book Is Structured

This book takes the time to explain concepts step by step using working examples and detailed explanations. Using the famous Wrox Try It Out and How It Works sections, you are guided through task step by step, detailing important things as you progress through the task. Each Try It Out task followed by a detailed How It Works section that explains the steps you performed in the exercise.

At the end of each chapter, you find exercises that help you test the knowledge you gained in th chapter. You'll find the answers to each question in Appendix A at the end of this book. Don't worry you don't know all the answers to the questions. Later chapters do not assume you followed an carried out the tasks from the exercise sections of previous chapters.

Since this is a beginner's book, I can't go into great detail on a number of topics. For pretty muc each chapter in this book, you'll easily find numerous other books that exclusively deal with the top discussed. Where appropriate, I have included references to these books so you can easily decid where to go to next if you want to deepen your knowledge on a specific subject.

What You Need to Use This Book

This book assumes you have a system that meets the following requirements:

- Capable of running Visual Web Developer. For the exact system requirements, consult th readme file that comes with the software.
- Running Windows Vista or Windows 7 (both require at least the Home Premium edition), or on of the Windows Server 2008 editions.

Although you should be able to follow along with most of the exercises using another version Windows such as Windows XP (as long as it's supported by Visual Web Developer), the exercises in Chapter 19 on deployment require the use of Microsoft's web server IIS 7 or later, which only ship with the Windows versions in the requirements list.

Chapter 1 shows you how to obtain and install Visual Web Developer 2010, which in turn instal
the Microsoft .NET Framework version 4 and SQL Server 2008 Express edition; all you need is a goo
operating system and the drive to read this book!

Conventions

To help you get the most from the text and keep track of what's happening, a number of convention
are used throughout the book.

Try It Out Conventions

The Try It Out is an exercise you should work through, following the text in the book.

1. They usually consist of a set of steps.
2. Each step has a number.
3. Follow the steps through with your copy of the code.
4. Then read the How It Works section to find out what's going on.

How It Works

After each Try It Out, the actions you carried out and the code you've typed in will be explained
detail.

NOTE Boxes like this one hold important, not-to-be forgotten information that is directly relevant to the surroundi
text.

COMMON MISTAKES Mistakes that are easily made while following the exercises are presented in a box like this.
sure to read these carefully when you get stuck in an exercise.

As for styles in the text:

- New terms and important words are *italicized* when they are introduced.
- Code within the text is presented like this: `Request.QueryString.Get("Id")`
- URLs that do not start with `www` are prefixed with http:// to make it clear it's an Internet addres
  URLs within the text are presented like this: http://imar.spaanjaars.com.
- You'll see many URLs that start with tinyurl.com which is a handy, online service to make URI
  shorter (and thus easier to type). Entering a tinyurl.com address in your browser should take yo
  to its final destination.
- Menu items that require you to click multiple submenus have a special symbol that looks lik
  this: ⇒. For example: File ⇒ New ⇒ Folder.
- Code or content irrelevant to the discussion is either left out completely or replaced with ellips
  points (three dots), like this:

```
<tr>
```

```
    <td style="white-space: nowrap;">
      ... Menu items go here; not shown
    </td>
  </tr>
```

The three dots are used regardless of the programming language used in the example, so you'
see it for C#, Visual Basic, HTML, CSS, and JavaScript. When you see it in code you'
instructed to type into the code editor, you can simply skip the three dots and anything th
follows them on the same line.

- Code shown for the first time, or other relevant code, is in the following format:

```
Dim roles As New ArrayList()
roles.Add("Administrators")
roles.Add("ContentManagers")
```

To put emphasis on a block of code surrounded by other code, I used a bolded font like this:

```
<appSettings>
  <add key="FromAddress" value="info@planetwrox.com"/>
</appSettings>
```

The surrounding code is used to make it easier to see where the bolded code should be placed.

- Quite often, white space in code is irrelevant, as is mostly the case with ASP.NET markup an
HTML. To fit code within the boundaries of this book, I often wrap code over multiple lines an
indent the part that should have been on the previous line like this:

```
<!DOCTYPE html PUBLIC"-//W3C//DTD XHTML 1.0 Transitional//EN"
      "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
```

If you're typing this code yourself, you can put it all on one line, or use the same line breaks
you prefer.

- Text that appears on screen often has Each Word Start With A Capital Letter, even though th
original screen text uses a different capitalization. This is done to make the screen text stand o
from the rest of the text.

Source Code

As you work through the examples in this book, you may choose either to type in all the co
manually or to use the source code files that accompany the book. All of the source code used in th

sample content of Beginning ASP.NET 4: in C# and VB

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