

Kirk Haselden

Microsoft®  
SQL Server™ 2008  
Integration  
Services

**UNLEASHED**

**SAMS**

The background of the book cover is a vibrant orange. The bottom third of the cover features a dynamic, abstract graphic with bright yellow and orange light streaks radiating from the center, overlaid with dark, curved, metallic-looking structures that resemble parts of a machine or architectural elements.

## Microsoft® SQL Server™ 2008 Integration Services Unleashed

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# Foreword

It's a real pleasure to write the foreword to this latest edition of *SSIS Unleashed*. A lot has changed since the first edition. SQL Server has a new edition, the business environment is ever more challenging, and Kirk and I both have new jobs.

SQL Server 2008 includes many enhancements in its Business Intelligence platform in general and several key improvements in its Integration Services component, which is the subject of this book. The new pipeline improvements and support for persistent lookups will help your SSIS packages scale to unprecedented levels. The addition of change data capture and the new Merge SQL statement will make it easier for you to write cleaner, simpler SSIS packages.

These enhancements come at a good time. We live in an interconnected world that makes ETL (Extract, Transform, and Load) more important than ever. As of this writing, the economy is in turmoil and companies everywhere need an accurate, current, three hundred and sixty degree view of their business. Responsible, proactive IT departments integrate data from across the enterprise to present a complete view of the business to their business users. Further, leading companies are accustomed to sharing data with business partners and customers. Think of code sharing among airlines or telecom companies that download call-level detail information to their customers. Many companies purchase data from syndicated data providers, and the Internet has grown to become a rich data source to companies that want to deepen their relationship with consumers. All of these business activities are well served by ETL tools, specifically SQL Server 2008 Integration Services.

As in the first edition, Kirk Haselden is your enthusiastic and capable guide. His deep passion for data and its value to companies and to users has guided his career for many years. He was the Development Manager who delivered SSIS in SQL Server 2005. That effort helped cement SQL Server 2005 as a leader in the data warehousing and business intelligence markets. By 2006 Microsoft customers were asking for help in managing "master data." I turned to Kirk to start and lead a team that would go on to research the MDM market and, in 2007, begin implementation of Microsoft's SharePoint Master Data Services product. I can't wait to see the results of Kirk's latest effort.

In the meantime, you have this latest edition of *SSIS Unleashed*. As in the first edition, you get a development manager's—and insider's—view of the product. Kirk takes you inside the product and provides the insight that will help you optimize your use of the product, and your impact on your organization. He provides advice that goes beyond just ETL and addresses good practices that will help you beyond your data integration work. For example, in the new chapter on troubleshooting, Kirk exhorts you to avoid the fuss in the first place, providing a simple roadmap to keeping your implementations simple from the start. Other new chapters cover advance packages, the profiling task, the ADO.NET destination, and other new components. Whether you are migrating from SQL Server 2005 to SQL Server 2008, or if SQL Server 2008 is your first SQL Server experience, you will be well served by this book.

As always, it's been a privilege and a pleasure to work with Kirk. His passion and energy are infectious. His care and concern for customers is inspiring. And his writing continues to be top-notch. I hope you enjoy this book.

**Bill Baker, CTO Visible Technologies**  
November 2008, Seattle, WA

## CHAPTER 1

# What Is Integration Services and Why Do I Need It?

This chapter is a brief introduction to Integration Services, its origins, its history, and a high-level view of what Integration Services is and how it can be used.

## What Is SQL Server Integration Services?

Depending on whom you ask, you might get different answers to that question ranging from descriptions such as a data import/export wizard, to an ETL tool, to a control flow engine, to an application platform, or to a high-performance data transformation pipeline. All are correct because Integration Services is a set of utilities, applications, designers, components, and services all wrapped up into one powerful software application suite. SQL Server Integration Services (SSIS) is many things to many people.

### Data Import/Export Wizard

One of the most popular features of Integration Services is the Import/Export Wizard, which makes it easy to move data from a source location such as a flat file or database table to a flat file, table, or other destination. The Import/Export Wizard was the first utility developed back in the SQL Server 7.0 time frame and continues today as an important utility in the database administrator's (DBA) toolbox.

### ETL Tool

ETL is an acronym for *Extract, Transform, and Load* and describes the processes that take place in data warehousing

## IN THIS CHAPTER

- ▶ What Is SQL Server Integration Services?
- ▶ A Short Integration Services History
- ▶ How This Book Is Organized
- ▶ The Sample Projects

environments for extracting data from source transaction systems; transforming, cleaning, deduplicating, and conforming the data; and finally loading it into cubes or other analysis destinations. Although Data Transformation Services (DTS), Integration Services' predecessor application, was considered a valuable tool for doing ETL, Integration Services is where true Enterprise ETL became available in SQL Server.

## Control Flow Engine

The processes involved in moving data from location to location and transforming it along the way are not restricted to only processing data. Integration Services provides a control flow for performing work that is tangentially related to the actual processing that happens in data flow, including downloading and renaming files, dropping and creating tables, rebuilding indexes, performing backups, and any other number of tasks. Integration Services provides a full-featured control flow to support such activities.

## Application Platform

Developers can create applications that use Integration Services as a platform, embedding the engines within their application using the provided object models. As a developer, you can embed the Integration Services engines and components within your applications using the object models.

## High Performance Data Transformation Data Pipeline

That's a mouthful and really incorporates two ideas: high performance and data pipelining. The Data Flow Task is a high-performance tool because you can use it to perform complex data transformations on very large datasets for incredibly performant processing. The pipeline concept means that you can process data from multiple heterogeneous data sources, through multiple parallel sequential transformations, into multiple heterogeneous data destinations, making it possible to process data found in differing formats and on differing media in one common "sandbox" location.

## A Short Integration Services History

Integration Services is the successor to Data Transformation Services (DTS). DTS had humble beginnings. It was started on a shoestring budget with very few resources. Its first incarnation was a proof-of-concept transformation, which later became known as the *data pump*. The proof of concept caught the attention of some folks around Microsoft, and it was given some funding.

The first release of DTS shipped with SQL Server 7.0 to receptive users. The alternatives at the time were either difficult to work with, expensive, or both. Many DBAs were forced to write custom transformation software, which was inflexible and difficult to maintain. Some tools had limitations, such as the need for source and destination schemas to match exactly, direct dependence on a particular database product, and/or no transformation capabilities. Many wrote custom parsing and transformation applications. For example, many companies are only now converting from hand-coded flat file parsers, SQL scripts, and transformation code to a standard platform such as Integration Services.

The first release of DTS addressed several of these issues and simplified life for a lot of people. By using OLEDB for its data access layer, DTS could access various data sources with little or no custom coding. DTS was also affordable because it shipped “in the box” with SQL Server. Users had access to all the power of more expensive products, yet incurred no additional cost for their ETL tools. This was obviously a benefit to IT shops trying to stretch their budgets. DTS was a flexible product that was easy to use. There were also a number of standard tasks in the box, including the Transform Data, Execute Process, Active X Script, Execute SQL, and Bulk Insert Tasks.

SQL Server 8.0 added even more functionality by adding more tasks. The Execute Package, FTP, and MSMQ Tasks added incremental improvements across the product. However, users experienced some frustration with DTS when attempting to work with large datasets and some of the other limitations inherent in a script-based tool. The time was ripe to create a truly enterprise-ready integration tool.

In 2000, SQL Server decided to make a substantial investment in the ETL and Integration space and brought together some talented folks who formulated the ideas behind the Data Flow Task and the next version of Integration Services. Over a period of five years, the development time frame for SQL Server 2005, the DTS team completely redesigned and rewrote DTS to become Integration Services 2005.

Integration Services 2008 is the next incarnation of that release. While not as revolutionary a release as in 2005, Integration Services 2008 brings some new capabilities and incremental improvements across the product.

## How This Book Is Organized

This book is organized into eight parts starting with basic introductory or conceptual discussions and steadily transitioning to more advanced topics. The first parts are appropriate for those seeking a high-level overview of Integration Services. The middle parts are appropriate for users such as database administrators, ETL developers, and data architects. The last part is appropriate for those interested in writing custom components or simply better understanding how Integration Services works “under the covers.”

- ▶ Part I, “Getting Started,” covers how to set up the sample packages and sources, set up Integration Services, and migrate packages from DTS.
- ▶ Part II, “Integration Services Basics,” is a conceptual and practical guide to understanding and using the product. This is a high-level overview of important concepts.
- ▶ Part III, “Control Flow Services,” covers the actual process of building packages and should give those who are new to SSIS the basic skills necessary to find their way around in the designer.
- ▶ Part IV, “Management Services,” covers some of the more challenging topics such as how to debug, troubleshoot, diagnose, secure, and deploy packages.
- ▶ Part V, “The Data Flow Task,” covers the stock tasks and other control flow features of Integration Services.

- ▶ Part VI, “Solving Common Challenges,” covers the features that support the day-to-day management of Integration Services solutions.
- ▶ Part VII, “Advanced Package Concepts and Patterns,” focuses on exploring the capabilities of the Data Flow Task and components.
- ▶ Part VIII, “Programming Integration Services,” teaches you how to build components that plug into Integration Services. These look good now.

Each chapter was written to stand alone as much as possible. Although some topics naturally rely on other previously discussed concepts, great effort was made to write the chapters so that each could be read independently. Also, most of the topics are reinforced with samples. Samples are an important part of this book and should be studied carefully if you want to fully understand Integration Services.

## The Sample Projects

In the provided samples, numerous sample solutions with packages illustrate the discussed concepts. In addition, custom task and custom component projects are provided that you can study to better understand how to write custom components for Integration Services. The custom tasks, components, and utilities provided are as follows:

- ▶ **SampleTask**—A rudimentary task discussed in Chapter 28, “Building Custom Tasks.”
- ▶ **StarterTask**—A custom task project with a full task UI you can use to start your own custom task project.
- ▶ **HTTPTask**—A custom task for downloading files via HTTP. This is a simple task with no UI.
- ▶ **ExpressionTask**—A custom task for evaluating expressions using the Integration Services Expression Evaluator engine.
- ▶ **CryptoTask**—A fully functional task for encrypting and decrypting text files using the Rijndael algorithm.
- ▶ **ImageFileSrc**—A Data Flow Source Adapter for reading image file information from JPG files.
- ▶ **DataProfiler**—A Data Flow transform for profiling data.
- ▶ **SQLClientDest**—A Data Flow Destination Adapter for writing data flow data to SQL Server using the ADO.NET SQL Client provider.
- ▶ **ODBCDest**—A Data Flow Destination Adapter for writing data flow data to SQL Server using the SQL Server ODBC Client provider.
- ▶ **ConfigEdit**—A simple utility for editing configurations in a package.
- ▶ **ConfigBatch**—A utility for adding, modifying, or deleting a configuration from multiple packages in a batch.

By purchasing this book, you have license to use and freely distribute these components. You can also modify the components in any way you want for sale or redistribution. In the event that you do use this code, a small attribution to this book and the author would be appreciated.

## Summary

SQL Server Integration Services is a complex, flexible, and powerful product with many uses. Many people use Integration Services for enterprise extract, transform, and load purposes. Others use it for an IT management tool for doing things like backing up databases. Others use it as an integration tool for synchronizing multiple systems. However you use it, Integration Services can be frustrating and difficult to learn. Hopefully, this book will enable you to take advantage of all that power and flexibility in as little time as possible.



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