Pro ASP.NET SignalR

Real-Time Communication in .NET with SignalR 2.1

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To my parents and sister, whom I haven't seen in years.

—Keyvan

In memory of Kae White, the greatest and most caring mother.

—Darren

Contents at a Glance

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About the Authors

Keyvan Nayyeri is a software engineer with a master of science degree in computer science and a bachelor of science degree in applied mathematics. He has been an active contributor to the .NET community for more than ten years, published various articles about .NET programming, and contributed to several open-source projects.

Keyvan has authored several titles, including *Professional Community Server*, *Professional Visual Studio Extensibility,* and *Beginning ASP.NET MVC 1.0*. He was also a guest author and technical editor on *Professional Visual Studio 2008*.

Keyvan lives with Titan, his Siberian husky. He is a sports enthusiast and enjoys most of his spare time running and hiking outdoors or playing soccer and tennis. When he is too tired for sports, he can be found at a new restaurant trying new food or at his home reading an exotic book. You can follow him on Twitter `@keyvan`.

Darren White is a lead software engineer in Dallas, Texas, and has a bachelor of science in computer science from the University of Oklahoma. He is an officer in the North Dallas .NET User Group and is a local user group speaker.

Darren has been working with Microsoft technologies since Visual Basic 3. His primary technical focus is on server-side technologies using C#. In his rare moments of free time, he can be found studying new technologies, mathematics, or French. But his most important time is spent with his wife, Shazia. You can follow him on Twitter `@Dowjack`.

About the Technical Reviewer

Rob Swafford is a senior developer at Sonoma Partners, LLC, specializing in Microsoft Dynamics CRM and .NET web application development. He has been developing in .NET since the early days of the framework, and has been a Visual Studio user since Visual C++ 6.0. His industry experience spans nearly a decade in a wide range of companies, from small start-ups, state and local government, and multinational corporations. He currently resides in the greater Milwaukee area with his wife Jeanna and two young sons.

Acknowledgments

Writing a book is a difficult task, and at least one of us has experienced this process four times before. This difficulty comes at different levels from different aspects, and not only affects authors' lives and careers but also the people around them. So a book is not only an indicator of the authors' efforts but also of the people around them. Here we want to take a moment to mention some people who helped us finish this book.

First, we want to thank families and friends who supported us during the long writing process and put up with our absences and excuses. Thanks to Keyvan's parents and sister, who have been supporting him from a very long distance and always encouraged him to move forward with his professional life. Also, thanks to Darren's family and wife, Shazia, who supported and encouraged him to get his first book written and published.

We also have to thank our editorial team. Gwenan had a key role in coordinating this project that was faced with several challenges and tolerated our limited time and busy schedules to finally get this book done. Christine made sure that everything was clear and easy to understand and helped us follow a consistent structure. Rob, our technical editor, had a great impact on making sure that all key topics were covered in an easy-to-understand way.

A special thanks from Darren to the great friends and teachers at the University of Oklahoma. Specific thanks go to Sridhar Radhakrishnan, Moshe Gutman, Kyle Abbott, Clay Packard, and John Antonio for the solid technical foundation and growth that has lead his career.

Introduction

When we were contacted by Apress about writing a new book on ASP.NET that targets newer technologies, the first two technologies that came to mind were ASP.NET SignalR and ASP.NET Single Page Applications. We finally decided on ASP.NET SignalR because we believe that it is a great addition to the Microsoft stack of technologies and has a great future. At the same time, we noticed the lack of a good single resource for experienced ASP.NET developers to get started on using this technology, which made it even more important to write this book.

Pro ASP.NET SignalR is the outcome of the work we did in the past few months in collaboration with Apress, our editors, and others who helped us with this process. Our hope is that we have written a good resource for you and that it gives you everything you need to get started with Microsoft ASP.NET SignalR and apply it in practice.

Like any other book or training resource, this book comes with some conventions and assumptions that we had to make to adjust our content for the audience and make it most useful to those who will read it. This introduction section clarifies some of these assumptions and conventions.

Who This Book Is For

As you pick up this book, the first question is whether this is the right book for you. To answer that question, you should know what this book is about. The short answer is that this book is about Microsoft ASP.NET SignalR and serves as a unique resource to get you started with this technology to use it in practice. To achieve that goal, it assumes that you have prior knowledge in some related technologies (shown in the following section).

This book targets intermediate- or professional-level readers who are familiar with the Microsoft stack of technologies for web development as well as basic HTML and JavaScript. With such a background, we teach you how to use Microsoft ASP.NET SignalR with a pragmatic approach. We start with the basic concepts and then move on to more advanced ones, and use practical examples with explanations to make everything easier to understand.

If you want to get started with SignalR and you have the necessary background, this book is for you. If you already know about SignalR and want to advance your knowledge, this book is also for you because more than half of the book is dedicated to advanced topics that most people are not familiar with.

On the other hand, if you are not an experienced .NET developer—especially with ASP.NET, C#, HTML, and JavaScript/jQuery—you might want to start with this book before reading some background information.

Our writing experience tells us that being brief and to the point is important, especially for technical readers who have very limited time and need to keep up with several new technologies. Therefore, this book tries to be brief and cover only what you need. We avoid verbose discussions on background topics and rely on our common agreement for a basic understanding of important background information.

Prerequisites

There are two types of prerequisites you should have before reading this book: technical and tool prerequisites.

For technical prerequisites, you have to be familiar with the following technologies and concepts at a beginning to average level:

- ASP.NET (especially its fundamentals)
- Internet Information Services (IIS)
- JavaScript and jQuery library
- HTML and CSS
- Visual Studio (performing common tasks and operations in Visual Studio is basic)
- Windows Azure (having a background can help with certain chapters)
- iOS and Android programming (having a background can help with certain chapters, even though it is not essential)

For tool prerequisites, you need the following installed on your machine:

- Windows operating system (we recommend Windows 8.1, but certain versions of Windows work as long as they can support Visual Studio 2013)
- Visual Studio 2013 (we use this version, but you can use other versions if they support the features you need)
- Fiddler (a free HTTP debugging tool by Telerik used for diagnosis and tracing of applications)
- Google Chrome, Internet Explorer, or Firefox (one or more of these browsers are needed for testing the code samples)

How This Book Is Structured

Our recommendation is to read all the chapters of this book in order. We tried to keep the book short so this can be achieved in a reasonable amount of time. If you want to skip certain topics, however, the chapters are independent from each other, so you can start reading individual chapters if you have enough understanding of the topics covered.

The first two chapters of the book are introductory to get you started. The next two chapters target the most fundamental concepts needed to implement ASP.NET SignalR applications. The four chapters that come next primarily focus on a major topic about ASP.NET SignalR development. The last two chapters are two case studies to show all the concepts in two examples.

Here is a short overview of the chapters in this book:

- Chapter 1: A quick introduction to real-time web development, some general concepts, and ASP.NET SignalR's history
- Chapter 2: Getting started with ASP.NET SignalR development with some quick examples to demonstrate core concepts
- Chapter 3: Developing SignalR applications with hubs, and related concepts
- Chapter 4: Developing SignalR applications with persistent connections, and related concepts

- Chapter 5: Troubleshooting, debugging, and testing ASP.NET SignalR applications
- Chapter 6: Overview of major clients that support ASP.NET SignalR such as iOS, Android, Windows Desktop, Windows Phone, and others
- Chapter 7: Extending and customizing ASP.NET SignalR's behavior
- Chapter 8: Configuration, security, and scaling aspects of ASP.NET SignalR
- Chapter 9: Case study
- Chapter 10: Second case study