



# Beginning SQL Server Reporting Services

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Kathi Kellenberger

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Edwardsville, Illinois  
USA

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*For Nate. I love your handsome little face!*



# Contents at a Glance

<b>About the Author .....</b>	<b>xiii</b>
<b>About the Technical Reviewer .....</b>	<b>xv</b>
<b>Acknowledgments .....</b>	<b>xvii</b>
<b>■ Part I: Getting Started.....</b>	<b>1</b>
■ Chapter 1: Getting Started.....	3
■ Chapter 2: Using the Wizard to Create Your First Reports.....	33
<b>■ Part II: Report Development .....</b>	<b>59</b>
■ Chapter 3: Understanding Data Sources and Datasets.....	61
■ Chapter 4: Working with Tables, Controls, and Report Sections .....	83
■ Chapter 5: Adding Grouping Levels to Reports.....	111
■ Chapter 6: Making Reports Dynamic.....	135
■ Chapter 7: Bringing Data to Life Visually.....	171
<b>■ Part III: Deploying Reports.....</b>	<b>223</b>
■ Chapter 8: Publishing Reports.....	225
■ Chapter 9: Securing Your Reports .....	253
■ Chapter 10: Creating Self-Service and Mobile Reports .....	277
■ Chapter 11: Where to Go from Here .....	319
<b>Index.....</b>	<b>325</b>



# Contents

<b>About the Author .....</b>	<b>xiii</b>
<b>About the Technical Reviewer .....</b>	<b>xv</b>
<b>Acknowledgments .....</b>	<b>xvii</b>
<b>■ Part I: Getting Started.....</b>	<b>1</b>
<b>■ Chapter 1: Getting Started.....</b>	<b>3</b>
Understanding SSRS Architecture .....	4
Installing SQL Server with SSRS .....	5
Installing SQL Server Data Tools .....	11
Configuring SSRS .....	13
Configuring Local SSRS Settings .....	19
Determining the SQL Server Name .....	22
Restoring the AdventureWorks Database.....	23
Taking a Tour of SSDT.....	27
Summary.....	31
<b>■ Chapter 2: Using the Wizard to Create Your First Reports.....</b>	<b>33</b>
Creating Your First Report .....	33
Using the Preview Buttons .....	43
The Print Layout Button .....	44
The Page Setup Button.....	44
Additional Buttons .....	45



Formatting the Wizard Report .....	45
Creating a Matrix Report .....	52
Summary.....	57
<b>■ Part II: Report Development.....</b>	<b>59</b>
<b>■ Chapter 3: Understanding Data Sources and Datasets.....</b>	<b>61</b>
Creating Shared Data Sources .....	61
Creating Shared Datasets.....	67
Using Data Sources and Datasets .....	69
Using a Shared Dataset.....	77
Summary.....	81
<b>■ Chapter 4: Working with Tables, Controls, and Report Sections .....</b>	<b>83</b>
Working with Tables .....	83
Property Window Properties .....	87
Property Dialog Properties.....	89
Other Report Components.....	94
Page Headers .....	94
Table Cell Formatting.....	96
Page Footers.....	98
Report Cover Page.....	99
Text Boxes with Data .....	102
Calculated Fields .....	102
The List Control.....	106
Setting Report Properties.....	108
Summary.....	110

<b>■ Chapter 5: Adding Grouping Levels to Reports.....</b>	<b>111</b>
Designing Your Report.....	111
The Report Requirements.....	111
The Report Layout .....	112
Building a Report with Grouping Levels .....	112
Add a Grouping Level to a Table Row .....	113
Add a Grouping Level to the Grouping Window .....	116
Formatting the Report .....	118
Sorting the Groups.....	122
Finalizing the Report.....	123
Building a Report with an Alternate Layout.....	124
Building a Report with a Space-Saving Layout .....	128
Building a Matrix Report.....	129
Summary.....	133
<b>■ Chapter 6: Making Reports Dynamic.....</b>	<b>135</b>
Adding Parameters to Report.....	135
The Hard-Coded Parameter List .....	138
Adding a Parameter List Based on a Query .....	139
Default Parameters.....	143
Multivalued Parameters.....	145
Cascading Parameters.....	146
Parameter Placement .....	147
Parameter Data Types.....	148
Using Stored Procedures .....	150
Controlling Properties.....	156
Visibility .....	156
Formatting .....	163
Interactive Sorting .....	164
Creating Drill Through Reports .....	167
Summary.....	170

■ <b>Chapter 7: Bringing Data to Life Visually</b> .....	<b>171</b>
Adding Charts and Graphs to Reports .....	171
Adding Gauges to Reports.....	196
Adding Data Bars, Sparklines, and Indicators to Tables .....	202
Adding a Map to a Report.....	210
Building a Dashboard .....	217
Summary.....	222
■ <b>Part III: Deploying Reports</b> .....	<b>223</b>
■ <b>Chapter 8: Publishing Reports</b> .....	<b>225</b>
Getting Around in the Web Portal .....	225
Deploying Reports from SSDT .....	229
Uploading Reports.....	238
Creating Data Sources.....	241
Deploying Report Parts.....	242
Deploying Reports to SharePoint.....	245
Summary.....	251
■ <b>Chapter 9: Securing Your Reports</b> .....	<b>253</b>
Understanding SQL Server Security .....	253
Setting Up an SQL Account.....	254
Connecting to SQL Server.....	259
Configuring Site Security.....	263
Configuring Folder and Report Security .....	265
Sending Reports Automatically with Subscriptions .....	269
Securing Delivery .....	275
Summary.....	276

■ <b>Chapter 10: Creating Self-Service and Mobile Reports</b> .....	<b>277</b>
Using Report Builder .....	277
Creating KPIs .....	289
Creating Mobile Reports .....	298
Summary .....	317
■ <b>Chapter 11: Where to Go from Here</b> .....	<b>319</b>
SSRS Installation .....	319
Architecture and Configuration .....	321
Development .....	322
Administration .....	322
Integration .....	323
Summary .....	324
<b>Index</b> .....	<b>325</b>



# About the Author



**Kathi Kellenberger** known to the SQL Server community as Aunt Kathi, is an independent SQL Server consultant associated with Linchpin People and a Data Platform MVP. She loves writing about SQL Server and has contributed to more than a dozen books as an author, coauthor, or technical reviewer. Kathi enjoys spending free time with family and friends, especially her five grandchildren. When she is not working or involved in a game of Hide 'n Seek with the kids, you may find her at the local Karaoke bar. Kathi's blog can be found at [www.auntkathisql.com](http://www.auntkathisql.com).



# About the Technical Reviewer



**Rodney Landrum** went to school to be a poet and a writer. And then he graduated, so that dream was crushed. He followed another path, which was to become a professional in the fun-filled world of information technology. He has worked as a systems engineer, UNIX and network administrator, data analyst, client services director, and finally database administrator. The old hankering to put words on paper, while paper still existed, got the best of him, and in 2000, he began writing technical articles—some creative and humorous, some quite the opposite. In 2009 he wrote *The SQL Server Tacklebox* (Simple Talk Publishing, 2009), a title his editor disdained but a book closest to the true creative potential he sought; he wanted to do a full book without a single screenshot. He promises his next book will be fiction or a collection of poetry, but that has yet to transpire.





# Acknowledgments

Once again, I have placed my words inside a book. For me, writing really is a labor of love. The best thing in the world is to be approached at a conference by someone who has read one of my books and learned a new skill because of it. This book is for all of you out there who have thanked me for writing, letting me know that I have made a difference in your career if not your life.

Of course, I must thank my husband and family for putting up with me saying so often, “I can’t—I need to work on my book.” I hope I have managed to be there for you when you really needed me.

Thanks to Rodney, Jonathan, and Jill for helping me to get the book to completion in great shape. Thanks to Microsoft for giving SQL Server Reporting Services the love it deserves in the 2016 release.

And, thank you to everyone who reads this book. I hope you enjoy working with SSRS as much as I have over the years.

**PART I**



# **Getting Started**

## CHAPTER 1



# Getting Started

At my first job as a database administrator, I was asked to look at a problem with some reports. The reports were created in MS Access and linked to a SQL Server database. Each manager had his or her own version of the reports and, even though the reports had started out the same at one time, they had been modified by the individual managers over the years. The managers were complaining that the numbers were not consistent, and could I fix the problem?

I worked to correct the discrepancies as best I could, but the individual copies of reports still existed. Shortly after this, I attended the 2003 PASS Summit and saw the announcement about SQL Server Reporting Services (SSRS). In 2004, Microsoft released SSRS as an add-in for SQL Server 2000. I didn't wait for the release. I knew that SSRS was going to solve my MS Access report problem, and I installed SSRS as soon as it was available.

The advantage that SSRS brought, compared to the MS Access reports, was the centralized web site, Report Manager, where the reports were published. Instead of each manager having his or her own copy of reports, the managers would run the reports from a central location eliminating the discrepancies.

SQL Server Reporting Services is one of the core components of the Microsoft Business Intelligence stack. SSRS is a feature-rich reporting tool that now includes mobile reports as well as a modern on-premises web portal.

SSRS has a number of interactive features, visual elements such as charts and maps, security, and more. Reports can contain data displayed in tabular format or visually. You can also create attractive and informative dashboards.

To run reports, end users browse to the web portal and click the report name. In the background, SSRS requests the data from the source databases and builds the report. The report is then delivered to the end user. Figure 1-1 shows how this works.

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**Electronic supplementary material** The online version of this chapter (doi:[10.1007/978-1-4842-1990-4\\_1](https://doi.org/10.1007/978-1-4842-1990-4_1)) contains supplementary material, which is available to authorized users.

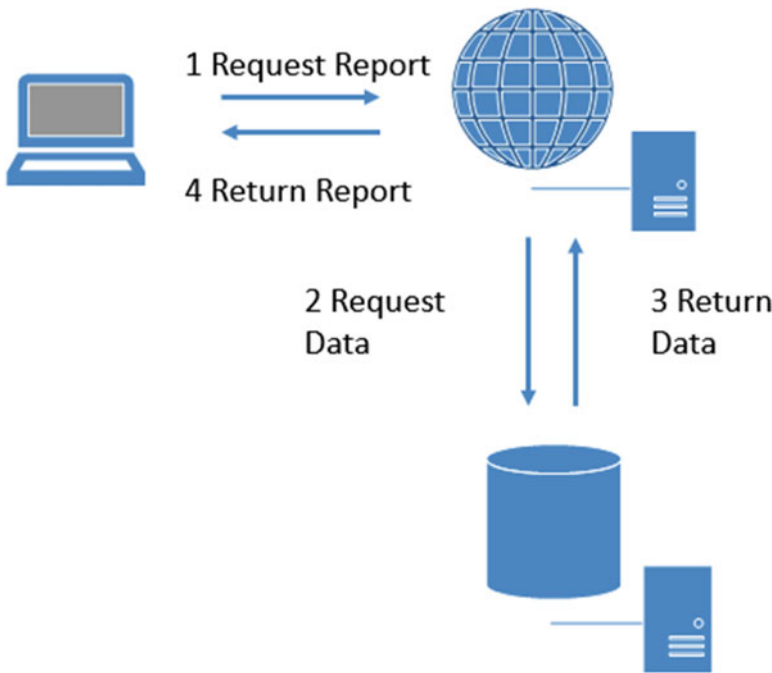


Figure 1-1. Reporting steps

## Understanding SSRS Architecture

An SSRS implementation consists of multiple components that can be configured in many different ways. At a minimum, everything can go on one computer, even on a laptop. This configuration is probably useful only for development, and it is what I recommend for following along with the examples in this book. The configuration consists of a SQL Server instance that includes Reporting Services as well as the source databases and SQL Server Data Tools (SSDT) running in Visual Studio.

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■ **Note** SSRS can also be installed in SharePoint integrated mode. The way you develop reports is identical to the default which is called native mode. This book will focus on native mode, but it does have a section in Chapter 8 on deploying reports to SharePoint.

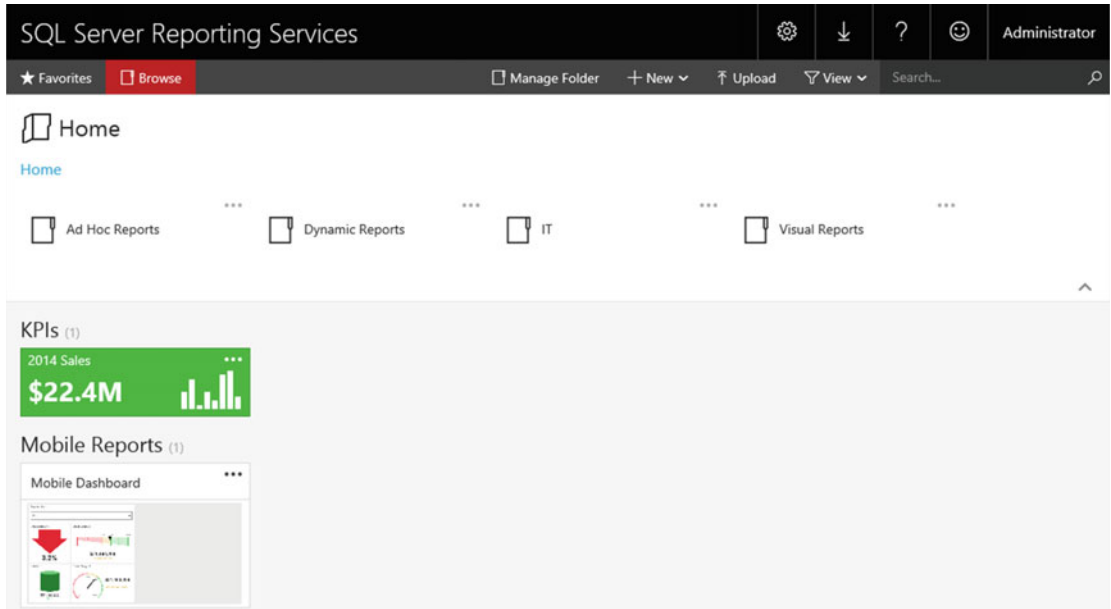
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Typically, in a production environment, a server is dedicated to running SSRS, and the source data is found on other servers throughout the network. Report developers will use SSDT on their local computers to develop the reports and then publish the reports to the production server or possibly to a server where the reports can be tested before going live.

Before learning how to get everything set up on your computer, you will learn more about the components of SSRS. First there must be a SQL Server instance in place to host the SSRS databases. The instance is often installed on the server where the SSRS service is installed, but it can be a different server.

There are two databases that will be created when you install or initially configure SSRS: ReportServer and ReportServerTempDB. ReportServer is used to store report definitions, security, history, and everything else that is needed for the published reports. You can probably tell by the name ReportServerTempDB that this database is used as a temporary workspace.

When you install SSRS, it creates a web service that responds to report requests. In native mode, it provides a web portal where users can browse for and run reports. In previous versions of SSRS this was called Report Manager, but starting with 2016 this interface has been completely redesigned. It is now just called the web portal and resembles Figure 1-2.



**Figure 1-2.** The web portal

The source of data can be from just about anywhere. This book will show examples from SQL Server databases, but you could report against Oracle, Analysis Services cubes, XML documents, SharePoint lists, cloud databases, and more.

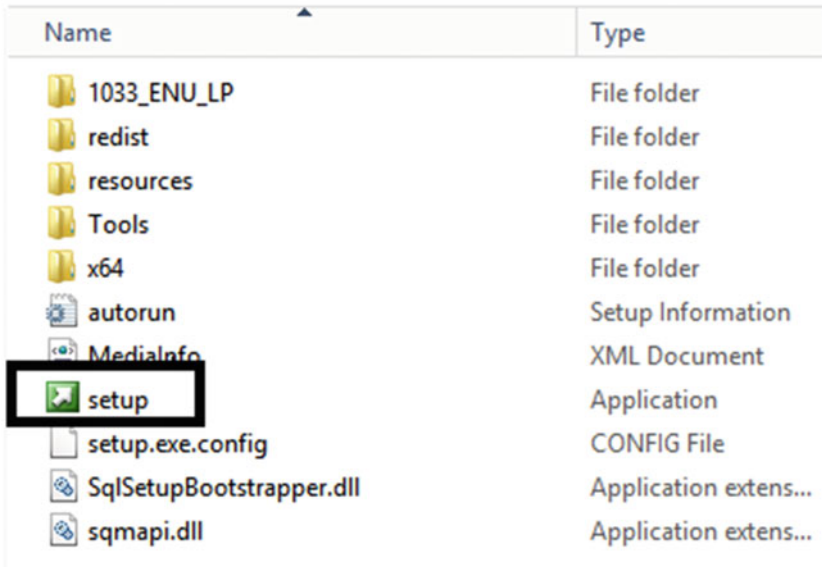
## Installing SQL Server with SSRS

You can follow along with many of the examples in the book by installing the developer tools without installing SSRS. You could also work with an SSRS instance that is already in your company's network. I do recommend that, if at all possible, you install SSRS on your development computer. That will allow you to learn how to do some administrative tasks as well as develop the reports.

SQL Server is available in several editions. Each edition has a specific set of features and price. For development and learning, you can download the free Developer Edition. Just search the web for "SQL Server Developer Edition download" to find the file. There is also an Express Edition that is free, but the features are very limited.

■ **Note** At the time of this writing, the media is an iso file. My Windows 10 laptop can easily handle iso files, but your operating system may not. You can search for a utility to mount or extract iso files if needed.

From the media, you should see a setup icon shown in Figure 1-3.

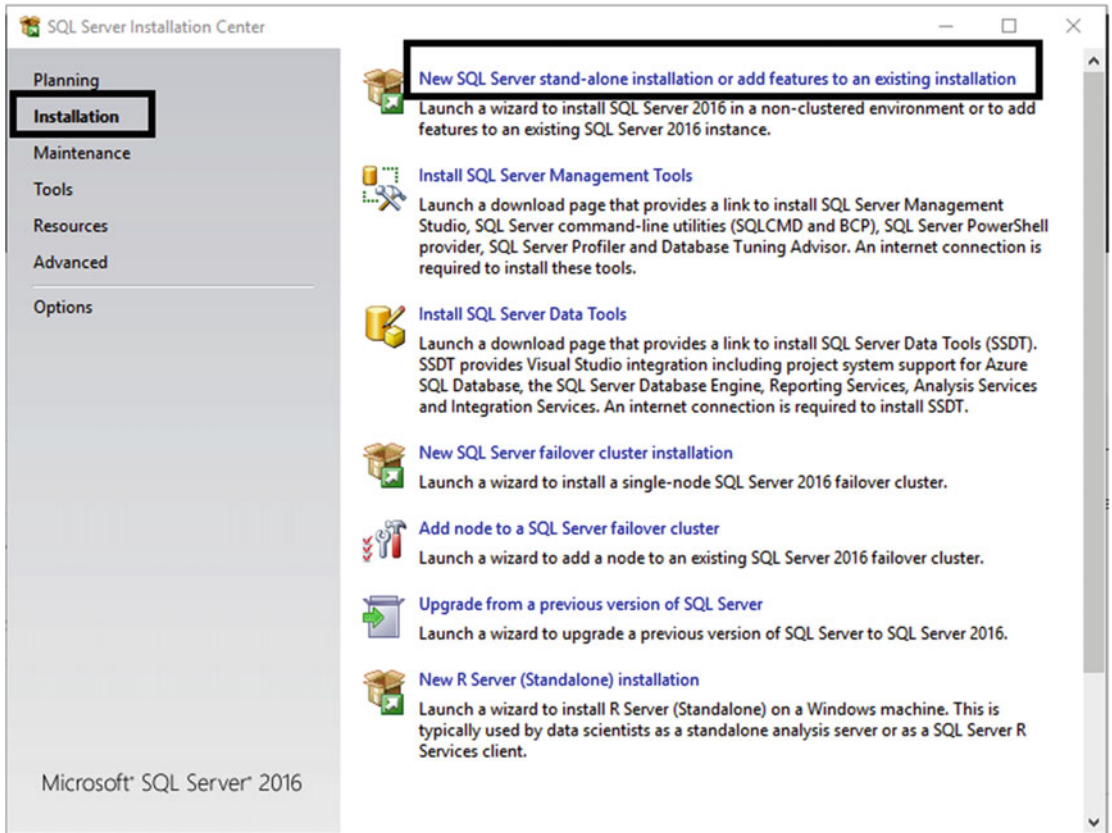


Name	Type
1033_ENU_LP	File folder
redist	File folder
resources	File folder
Tools	File folder
x64	File folder
autorun	Setup Information
MediaInfo	XML Document
<b>setup</b>	Application
setup.exe.config	CONFIG File
SqlSetupBootstrapper.dll	Application extens...
sqmapi.dll	Application extens...

**Figure 1-3.** The setup icon

Follow these instructions to install a SQL Server instance with SSRS:

1. Double-click setup to launch the SQL Server Installation Center.
2. Click Installation on the left.
3. Click New SQL Server stand-alone installation or add features to an existing installation at the top as shown in Figure 1-4.



**Figure 1-4.** The SQL Server Installation Center

4. An installation wizard will launch. On the initial information pages, click Next.
5. On the License Terms page, click I accept the License Terms and click Next.
6. Click Next on the Microsoft Update page.
7. After checking for updates, click Next on the Product Updates.
8. On the Install Rules page, click Next once it is done. If there are any Failed statuses, you will need to click the message to find out what is wrong and correct it.



- 9. On the Feature Selection page, select Database Engine Services and Reporting Services - Native as shown in Figure 1-5.

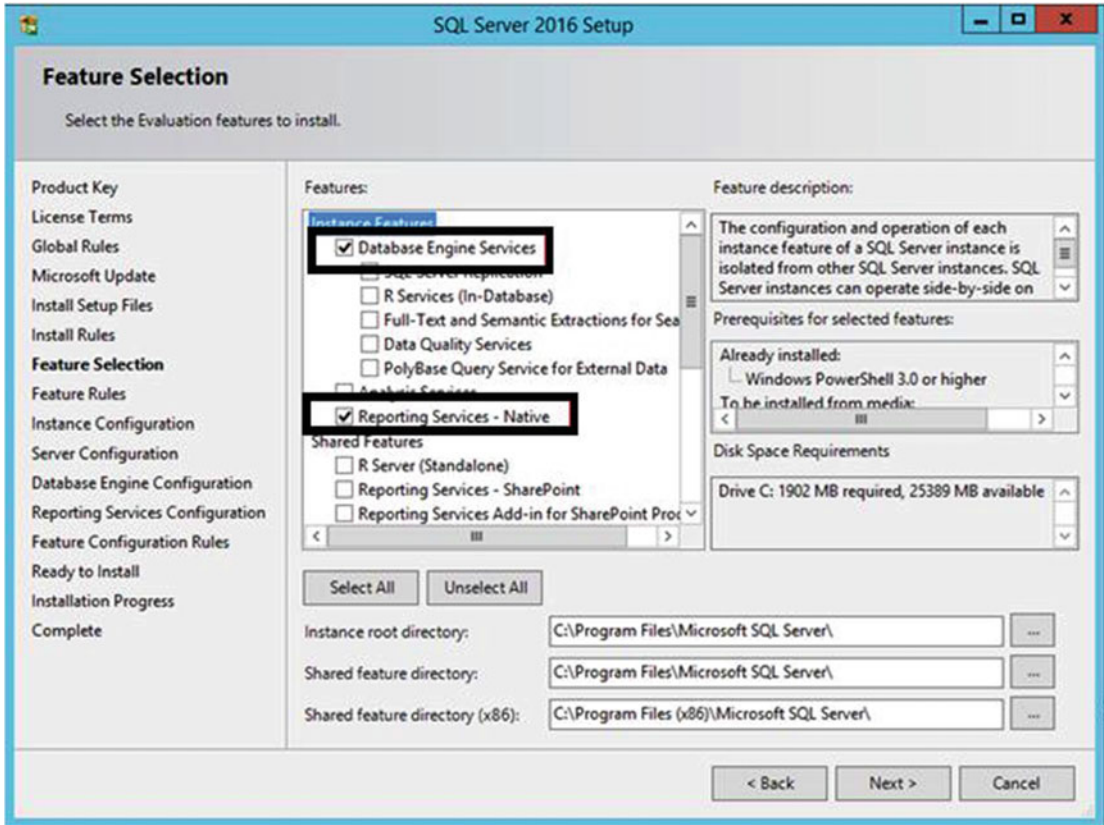
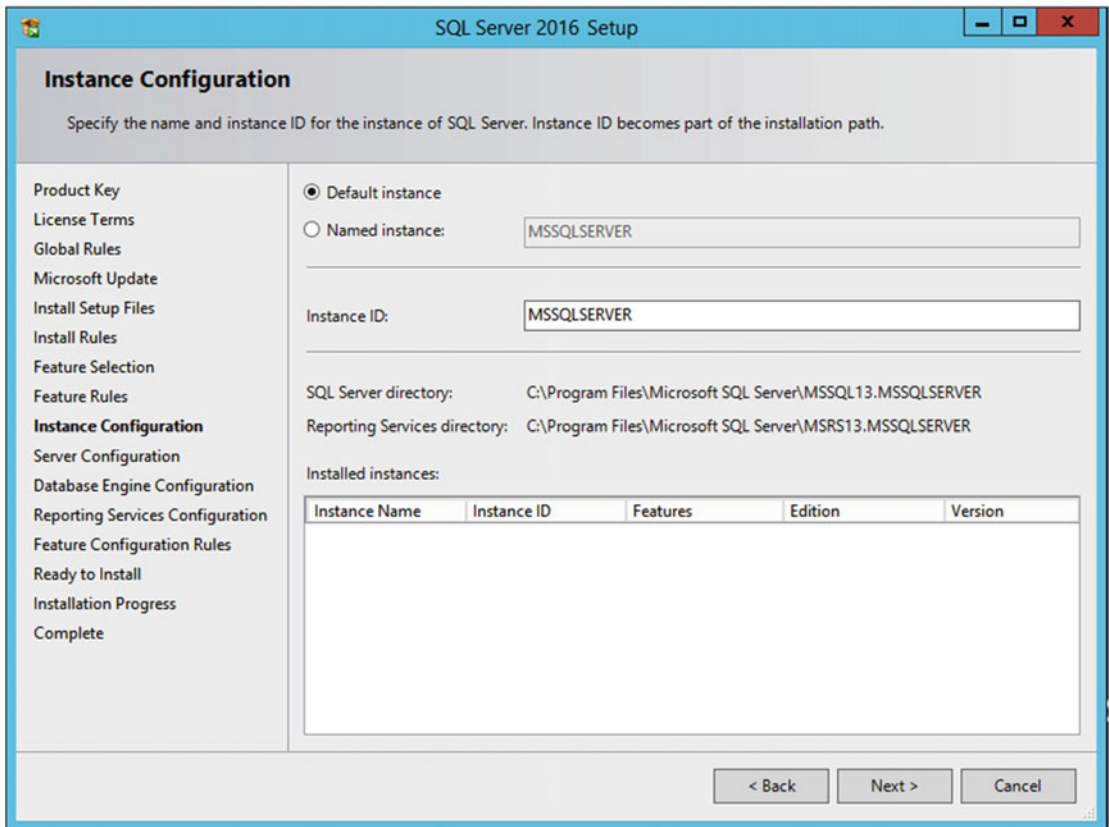


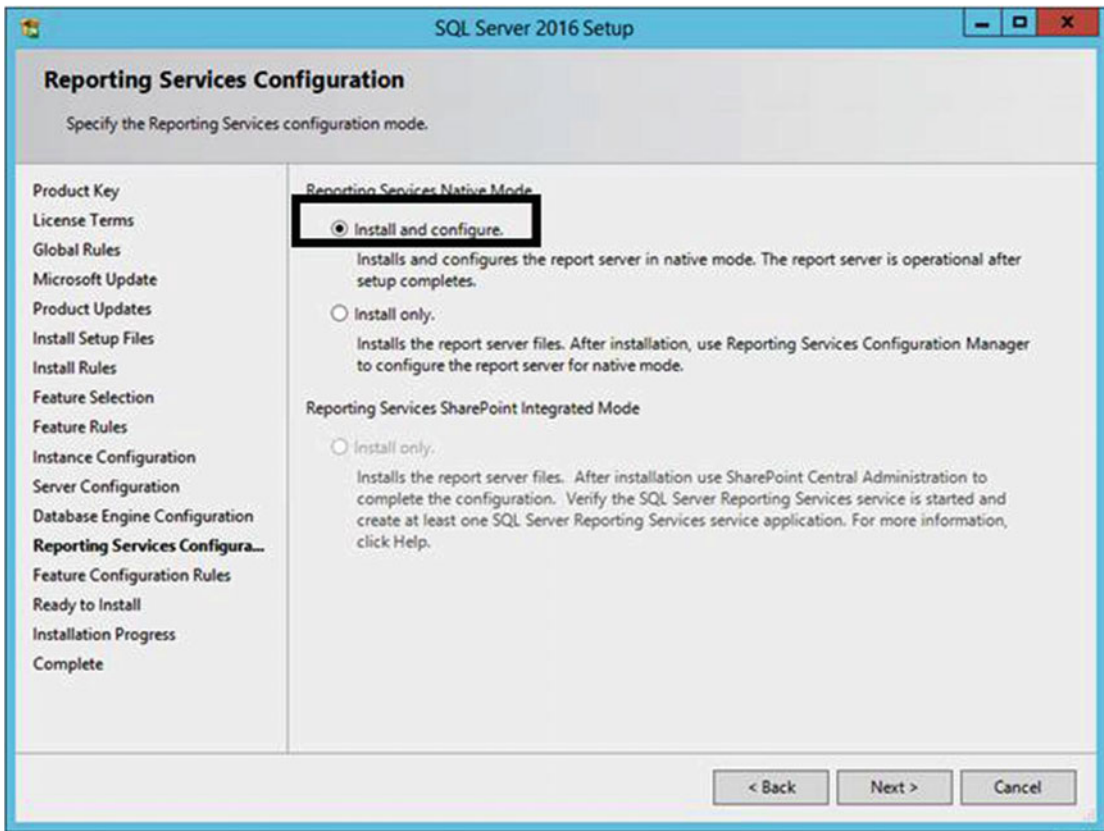
Figure 1-5. The feature selection

- 10. On the Instance Configuration page, you must decide whether to install a default instance with Instance ID MSSQLSERVER or a named instance. Each instance of SQL Server on a computer must be unique. If there are existing instances of SQL Server installed, you will see them listed. If no other default instance is installed, select Default Instance and click Next. Otherwise, select Named Instance and type in a name before clicking Next. Figure 1-6 shows this page.



**Figure 1-6.** The Instance Configuration page

11. On the Server Configuration page, accept the defaults and click Next.
12. On the Database Engine Configuration page, click Add Current User. This will make your account an administrator in SQL Server. Click Next.
13. On the Reporting Services Configuration page, make sure that you choose Install and configure as shown in in Figure 1-7 and click Next.



**Figure 1-7.** *The Reporting Service Configuration page*

14. On the Ready to Install page, click Install.
15. Restart the computer if requested to do so at the end of the installation.

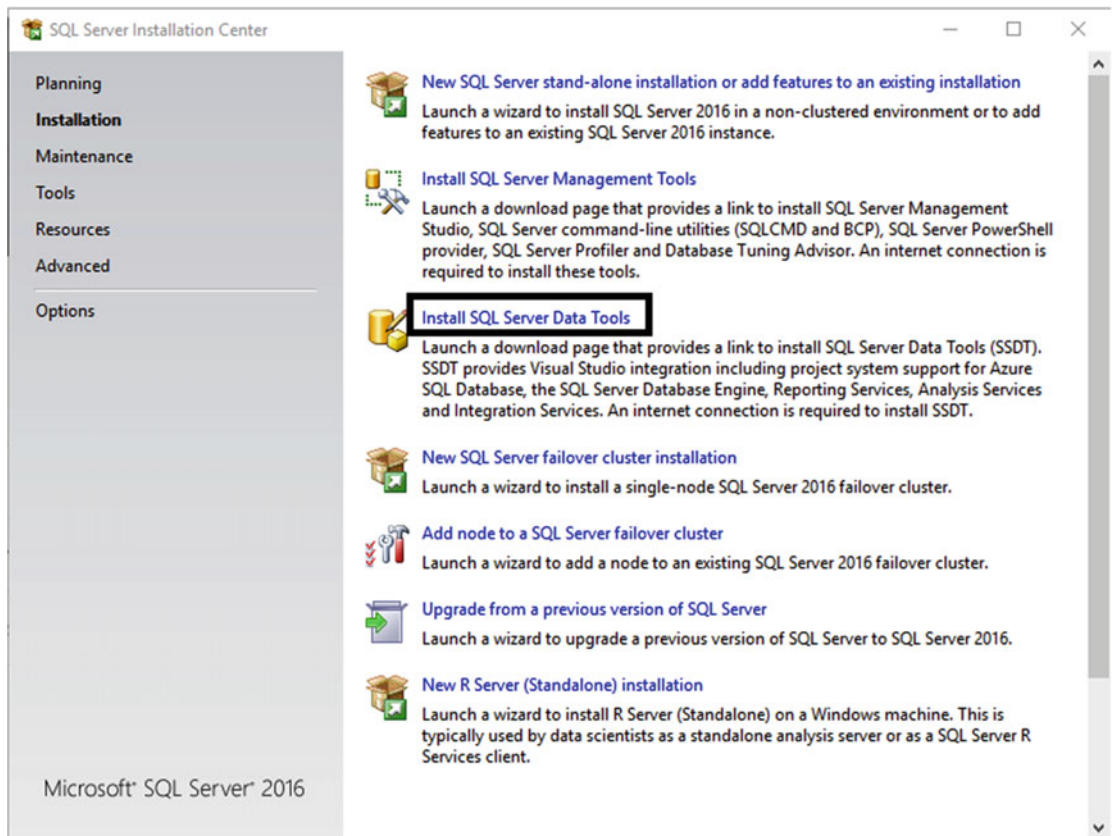
It may take several minutes to install the SQL Server instance and SSRS. There are dozens of things that could prevent a successful installation, and it would be impossible for me to help you troubleshoot via a book. My advice is to navigate to `C:\Program Files\Microsoft SQL Server\130\Setup Bootstrap\Log`. There will be log files with the messages generated during the installation. You can search the Internet using any error messages that you find for help and advice if the installation fails. That said, you may need to be connected to the Internet during the installation, and you may need to run the setup as an administrator for a successful install.

Previous versions of SQL Server allowed you to install SQL Server Management Studio (SSMS) with your SQL Server instance install. Starting with SQL Server 2016, Microsoft plans to release frequent updates to this tool, and make it available only by downloading. To find the link, relaunch the SQL Server Installation Center if you have closed it. On the Installation page, click Install SQL Server Management Tools. Follow the instructions found on the download page.

## Installing SQL Server Data Tools

The primary development tool for SSRS is SSDT, mentioned earlier, and it runs inside Visual Studio. Microsoft has changed the name and the source of the development tool over several versions of SQL Server. At one time, you could install Business Intelligence Development Studio, also known as BIDS, directly from the SQL Server installation media. At one point, Microsoft changed the name to SQL Server Data Tools – BI, and it was a separate download. To make things confusing, there was also another product called SSDT used for database projects, not BI projects like reports. Luckily, in 2016, Microsoft has combined the two products into one SSDT download.

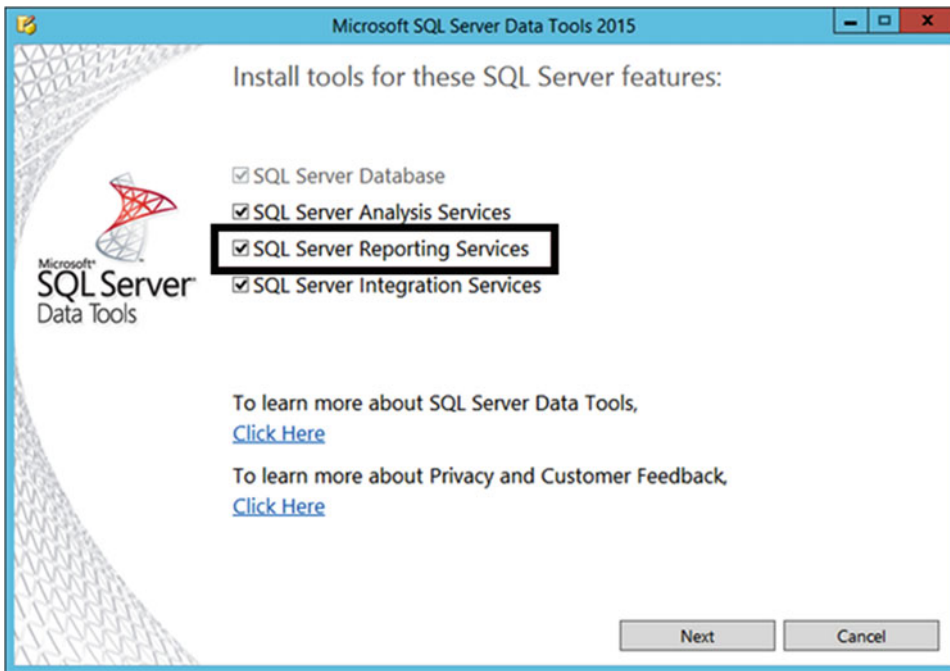
You can find the link to download and install SSDT on the Installation page of the SQL Server Installation Server as shown in Figure 1-8.



**Figure 1-8.** The link for SQL Server Data Tools

At the time of this writing, you can download the SSDTSetup.exe file and install from that, or you can scroll down the page to download an iso file. If you download the iso file, then run SSDTSetup.exe from the media to get the install started. Follow these steps to install SSDT:

1. Running SSDTSetup.exe starts the wizard. On the first page, make sure that SQL Server Reporting Services is checked as shown in Figure 1-9. You can leave the others checked as well.



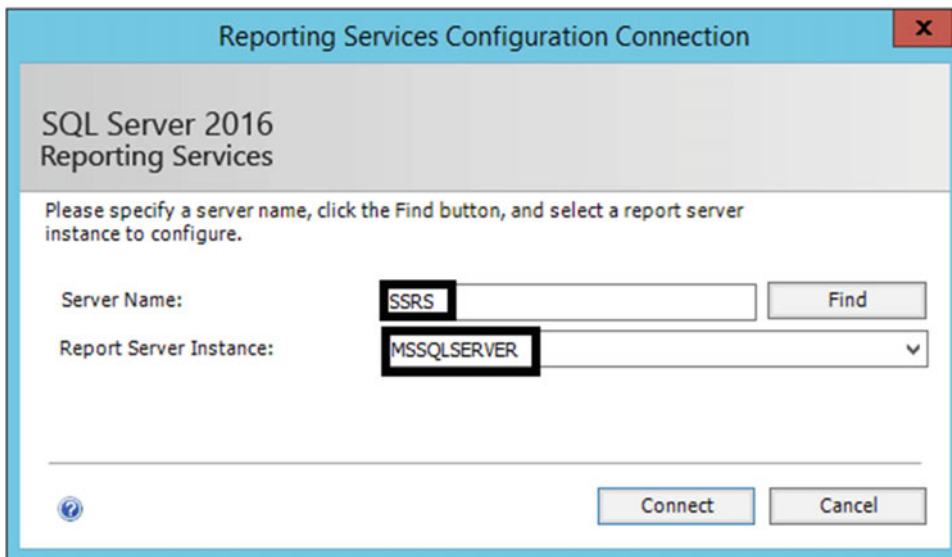
**Figure 1-9.** SQL Server Reporting Services is checked

2. Click Next.
3. On the License Terms page, check I agree to the license terms and conditions.
4. Click Install

## Configuring SSRS

If you followed the installation instructions exactly in the section “Installing SQL Server with SSRS”, SSRS should be configured. If, instead, you added SSRS to an existing SQL Server instance or selected Install only on the Reporting Services Configuration page, you will need to configure it now. To configure SSRS, follow these steps:

1. Launch Reporting Services Configuration Manager.
2. When asked to connect to your SSRS instance, select the server and instance name if required and click Connect as shown in Figure 1-10.



**Figure 1-10.** Connect to the SSRS instance