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Pro Visual Studio LightSwitch 2011 Development

CREATE BUSINESS APPLICATIONS EASILY, QUICKLY, AND EFFECTIVELY

Tim Leung and Yann Duran

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ISBN 978-1-4302-4008-2

ISBN 978-1-4302-4009-9 (eBook)

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Distributed to the book trade worldwide by Springer Science+Business Media New York, 233 Spring Street, 6th Floor, New York, NY 10013. Phone 1-800-SPRINGER, fax (201) 348-4505, email orders-ny@springer-sbm.com, or visit www.springeronline.com.

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About the Authors

■ **Tim Leung** is a professional software developer based in England. For the past 12 years, he has specialized in enterprise application development using products from the Microsoft technology stack. In particular, he possesses deep knowledge of the Microsoft .NET Framework and SQL Server. He is an active member of the UK developer community and often delivers presentations on technical topics. He is also a chartered member of the British Computer Society. Tim is passionate about the concept of rapid application development and was awarded the Microsoft Community Contributor Award in 2011 for contributions to the LightSwitch community.

■ **Yann Duran** is a self-employed, self-taught software developer, based in Australia, who has been involved in writing software, in one form or another, for over 25 years. He started with hand-assembling Z80 assembly code on his Tandy Model 16 computer (dual 8-inch disk drives, 64KB RAM) in the early 80s, and then taught himself a raft of software technologies in the following years. These included Turbo Pascal, MS Access (VBA), SQL Server (T-SQL), VB.NET, WinForms, Entity Framework (EF), Windows Presentation Foundation (WPF), and finally LightSwitch. Yann has been passionate about programming since he was in high school, in the days before the PC arrived, when "computers" were actually programmable calculators with punch cards and magnetic strips, and huge mainframes. He has also worked in computer sales, delivering software seminars and IT support, but programming has always remained his passion. Yann has been active in the LightSwitch community since Beta 1, and was awarded the Microsoft Community Contributor Award in 2011 for his contributions to that community.

About the Technical Reviewers

■ **John Rivard** is a software design engineer for Microsoft Visual Studio. Over his career, he has worked on a variety of developer tools including Visual FoxPro, Visual Basic .NET, the .NET Framework, and Silverlight. John is the architect for Visual Studio LightSwitch, a model-based development tool for creating business applications quickly and easily for the desktop and the cloud. John started at Microsoft Corporation in 1991 and is a graduate of the University of Washington in computer engineering.

■ **Jeff Sanders** is a published author, technical editor, and accomplished technologist. He is currently a group manager/senior architect at Avanade.

Jeff has years of professional experience in the field of IT and strategic business consulting, leading both sales and delivery efforts. He regularly contributes to certification and product roadmap development with Microsoft, and speaks publicly on Microsoft enterprise technologies. With his roots in software development, Jeff's areas of expertise include collaboration and content management solutions, operational intelligence, digital marketing, distributed component-based application architectures, object-oriented analysis and design, and enterprise integration patterns and designs.

Jeff is also the CTO of DynamicShift, a client-focused organization specializing in Microsoft technologies, specifically Office365/BPOS, SharePoint Server, StreamInsight, Windows Azure, AppFabric, Business Activity Monitoring, BizTalk Server, and .NET. He is a Microsoft Certified Trainer and leads DynamicShift in both training and consulting efforts.

He enjoys non-work-related travel, spending time with his wife and daughter, and wishes he had more time for both. He may be reached at `jeff.sanders@dynamicshift.com`.

Acknowledgments

Writing a book is an enormous task. It can easily take over your whole life and suck up every waking minute of your time. It really ought to come with a health warning! Putting this book together wouldn't have been possible without the help of many people, to whom we are very grateful.

First, we'd like to thank everyone who has helped or supported us throughout this process. It's impossible to name everyone, because we've been in touch with so many people. If we've left you out, it's not because we're not grateful!

At Apress, we'd like to say a special thanks to Tom Welsh, our development editor. Tom has been the first port of call for any issues that we've had and has done a fantastic job in looking after us. We're also grateful to our coordinating editors Annie Beck and Tracy Brown for all the assistance that they've given us. Last but not least, our acquisitions editor Jonathan Hassell deserves a special mention because this book would not have been possible without him.

In writing this book, we've had the privilege of working with some of the greatest minds at Microsoft. In particular, our technical reviewer John Rivard has been a real inspiration and has given us valuable insight into the product. We also want to thank Beth Massi and Doug Rosen for all the help and assistance that they've given us. We'd like to acknowledge everyone in the LightSwitch team, particularly those who have contributed articles to the LightSwitch community. These include (but are not limited to) Sheel Shah, Andy Kung, and Eric Erhardt.

Finally, we'd like to thank friends and family for all their patience and for putting up with us during the project.

Foreword

All businesses use software to automate their business functions. At their heart, such applications are about gathering, storing, and processing data, and so could perform tasks that we typically consider under the rubric of *business applications*—for example, tracking finances or assets (as in ERP software). But it also includes the process of software development, systems management, or anything else involving data. There is a lot of this business software out there, a lot more being written, and even more that people wish they had the time, budget, and skill to write.

Building such software involves two concerns: the business problem to be solved (the domain) and the technology into which a solution is rendered. First you have to have one person who understands both the domain and the technology necessary to render it into software, or you have to have a team with a mix of skills. That's enough to kill many small projects.

Assuming you can get the right people together, the technologist then spends a great deal of time on issues that have nothing to do with the business problem being solved, including UI, protocols, business logic mechanisms, security, integration with Microsoft Office, and much, much more. One needs a good deal of skill, time, inclination, and budget to get a project accomplished.

To help people write business applications faster, we wrote Microsoft Visual Studio LightSwitch, the simplest way for developers of all skill levels to develop business applications for the desktop and cloud. Using LightSwitch, the core technical problems are solved, and a lot of projects—which without LightSwitch would have never seen the light of day—are now in production.

Pro Visual Studio LightSwitch 2011 Development provides a conceptual and practical introduction to many core LightSwitch building blocks, including importing and defining data schema, designing queries and screens, validating data, authenticating and authorizing application users, and deploying the final product.

However, the challenge with rapid application development environments is that they're great at solving the problems they anticipated, but what if you need to do more? Happily, LightSwitch was designed without the glass ceiling that constrains the tools of the 4GL generation, so the full power of Visual Studio is available to you if you want it—the limit is your imagination.

Tim and Yann have a lot of imagination, and they have explored many ways to supplement LightSwitch in this book. They offer solutions for a number of problems that LightSwitch does not address but that you may encounter as you write your applications. Theirs is a cookbook. Some recipes won't have ingredients you like, some you'll season to fit your taste, some will open possibilities you hadn't even considered, and some you'll use as is. A sampling includes sending email, creating reports, and implementing auditing.

They share a passion with the LightSwitch team and with their readers: to build great business applications, fast. Together we can make businesses more successful through software.

Steve Anonsen, Distinguished Engineer, Microsoft Visual Studio
John Rivard, Partner Software Design Engineer, Microsoft Visual Studio

Introduction

We've designed this book to show you how to write professional applications using Microsoft LightSwitch.

As software developers, we understand how difficult it is to develop software in real life. End users expect their applications to be reliable, functional, and polished. They'll also have preferences in terms of how they want their application to look and feel.

To help you meet these real-life expectations, we've focused this book on many of the typical scenarios that customers or clients will ask of you. For example, we'll show you how to perform various tasks that are not natively supported. These include creating reports, sending email, and working with data in nonstandard ways.

To make life easy for you, LightSwitch hides away much of what it does. This is great when you're a beginner. But if you need to create some advanced applications or if you just happen to be curious, this can soon become a hindrance. To help you as much as possible, we've tried to focus on the following:

- Describing what LightSwitch does beneath the surface
- Showing you where and how to write code in LightSwitch

If you come from the following background, you'll be sure to get the most out of this book:

- You have some programming experience, either with .NET or some other programming language environment.
- You have a basic understanding of database concepts such as tables, columns, and data types.
- You've installed LightSwitch and have spent some time familiarizing yourself with the development environment.

However, don't worry if you don't meet the exact profile that we've just described. We'll now guide you through a few of the basics to get you started.

Understanding the Basics

Although we've targeted this book at those with some development experience, don't worry if you're only just starting out. The book explains everything that you need to know.

But if you want to ground yourself a bit more in the basics, we recommend that you visit the LightSwitch Developer Center at the following URL:

```
http://msdn.microsoft.com/en-us/lightswitch/ff796201
```

Through the developer center, you'll find the latest news on LightSwitch as well as links to the MSDN help and forums. You'll also find links to a series of *how to* videos that we highly recommend. The star behind these videos is Beth Massi, and she has kindly spoken to us about her role as the LightSwitch community manager.

A Word from the LightSwitch Community Manager

My name is Beth Massi and I'm currently the community manager for the Visual Studio LightSwitch Team at Microsoft. My professional programming career started in the 1990s using Clipper and FoxPro to build information systems for the health-care industry. I remember back then, just out of college, how these rapid application development (RAD) languages and tools made it so much easier to build database applications for businesses, especially over the alternatives at the time. I also remember how helpful the community was for newbies like me. There was always a feeling of "no question is a stupid question" on the forums, and almost everyone was excited and welcoming to me. Because of my passion for these RAD tools and the closeness of that community, I built many valuable relationships that took my career to the next level. I started to give back by writing and building free application frameworks and then eventually speaking at user groups and conferences. As the years flew by, I moved to VB.NET and Visual Studio and brought the same passion for the developer community with me, which helped me get my first Solutions Architect MVP award in 2005.

After being an MVP for a few years, Microsoft approached me to help them with the Visual Basic developer community. I couldn't pass up the opportunity to be a part of the community as an official Microsoft employee. I produced hundreds of articles and videos and delivered presentations all over the world. I've met many types of developers doing many interesting things and have helped people troubleshoot many interesting problems. Microsoft has given me the ability to reach the entire world, and I will always appreciate that.
Even before the first beta of Visual Studio LightSwitch was available, internally I was begging to be part of the LightSwitch team. I wanted to use the successes I had with the Visual Basic community to help kick-start a new community on one of the most RAD development environments I had seen come from Microsoft in a very long time—especially one that focused on building business applications. I felt the nostalgia of the old dBase community I started from and wanted to foster a similar vibe. So when the first beta for Visual Studio LightSwitch was released at the end of 2010, I had the opportunity to become the community manager for the team and I jumped on it.

First order of business was to create a slew of training content and erect a web site on MSDN called the LightSwitch Developer Center (`http://msdn.com/LightSwitch`). This is your one-stop-shop for videos, articles, samples, starter kits, and much more to get you productive quickly. The site continues to grow as we build more content every week. If you are new to LightSwitch, I encourage you to visit the learning center Getting Started section (`http://bit.ly/LearnLightSwitch`) as well as the How Do I videos (`http://bit.ly/LightSwitchVideos`). From the LightSwitch Developer Center, you can easily get to our forums (`http://bit.ly/LightSwitchForums`), where we have an active community helping answer questions with LightSwitch team members. You can also see the latest blogs on the home page from our LightSwitch bloggers, including the LightSwitch Team (`http://blogs.msdn.com/LightSwitch`) and myself (`www.BethMassi.com`). Finally, I encourage you to join the conversation on Twitter (`@VSLightSwitch`) as well as our Facebook page (`facebook.com/VSLightSwitch`) and let us know what you think!

I am confident that the LightSwitch community will continue to grow and that I will see newbies become MVPs just as I did so many years ago. I couldn't be happier to help nurture the community in the goodness that is Visual Studio LightSwitch. Enjoy!

Where to Download LightSwitch

To get started, you'll need to download and install LightSwitch. You can download a free 90-day trial by following the link at the developer center. On the download page, you'll have a choice of downloading a web installer (3.7MB) or the full LightSwitch CD in ISO format (577MB). The web installer detects the components that are installed on your machine and installs only the additional components that are needed.

The full ISO download is ideal if you want to install LightSwitch on multiple machines, or if you suspect that you'll need to reinstall LightSwitch at some point in the future.

If Visual Studio 2010 is already installed on your computer, LightSwitch integrates itself into your existing Visual Studio 2010 installation. If not, LightSwitch installs itself as a stand-alone product.

When you're ready to purchase LightSwitch, you can do so by clicking Help ä Register Visual Studio 2011 from within LightSwitch. This opens a dialog box displaying a button that takes you to the Microsoft Store, enabling you to purchase LightSwitch. You'll receive a product key at the end of the process.

You can then convert your trial version into the full version by entering your product key.

System Requirements

To create applications by using LightSwitch, your development computer needs to meet the following specifications.

The operating system requirements are as follows:

- Windows 7 (x86 and x64)
- Windows Vista (x86 and x64) with Service Pack 2—all editions except Starter Edition
- Windows XP (x86) with Service Pack 3—all editions except Starter Edition
- Windows Server 2008 R2 (x64)—all editions
- Windows Server 2008 (x86 and x64) with Service Pack 2—all editions
- Windows Server 2003 R2 (x86 and x64)—all editions
- Windows Server 2003 (x86 and x64) with Service Pack 2 (Users will need to install MSXML 6, if it is not already present.)

The hardware requirements are as follows:

- Computer with a 1.6GHz or faster processor
- 1024MB RAM (1.5GB if running in a virtual machine)
- 3GB of available hard-disk space
- 5400RPM hard drive
- DirectX 9–capable video card running at 1024×768 or higher-resolution display

How This Book Is Structured

The book is divided into six main parts:

- Part 1: LightSwitch Concepts
- Part 2: Working with Data
- Part 3: Interacting with Data
- Part 4: Getting Data Out
- Part 5: Securing Your Application
- Part 6: Deployment

In the first part, we describe the architecture behind LightSwitch and explain the parts that make up a LightSwitch application.

Part 2 focuses on data. We show you how to design tables, write queries, access data via code, and how to validate your data.

Part 3 shows you how to use RIA Services to perform more-sophisticated tasks using data. It also introduces the screen designer and explains that you're not just limited to the controls that LightSwitch provides. The custom controls chapter shows you how to go beyond the controls that are natively provided. We also show you how to reuse code by creating extensions.

In part 4, we show you how to create reports and how to send emails.

Part 5 explains how to restrict what your users can or can't do in your application. We also show you how to audit the activity that takes place in your application.

Part 6 shows you how to deploy your application. It also includes a troubleshooting section that shows you what to do when things go wrong.

Conventions

The following sections describe conventions used throughout this book.

Examples

To give this book a bit of real-life feel, we've based many of our examples on a fictional company. This company specializes in selling healthy organic snacks through the Web.

The snacks are delivered by mail, and the business model works by means of subscription. There are three types of subscription (bronze, silver, gold), and these are priced on a monthly basis. Each subscription type entitles you to a number of free snacks per month, and higher-level subscriptions entitle you to receive more food packages and a greater variety of food.

The company has embraced LightSwitch and has started using it throughout all parts of the business.

The office workers use an application called *OfficeCentral*. This application supports the activities that take place in the office and includes features such as the following:

- Timesheet
- Expenses
- Project codes
- Holiday request tracking
- Purchase order tracking
- Invoice tracking
- Asset tracking
- Accident report book
- Staff home contact details

The staff responsible for shipping the deliveries works from a warehouse and uses an application called *ShipperCentral*. This application enables workers to view and amend orders, delivery details, and customer details.

The management uses an application called *AdminCentral*. This application supports the managerial side of the business and allows managers to keep an eye on *churn* rates, subscription