

Michael Lisin
Jim Joseph
Amit Goyal

Microsoft®
SQL Server 2008
Reporting
Services

UNLEASHED

SAMS



Microsoft® SQL Server™ 2008 Reporting Services Unleashed

Copyright © 2010 by Sams Publishing

All rights reserved. No part of this book shall be reproduced, stored in a retrieval system, or transmitted by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission from the publisher. No patent liability is assumed with respect to the use of the information contained herein. Although every precaution has been taken in the preparation of this book, the publisher and author assume no responsibility for errors or omissions. Nor is any liability assumed for damages resulting from the use of the information contained herein.

ISBN-13: 978-0-672-33026-1

ISBN-10: 0-672-33026-1

Library of Congress Cataloging-in-Publication data is on file.

Printed in the United States of America

First Printing July 2009

Trademarks

All terms mentioned in this book that are known to be trademarks or service marks have been appropriately capitalized. Sams Publishing cannot attest to the accuracy of this information. Use of a term in this book should not be regarded as affecting the validity of any trademark or service mark.

Warning and Disclaimer

Every effort has been made to make this book as complete and as accurate as possible, but no warranty or fitness is implied. The information provided is on an “as is” basis. The authors and the publisher shall have neither liability nor responsibility to any person or entity with respect to any loss or damages arising from the information contained in this book.

Bulk Sales

Pearson offers excellent discounts on this book when ordered in quantity for bulk purchases or special sales. For more information, please contact:

U.S. Corporate and Government Sales
1-800-382-3419
corpsales@pearsontechgroup.com

For sales outside of the U.S., please contact:

International Sales
+1-317-581-3793
international@pearsontechgroup.com

Editor-in-Chief
Karen Gettman

Executive Editor
Neil Rowe

Acquisitions Editor
Brook Farling

Development Editor
Mark Renfrow

Managing Editor
Patrick Kanouse

Project Editor
Seth Kerney

Copy Editor
Keith Cline

Indexer
Ken Johnson

Proofreader
Geneil Breeze

Technical Editor
J. Boyd Nolan

Technical Contributor
Prash Shirolkar

**Publishing
Coordinator**
Cindy Teeters

Book Designer
Gary Adair

Composition
Mark Shirar

Introduction

SQL Server 2008 Reporting Services (SSRS) is a server-based, extensible, and scalable platform that delivers and presents information based on data that a business collects during its operation.

Information, in turn, helps business managers to evaluate the current state of the enterprise and make decisions on how to increase revenues, reduce costs, and increase customer and employee satisfaction.

The Reporting Services scope extends from traditional paper reports to interactive content and various forms of delivery: email, file shares, and so on. SSRS is capable of generating reports in various formats, such as Hypertext Markup Language (HTML), Extensible Markup Language (XML), and Excel formats, thus allowing users to manipulate their data in whatever format is required.

Before diving into this book, let's take a moment to understand the layout and some of the conventions used in the book. First, we cover how this book is organized and what you can expect in each section. Second, we cover the style and formatting conventions used in this book. It is particularly noteworthy to note the style changes in reference to code lines, including SQL Server and .NET code.

How This Book Is Organized

This book begins with an introductory overview of SSRS and covers a broad range of topics in the areas of report authoring, Reporting Services deployment and administration, and custom code development for Reporting Services.

The chapters in Part I, "Introduction to Reporting Services," provide a high-level overview of Reporting Services and highlight key features of the Reporting Services, deployment scenarios, typical users of Reporting Services, and Reporting Services architecture. This part allows for leisurely reading and does not require you to have access to a computer.

The chapters in Part II, "Report Authoring from Basic to Advanced," take you through report development tools and processes. This part describes report building blocks and walks through building a report from simple to complex.

The chapters in Part III, “Reporting Services Management,” discuss advanced topics of Reporting Services administration, such as setting proper security, managing Reporting Services as individual servers and in a web farm, and gathering report-execution information.

The chapters in Part IV, “Reporting Services Customizations,” are for those of you who might want to extend Reporting Services and incorporate reports into your applications. This part covers key programmable aspects of Reporting Services.

The chapters in Part V, “SharePoint Integration,” provide detailed drill-down into running Reporting Services in SharePoint integrated mode. If you are interested in allowing your users to view and manage reports from their SharePoint sites, this section provides comprehensive information on architecture, installation, tools, and management.

Conventions Used in This Book

SQL Server 2008 Reporting Services is frequently abbreviated as SSRS, and where appropriate we may distinguish between versions of the product such as SSRS 2005 or SSRS 2008.

Business Intelligence Development Studio is frequently abbreviated as BIDS.

New features available in SQL Server 2008 Reporting Services as compared to SQL Server 2005 Reporting Services are labeled with “New in 2008.”

Names of products, tools, individual windows (docking or not), titles, and abbreviations are capitalized: for example, SQL Server, SQL Server Reporting Services, Visual Studio, Report Designer, Report Builder, Report Manager, Windows, and so on.

Monospace is used to highlight the following:

- ▶ **Sections of code that are included in the flow of the text:** “Add a text box to a report and place the following code in the Background Color property: =Code. Highlight(value).”
- ▶ **Filenames:** “Visual Studio creates a project with a single class Class1. Let’s rename file Class1.cs in Solution Explorer to MainClass.cs.”
- ▶ **Pathnames:** Report Server (the default directory is C:\Program Files\Microsoft SQL Server\MSRS10.MSSQLSERVER\Reporting Services\ReportServer\bin).
- ▶ **Error numbers, codes, and messages:** “[rsRuntimeErrorInExpression] The Value expression for the textrun 'Textbox1.Paragraphs[0].TextRuns[0]' contains an error: Request for the permission of type 'System.Security.Permissions.FileIOPermission, mscorlib, Version=2.0.0.0, Culture=neutral, PublicKeyToken=b77a5c561934e089' failed.”
- ▶ **Names of permissions, constants, properties, collections, and variables:** Execute, Fields, ReportParameter, Parent.

To indicate adjustable information, we use the following:

- ▶ {}, mostly where the variable information can be confused with XML (for example, `<Value>{EXPRESSION}</Value>`). In this example, an {EXPRESSION} is any valid expression, such as `=Fields!ProductImage.Value`.
- ▶ <>, where the variable information cannot be confused with XML (for example, `=Fields!<Field Name>.Value`).

CHAPTER 1

Introduction to SQL Server Reporting Services (SSRS)

In today's ultracompetitive business environment, having good information is essential. Companies are awash in information, and with the advent of technologies such as radio frequency identification (RFID), more and more information is coming. Technology has made the job of gathering information trivial, but making sense of it all still remains elusive. This makes good reporting and business intelligence tools essential.

This first chapter is strictly nontechnical. This chapter focuses on the following:

- ▶ Capabilities of SSRS
- ▶ How it fits into the Microsoft Business Intelligence platform
- ▶ Report development life cycle as it relates to SSRS
- ▶ Editions of SSRS
- ▶ Licensing SSRS

NOTE

This book abbreviates SQL Server 2008 Reporting Services as SSRS and SQL Server 2005 Reporting Services as SSRS2K5.

New features available in SSRS and not in SSRS2K5 are labeled with "New in 2008."

IN THIS CHAPTER

- ▶ What Is SSRS?
- ▶ SSRS for End Users
- ▶ Overview of Features
- ▶ SSRS in the Report Development Life Cycle
- ▶ Editions of Reporting Services
- ▶ How Is SSRS Licensed?

What Is SSRS?

SSRS is Microsoft's answer to business reporting. It provides a unified, server-based, extensible, and scalable platform from which to deliver and present information. Its scope extends from traditional paper reports to web-based delivery and interactive content. SSRS can also be configured to deliver reports to people's inboxes, file shares, and so on. SSRS is capable of generating reports in various formats, such as the web-oriented Hypertext Markup Language (HTML) and desktop application (Microsoft Excel and CSV) formats, thus allowing users to manipulate their data in whatever format is required. In addition, SharePoint can be used as a front end for SSRS, allowing reports to be presented directly in corporate portals.

SSRS is just one of the components in the Microsoft Business Intelligence (BI) platform. Combined, those components provide an excellent platform for enterprise data analysis. The Microsoft BI platform includes the following:

- ▶ **SQL Server:** The traditional database engine, which also stores SSRS catalog data.
- ▶ **SQL Server Analysis Services (SSAS):** A component for online analytical processing (OLAP) and data mining. OLAP performs data aggregation and allows users to traverse from aggregations to details looking through the dimensions (such as geography or time) of data. Data mining helps users to discover patterns in data.
- ▶ **SQL Server Integration Services (SSIS):** A component for extracting, transforming, and loading (ETL) data.

SSRS for End Users

SSRS is unique in the Microsoft BI suite because it covers a variety of information users. Microsoft divides users into three groups: information consumers, information explorers, and analysts.

Table 1.1 briefly summarizes the percentages of users in each group, the level of technical experience, and the expectations from an enterprise reporting tool. All of these factors will vary from company to company, but generally the breakdown holds true.

TABLE 1.1 Breakdown of Information Workers

Type of User	Percentage	Technical Expertise	Expectation
Analysts	5%–10%	High	Analysts can develop reports, work with ad hoc reports, and perform sophisticated calculations (such as linear regressions and trend analysis). Analysts often publish reports to explorers and consumers.

TABLE 1.1 Continued

Type of User	Percentage	Technical Expertise	Expectation
Information explorers	15%–30%	Medium	Information explorers want to interact with reports to some degree, such as applying filters or performing drill down through.
Information consumers	55%–85%	Low	Information consumers use static, predefined, and preformatted reports.

To address the varying needs of these types of users, SSRS provides three main tools from the user perspective:

- ▶ **Report Viewer:** The primary mechanism for viewing reports over the Web. Report Manager is the name of the website that SSRS sets up. It provides a very clean and neatly organized user interface for end users. Developers can also embed a ReportViewer control into both ASP.NET and Windows Forms applications.
- ▶ **Report Builder:** The tool that provides users with a front end for ad hoc reporting against a SQL Server or Analysis Services database. Unlike most ad hoc reporting tools, users of Report Builder do not need to know Structured Query Language (SQL) or anything about joins or grouping to create reports.
- ▶ **Report Designer:** The tool that takes on the job of building advanced reports. Although Report Builder does a good job as an ad hoc reporting tool, Report Designer was made to tackle really advanced reports.

Figure 1.1 summarizes the types of reporting users, and mentions some of the tools SSRS provides for them.

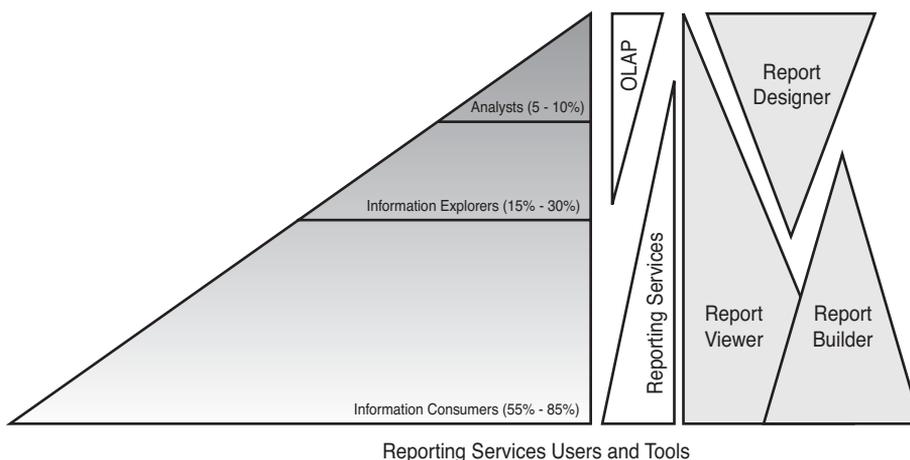


FIGURE 1.1 Reporting Services users and tools.

Overview of Features

SSRS has a number of features to address complex business reporting needs. Over the course of this book, these features are explored more closely. For now, here is a brief overview.

As far as creating reports, SSRS is a full-featured report engine. Reports can be created against any data source that has a managed code provider, OLE DB, or ODBC data source. This means you can easily retrieve data from SQL Server, Oracle, Analysis Services, Access, or Essbase, and many other databases. This data can be presented in a variety of ways. Microsoft took the feedback from SSRS2K5 and enhanced 2008 with new Chart and Gauge controls, and a new Tablix control, which is a mix of the Table and the Matrix controls from the earlier release. Combined, these new presentation formats give a whole new experience out of the box. Other enhancements include new output presentation formats, including Word and Excel, and direct integration with SharePoint.

Here is a concise list of SSRS features:

- ▶ Retrieve data from managed providers, OLE DB, and ODBC connections
- ▶ Display data in a variety of ways, including tabular, free form, and charts
- ▶ Export to many formats, including HTML, PDF, XML, CSV, TIFF, Word reports (New in 2008), and Excel
- ▶ Aggregate and summarize data
- ▶ Add in report navigation
- ▶ Create ad hoc reports and save them to the server
- ▶ Create custom controls using a report-processing extension
- ▶ Embed graphics and images and external content
- ▶ Integrate with SharePoint
- ▶ Provide a Simple Object Access Protocol (SOAP) application programming interface (API) and pluggable architecture
- ▶ Provide subscription-based reports and on-demand reports
- ▶ Allow users to store and manage their own custom reports built with SSRS's Report Builder 2.0 and manage subscriptions to the reports (New in 2008)
- ▶ URL-based report access
- ▶ Gauge and Chart controls to display KPI data (New in 2008)

As you can see, SSRS provides a comprehensive set of features out of the box. Another nice feature of SSRS is its extensibility. Because there is no way that the developers of SSRS could have anticipated every need of an enterprise reporting solution, they made SSRS extensible. This extensibility enables developers to use SSRS in any number of ways, from embedded reports to customized reporting solutions.



Enterprise Report Examples

Each user is likely to have favorite reports to make timely and effective business decisions, and although it is not possible to cover a whole gamut of reports in this book, some common ideas can help you think through practical applications of SSRS.

Scorecard reports are frequently used in today's businesses and provide information for each manager on how well his group is doing as compared to the goals set for the group. Usually, a scorecard implements a "traffic light" type of highlight or a "gauge" indicator. Values on the scorecard are highlighted in green when the group is meeting its goals, in yellow when the group is doing so-so, and in red when the group's performance requires immediate attention. Scorecard reports can take advantage of the key performance indicators (KPIs) features of Analysis Services 2008. Gauges and charts have been significantly enhanced in SQL Reporting Services 2008 by the acquisition of the Dundas Gauge and Chart controls by Microsoft.

When users are looking to combine a comprehensive set of business health and "speed" gauges (scorecard) and related information in a small space, a dashboard is used to accomplish this goal. A dashboard provides a short, typically one-page, summary view of a business (much like a car's dashboard summarizes a car's status) and allows drill down through the items on the top page to retrieve detailed information. SharePoint is an excellent platform to host dashboards and greatly simplifies arranging reports in a meaningful fashion on a page.

Today, when everybody is so short on time, it might be easy to miss an information point that could prove fatal for a business. Exception reporting is what comes to the rescue of a time-constrained user. Unlike regularly scheduled reports or summaries provided by scorecards, exception reports are created and delivered to a user when an unusual event occurs. An exception report removes the "noise" created in periodic reports, focusing instead on mission-critical anomalies. An example of such an anomaly could be a sudden drop in daily sales for a particular region.

Other typical reports include various views of sales (geographic, demographic, product, promotion breakdowns), inventory, customer satisfaction, production, services, and financial information.

SSRS in the Report Development Life Cycle

To understand all the ways SSRS can be used and deployed, you can simply walk through the report development life cycle and see what features are useful in each stage.

A typical reporting application goes through three stages (see Figure 1.2): authoring, managing, and delivery. SSRS provides all the necessary tools to work with a reporting application in all three stages.

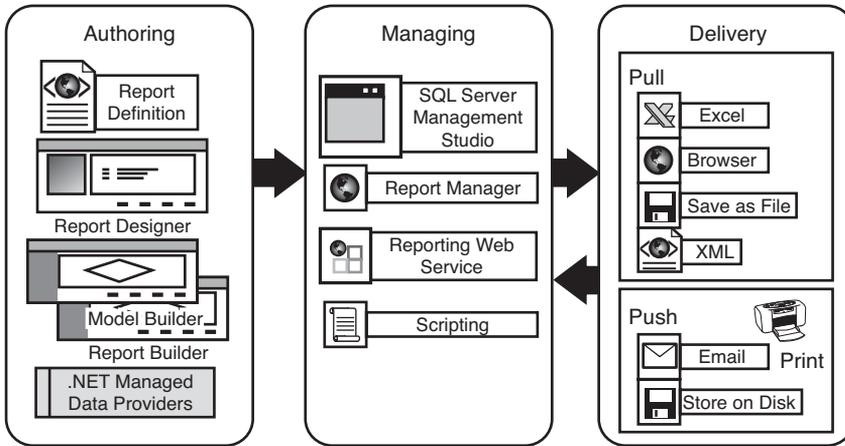


FIGURE 1.2 Reporting life cycle.

Authoring Stage

During this stage, the report author defines the report layout and sources of data. For authoring, SSRS maintains all the features of SSRS2K5 and adds some new features. SSRS still maintains Report Designer as its primary tool for developing reports in the 2008 release. Report Builder 1.0 is also available as a tool for developing reports against report models. Report models are metadata models describing the physical structure and layout of the underlying SQL Server database. The biggest new enhancement for SSRS as far as tools for authoring go is the addition of Report Builder 2.0. Report Builder 2.0 fits nicely into the high-powered analyst space and gives them almost all the power of Business Intelligence Development Studio (BIDS), but with an Office 2007 look and feel.

NOTE

Report Builder 2.0 is not installed along with the SQL Server Reporting Services, but is available as a free download in the SQL Server 2008 feature pack.

Figure 1.3 shows the Report Designer interface.

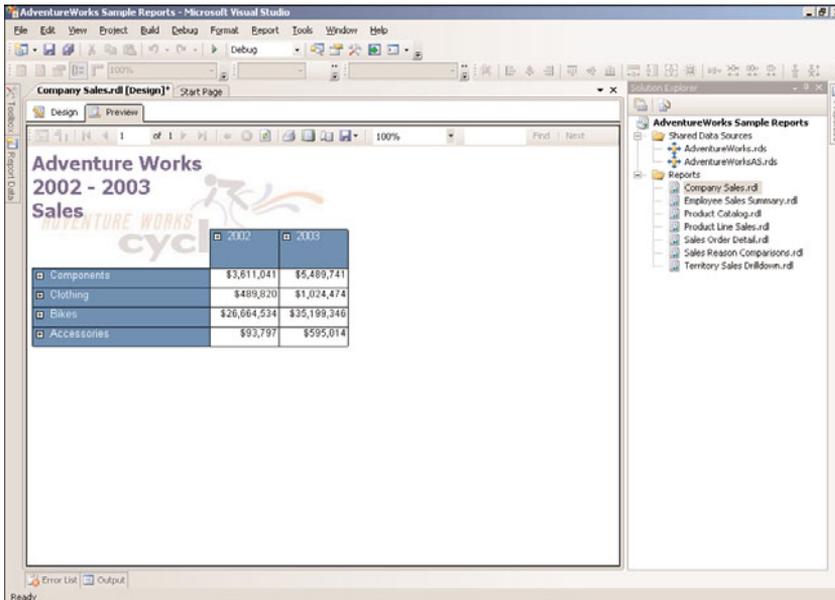


FIGURE 1.3 Report Designer.

Report Designer is a full-featured report-authoring tool that targets developers and provides extensive design capabilities and can handle a variety of data sources. Report Designer can work with all reports generated for SSRS, including reports generated by Report Builder. Report Designer incorporates the following productivity features:

- ▶ Import Access Reports, a feature that enables report designers to import Microsoft Access reports and create a report definition in turn. In complex cases, it might not be able to successfully or completely import an Access report. The general rule of thumb is that SSRS will be able to convert approximately 80% of the existing Access reports.
- ▶ IntelliSense for Expression Editing, which provides assistance with the syntax of a function used in expressions, names of class members, and indicates syntax errors in expressions by underlining them with squiggly red lines. You will see more details about this feature in Chapter 10, “Expressions.”
- ▶ Multidimensional Expressions (MDX) and Data Mining Expressions (DMX) Query Designer, which provides a drag-and-drop interface for writing MDX and DMX queries. This feature is covered in more detail in Chapter 17, “Working with Multidimensional Data Sources.”
- ▶ Relational Query Designer, which provides a drag-and-drop interface for writing SQL queries.
- ▶ Report Wizard, which provides step-by-step instructions to create a report.

- ▶ Preview mode, which enables a report author to preview the report design and layout before he publishes the report. This is a powerful feature of a Report Designer that does not require Reporting Services to be installed on a computer on which the preview is generated.
- ▶ Publishing and deployment functionality, which allows a report designer to publish a report to a target server. For example, the developer might choose to publish to a development or to a test reporting server.

SSRS also allows end users to design reports with SSIS. Three tools make this possible: Report Builder and Model Builder, and the new Report Builder 2.0. For those familiar with SSRS2K5, Report Builder and Model Builder are carryovers with little to no changes. Report Builder 2.0, however, is a brand new addition, which is a break from the previous edition. It is a smart client application that enables users to design reports with the full capability of SSRS. It also works directly against the client database.

With Report Builder 1.0, before an end user can develop a report, a developer must create a model, using the Model Builder tool. Figure 1.4 depicts the Model Builder's interface. A model is similar to a report, in that a model is a file written in Extensible Markup Language (XML) with an extension of .smdl. A model defines layout, data sources, data entities, and relationships in terms that are understood by end users and not in terms of SQL or MDX.

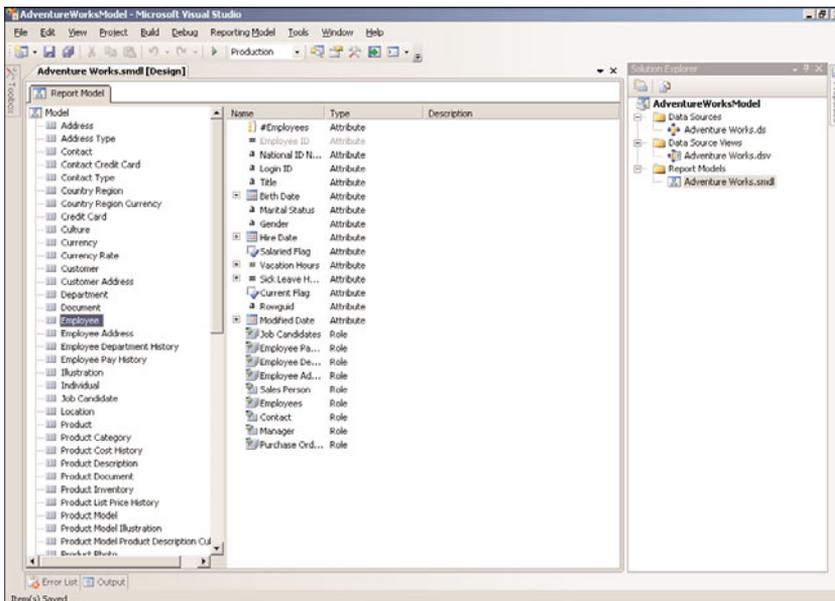


FIGURE 1.4 Model Builder 1.0.

When a model is published, an end user can choose a report's layout and drag and drop model items on a report. This is how an end user can create ad hoc reports, based on the published model. Figure 1.5 shows the Report Builder interface.

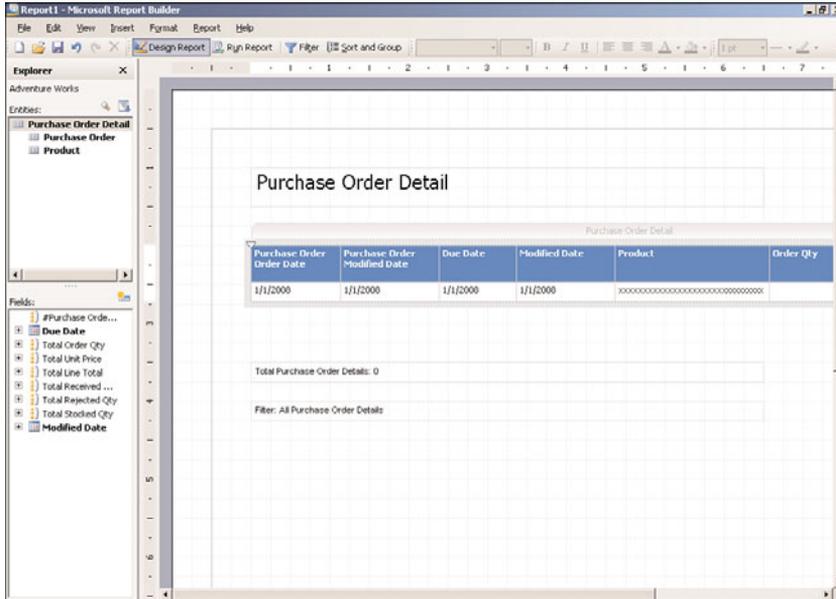


FIGURE 1.5 Report Builder 1.0.

Report Builder 1.0 targets end users and provides access to data sources predefined in a mode.

NOTE

Report Builder 1.0 cannot modify reports generated by Report Designer.

Report Builder 1.0 is a click-once .NET-smart client application that is launched from Report Manager's toolbar.

Report Designer and Report Builder (both versions) generate reports in Report Definition Language (RDL). RDL is an XML-based language, a code presentation of a report that defines data, presentation elements of a report, calls to the outside .NET assemblies, custom VB.NET functions, and expressions. RDL has powerful design elements (controls), such as the familiar Table, Chart, Subreport, and Matrix. SSRS has the capability to parameterize, sort, filter, drill down through, and aggregate data. RDL can be saved as a file on a file system or as data in the Reporting Services database. RDL is an open language that allows third-party vendors to develop custom authoring tools.

Report Builder 2.0 (New in 2008) represents a clean break with Report Builder 1.0. It is a full-featured smart client application that enables you to design and preview reports, then

publish them either to the Report Server or to a SharePoint site. Report Builder 2.0 does not use metadata models; instead, it queries data directly from any .NET provider data source, including relational, multidimensional, XML, and ODBC data sources.

Report Builder 2.0 also breaks in terms of user interface (UI). It is not a click-once application like the 1.0 version. Rather, it is a separate install distributed with the SQL Server 2008 feature pack. It has an Office 2007 Ribbon look and feel. Unlike the earlier version, it is also a full-featured Report Designer fixing many limitations in Report Builder 1.0, from difficulty assigning print margins to using complicated expressions.

Figure 1.6 shows Report Builder 2.0.

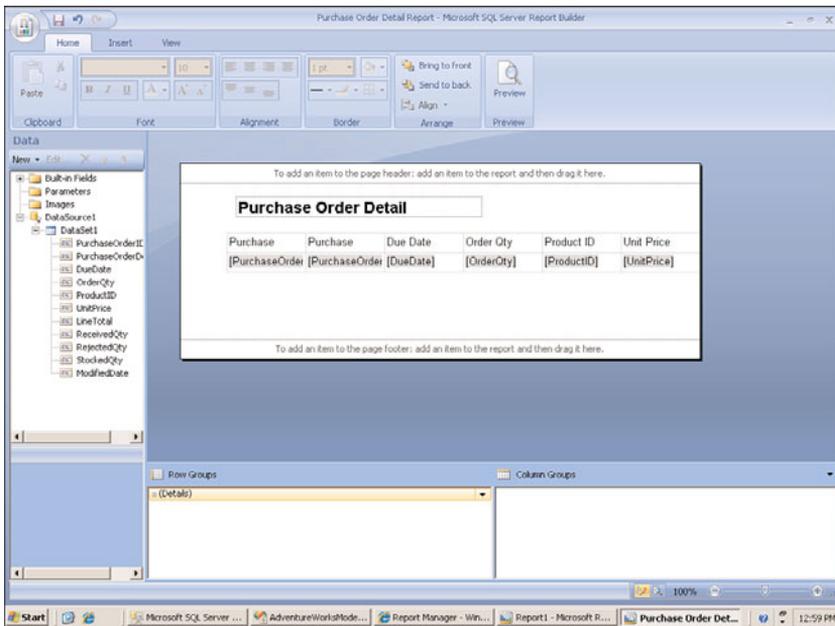


FIGURE 1.6 Report Builder 2.0

Managing Stage

During this stage, the report author publishes the report to a central location where it can be managed by a report administrator in terms of security and delivery. This central location is an SSRS database. After the report is published, the administrator can use Report Manager, SharePoint, custom written scripts, third-party tools, or SQL Server Management Studio to manage published reports. The report administrator can

- ▶ Assign the report's security or the right a user might have to a report.
- ▶ Establish execution control, such as selecting a time of an execution or caching options.
- ▶ Access and organize subscriptions from a single location.

- ▶ Control report-execution properties, which control how and when reports are processed. For example, the administrator can set processing options to prevent a large report from running on demand.
- ▶ Set timeout values to prevent a single report from overloading system resources.
- ▶ Automate report delivery through a standard subscription. Users can use subscriptions to set report presentation preferences. Users who prefer to view a report in Excel, for example, can specify that format in a subscription.
- ▶ Automate report distribution through data-driven subscriptions. A data-driven subscription generates a recipient list and delivery instructions at runtime from an external data source. A data-driven subscription uses a query and column-mapping information to customize report output for a large number of users.
- ▶ Set delivery methods for a report, such as file share, printer (this would require a custom extension in the current release, which is discussed in Chapter 29, “Extending Reporting Services”), or email.

Figure 1.7 shows the Report Manager’s interface.

The default URL for Report Manager is `http://<server>/reports` (as shown in Figure 1.7). This is a default virtual directory in which Report Manager is installed. A report administrator can later change this URL by editing configuration files or using the Reporting Services Configuration Manager, as shown in Figure 1.8.

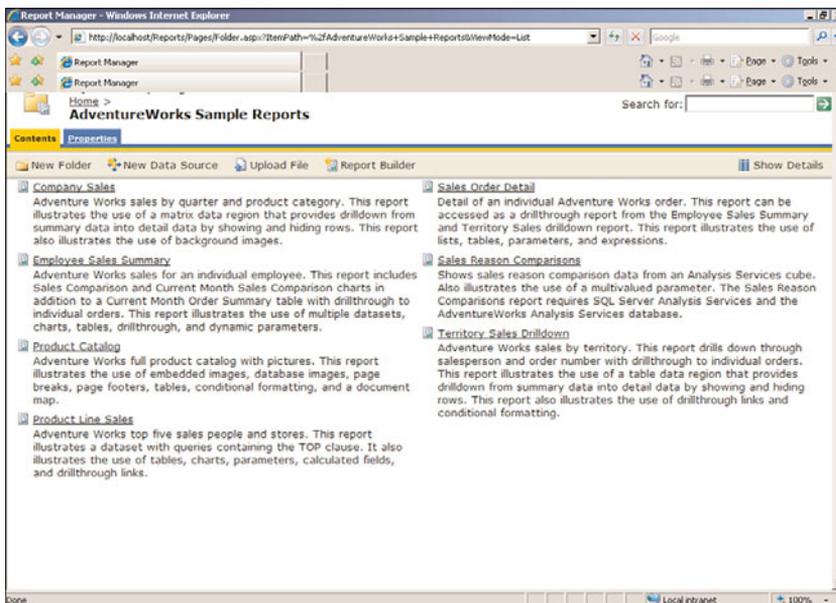


FIGURE 1.7 Report Manager.

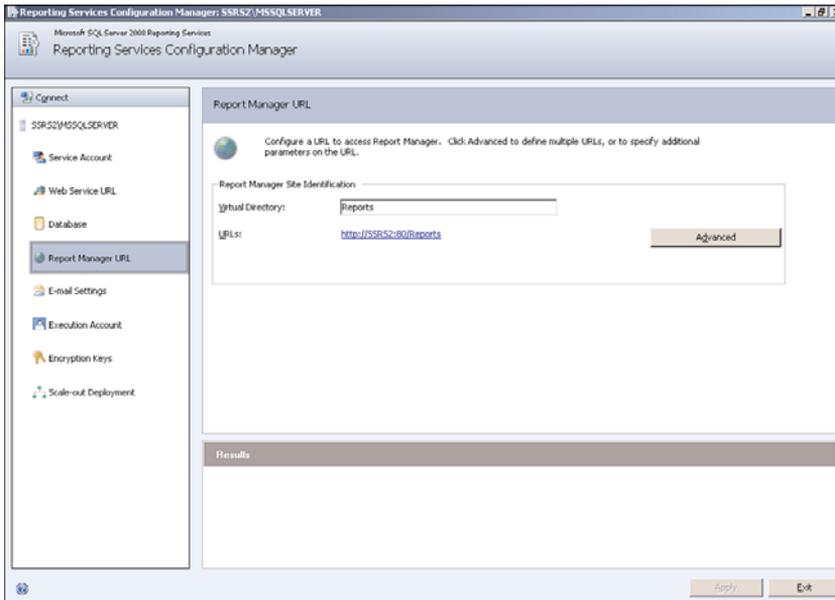


FIGURE 1.8 Reporting Services Configuration Manager.

Using SQL Server Management Studio, shown here in Figure 1.9, an administrator can perform most of the operations that she would otherwise perform through Report Manager. SQL Server Management Studio can access the SSRS catalog directly and does not require the SSRS Windows Service to be running to change the report's properties. However, an administrator will not be able to view the report if the SSRS Windows Service is not running.

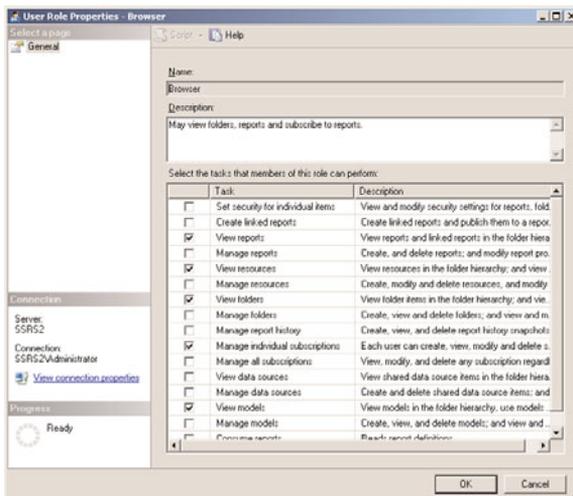


FIGURE 1.9 Managing within SQL Server Management Studio.

Table 1.2 presents a summary of the management features of SSRS.

TABLE 1.2 SSRS Management Features

Feature	Details
Browser-based management: Report Manager	Manages and maintains reports and the reporting environment.
Windows-based management: SQL Server Management Studio	Provides slightly better performance than the browser-based tool, in addition to the convenience of a single point of access (SQL Server Management Studio) for management of all SQL Server–related components.
Command-line utilities	Configure, activate, manage keys, and perform scripted operations.
Scripting support	Helps automate server administration tasks. For example, an administrator can script deployment and security settings for the group of reports, instead of doing the same one by one using Report Manager.
Folder hierarchy	Organizes reports by certain criteria, such as reports for specific groups of users (for example, a folder for the sales department).
Role-based security	Controls access to folders, reports, and resources. Security settings get inherited through the folder structure, similar to Windows folders security inheritance. Security can be inherited through the hierarchy or redefined at any level of hierarchy: folder or report. Role-based security works with Windows authentication. Security is installed during SSRS installation.
Job management	Monitors and cancels pending or in-process reports.
Shared data sources	Share data source connections between multiple reports, and are managed independently from any of the reports.
Shared schedules	Share schedules between multiple reports, and are managed independently from any of the reports.
History	Allows storing snapshots of a report at any particular moment of time. You can add report snapshots on an ad hoc basis or as a recurring scheduled operation. History can be used to view past versions of a report and see how information on a report has changed.
Linked reports	Create a link to an existing report that provides a different set of properties, parameter values, or security settings to the original report. To the user, each linked report appears to be a standalone report.
XML-based server configuration	Edits configuration files to customize email delivery, security configuration tracing, and more.

TABLE 1.2 Continued

Feature	Details
Database server and report logging capability	Contains information about the reports that execute on a server or on multiple servers in a single web farm. You can use the report execution log to find out how often a report is requested, what formats are used the most, and what percentage of processing time is spent on each processing phase.

The true test of an enterprise system is its ability to scale from a single user to up to thousands across an enterprise. The second test of an enterprise system is to maintain uptime and reliability. SSRS passes both tests.

SSRS manages these tasks by using underlying Windows technologies. The simplest deployment of SSRS just places all the components on a single machine. That single machine can then be updated with bigger and better hardware. The single machine deployment model provides a relatively cheap and cost-effective way to get up and running with SSRS.

SSRS can also be deployed across a network load-balanced (NLB) cluster, giving it scalability and availability. The database catalog that SSRS uses can also be deployed across a clustered database server apart from the web servers. This allows for nearly limitless growth in terms of number of users (scalability) and, at the same time, maximum availability.

Delivery Stage

During this stage, the report is distributed to the report's users and is available in multiple output formats. The SSRS retrieval mechanism enables users to quickly change an output format.

SSRS supports various delivery methods: email, interactively online (usually through a web browser, a portal such as SharePoint, or custom application), printer (requires custom extension), or file system. If the delivery method of interest is not available by default from SSRS, you can relatively easily develop custom delivery extensions. SSRS Books Online provides a complete set of samples for various custom delivery extensions. You can learn more about custom extensions in Chapter 29.

Reports are structured as items in a folder structure and allow for easy browsing and execution. You can see an example of viewing a report online in Figure 1.10. Note that the report is shown inside of Report Manager. Report Manager provides an additional functionality, such as assigning security or subscribing to a report. You can also view the report directly in the browser without Report Manager.

Alternatively, a user can subscribe to a report that subsequently will be delivered via email, as shown in Figure 1.11. Email delivery is a push model of report delivery. The push model is especially useful for the cases in which report generation takes a long time, the report needs to be delivered to an outside user, or there is an emergency situation that generates an exception report.

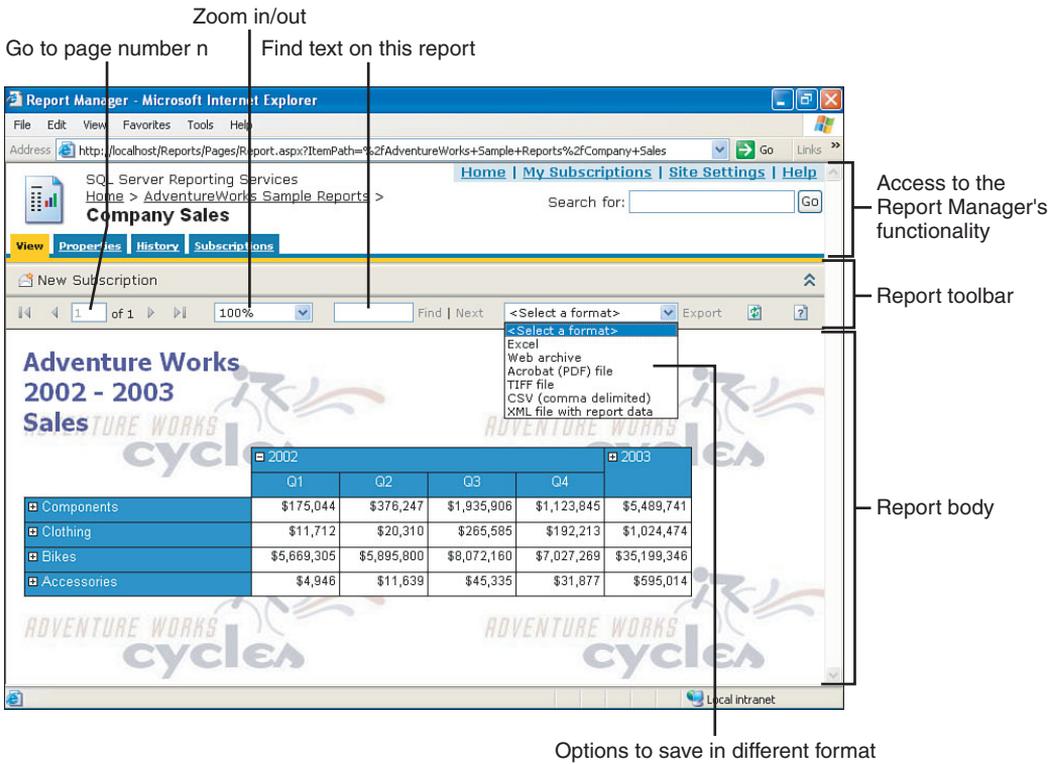


FIGURE 1.10 Online viewing.

Online and scheduled deliveries are great, but for a single solution to be truly ubiquitous, it has to offer more. SSRS does this, again, by making itself extensible rather than being all-encompassing.

A perfect example of this is via embedded reporting. With Visual Studio 2008, Microsoft has developed an integrated ReportViewer control. This control enables developers to embed SSRS reports into their Windows and web applications. Figure 1.12 shows the ReportViewer control.

If developers need to do more than just view reports, they can access the SSRS web services directly. This set of SOAP-based calls (SOAP API) provides access to just about every function on the Report Server. In fact, Report Manager does nothing more than make the same web service calls. For example, with the API, developers can modify permissions and create custom front ends.

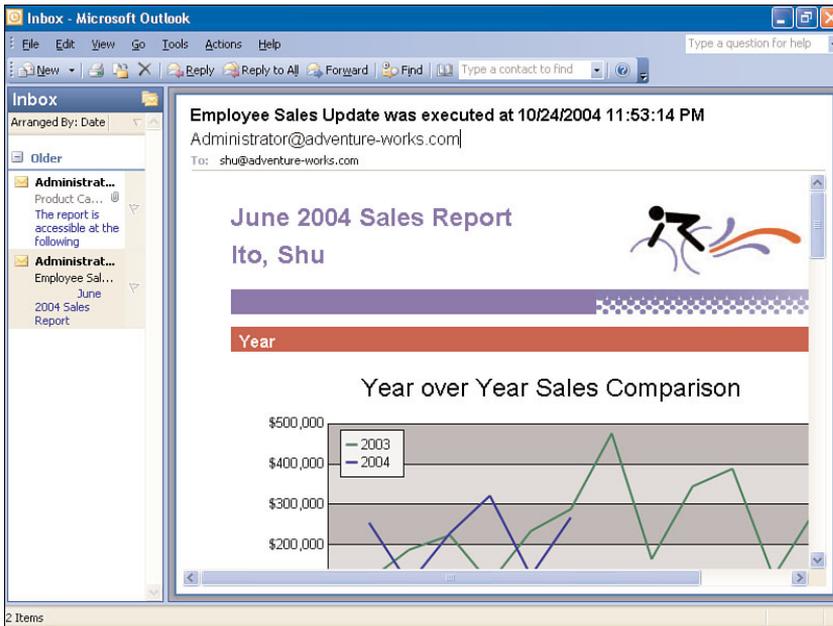


FIGURE 1.11 Email delivery.

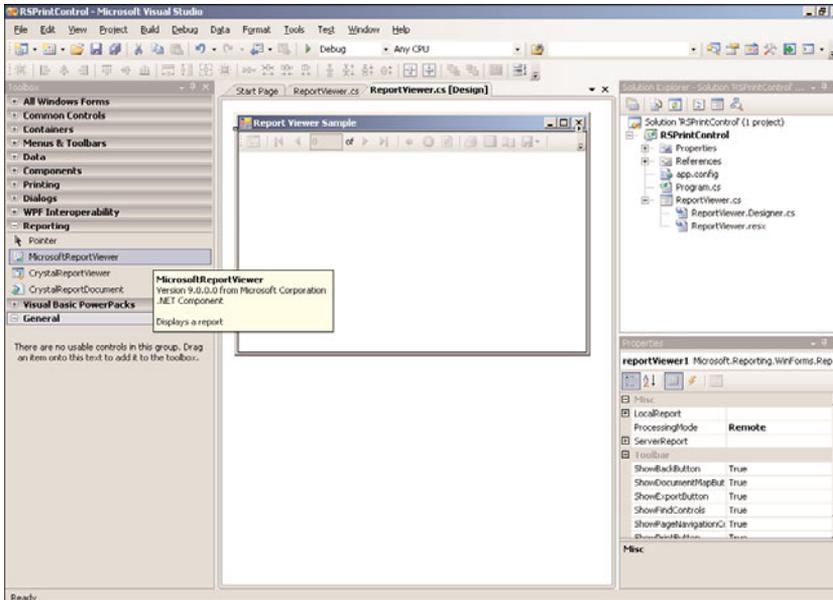


FIGURE 1.12 ReportViewer control.



Editions of Reporting Services

SSRS comes in four editions, which mirror the editions of SQL Server and Visual Studio. These editions range from free starter editions to full-scale Enterprise editions.

Chapter 5, “Reporting Services Deployment Scenarios,” has more information about the different editions and supported features. Table 1.3 offers a high-level overview of the different editions of SSRS.

TABLE 1.3 Overview of SSRS Editions

Edition	Quick Overview
Express	Express Edition offers a lightweight edition of SSRS for developers who want to learn how to use SSRS.
Workgroup	Workgroup is for use in small departmental organizations or branch offices. Should the need arise, Workgroup Edition can be upgraded to Standard or Enterprise editions.
Standard	Standard Edition is for use in small- to medium-sized organizations or in a single-server environment. Standard Edition supports all the features of SSRS, except highly specialized data-driven subscriptions, and infinite drill down through Report Builder.
Enterprise	Enterprise Edition is for use in large organizations with complex database and reporting needs. Enterprise Edition is fully functional, and supports scale-out functionality across a web farm.
Developer	Developer Edition is essentially the same as Enterprise Edition, but has different licensing requirements to make it easy for people to develop enterprise applications. Developer Edition is licensed per developer in development (nonproduction) environments.

How Is SSRS Licensed?

The short answer is that every machine running SSRS has to be licensed as if it were running SQL Server. This means that any machine running SQL Server is automatically licensed for not just SQL Server, but for the entire Microsoft BI platform. This includes SSRS, SSAS, SSNS, and SSIS. This makes it really easy to get one’s feet wet with SSRS. Just install SQL Server on one machine, and then install SSRS. On the flip side, if the choice is made to use the Enterprise Edition in a web farm scale-out scenario, every machine in the web farm must be licensed to run SQL Server.

Microsoft offers three ways to license SQL Server. Table 1.4 summarizes the licensing options for SQL Server. For more information and specific costing options, contact your Microsoft sales representative or reseller.

TABLE 1.4 Licensing Options for SQL Server

License Options	Description
Per processor	Licenses are paid for each processor on the machine running SQL Server. This license is optimal for web-facing or business-to-business machines running SQL Server. It is also helpful for very large user populations.
Server license plus device client access licenses (CALs)	Licenses are paid for the machine running SQL Server, and for every device connecting to SQL Server. An ideal situation for this type of licensing (CALs) is kiosks for which there are multiple users per device.
Server license plus user CALs	Licenses are paid for the machine running SQL Server and per user accessing the machine. This is useful for enterprises in which every user can access the SQL Server machine for multiple devices.

TIP

When determining the most appropriate licensing model, make sure to calculate the total license cost for each option and combination of licensing options. Select a licensing model combination that is the most financially sound for your business.

Summary

This chapter provided a high-level overview of SSRS features. It started by introducing you to some end-user tools. From there, it showed how different SSRS features can be leveraged in the report development life cycle. Finally, it concluded with a discussion about the different editions of SSRS and how it is licensed.

The following chapters build on the content covered here, and delve into the capabilities of SSRS reports and into the architecture of SSRS. Chapter 6, “Installing Reporting Services,” concludes Part I, with a discussion about different installation scenarios and how to install SSRS.

Index

A

accessing data

- connection strings, 183-186

- data sources

 - creating, 195

 - credentials, 182

 - data source expressions, 180-182

 - report-specific data sources, 180-181

 - shared data sources, 180-181

- data-processing extensions, 180

- queries

 - command type, 189-190

 - data properties, 188

 - Fields collection, 193

 - filters, 195

 - Generic Query Designer, 187

 - Graphical Query Designer, 186-187

 - Parameters collection, 190

 - XML, 192

Action element (ReportItems element), 149

Activated phase (activation process), 87

activation process (report server initialization)

- Activated phase, 87

- Announce Self phase, 86

ad hoc reporting

- DBMS, 328

- issues with, 327

- Model Designer, 328

- creating data source views, 333-334
- creating data sources, 332
- creating model projects, 331
- creating report models, 334-337
 - .ds files, 329
 - .dsv files, 329
- entities in report models, 330
- expressions in report models, 331
- folders in report models, 331
- modifying items in report models, 337-338
- perspectives in report models, 331
- publishing report models, 338-339
- report model sections, 329
- roles in report models, 330
- SDML, 328-329
- source fields in report models, 330
- RDBMS, 328
- Report Builder 2.0, 328, 345
 - data pane, 350
 - Data Region Wizard, 354
 - design surface, 348
 - features of, 346-347
 - grouping pane, 350
 - installing, 347-348
 - managing data sets, 352-355
 - managing data sources, 352-355
 - Properties dialog, 350
 - report layouts, 354-356, 359
 - Ribbons interface, 349-350
- Report Designer
 - click-through reports, 343
 - creating report models, 339
 - features of, 339-340
 - matrix/pivot table reports, 344
 - publishing reports, 344
 - RDL, 339
 - saving reports, 344
 - starting, 339
 - tabular reports, 342-343
- SSRS/WSS integrated systems
 - ODC files, 593
 - Report Builder, 590-591, 594-596
 - report data sources, 593
 - report models, 594
- Add New Item dialog (Solution Explorer), 124**
- adjacent group (Tablix data regions), 225**
- administration**
 - administration pages, SSRS/WSS integration, 561
 - administrator updates, SSMS, 58-60
 - key management
 - changing symmetric keys, 423
 - deleting symmetric keys, 423
 - restoring symmetric keys, 422
 - symmetric key backups, 421
 - monitoring
 - email delivery, 418
 - jobs, 414-415
 - memory, 420
 - performance, 416-418
 - Report Server, 411-413
 - unattended execution accounts, 418
 - scale-out deployments, 424
- After property, 281**
- aggregate functions, 170, 173, 258-259**
- aggregating data, 251**
 - Group Properties dialog, 253-254
 - new groups, creating, 252
 - OLAP, 297
 - sorting grouped data, 254-255
- AllowBlank element (ReportParameters element), 143**
- Analysis Services, 108**

- cube development via OLAP
 - cube creation, 302
 - cube verification, 311
 - Customer dimension design, 308-309
 - data source creation, 302
 - DMM deployments, 314-315
 - graphical KPI, 322
 - KPI additions to cubes, 311-312
 - KPI controls, 321-322
 - KPI leveraging report example, 320
 - mining structure creation, 313-314
 - querying data, 316-319
 - Time dimension design, 306, 310
 - OLAP, 296
 - aggregated data, 297
 - HOLAP, 297
 - MOLAP, 297-298
 - ROLAP, 297
 - summarized data, 297
 - UDM, 296
 - analysts, Microsoft's breakdown of information workers, 6**
 - analyzing two-dimensional data, 300-301**
 - Announce Self phase (activation process), 86**
 - anonymous report server access, SSRS Internet deployments, 88**
 - API (application programming interfaces), SSRS 2008 enhancements, 75**
 - arguments (command-line), list of, 428-429**
 - arithmetic operators (expressions), 154**
 - ASP.NET, web farms and, 87**
 - assemblies (custom)**
 - calling, 444-445, 457
 - classes, initializing, 446-448
 - compiling, 444
 - creating, 441-443
 - debugging, 460-463
 - Execute permission, 457
 - security
 - Assert permission, 458-459
 - Execute permission, 458
 - setting permissions, 455-456
 - strongly-named assemblies, 450
 - testing, 443
 - updating, 449
 - Assert permission, custom assemblies, 458-459**
 - asymmetric encryption, SSRS deployments, 86**
 - authentication, 428**
 - Kerberos and, 33
 - NTLM and, 33
 - Report Servers, 378
 - ReportServiceAuthentication web service, 479
 - security extensions, 33
 - SSRS/WSS integration, 531-532, 546-548, 554
 - Windows authentication, SSRS Internet deployments, 88
 - authoring stage (report development life cycle), 10-14**
 - authorization**
 - security extensions, 33
 - SSRS/WSS integration, 546, 549-551
 - availability**
 - SSRS Standard Edition, 96
 - standard (single-server) SSRS deployment model, 84
- ## B
- Back to Parent Report button (Report Viewer), 287**
 - background control properties, formatting, 264-265**
 - backups, symmetric keys, 421**
 - Before property, 281**

BI (Business Intelligence) platform (Microsoft), 6

BIDS (Business Intelligence Development Studio), 55

Design pane, 46

Design view

Design tab, 134

Preview tab, 134-135

Properties window, 131-133

Report Data window, 131-132

Sorting tab, 134

Toolbox, 131

IA64 support, 95

New Project dialog, 122

Properties windows, 45

Report Builder, SSRS/WSS integration, 563-564

Report Designer, SSRS/WSS integration, 563-564

Report Model Designer, SSRS/WSS integration, 563-564

Report Server Project Wizard

report creation, 112-116

sample database installation, 111

Reporting Services

Report Model project, 44

Report Server project, 44

Solution Explorer, 45

Add New Item dialog, 124

cube creation, 302, 306-315

Data Source Properties dialog, 126

Data Source view creation, 302

Dataset Properties dialog, 127

DM report creation, 323, 326

Shared Data Source dialog, 123

Toolbox, 45

Visual Studio versus, 121

bindings (report models), 330

bit shift operators (expressions), 154

bitwise/logical operators (expressions), 154

BLOB (binary large objects), standard (single-server) SSRS deployments, 84

bodies (reports) versus page headers/footers, 248

Body area (Tablix data regions), 220

BookmarkLink (Go to Bookmark) action, 283-286

border appearance control properties, formatting, 265-266

breaks (pages), 279

Browser role (SSRS security), 381

built-in roles

assigning, Report Manager, 383-384

Browser role, 381

Content Manager role, 381

My Reports role, 381

Publisher role, 381

Report Builder role, 381

System Administrator role, 382

System User role, 382

Business Intelligence (BI) platform (Microsoft), 6

C

caching

report processor, 29

reports, 417

CD/DVD-ROM, SSRS deployment requirements, 92

Central Administration (WSS), SSRS integration, 539-540, 552-553

Chart control, 2008 SSRS enhancements, 71-72

Chart data regions, 235

Chart areas, 240-241

Chart Category Groups, 240

chart data value, 236-238

chart series, 239

designing, best practices, 242

- Group Properties dialog, displaying, 253
- new data groups, adding, 253
- practical uses for, 243-245
- RDL, 241-242
- child/parent group to create group hierarchy (Tablix data regions), 225**
- click-through reports, 343**
- collections (expressions)**
 - DataSets collection, 153, 158-159
 - DataSources collection, 153, 159
 - Fields collection, 153, 160-161, 193
 - Globals collection, 153, 161
 - Parameters collection, 153, 162, 190, 201
 - ReportItems collection, 153, 163
 - User collection, 153, 163
 - Variables collection, 153-154, 164
- color, alternating table row colors, 276-277**
- columns**
 - Column Groups area (Tablix data regions), 220
 - Columns property, 280
 - reports, adding to, 130
 - tables, adding to, 132, 135
- command type, querying data, 189-190**
- command-line arguments list, 428-429**
- comparison operators (expressions), 154**
- compiling**
 - custom assemblies, 444
 - extensions, 503
- concatenation operators (expressions), 154**
- configuring**
 - configuration files, 452-454
 - Configuration utility (Net Framework), 454
 - data sources, report deployments via
 - Report Manager, 364-366
 - encryption keys, 51
 - Execution accounts, 51
 - Report Manager URL, 50
- Report Server
 - email settings, 50
 - Report Server database, 50
- Reporting Services Configuration Manager, 50, 58
- Reporting Services Configuration tool, 39
- scale-out deployments, 51
- Services accounts, 50
- SSRS/WSS integration, 537, 558
- Web Service URL, 50
- connection strings, 123, 183-186**
- constants (expressions), 153**
- containers, 208-209**
- Content Manager role (SSRS security), 381**
- Corner area (Tablix data regions), 220**
- cost evaluations, SSRS deployments, 81**
- CPU, SSRS deployment requirements, 91**
- CRI (custom report items), SSRS 2008 enhancements, 76**
- cubes (Analysis Services)**
 - Cube Wizard, 305
 - OLAP, developing via
 - cube creation, 302
 - cube verification, 311
 - Customer dimension design, 308-309
 - data queries, 316-319
 - data source creation, 302
 - DMM deployments, 314-315
 - graphical KPI, 322
 - KPI additions to cubes, 311-312
 - KPI controls, 321-322
 - KPI leveraging report example, 320
 - mining structure creation, 313-314
 - Time dimension design, 306, 310
- custom assemblies**
 - calling, 444-445, 457
 - classes, initializing, 446-448

- compiling, 444
- creating, 441-443
- debugging, 460-463
- Execute permission, 457
- security
 - Assert permission, 458-459
 - Execute permission, 458
 - setting permissions, 455-456
- strongly-named assemblies, 450
- testing, 443
- updating, 449

custom extensions, 31

- frequently used interfaces table, 500-502
- Microsoft.ReportingServices.DataProcessing namespace, 503
- Microsoft.ReportingServices.Interfaces namespace, 503
- Microsoft.ReportingServices.ReportRendering namespace, 503

custom report items, 516-517**custom roles, 386-388****Customer dimension (cubes), 308-309****customizing SSRS, RDCE limits on, 509****D****dashboards, 9****data analysis, two-dimensional data, 300-301****data marts, 296****data pane (Report Builder 2.0), 350****data processing extensions, 499****Data Region Wizard (Report Builder 2.0), 354****data regions, 150, 208**

- Chart data regions, 235
 - adding new data groups, 253
 - best practices for design, 242
 - Chart areas, 240-241

- Chart Category Groups, 240
- chart data value, 236-238
- chart series, 239
- displaying Group Properties dialog, 253
- practical uses for, 243-245
- RDL, 241-242

- Gauge data regions, 246-248
 - adding new data groups, 252
 - displaying Group Properties dialog, 253
- sorting, 254-255

- Tablix data regions, 219-228
 - adding new data groups, 252
 - displaying Group Properties dialog, 253
 - formatting, 230-232

data sets

- components of, 179
- managing via Report Builder 2.0, 352-355
- querying data, properties for, 188
- Visual Studio, creating in, 126-130

data source expressions, 180-182**Data Source Properties dialog (Solution Explorer), 126****data sources**

- components of, 179
- configuring, report deployments via Report Manager, 364-366
- creating, 195, 332
- credentials, 182
- data source expressions, 180-182
- data source views, creating, 302, 333-334
- managing via Report Builder 2.0, 352-355
- overwriting, deploying reports via Visual Studio, 362
- report-specific data sources, 180-181
- shared data sources, 180-181
 - changing to, 367
 - creating in Visual Studio, 123
 - security, 379

- sorting, 254-255
 - SSRS/WSS integrated systems, managing in, 576-577
- Data tab (Report Designer), 37**
- Data type property (parameters), 200**
- data, accessing**
 - connection strings, 183-186
 - data sources
 - creating, 195
 - credentials, 182
 - data source expressions, 180-182
 - report-specific data sources, 180-181
 - shared data sources, 180-181
 - data-processing extensions, 180
 - queries
 - command type, 189-190
 - data properties, 188
 - Fields collection, 193
 - filters, 195
 - Generic Query Designer, 187
 - Graphical Query Designer, 186-187
 - Parameters collection, 190
 - XML, 192
- data-driven subscriptions, SSRS Standard Edition, 96**
- data-processing extensions, 31**
- data-visualization controls, 2008 SSRS enhancements, 71-72**
- databases**
 - DMBS, 328
 - DW, 295-296
 - managing, SSRS/WSS integration, 530-531
 - OLTP databases, 295
 - RDBMS, 328
 - Report Server database, 33-34, 50
 - ReportServerTempDB, 33-34
 - RSExecutionLog database, creating, 396
 - sample databases, installing via Report Server Project Wizard, 111
 - subscription databases, creating, 407
 - transaction-processing, OLTP databases, 295
- Dataset Properties dialog (Solution Explorer), 127**
- DataSets collection (expressions), 153, 158-159**
- DataSets element (RDL), 144-148**
- DataSources collection (expressions), 153, 159**
- DataType element (ReportParameters element), 143**
- date/time format strings**
 - custom date/time format strings, 273-276
 - standard date/time format strings, 272-273
- DBMS (database management systems), 328**
- DDS (data-driven subscriptions), 402**
 - creating, 406-408
 - SSRS/WSS integrated systems, managing, 583-584
- debugging**
 - custom assemblies, 460-463
 - embedded code, 437-438
 - extensions, 507
- decision trees, DM, 315**
- declarative programming, RDL and, 138**
- DefaultValue element (ReportParameters element), 143**
- Delete Group and Related Rows and Columns option (Tablix data regions), 227**
- Delete Group Only option (Tablix data regions), 227**
- deleting**
 - containers, 209
 - schedules, 392
 - snapshots from reports, 373
 - subscriptions, 410
 - symmetric keys, 423
- delivery extensions, 32, 499**
 - IDeliveryExtension interface, 513
 - IExtension interface, 511-512
 - user/SSRS interactions, 514-516

delivery stage (report development life cycle), 18-19

deploying

extensions, 504-507

integrated SSRS/WSS systems, 542

RDCE, 510-511

reports

Report Manager, 363-367

report models, 338-339

Visual Studio, 361-363

scale-out deployments, 424

SSRS, 56

deployment functionality, Report Designer, 12

deployment scenarios (SSRS), 79

CD/DVD-ROM requirements, 92

cost evaluations, 81

CPU requirements, 80, 91

deployable elements table, 80

disk space requirements, 91

hardware requirements, 91-92

high-availability deployments, 81-82

Internet deployments

anonymous report server access, 88

enabling Report Manager for Internet access, 90-91

programmatically deployments, 89-90

report server deployments with Windows authentication, 88

memory and, 80, 91

monitor requirements, 92

OS requirements, 94-95

performance and, 80, 84

pointing device (mouse) requirements, 92

reliability and, 81

report server initialization

activation process, 86

encryption, 86

uninitializing servers, 87

scale-out deployment model, 82

advantages/disadvantages of, 85

requirements for, 86

scale-up deployment model, 81

software requirements, 92-95

standard (single-server) deployment model, 82

availability and, 84

disk space requirements, 84

performance and, 84

requirements for, 85

System Configuration Checks, 92

Design pane (BIDS), 46

design surface (Report Builder 2.0), 348

Design tab (Design view), 134

Design view (BIDS)

Design tab, 134

Preview tab, 134-135

Properties window, 131-133

Report Data window, 131-132

Sorting tab, 134

Toolbox, 131

detail data and associated group (Tablix data regions), 224

Developer Edition (SSRS), 21, 97

dimension, defining, 300

disabling My Reports feature, 374

disk space, SSRS deployment requirements, 84, 91

distributed servers, SSRS/WSS integration, 532

DM (data mining), 296

cubes

DMM deployments, 314-315

mining structure creation, 313-314

querying data, 316-319

Data Mining Wizard, 314-315

decision trees, 315

DMM

- creating, 298-299
- cube creation process, 314-315
- querying DMM, 299
- training DMM, 299
- truth tables, 299

- Mining Accuracy Chart tab, 315
- Mining Model Prediction tab, 315
- reports, creating, 323, 326

DMX (Data Mining Expressions) Query Designer (Report Designer), 11

DMX (Data Mining Extensions), 300

documents

- document maps, 287-288
- Documents web part (WSS), 568
- managing, WSS, 587

domain controllers, troubleshooting in SSRS/WSS integration, 543

Drillthrough (Go to Report) action, 283, 286

.ds (data source) files, 329

.dsv (data source view) files, 329

Dudas Software, data-visualization controls, 71

DVD-ROM/CD, SSRS deployment requirements, 92

DW (data warehouses), 295

- attributes of, 296
- data marts, 296

dynamic rows/columns are associated with one or more groups (Tablix data regions), 226

dynamic SQL, parameters and, 202

E

editing

- configuration files, 454
- embedded code, 433
- RDL files, 142

email

- delivering, monitoring (administration), 418
- delivering reports via, 403
- Report Server settings, configuring, 50

embedded code

- benefits of, 434
- debugging, 437-438
- editing, 433
- functions, 435
- medians, calculating via, 435-436

encryption

- encryption keys, configuring, 51
- SSRS deployments, 86

end users, Microsoft's breakdown of

- analysts, 6
- information consumers, 7
- information explorers, 7

endpoints (web services), 29, 427

Enterprise Edition (SSRS), 21

enterprise reports

- dashboards, 9
- exception reports, 9
- scorecard reports, 9

entities

- report models, 330
- role models, grouping via folders, 331

error messages, HTTP 503, 27

Evaluation edition (SSRS), 97

EventProcessing extension, 500

exception reports, 9

Execute permission, custom assemblies, 457-458

execution accounts

- configuring, 51
- unattended accounts, monitoring (administration), 418

execution logs, 395-396, 411-412

Execution Status Codes.rdl reports, 398**Execution Summary.rdl reports, 398****execution timeouts (reports), 393****Express Edition (SSRS), 21****expressions, 331**

adding, 155, 157

collections, 153

DataSets collection, 158-159

DataSources collection, 159

Fields collection, 160-161, 193

Globals collection, 161

Parameters collection, 162, 190, 201

ReportItems collection, 163

User collection, 163

Variables collection, 154, 164

constants, 153

data source expressions, 180-182

defining, 151

functions

aggregate functions, 170, 173

Previous function, 173

RowNumber function, 174

RunningValue function, 174

security, 174

Visual Basic runtime functions, 154,
165-169

operators

arithmetic operators, 154

bit shift operators, 154

comparison operators, 154

concatenation operators, 154

logical/bitwise operators, 154

report item properties, changing, 175-176

report values, emphasizing, 176

syntax of, 152-154

extensibility, SSRS Standard Edition, 96**extensions**

compiling, 503

custom extensions, 31

frequently used interfaces table, 500-
502Microsoft.ReportingServices.
DataProcessing namespace, 503Microsoft.ReportingServices.Interfaces
namespace, 503Microsoft.ReportingServices.
ReportRendering namespace, 503

data-processing extensions, 31, 499

debugging, 507

delivery extensions, 32, 499

IDeliveryExtension interface, 513

IExtension interface, 511-512

user/SSRS interactions, 514-516

deploying, 504-507

EventProcessing extension, 500

lists of extensions, retrieving, 500

ModelGeneration extension, 500

query parameters, 509

RDCE, 508

deploying, 510-511

limits on customization, 509

limits on SSRS supported features, 509

rendering extensions, 32, 499

security extensions, 33, 500, 546

SemanticQuery extension, 500

SSRS support for, 23

F**fact (measure), defining, 300****Field element (DataSets element), 145****Fields collection (expressions), 153, 160-161,
193**

Fields element (DataSets element), 145
Fields tab (Dataset Properties dialog), 127
file shares, delivering reports to, 404-405
Filter web part (WSS), 568
filters, querying data, 195
Filters element (DataSets element), 145-147
Filters property (Tablix data regions), 231
Filters tab (Dataset Properties dialog), 127
FixedColumnHeaders property (Tablix data regions), 231
FixedRowHeaders property (Tablix data regions), 231
folders
 report models, 331
 security, 378
footers/headers versus report bodies, 248
formatting
 background control properties, 264-265
 border appearance control properties, 265-266
 date/time format strings
 custom date/time format strings, 273-276
 standard date/time format strings, 272-273
 numeric format strings, 267
 custom numeric format strings, 270-272
 standard numeric format strings, 268-270
 output text control properties, 265-267
 pagination, 277
 After property, 281
 Before property, 281
 Columns property, 280
 HideIfNoRows property, 282
 InteractiveHeight property, 278-279
 InteractiveWidth property, 278-279
 KeepTogether property, 281
 KeepWithGroup property, 281

 None property, 282
 PageBreak property, 279
 PageHeight property, 278
 PageWidth property, 278
 RepeatOnNewPage property, 281
 tables, alternating row colors, 276-277
 Tablix data regions, 230, 232
functions (expressions), 165
 aggregate functions, 170, 173, 258-259
 embedded functions, 435
 InScope function, 260-261
 Level function, 260-261
 Previous function, 173
 RowNumber function, 174
 RunningValue function, 174
 security, 174
 Visual Basic runtime functions, 154, 165-169

G

Gauge data regions, 246-248
 Group Properties dialog, displaying, 253
 new data groups, adding, 252
Generic Query Designer, 128, 187
Globals collection (expressions), 153, 161
graphical KPI, Analysis Services cubes, 322
Graphical Query Designer, 129-130, 186-187
grouping data, 251
 associated group (Tablix data regions) and, 225
 Group Properties dialog, 253-254
 new groups, creating, 252
 sorting data, 254-255
grouping pane (Report Builder 2.0), 350
GroupsBeforeRowHeader property, Tablix data regions, 232

H

hardware, SSRS deployments

- costs of, 81
- requirements, 91-92

headers/footers versus report bodies, 248

Height element (ReportItems element), 149

Hidden element (ReportParameters element), 143

hidden parameters, 198

Hidden property

- hiding/toggling items, 288
- parameters, 200

HidelifNoRows property, 282

hiding/toggling items, 288

high memory pressure, defining, 27

high-availability SSRS deployments, 81-82

histories (reports)

- Report Server settings, 371-372
- SSRS/WSS integrated systems, managing in, 580

HOLAP (Hybrid OLAP), 297

HTTP (Hypertext Transfer Protocol)

- HTTP 503 error messages, 27
- HTTP logs, 413

HTTPSYS, Report Server support, 25

Hyperlink (Go to URL) action, 283-285

I

IA64

- BIDS support, 95
- SSRS deployments, 92

IIS (Internet Information Services)

- Report Server authentication, 378
- SSRS dependency on in previous editions, 24-25

Import Access Reports feature (Report Designer), 11

independent report items, 208

- image report items, 211-213
- line report items, 211
- rectangle report items, 211
- textbox report items, 214-217

information workers, Microsoft's breakdown of

- analysts, 6
- information consumers, 7
- information explorers, 7

initializing report servers

- activation process, 86
- encryption, 86
- uninitializing servers, 87

InitialToggleState property (hiding/toggling items), 288-289

injection attacks, 202

InScope function, 260-261

Insert tab (Report Builder 2.0 Ribbons interface), 349

inside group row (or column) for a group (Tablix data regions), 225

installing

- Report Builder 2.0, 347-348
- SSRS, 99-102, 105, 109, 536
- WSS, SSRS/WSS integration, 536-537

instances, setting properties, 52

integration

- Integrated mode (WSS), SSRS configuration in, 537
- Integration Services, 109
- SSIS, 6

Model Builder, 12, 36

Report Builder 1.0, 12-13, 35-36, 46

Report Builder 2.0, 12-14, 36-37, 48-50

IntelliSense for Expression Editing feature (Report Designer), 11

interactive user sorting, 254-258

InteractiveHeight property, 278-279

InteractiveWidth property, 278-279

Internal property (parameters), 200

Internet, SSRS deployments

programmatically deployments, 89-90

Report Manager, enabling for Internet access, 90-91

report servers

anonymous report server access, 88

server deployments with Windows authentication, 88

InterpretSubtotalsAsDetails element (DataSets element), 145

ISAPI (Internet Server Application Programming Interface) filters, 25

item properties (reports), changing via expressions, 175-176

item-level roles (SSRS security), 380

Browser role, 381

Content Manager role, 381

My Reports role, 381

Publisher role, 381

Report Builder role, 381

System Administrator role, 382

System User role, 382

tasks assigned to, 381-382

J - K

jobs

monitoring (administration)

canceling running jobs, 415

job status frequency, 415

viewing running jobs, 414

processing

large reports, 394

user/system jobs, 394

system jobs, 414

user jobs, 414

KeepTogether property, 281

KeepWithGroup property, 281

Kerberos, SSRS

authentication, 33

WSS integration, 546, 554

key management (symmetric keys)

backups, 421

changing, 423

deleting, 423

restoring, 422

KPI (Key Performance Indicators), cubes

adding to, 311-312

graphical KPI, 322

KPI controls, 321-322

leveraging KPI report example, 320

L

Layout tab (Report Designer), 37

LayoutDirection property, Tablix data regions, 232

Left element (ReportItems element), 149

Level function, 260-261

licensing, SSRS, 21-22, 97

line report items, 211

linked reports, 370-371, 379

links (hyperlinks), Hyperlink (Go to URL) action, 283-285

log files, Report Server

execution logs, 411-412

HTTP logs, 413

trace logs, 412-413

logical/bitwise operators (expressions), 154

low memory pressure, defining, 27

M

management

management pages, SSRS/WSS integration, 561

managing stage (report development life cycle), 14, 17-18

SQL Server Management Studio, 51

- Object Explorer, 52

- Properties dialog, 52

- Register Servers window, 52

SSRS management, 17, 95

maps (document), 287-288

matrix/pivot table reports, 344

MDX (Multidimensional Expressions), 11, 300

measure (fact), defining, 300

medians, calculating via embedded code, 435-436

medium memory pressure, defining, 27

members, defining, 300

memory

MemorySafetyMargin memory configuration option, 27

MemorySafetyMargin memory threshold setting, 420

MemoryThreshold memory configuration option, 27

MemoryThreshold memory threshold setting, 420

monitoring (administration), 420

SSRS

- deployments, 80, 91

- management of, 26-28

- SSRS 2008 memory pressure, 65

- SSRS 2008 memory usage, 65

threshold settings, 420

Microsoft BI (Business Intelligence) platform, 6

Microsoft.ReportingServices.DataProcessing namespace, custom extensions, 503

Microsoft.ReportingServices.Interfaces namespace, custom extensions, 503

Microsoft.ReportingServices.ReportRendering namespace, custom extensions, 503

Mining Accuracy Chart tab (DM), 315

Mining Model Prediction tab (DM), 315

Model Builder, 12, 36

Model Designer, 328

- .ds files, 329

- .dsv files, 329

report models

- bindings, 330

- creating, 334-337

- creating data source views, 333-334

- creating data sources, 332

- creating model projects, 331

- entities, 330

- expressions, 331

- folders, 331

- modifying items in, 337-338

- perspectives, 331

- physical models, 330

- publishing, 338-339

- roles, 330

- semantic models, 329

- source fields, 330

SDML, 328-329

model projects, creating, 331

ModelGeneration extension, 500

modifying

- custom roles, 387-388

- report properties, 367

MOLAP (Multidimensional OLAP), 297-298

monitoring

- email delivery, 418

- jobs

- canceling running jobs, 415

- job status frequency, 415

- viewing running jobs, 414

- memory, 420

performance, 416
 cached reports, 417
 large reports, 417
 on-demand report processing, 417
 performance counters, 417
 query timeouts, 418
 report-execution timeouts, 418
 snapshots, 417

Report Server
 execution logs, 411-412
 HTTP logs, 413
 trace logs, 412-413
 unattended execution accounts, 418

monitors, SSRS deployment requirements, 92

MOSS (Microsoft Office SharePoint Server), 521

mouses (pointing devices), SSRS deployment requirements, 92

moving reports, 368

MSRS 2008 Web Service performance counter, 417

MSRS 2008 Windows Service performance counter, 417

multicolumn reports, 280

MultiValue element (ReportParameters element), 144

multivalue parameters, examples of, 203-205

My Reports feature
 enabling/disabling, 374
 folder structure, 373

My Reports role (SSRS security), 381

My Subscriptions feature (Report Manager), 409-410

N

Name element
 DataSets element, 145
 ReportItems element, 149
 ReportParameters element, 143

Name property (parameters), 199

naming reports in Visual Studio, 124

navigating reports
 Back to Parent Report button (Report Viewer), 287
 BookmarkLink (Go to Bookmark) action, 283-286
 document maps, 287-288
 Drillthrough (Go to Report) action, 283, 286
 hiding/toggling items, 288
 Hyperlink (Go to URL) action, 283-285
 practical uses of, 289-293

NET 2.0
 SSRS web service security, 491-492
 web services, accessing, 475

NET 3.0
 SSRS web service security, 492-494
 web services
 accessing, 476
 security, 492-494

NET Framework
 Configuration utility, 454
 SDK, 454

NET security, 450

New Project dialog (BIDS), 122

NLB clusters, 85

None property, 282

NoRowsMessage property (Tablix data regions), 232

Notification class, members of, 515-516

NTLM (NT LAN Manager), SSRS authentication and, 33

Nullable element (ReportParameters element), 143

numeric format strings
 custom numeric format strings, 270-272
 formatting, 267-272
 standard numeric format strings, 268-270

O

Object Explorer (SQL Server Management Studio), 52

ODC (Office Data Connection) files, SSRS/WSS integrated systems, 593

OLAP (Online Analytical Processing), 296

aggregated data, 297

Analysis Services cube development

cube creation, 302

cube verification, 311

Customer dimension design, 308-309

data queries, 316-319

data source creation, 302

DMM deployments, 314-315

graphical KPI, 322

KPI additions to cubes, 311-312

KPI controls, 321-322

KPI leveraging report example, 320

mining structure creation, 313-314

Time dimension design, 306, 310

DM, 296-299

HOLAP, 297

MOLAP, 297-298

ROLAP, 297

summarized data, 297

OLTP (online transaction processing) databases, 295

OmitBorderOnPageBreak property (Tablix data regions), 232

on-demand report processing, 417

operators (expressions)

arithmetic operators, 154

bit shift operators, 154

comparison operators, 154

concatenation operators, 154

logical/bitwise operators, 154

Options tab (Dataset Properties dialog), 127

OS (operating systems), SSRS deployment requirements, 94-95

output text control properties, formatting, 265-267

outside group row (or column) for a group (Tablix data regions), 226

overwriting data sources, deploying reports via Visual Studio, 362

P

PageBreak property, 279

PageBreakAtEnd element (ReportItems element), 149

PageBreakAtStart element (ReportItems element), 149

PageHeight property, 278

PageWidth property, 278

pagination, 277

After property, 281

Before property, 281

Columns property, 280

HideIfNoRows property, 282

InteractiveHeight property, 278-279

InteractiveWidth property, 278-279

KeepTogether property, 281

KeepWithGroup property, 281

None property, 282

PageBreak property, 279

PageHeight property, 278

PageWidth property, 278

RepeatOnNewPage property, 281

sizing pages, 278-279

parameters (report)

Data type property, 200

data-driven parameters, 200

defining, 197

dependencies of, 202

- dynamic SQL, 202
 - expressions and, 201
 - hidden parameters, 198
 - Hidden property, 200
 - Internal property, 200
 - multivalue parameters, 203-205
 - Name property, 199
 - presentation options, 198
 - Prompt property, 200
 - query parameters, 200
 - setting up, 198
 - Parameters collection (expressions), 153, 162, 190, 201**
 - Parameters tab (Dataset Properties dialog), 127**
 - ParameterValue class**
 - common public properties table, 490-491
 - report parameters, 489-491
 - parent/child group to create group hierarchy (Tablix data regions), 225**
 - pausing schedules, 392**
 - performance**
 - monitoring, 416
 - cached reports, 417
 - large reports, 417
 - objects, summary of, 39-41
 - on-demand report processing, 417
 - performance counters, 417
 - query timeouts, 418
 - report-execution timeouts, 418
 - snapshots, 417
 - SSRS
 - SSRS 2008, changes in, 55
 - deploying, 80, 84
 - peripherals, SSRS deployment requirements, 92**
 - permissions**
 - custom assemblies, setting in, 455-456
 - SSRS/WSS integrated systems, managing in, 576
 - perspectives (report models), 331**
 - physical models (report models), 330**
 - pivot table/matrix reports, 344**
 - pointing devices (mouses), SSRS deployment requirements, 92**
 - presentation elements. See report items**
 - Preview tab**
 - Design view, 134-135
 - Report Designer, 12, 37
 - previewing reports, 263**
 - Previous function (expressions), 173**
 - processing reports, managing SSRS/WSS integrated systems, 579-580**
 - processors**
 - scheduling and delivery processor, 34-35
 - SSRS support for, 23
 - programmability, SSRS, 95**
 - programmatic SSRS deployments, 89-90**
 - Prompt element (ReportParameters element), 144**
 - Prompt property (parameters), 200**
 - Properties dialog**
 - Report Builder 2.0, 350
 - SQL Server Management Studio, 52
 - Properties window**
 - Design view, 131-133
 - BIDS, 45
 - Publisher role (SSRS security), 381**
 - publishing reports**
 - Report Designer, 12, 344
 - report models, 338-339
- ## Q
- queries**
 - Analysis Services cubes, OLAP, 316-319
 - command type, 189-190

- data set properties, 188
- DMM querying, 299
- Fields collection, 193
- filters, 195
- parameters, 200, 509
- Parameters collection, 190
- Query Designers
 - DMX, 11
 - Generic Query Designer, 128
 - Graphical Query Designer, 129-130
 - MDX, 11
 - Relational Query Designer, 11
 - Visual Query Designer, 128
- Query element (DataSets element), 145-147
- timeouts, 393, 418
- XML, 192

R

- RDBMS (relational database management systems), 328**
- RDCE (Report Definition Customization Extension), 508**
 - customization, limits on, 509
 - deploying, 510-511
 - SSR
 - 2008 enhancements, 76
 - limits on supported features, 509
- RDL (Report Definition Language), 13, 137, 339. See also XML (Extensible Markup Language)**
 - data regions, 150
 - DataSets element, 144-148
 - declarative programming, 138
 - editing in, 142
 - Report element, 140
 - report processing, 392
 - ReportItems element, 148-149
 - ReportParameters element, 140-144
 - SSRS 2008 enhancements, 73
 - Visual Studio and, 121
- .rds files, Visual Studio and, 121**
- rectangle report items, 211**
- Register Servers window (SQL Server Management Studio), 52**
- Relational Query Designer (Report Designer), 11**
- reliability, SSRS deployments, 81**
- removing servers from scale-out deployments, 424**
- rendering**
 - extensions, 32, 499
 - reports
 - report-execution snapshots, 88
 - ROM, 67, 76
 - URL access, 465-467
- RepeatColumnHeaders property (Tablix data regions), 232**
- RepeatOnNewPage property, 281**
- RepeatRowHeaders property (Tablix data regions), 232**
- report bodies versus page headers/footers, 248**
- Report Builder**
 - Report Builder 1.0, 7, 12, 35-36, 46, 119
 - launching, 121
 - overview of, 120
 - RDL, 13
 - Report Designer versus, 120
 - Report Builder 2.0, 7, 12-14, 36-37, 48, 50, 69, 119, 121, 328, 345
 - data pane, 350
 - Data Region Wizard, 354
 - design surface, 348
 - features of, 346-347
 - grouping pane, 350
 - installing, 347-348

- launching, 121
- managing, 352-355
- overview of, 120
- Properties dialog, 350
- Report Designer versus, 120
- report layouts, 354, 356, 359
- Ribbons interface, 349-350
- Report Builder role (SSRS security), 381
- SSRS/WSS integration, 563-564, 590-591, 594-596
- Report class, members of, 516**
- Report Control, URL access, 468-471**
- Report Data window**
 - Design view, 131-132
 - Report Designer, 46
- Report Designer, 7, 46, 119**
 - click-through reports, 343
 - Data tab, 37
 - deployment functionality, 12
 - DMX Query Designer, 11
 - features of, 339-340
 - Import Access Reports feature, 11
 - IntelliSense for Expression Editing feature, 11
 - Layout tab, 37
 - matrix/pivot table reports, 344
 - MDX Query Designer, 11
 - Preview tab, 12, 37
 - publishing reports, 12, 344
 - RDL, 13, 339
 - Relational Query Designer, 11
 - Report Builder versus, 120
 - Report Data window, 46
 - Report menu, 46
 - report models, creating, 339
 - Report Parameter Properties dialog, 142
 - Report Wizard, 11, 37
 - saving reports, 344
- SSRS
 - 2008 enhancements, 69
 - SSRS/WSS integration, 563-564
 - starting, 339
 - tabular reports, 342-343
 - Toolbox window, 210
- Report element (RDL), 140**
- report engine, architectural changes, 63-65**
- Report Explorer web part, 572**
- report histories, managing in SSRS/WSS integrated systems, 580**
- report items, 207**
 - containers, 208-209
 - custom report items, 516-517
 - data regions, 208
 - Chart data regions, 235-245, 253
 - Gauge data regions, 246-248, 252-253
 - Tablix data regions, 219-232, 252-253
 - independent report items, 208
 - image report items, 211-213
 - line report items, 211
 - rectangle report items, 211
 - textbox report items, 214-217
 - practical uses for, 232-235
 - report bodies versus page headers/footers, 248
- Report Manager, 15, 26, 38, 43**
 - built-in role assignments, 383-384
 - DDS, creating, 408
 - default URL, 15
 - delivering reports, file share deliveries, 405
 - deploying reports
 - changing data sources, 367
 - data source configuration, 364-366
 - new folder creation, 363
 - report uploads, 366-367
 - Internet access, enabling, SSRS Internet deployments, 90-91

- My Subscriptions feature, 409-410
- Report Manager URL, configuring, 50
- snapshots
 - adding to reports, 372
 - deleting from reports, 373
- subscriptions, creating, 404
- updates, 62
- Report menu (Report Designer), 46**
- Report Model Builder, 12, 36**
- Report Model Designer, SSRS/WSS integration, 563-564**
- Report Model projects, 44, 121**
- report models**
 - bindings, 330
 - creating, 337
 - Model Designer, 334-336
 - Report Designer, 339
 - .ds files, 329
 - .dsv files, 329
 - entities, 330
 - expressions, 331
 - folders, 331
 - modifying items in, 337-338
 - perspectives, 331
 - physical models, 330
 - publishing, 338-339
 - roles, 330
 - SDML, 328-329
 - semantic models, 329
 - source fields, 330
- Report Parameter Properties dialog (Report Designer), 142**
- report processor, 29-30**
- Report Server, 44**
 - adding users to, 378
 - authentication, 378
 - email settings, configuring, 50
 - HTTPS support, 25
 - initializing
 - activation process, 86
 - encryption, 86
 - initializing servers, 87
 - integrated mode, 529-530
 - monitoring (administration)
 - execution logs, 411-412
 - HTTP logs, 413
 - trace logs, 412-413
 - processing reports (jobs), 394
 - rendering extensions, 32
 - report history settings, 371-372
 - Report Server Configuration Tool, SSRS/WSS integration, 558
 - Report Server database, 33-34, 50
 - Report Server Project Wizard
 - creating reports, 112-116
 - installing sample databases, 111
 - Report Server Service performance counter, 417
 - Report Server web service, 26, 29-30
 - resources, security, 379
 - schedules, 389
 - creating, 391
 - deleting, 392
 - pausing, 392
 - report-specific schedules, 390
 - shared schedules, 390-392
 - security, 378-379
 - SSRS
 - Internet deployments, 88
 - SSRS/WSS integration, 528, 558
 - trace logs, 412
 - URL access, parameters table, 468
 - Visual Studio and, 121
- Report Summary.rdl reports, 398**
- Report Viewer, 7, 19**
 - Back to Parent Report button, 287

- Report Viewer web part, 566-567, 572
 - connecting with SharePoint web parts, 568
 - parameters table, 571
 - URL access, web part control parameters, 472
- Report Wizard, 11, 37**
- ReportExecution2005 web service, 479**
- ReportExecution2005.asmx web service, 482-484, 551**
- reporting controls, SSRS, 96**
- Reporting Services, 108**
 - BIDS
 - Report Model project, 44
 - Report Server project, 44
 - OLAP, Analysis Services cube queries, 316-319
 - Reporting Services Configuration Manager, 16, 50, 58
 - Reporting Services Configuration tool, 39
- reporting wizard, SSRS, 96**
- ReportItems collection (expressions), 153, 163**
- ReportItems element (RDL), 148-149**
- ReportParameter class, 489-490**
- ReportParameters element (RDL), 140-144**
- reports**
 - authoring stage (report development life cycle), 10-14
 - cached reports, 417
 - click-through reports, 343
 - columns, adding to, 130
 - dashboards, 9
 - delivering
 - delivery stage (report development life cycle), 18-19
 - email, 403
 - file shares, 404-405
 - options for, 402
 - deploying
 - Report Manager, 363-367
 - Visual Studio, 361-363
 - DM reports, creating, 323, 326
 - enterprise reports, 9
 - exception reports, 9
 - execution logs, 395-396
 - Execution Status Codes.rdl reports, 398
 - Execution Summary.rdl reports, 398
 - histories, Report Server settings, 371-372
 - item properties, changing via expressions, 175-176
 - large reports, 417
 - layouts, Report Builder 2.0, 354-356, 359
 - linked reports, 370-371
 - managing stage (report development life cycle), 14, 17-18
 - matrix/pivot table reports, 344
 - modifying properties, 367
 - moving, 368
 - on-demand processing, 417
 - parameters
 - Data type property, 200
 - data-driven parameters, 200
 - defining, 197
 - dependencies of, 202
 - dynamic SQL, 202
 - expressions and, 201
 - hidden parameters, 198
 - Hidden property, 200
 - Internal property, 200
 - multivalue parameters, 203-205
 - Name property, 199
 - presentation options, 198
 - Prompt property, 200
 - Report Parameter Properties dialog (Report Designer), 142

- query parameters, 200
 - setting up, 198
- previewing, 263
- processing, 29-30
 - data processing, 392
 - execution timeouts, 393
 - large reports, 394
 - layout processing, 392
 - query timeouts, 393
 - RDL, 392
 - rendering, 393
 - retrieving report definitions, 392
 - SSRS/WSS integrated systems, 579-580
 - user/system jobs, 394
- Report Designer
 - publishing from, 344
 - saving in, 344
- Report Server Project Wizard, creating via, 112-116
- Report Summary.rdl reports, 398
- report-authoring support table (SSRS upgrades), 76-77
- report-execution snapshots, rendering reports via, 88
- report-execution timeouts, 418
- report-specific data sources, 180-181
- report-specific schedules, 390
- reporting controls, SSRS, 96
- RSExecutionLog database, creating, 396
- sample reports, 398
- scorecard reports, 9
- security, 379
- snapshots, 417
 - creating, 372
 - deleting, 373
 - rendering reports via report-execution snapshots, 88
- subscriptions
 - components of, 401-402
 - creating, 404
 - DDS, 402, 406-408
 - deleting, 410
 - managing, 409-410
 - processing, 403
 - requirements for, 401-402
 - uses for, 402
- tables, creating, 132, 135
- tabular reports, 342-343
- uploading report deployments via Report Manager, 366-367
- values, emphasizing via expressions, 176
- Visual Studio, creating via, 122
 - column additions to reports, 130
 - data set creation, 126-130
 - Design view, 131-135
 - naming reports, 124
 - previewing reports, 135
 - shared data source creation, 123
 - table creation, 132, 135
 - XML, viewing, 139
- ReportServerTempDB, 33-34**
- ReportService2005 web service, 479**
- ReportService2005.asmx web service, 486-488**
- ReportService2006 web service, 479-480**
- ReportService2006.asmx web service, 551**
- ReportServiceAuthentication web service, 479**
- ReportServiceAuthentication.asmx web service, 551**
- ReportViewer control**
 - SSRS 2008 enhancements, 69
 - SSRS deployments, 90
- restoring symmetric keys, 422**
- Ribbons interface (Report Builder 2.0), 349-350**
- rich-text, SSRS 2008 support, 73**

ROLAP (Relational OLAP), 297

role assignments (SSRS security), 379-380

- built-in roles
 - assigning, 383-384
 - Browser role, 381
 - Content Manager role, 381
 - My Reports role, 381
 - Publisher role, 381
 - Report Builder role, 381
 - System Administrator role, 382
 - System User role, 382
- custom roles, 386
 - creating, 387-388
 - modifying, 387-388

roles (report models), 330

ROM (Rendering Object Model), 67, 76

Row Groups area (Tablix data regions), 220

RowNumber function (expressions), 174

rows (tables), alternating color in, 276-277

RS scripting utility, 488-489

- code examples, 430-432
- command line examples, 430
- command-line arguments list, 428-429
- RSS files, 427-428
- web service endpoints, 427

RS SharePoint add-in, SSRS/WSS integration, 528-529

rs.exe command-line utility, 30

rsactivate.exe command-line utility, 30

rsconfig.exe command-line utility, 30

RSExecutionLog database, creating, 396

rskeymgmt.exe command-line utility, 30

RSPrintClient control, 39

RSS files, 427-428

Run tab (Report Builder 2.0 Ribbons interface), 350

RunningValue function (expressions), 174

S

sample databases, installing (Report Server Project Wizard), 111

saving reports (Report Designer), 344

scalability, SSRS

- report-processing enhancements, 65
- scale-out deployments, 82, 424
 - advantages/disadvantages of, 85
 - configuring, 51
 - requirements for, 86
 - SSRS/WSS integration, 533
 - SSRS/WSS system deployments, 542
- scale-up SSRS deployment model, 81
- SSRS 2008, changes in, 55
- SSRS Standard Edition, 96

schedules

- creating, 390-391
- deleting, 392
- managing, 389-392
- pausing, 392
- report-specific schedules, 390
- shared schedules, 390-392, 580

scheduling and delivery processor, 34-35

Scheduling web service, 26

Scope parameter (aggregate functions), 258-259

scorecard reports, 9

scripting

- authentication, 428
- RS utility
 - code examples, 430-432
 - command line examples, 430
 - command-line arguments list, 428-429
 - RSS files, 427-428
 - web service endpoints, 427
- variables, 428

SDK (Software Development Kit), 454

SDML (Semantic Definition Model Language), 328-329

security

authentication, SSRS Internet deployments, 88

custom assemblies

 Assert permission, 458-459

 Execute permission, 458

custom extensions, SSRS/WSS integration, 546

encryption keys, configuring, 51

folders, 378

functions (expressions), 174

linked reports, 379

models, 379

NET security, 450

Report Server

 adding users, 378

 authentication, 378

 resources, 379

reports, 379

security extensions, 33, 500

shared data sources, 379

SSRS, 95, 377

 built-in roles, 381-384

 custom roles, 386-388

 encryption, 86

 folders, 378

 models, 379

 programmatic deployments, 89-90

 reports, 379

 resources (Report Server), 379

 role assignments, 379-380

 shared data sources, 379

 SSRS web services, 491-495

 tasks, 379-380

 users, 380

 Windows authentication, 88

SSRS/WSS integration

 authentication, 546-548, 554

 authorization, 546, 549-551

 custom security extensions, 546

 Kerberos, 546, 554

 managing, 531-532

 Windows integrated security, 547-548

semantic models (report models), 329

SemanticQuery extension, 500

servers, adding to/removing from scale-out deployments, 424

Services accounts, configuring, 50

Shared Components, 109

shared data sources, 180-181

 changing to, 367

 security, 379

 Shared Data Source dialog (Solution Explorer), 123

 Visual Studio, creating in, 123

shared schedules, 390-392, 580

Sharepoint Services (WSS)

 document management, 587

 Documents web part, 568

 Filter web part, 568

 MOSS, 521

 permissions table, 550-551

 reports, viewing

 integrated SSRS/WSS systems, 565

 Report Explorer web part, 572

 Report Viewer web part, 566-568, 571-572

SSRS integration, 74-75, 519-520, 527

 ad hoc reports, 590-596

 administration pages, 561

 authentication, 546-548, 554

 authorization, 546, 549-551

 configuring SSRS integration via WSS Central Administration, 539-540, 552-553

- custom security extensions, 546
- database management, 530-531
- deployment architectures, 532-533
- deployment mode options, 522-523
- deployment prerequisites, 532
- integrated mode, 521-524
- Kerberos, 546, 554
- management pages, 561
- managing data sources, 576-577
- managing parameters, 578
- managing permissions, 576
- managing properties, 574
- managing report histories, 580
- managing report processing, 579-580
- managing reports, 573, 576-580, 583-584
- managing shared schedules, 580
- managing subscriptions, 582-584
- native mode, 521
- ODC files, 593
- programmability, 551
- Report Builder, 563-564, 590-591, 594-596
- report data sources, 593
- Report Designer, 563-564
- Report Model Designer, 563-564
- report models, 594
- Report Server Configuration Tool, 558
- Report Server integrated mode, 529-530
- RS SharePoint add-in, 528-529
- sample reports, 524
- scaling-out deployments, 542
- security management, 531-532
- SharePoint Object Model, 528
- SSMS, 560-561
- SSRS add-in installation, 538
- SSRS configuration in WSS Integrated mode, 537
- SSRS installation, 536
- SSRS updates, 542
- troubleshooting, 543
- unsupported features, 523-524
- URL access parameters, 569-571
- viewing reports, 565-572
- Windows integrated security, 547-548
- WSS installation, 536-537
- single machine deployments (SSRS/WSS integration), 532**
- single-server (standard) SSRS deployment model, 82**
 - availability and, 84
 - disk space requirements, 84
 - performance and, 84
 - requirements for, 85
- sizing pages, 278-279**
- .smdl files, Visual Studio and, 121**
- snapshots, 417**
 - creating, 372
 - deleting, 373
 - report-execution snapshots, rendering reports via, 88
 - SSRS Internet deployments, 88
- SOAP (Simple Object Access Protocol), endpoint namespaces, 75**
- software, SSRS deployment requirements, 92-95**
- Solution Explorer (BIDS), 45**
 - Add New Item dialog, 124
 - cubes
 - creating, 302, 306-310
 - DMM deployments, 314-315
 - KPI additions to cubes, 311-312
 - mining structure creation, 313-314
 - verifying, 311
 - Data Source Properties dialog, 126
 - Data Source view, creating, 302
 - Dataset Properties dialog, 127

DM reports, creating, 323, 326

Share Data Source dialog, 123

solutions, defining, 121

SortExpressions property (Tablix data regions), 232

sorting

data regions, 254-255

data sources, 254-255

interactive user sorting, 254-258

Sorting tab (Design view), 134

source fields (report models), 330

SQL

dynamic SQL, parameters and, 202

injection attacks, 202

SQL Server

2008 Setup, 99-102, 105, 108-109

Microsoft BI platform, 6

SQL Server Agent, 35

SQL Server Management Studio. See SSMS (SQL Server Management Studio)

SQL Server Reporting Services. See SSRS (SQL Server Reporting Services)

SSAS (SQL Server Analysis Services), Microsoft BI platform, 6

SSIS (SQL Server Integration Services)

Microsoft BI platform, 6

Model Builder, 12, 36

Report Builder 1.0, 12-13, 35-36, 46

Report Builder 2.0, 12-14, 36-37, 48-50

SSL (Secure Sockets Layer), SSRS web service security, 495

SSMS (SQL Server Management Studio), 16, 38, 51

Object Explorer, 52

Properties dialog, 52

Register Servers window, 52

schedules, creating, 390

SSRS/WSS integration, 560-561

subscription databases, creating, 407

updates, 58-60

SSRS (SQL Server Reporting Services), 6

administration

key management, 421-423

monitoring email delivery, 418

monitoring jobs, 414-415

monitoring memory, 420

monitoring performance, 416-418

monitoring Report Server, 411-413

scale-out deployments, 424

unattended execution accounts, 418

API, SSRS 2008 enhancements, 75

architecture changes, 56-58

BIDS

Design pane, 46

Properties windows, 45

Reporting Services, 44

Solution Explorer, 45

Toolbox, 45

Chart control, 2008 SSRS enhancements, 71-72

configuring

configuration files, 452-454

SSRS/WSS integration, 537

CRI, 76

custom report items, 516-517

data-visualization controls, 2008 SSRS enhancements, 71-72

deploying, 56, 79

CD/DVD-ROM requirements, 92

cost evaluations, 81

CPU requirements, 80, 91

deployable elements table, 80

disk space requirements, 91

hardware requirements, 91-92

high-availability deployments, 81-82

- Internet deployments, 88-91
- memory and, 80
- memory requirements, 91
- monitor requirements, 92
- OS requirements, 94-95
- performance and, 80, 84
- pointing device (mouse) requirements, 92
- reliability and, 81
- report server initialization, 86-87
- scale-out deployment model, 82, 85-86
- scale-up deployment model, 81
- software requirements, 92-95
- standard (single-server) deployment model, 82-85
- System Configuration Checks, 92
- design goals, 56
- Developer Edition, 21, 97
- edition features table, 96
- Enterprise Edition, 21
- Evaluation edition, 97
- Express Edition, 21
- extensions
 - compiling, 503
 - custom extensions, 31, 500-503
 - data processing extensions, 499
 - data-processing extensions, 31
 - debugging, 507
 - delivery extensions, 32, 499, 511-516
 - deploying, 504-505, 507
 - EventProcessing extension, 500
 - ModelGeneration extension, 500
 - query parameters, 509
 - RDCE, 508-511
 - render extensions, 499
 - rendering extensions, 32
 - retrieving lists of extensions, 500
 - security extensions, 33, 500
 - SemanticQuery extension, 500
 - SSRS support for, 23
- feature overview, 8
- IIS, SSRS dependency on in previous editions, 24-25
- installing, 99-102, 105, 109, 536
- instances, setting properties of, 52
- ISAPI filters, 25
- licensing, 21-22, 97
- manageability, 95
- management features, 17
- memory management, 26
 - configuration options, 27-28
 - HTTP 503 error messages, 27
 - memory pressure, 27, 65
 - memory usage, 65
- new features of, 55
- performance
 - changes to, 55
 - performance monitoring objects, 39-41
- processors
 - scheduling and delivery processor, 34-35
 - SSRS support for, 23
- programmability, 95
- RDCE, 76
- RDL, 2008 SSRS enhancements, 73
- Report Builder 1.0, 7, 46
- Report Builder 2.0, 7, 48-50, 69
- Report Designer, 7, 46
 - 2008 SSRS enhancements, 69
 - Data tab, 37
 - Layout tab, 37
 - Preview tab, 37
 - Report Data window, 46
 - Report menu, 46
 - Report Wizard, 37
- report development life cycle
 - authoring stage, 10-14

- delivery stage, 18-19
 - managing stage, 14, 17-18
- report engine, architectural changes, 63, 65
- Report Manager, 38, 43, 62
- Report Server database, 33-34
- Report Viewer, 7, 19
- report-authoring support table, 76-77
- reporting controls, 96
- Reporting Services Configuration Manager, 50, 58
- Reporting Services Configuration tool, 39
- reporting wizard, 96
- ReportServerTempDB, 33-34
- ReportViewer control, 2008 SSRS enhancements, 69
- rich-text support, 73
- ROM, 67, 76
- rs.exe command-line utility, 30
- rsconfig.exe command-line utility, 30
- rskeymgmt.exe command-line utility, 30
- RSPrintClient control, 39
- scalability
 - changes to, 55
 - report-processing enhancements, 65
- scripting, RS scripting utility, 488-489
- security, 95, 377
 - built-in roles, 381-384
 - custom roles, 386-388
 - folders, 378
 - models, 379
 - reports, 379
 - resources (Report Server), 379
 - role assignments, 379-380
 - shared data sources, 379
 - tasks, 379-380
 - users, 380
- SharePoint integration, 74-75
- SOAP endpoint namespaces, 75
- SSMS, 38, 51
 - administrator updates, 58-60
 - Object Explorer, 52
 - Properties dialog, 52
 - Register Servers window, 52
- Standard Edition, 21, 96
- Teradata, 74
- updates, WSS integration, 542
- upgrades, report-authoring support table, 76-77
- web services, 496-497
 - accessing, 475-476
 - adding references to, 477, 480-486
 - endpoints, 29
 - NET 2.0 security, 491-492
 - NET 3.0 security, 492-494
 - report parameters, 489-491
 - ReportExecution2005 web service, 479
 - ReportExecution2005.asmx, 482-484
 - ReportService2005 web service, 479
 - ReportService2005.asmx, 486-488
 - ReportService2006 web service, 479-480
 - ReportServiceAuthentication web service, 479
 - RS scripting utility, 488-489
 - SSL security, 495
 - WSDL, 478
- Windows service
 - Report Manager, 26
 - Report Server web service, 26, 29-30
 - Scheduling web service, 26
- WMI
 - namespaces, 75
 - WMI Provider, 39
- Workgroup Edition, 21
- WSS integration, 519-520, 527
 - ad hoc reports, 590-596

- administration pages, 561
- authentication, 546-548, 554
- authorization, 546, 549-551
- configuring SSRS integration via WSS
 - Central Administration, 539-540, 552-553
- custom security extensions, 546
- database management, 530-531
- deployment architectures, 532-533
- deployment mode options, 522-523
- deployment prerequisites, 532
- integrated mode, 521-524
- Kerberos, 546, 554
- management pages, 561
- managing data sources, 576-577
- managing parameters, 578
- managing permissions, 576
- managing properties, 574
- managing report histories, 580
- managing report processing, 579-580
- managing reports, 573, 576-580, 583-584
- managing shared schedules, 580
- managing subscriptions, 582-584
- native mode, 521
- ODC files, 593
- programmability, 551
- Report Builder, 563-564, 590-591, 594-596
- report data sources, 593
- Report Designer, 563-564
- Report Model Designer, 563-564
- report models, 594
- Report Server, 528
- Report Server Configuration Tool, 558
- Report Server integrated mode, 529-530
- RS SharePoint add-in, 528-529
- sample reports, 524

- scaling-out deployments, 542
- security management, 531-532
- SharePoint Object Model, 528
- SSMS, 560-561
- SSRS add-in installation, 538
- SSRS configuration in WSS Integrated mode, 537
- SSRS installation, 536
- SSRS updates, 542
- troubleshooting, 543
- unsupported features, 523-524
- URL access parameters, 569-571
- viewing reports, 565-572
- Windows integrated security, 547-548
- WSS installation, 536-537
- SSRS2K5 (SQL Server Reporting Services 2005), IIS dependency, 24-25**
- static group (Tablix data regions), 225**
- static rows/columns are not associated with any groups and SSRS renders static row/column once (Tablix data regions), 226**
- Status column (My Subscriptions feature), 409-410**
- strongly-named custom assemblies, 450**
- Style element (ReportItems element), 149**
- subscriptions**
 - components of, 401-402
 - creating, 404
 - data-driven subscriptions, SSRS Standard Edition, 96
 - databases, creating, 407
 - DDS, 402
 - creating, 406-408
 - SSRS/WSS integrated systems, 583-584
 - deleting, 410
 - managing, My Subscriptions feature (Report Manager), 409-410
 - processing, 403
 - requirements for, 401-402

SSRS/WSS integrated systems, managing, 582-584

uses for, 402

summarized data, OLAP, 297

symmetric keys

backups, 421

changing, 423

deleting, 423

encryption, SSRS deployments, 86

restoring, 422

System Administrator role (SSRS security), 382

System Configuration Check, SSRS deployments, 92

system jobs, 394, 414

System User role (SSRS security), 382

system-level roles, tasks assigned to, 382-383

system-level tasks, 380

T

tables

columns, adding, 132, 135

formatting, alternating row colors, 276-277

reports, creating in, 132, 135

Tablix data regions, 55, 70, 219-228

formatting, 230-232

Group Properties dialog, displaying, 253

new data groups, adding, 252

tabular reports, 342-343

tasks

item-level role assignments, 381-382

item-level tasks, 380

SSRS security, 379-380

system-level role assignments, 382-383

system-level tasks, 380

Teradata, 74

testing custom assemblies, 443

textbox report items, 214-217

Time dimension (cubes), 306, 310

time/date format strings

custom date/time format strings, 273-276

standard date/time format strings, 272-273

timeouts

query timeouts, 393, 418

report-execution timeouts, 393, 418

ToggleItem property (hiding/toggling items), 288

toggling/hiding items, 288

Toolbox

BIDS, 45

Design view, 131

Top element (ReportItems element), 149

total row (or column) for a group (Tablix data regions), 226

trace logs, 412-413

training DMM (data-mining models), 299

transaction-processing databases, OLTP databases, 295

trend plotting functionality, 441

troubleshooting

domain controllers, SSRS/WSS integrated systems, 543

integrated SSRS/WSS systems, 543

truth tables, 299

two-dimensional data, analyzing, 300-301

U

UDM (Unified Data Model), 296

unattended execution accounts, monitoring (administration), 418

uninitializing report servers, 87

updates

administrators, SSMS, 58-60

custom assemblies, 449

Report Manager, 62
 SSRS, SSRS/WSS integration, 542

upgrades

scale-up SSRS deployment model, 81
 SSRS, report-authoring support table, 76-77

uploading reports, report deployments via Report Manager, 366-367

URL (uniform resource locators)

access
 access parameters in integrated SSRS/WSS systems, 569-571
 integrating with applications, 472-474
 parameter prefixes, 467
 rendering, 465-467
 Report Control parameters, 468-471
 Report Server parameters, 468
 Report Viewer web part control parameters, 472
 syntax of, 467
 Report Manager URL, configuring, 50
 Web Service URL, configuring, 50

UsedInQuery element (ReportParameters element), 144

users

authorization, SSRS/WSS integration, 549-551
 interactive user sorting, 254, 256-258
 Report Server, adding to, 378
 SSRS security, 380
 User collection (expressions), 153, 163
 user jobs, 394, 414

V

ValidValues element (ReportParameters element), 144

variables

scripting, 428
 Variables collection (expressions), 153-154, 164

View tab (Report Builder 2.0 Ribbons interface), 350

Visibility element (ReportItems element), 149

Visual Basic runtime functions (expressions), 154, 165-169

Visual Query Designer, 128

Visual Studio

BIDS versus, 121
 connection strings, creating, 123
 deploying reports, 361-363
 RDL files, 121
 .rds files, 121
 Report Model projects, 121
 Report Server projects, 121
 reports, creating, 122
 column additions to reports, 130
 data set creation, 126-130
 Design view, 131-135
 naming reports, 124
 previewing reports, 135
 shared data source creation, 123
 table creation, 132, 135
 .smdl files, 121

W

WCF (Windows Communications Foundation), web services

accessing, 476
 security, 492-494

web farms, ASP.NET and, 87

web services, 475, 496-497

accessing, 475-476
 endpoints, 29, 427
 references, adding, 477, 480-486
 report parameters
 ParameterValue class, 489-491
 ReportParameter class, 489-490

ReportExecution2005 web service, 479
 ReportExecution2005.asmx, 482-484, 551
 ReportService2005 web service, 479
 ReportService2005.asmx, 486-488, 551
 ReportService2006 web service, 479-480
 ReportServiceAuthentication web service, 479
 ReportServiceAuthentication.asmx, 551
 RS scripting utility, 488-489
 security
 NET 2.0, 491-492
 NET 3.0, 492-494
 SSL, 495
 Web Service URL, configuring, 50
 WSDL, 478

Width element (ReportItems element), 149

Windows authentication, SSRS Internet deployments, 88

Windows integrated security, SSRS/WSS integration, 547-548

Windows service (SSRS)

Report Manager, 26
 Report Server web service, 26, 29-30
 Scheduling web service, 26

wizards

Cube Wizard, 305
 Data Mining Wizard, 314-315
 Data Region Wizard (Report Builder 2.0), 354
 Report Server Project Wizard
 report creation, 112-114, 116
 sample database installation, 111
 Report Wizard (Report Designer), 11
 reporting wizard, SSRS, 96

WMI (Windows Management Instrumentation)

endpoint namespaces, SSRS 2008
 enhancements, 75
 WMI Provider, 39

Workgroup Edition (SSRS), 21

WorkingSetMaximum memory configuration option, 27

WorkingSetMaximum memory threshold setting, 420

WorkingSetMinimum memory configuration option, 27

WorkingSetMinimum memory threshold setting, 420

WSDL (Web Service Description Language), 478

WSS (Windows Sharepoint Services)

Central Administration, configuring SSRS
 integration, 539-540, 552-553
 document management, 587
 Documents web part, 568
 Filter web part, 568
 installing, SSRS/WSS integration, 536-537
 Integrated mode, SSRS configuration in,
 537
 MOSS, 521
 permissions table, 550-551
 reports, viewing
 integrated SSRS/WSS systems,
 565-568
 Report Explorer web part, 572
 Report Viewer web part, 566-568,
 571-572
 SSRS integration, 519-520, 527
 ad hoc reports, 590-591, 593-596
 administration pages, 561
 authentication, 546, 548, 554
 authorization, 546, 549-551
 configuring SSRS integration via WSS
 Central Administration,
 539-540, 552-553
 custom security extensions, 546
 database management, 530-531
 deployment architectures, 532-533
 deployment mode options, 522-523
 deployment prerequisites, 532
 integrated mode, 521-524
 Kerberos, 546, 554
 management pages, 561

- managing data sources, 576-577
- managing parameters, 578
- managing permissions, 576
- managing properties, 574
- managing report histories, 580
- managing report processing, 579-580
- managing reports,
 - 573, 576-580, 583-584
- managing shared schedules, 580
- managing subscriptions, 582-584
- native mode, 521
- ODC files, 593
- programmability, 551
- Report Builder, 563-564, 590-591,
 - 594-596
- report data sources, 593
- Report Designer, 563-564
- Report Model Designer, 563-564
- report models, 594
- Report Server Configuration Tool, 558
- Report Server integrated mode, 529-530
- RS SharePoint add-in, 528-529
- sample reports, 524
- scaling-out deployments, 542
- security management, 531-532
- SharePoint Object Model, 528
- SSMS, 560-561
- SSRS add-in installation, 538
- SSRS configuration in WSS Integrated mode, 537
- SSRS installation, 536
- SSRS updates, 542
- troubleshooting, 543
- unsupported features, 523-524
- URL access parameters, 569-571
- viewing reports, 565-572
- Windows integrated security, 547-548
- WSS installation, 536-537

X - Y - Z

x64, SSRS deployments, 92

XML (Extensible Markup Language). *See also* RDL (Report Definition Language)

- fields and, 194
- querying data, 192
- reports, viewing in, 139
- uses of, 138