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Knight's Microsoft® SQL Server 2012 Integration Services 24-Hour Trainer

Brian Knight, Devin Knight, Mike Davis, Wayne Snyder

KNIGHT'S MICROSOFT® SQL SERVER® 2012 INTEGRATION SERVICES 24-HOUR TRAINER

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KNIGHT'S

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Brian Knight
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Mike Davis
Wayne Snyder

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To the person who gave me my first chance at writing, Steve Wynkoop.
—Brian Knight

Philippians 4:13
—Devin Knight

To my wife Jessy, my son Gabriel, and my daughter Sydney; they are the reason I strive for more.
—Mike Davis

Vickie is my wife's name. She is patient, where I am impatient. She is at her best when things seem to be at their worst. In my experience, that is a rare trait. Her love, support, and understanding is what allows me, from a personal standpoint, to work on a project such as this. Most of my work on this project has been nights and weekends, in addition to a regular work week. For me, this is not possible without a good home life. Vickie—this is dedicated to you.
—Wayne Snyder

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—Brian Knight

I MUST GIVE THANKS TO GOD, who without in my life, I would not have such blessings. Thanks to my wife Erin who has had amazing patience during the late nights of writing, editing, and video recording. To our three children, Collin, Justin, and Lana, who have sacrificed time away from daddy. Thanks to the group of writers Brian, Mike, and Wayne, who all worked very hard while missing time with their families, too. Finally, I would like to thank my jousting mentor, Shane Adams, for showing me the way to become a real knight. Competitive jousting has always been a dream of mine, and I look forward to competing at the Liverpool Renaissance Fair.

—Devin Knight

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—Mike Davis

THIS BOOK IS THE CULMINATION OF THE WORK of many people, smart people, all who have worked very hard. To Kevin Kent, the senior project editor — you have been great to work with. Kim Cofer, the copy editor, who has taken my sloppy, southern version of English and made my chapters sound intelligent. And to Chris Albrektson, Chris Price, and Anthony Coleman, whose eagle eyes have enabled the work to actually be intelligent and technically accurate. Thank you all so much. Working with you all on this book has been a great pleasure!

To the reader — Do not be afraid of SSIS. You can learn this and be successful. This book will help you get started. Do not simply download the completed packages and look through them. Go through each Try It yourself. Do not let your brain go into auto-pilot mode. Engage your brain and think about each step. As you develop your skills, you will become very comfortable with the tool. You will be able to solve difficult ETL problems using SSIS. With the combination of Integration Services and your hard work, great things can happen for you, your company, and your customers.

—Wayne Snyder

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PREFACE

IF YOU'VE PICKED UP THIS BOOK, *Knight's Microsoft SQL Server 2012 Integration Services 24-Hour Trainer*, you've decided to learn one of SQL Server's most exciting applications, SQL Server Integration Services (SSIS). SSIS is a platform to move data from nearly any data source to nearly any destination and helps you by orchestrating a workflow to organize and control the execution of all these events. Most who dive into SSIS use it weekly, if not daily, to move data between partners, departments, or customers. It's also a highly in-demand skill—even in the worst of economic environments, jobs are still posted for SSIS developers. This is because no matter what happens in an economy, people still must move and transform data.

This book, then, is your chance to start delving into this powerful and marketable application. And what's more, this is not just a book you're holding right now. It's a video learning tool, as well. We became passionate about video training a number of years ago when we realized that in our own learning we required exposure to multiple teaching techniques to truly understand a topic—a fact that is especially true with tutorial books like this one. So, you'll find hours of videos on the DVD in this book to help you learn SSIS better than reading about the topic alone could and to help demonstrate the various tutorials in the book.

WHO THIS BOOK IS FOR

This is a beginner book and assumes only that you know SQL Server 2012 to run queries against the database engine (T-SQL skills are assumed and used throughout this book). Because this book is structured for a beginner, providing many tutorials and teaching you only what you'll likely use at work, it is not a reference book filled with a description of every property in a given task. It instead focuses on only the essential components for you to complete your project at work or school.

WHAT THIS BOOK COVERS

This book covers SQL Server 2012 and assumes no knowledge of previous versions of SQL Server. The differences between SQL Server 2005/2008 and SQL Server 2012 mostly exist around the administration of SSIS, and there are a few new components. By the time you've completed this book, you'll know how to load and synchronize database systems using SSIS by using some of the new SQL Server 2012 features. You'll also know how to load data warehouses, which is a very hot and specialized skill. Even in warehousing, you'll find features in the new SQL Server 2012 release that you'll wonder how you lived without, like Change Data Capture (CDC)!

HOW THIS BOOK IS STRUCTURED

Our main principle in this book is to teach you only what we think you need to perform your job task. Because of that, it's not a comprehensive reference book. You won't find a description of every feature of SSIS in here. Instead the book blends small amounts of description, a tutorial, and videos to enhance your experience. Each lesson walks you through how to use components of SSIS and contains a tutorial. In this tutorial, called "Try It," you can choose to read the requirements to complete the lesson, the hints of how to go about it, and begin coding, or you can read the step-by-step instructions if you learn better that way. Either way if you get stuck or want to see how one of us does the solution, watch the video on the DVD to receive further instruction.

WHAT THIS BOOK COVERS

This book contains 62 lessons, which are broken into 11 sections. The lessons are usually only a few pages long and focus on the smallest unit of work in SSIS that we could work on. Each section has a large theme around a given section in SSIS:

- **Section 1: Installation and Getting Started**—This section covers why you would use SSIS and the basic installation of SSIS and the sample databases that you'll use throughout this book. If you already have SSIS and the sample databases installed, you can review this section quickly.
- **Section 2: Control Flow**—This section explains how to use tasks in the Control Flow of SSIS.
- **Section 3: Data Flow**—Seventy-five percent of your time as an SSIS developer is spent in the Data Flow tab. This section focuses on the configuration of the core sources, transforms, and destinations.
- **Section 4: Making Packages Dynamic**—Now that you've created your first package, you must make it dynamic. This section covers how you can use variables, parameters, and expressions to make your package change at run time.
- **Section 5: Common ETL Scenarios**—In an effort to show you some real-world business scenarios, this section covers some of the common ETL scenarios like performing incremental loads and using SQL Server's newest component, Data Quality Services (DQS), with SSIS.
- **Section 6: Containers**—This section covers one of the key Control Flow items, containers, which control how SSIS does looping and grouping.
- **Section 7: Configuring Packages**—Here you learn how to configure your packages externally through configuration files, tables, and other ways.
- **Section 8: Troubleshooting SSIS**—No sooner do you have an SSIS package developed than you start experiencing problems. This section shows you how to troubleshoot these problems.
- **Section 9: Administering SSIS**—Now that your package is developed, here you learn how to deploy and configure the service.

- **Section 10: Loading a Warehouse**—A little more on the advanced side, this section teaches you how to load a data warehouse using SSIS.
- **Section 11: Wrap Up and Review**—This section was one of our favorites to write. It contains a lesson to bring everything together and also Appendices A and B, which contain crib notes for quick reference. As trainers and consultants, we are constantly asked to leave behind a quick page of crib notes of common code. In these appendices, you find guides on when to use which SSIS components and useful solutions and code snippets that address common situations you might face.

INSTRUCTIONAL VIDEOS ON DVD

As mentioned earlier in this preface, because we believe strongly in the value of video training, this book has an accompanying DVD containing hours of instructional video. At the end of each lesson in the book, you will find a reference to an instructional video on the DVD that accompanies that lesson. In that video, one of us will walk you through the content and examples contained in that lesson. So, if seeing something done and hearing it explained helps you understand a subject better than just reading about it does, this book and DVD combination is just the thing for you to get started with SSIS. You can also find the instructional videos available for viewing online at `www.wrox.com/go/ssis2012video`.

CONVENTIONS

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

> **WARNING** *Boxes like this one hold important, not-to-be forgotten information that is directly relevant to the surrounding text.*

> **NOTE** *Notes, tips, hints, tricks, and asides to the current discussion are offset and placed in italics like this.*

> *References like this one point you to the DVD to watch the instructional video that accompanies a given lesson.*

As for styles in the text:

- We *highlight* new terms and important words when we introduce them.
- We show URLs and code within the text like so: `persistence.properties`.
- We present code in the following way:

```
We use a monofont type for code examples.
```

SUPPORTING PACKAGES AND CODE

As you work through the lessons in this book, you may choose either to type in all the code and create all the packages manually or to use the supporting packages and code files that accompany the book. All the packages, code, and other support files used in this book are available for download at `www.wrox.com`. Once at the site, simply locate the book's title (either by using the Search box or by using one of the title lists) and click the Download Code link on the book's detail page to obtain all the source code for the book.

> **NOTE** *Because many books have similar titles, you may find it easiest to search by ISBN; this book's ISBN is 978-1-118-47958-2.*

Once you download the code, just decompress it with your favorite compression tool. Alternatively, you can go to the main Wrox code download page at `www.wrox.com/dynamic/books/download.aspx` to see the code available for this book and all other Wrox books.

You will need two sample databases for the tutorial, both provided by Microsoft for use with SQL Server: AdventureWorks2012 and AdventureWorksDW2012. The two sample databases are not installed by default with SQL Server 2012. You can download versions of the sample databases used for this book at the Wrox website at `www.wrox.com/go/SQLSever2012DataSets`. Lesson 3 also covers how to install and configure the databases.

ERRATA

We make every effort to ensure that there are no errors in the text or in the code. However, no one is perfect, and mistakes do occur. If you find an error in one of our books, like a spelling mistake or faulty piece of code, we would be very grateful for your feedback. By sending in errata, you may save another reader hours of frustration and at the same time you will be helping us provide even higher quality information.

To find the errata page for this book, go to `www.wrox.com` and locate the title using the Search box or one of the title lists. Then, on the Book Search Results page, click the Errata link. On this page you can view all errata that has been submitted for this book and posted by Wrox editors.