

# Microsoft System Center

## Extending Operations Manager Reporting

George Wallace • Chris Jones • Bill May • Fred Lee  
Mitch Tulloch, Series Editor

# Microsoft System Center

## Extending Operations Manager Reporting

George Wallace • Chris Jones • Bill May • Fred Lee  
Mitch Tulloch, Series Editor

PUBLISHED BY  
Microsoft Press  
A Division of Microsoft Corporation  
One Microsoft Way  
Redmond, Washington 98052-6399

Copyright © 2014 by Microsoft Corporation. All rights reserved.

No part of the contents of this book may be reproduced or transmitted in any form or by any means without the written permission of the publisher.

Library of Congress Control Number: 2014955192  
ISBN: 978-0-7356-9578-8

Printed and bound in the United States of America.

First Printing

Microsoft Press books are available through booksellers and distributors worldwide. If you need support related to this book, email Microsoft Press Book Support at [mspinput@microsoft.com](mailto:mspinput@microsoft.com). Please tell us what you think of this book at <http://aka.ms/tellpress>.

This book is provided “as-is” and expresses the author’s views and opinions. The views, opinions and information expressed in this book, including URL and other Internet Web site references, may change without notice.

Some examples depicted herein are provided for illustration only and are fictitious. No real association or connection is intended or should be inferred.

Microsoft and the trademarks listed at <http://www.microsoft.com> on the “Trademarks” Web page are trademarks of the Microsoft group of companies. All other marks are property of their respective owners.

**Acquisitions Editor:** Karen Szall  
**Developmental Editor:** Karen Szall  
**Copyeditor:** Megan Smith-Creed  
**Cover Illustration:** Twist Creative, Seattle

# Contents

- Introduction vii
  
- Chapter 1 Operations Manager and the cloud 1**
  - Microsoft cloud solutions ..... 1
  - Integration with Microsoft cloud solutions ..... 2
  - Operations Manager ..... 4
  - Operations Manager Reporting ..... 6
  
- Chapter 2 Operations Manager reporting basics 7**
  - Reporting with Operations Manager ..... 7
    - Scenario ..... 8
  - Reporting elements ..... 8
  - Planning reports ..... 9
    - Target audience ..... 10
    - Requirements gathering ..... 10
    - Presentation ..... 11
    - Technical jargon ..... 11
    - Performance ..... 11
    - Report parameters ..... 12
    - Follow up ..... 12
  - Viewing reports ..... 12
    - Viewing reports in the console ..... 12
    - Viewing reports in a web browser ..... 14
    - Branding reports ..... 15
  - Scheduling reports ..... 15

**What do you think of this book? We want to hear from you!**

Microsoft is interested in hearing your feedback so we can continually improve our books and learning resources for you. To participate in a brief online survey, please visit:

<http://aka.ms/tellpress>

<b>Chapter 3</b>	<b>Working with reports</b>	<b>17</b>
	Using built-in reports .....	17
	Using custom reports .....	19
	Duplicating existing reports.....	20
	Creating custom reports .....	20
	Examples of reporting scenarios.....	21
	Database administrator .....	21
	Chief Information Officer.....	24
<b>Chapter 4</b>	<b>Overview of report authoring tools</b>	<b>27</b>
	Report Builder .....	27
	SQL Server Data Tools.....	29
	Visual Studio Authoring Extensions.....	30
	Operations Manager 2007 R2 Authoring Console.....	31
	Power View.....	32
<b>Chapter 5</b>	<b>Authoring reports in Report Builder</b>	<b>33</b>
	Configuring Report Builder for Operations Manager reports.....	33
	Creating a report.....	34
	Configuring a data source.....	34
	Adding the data source to a new report.....	35
	Creating a dataset for the report.....	36
	Specifying the query for the report.....	37
	Designing the report .....	38
	Testing the report .....	40
<b>Chapter 6</b>	<b>Authoring reports in SQL Server Data Tools</b>	<b>41</b>
	Getting started with SSDT .....	41
	Creating a report.....	43
	Adding a data source .....	43
	Adding a dataset.....	44
	Adding datasets to a report.....	48
	Designing the report .....	50

<b>Chapter 7</b>	<b>Building management packs for reporting</b>	<b>55</b>
	Understanding reporting sections within a management pack .....	55
	Presentation .....	56
	Reporting.....	57
	Language packs .....	63
	Creating the management pack.....	63
	Operations Manager 2007 R2 Authoring Console .....	64
	Visual Studio Authoring Extensions.....	70
	Bundling the management pack.....	72
<b>Chapter 8</b>	<b>Authoring dashboards in Power View</b>	<b>75</b>
	Enabling Power View in Excel .....	75
	Configuring PowerPivot for your data model.....	76
	Creating a Power View dashboard.....	81
	Using Power View with SharePoint 2013 .....	83
<b>Chapter 9</b>	<b>Troubleshooting reporting in Operations Manager</b>	<b>87</b>
	Custom reporting issues.....	87
	Event 31567: Failed to deploy reporting component.....	87
	Report not showing in Reporting workspace .....	89
	The 'xxxx' parameter is missing a value .....	90
	Installation issues .....	91
	An attempt to connect to the report server failed .....	92
	The specified SQL Server instance is not valid .....	92
	General reporting issues.....	92
	Reports missing from the Operations Manager console .....	92
	SSRS Report Service is stopped .....	93
	Data Warehouse Synchronization Server is missing .....	94
	Required permissions for the Data Reader account .....	97
	Changing the password for the Data Reader account.....	97

---

**What do you think of this book? We want to hear from you!**

Microsoft is interested in hearing your feedback so we can continually improve our books and learning resources for you. To participate in a brief online survey, please visit:

<http://aka.ms/tellpress>

*This page intentionally left blank*

# Introduction

The System Center Operations Manager data warehouse stores many objects, making it possible to report on performance, availability, configuration, and security. You can use data collected by Operations Manager for issue tracking, awareness, planning, and forecasting, all of which are important factors for maintaining and managing your environment. But understanding what to report on and how to do so is what actually contributes to the stability of your infrastructure. If you're not using the data you collect about your environment, you're simply wasting space. If you use Operations Manager to monitor your environment, whether your infrastructure or a public, private, or hybrid cloud, this book is a good resource to help you understand the basics of reporting and how to build queries and stored procedures for your reports. It can also help you understand the various elements of Operations Manager management packs that are used when you create reports.

This book assumes that you have a good understanding of Operations Manager and the management pack structure required to create custom reports. It also assumes that you have a good working knowledge of SQL Server and tools like Report Builder, Business Intelligence Development Suite, and SQL Server Data Tools.

## About the companion content

---

The companion content for this book can be downloaded from the following page:

*<http://aka.ms/SCOpsmgr/files>*

The companion content includes the following:

- Sample SELECT query (Chapter 5)
- Contoso example report library and report fragment (Chapter 7)
- T-SQL code listings (Chapter 6)
- Microsoft Excel Power View dashboard example (Chapter 8)

## Acknowledgments

---

The authors would like to specifically thank Kevin Holman and Alban Montanera for their contributions to this book, and also the great Operations Manager community within Microsoft and around the globe. There truly is a great passion when it comes to Operations Manager.

The Series Editor would like to thank the following individuals at Microsoft who reviewed the outlines for the proposed titles in this series and provided helpful feedback to the authors: David Ziembicki, Adam Fazio, Robert Larson, David Stoker, and Joel Yoker.

## Free ebooks from Microsoft Press

---

From technical overviews to in-depth information on special topics, the free ebooks from Microsoft Press cover a wide range of topics. These ebooks are available in PDF, EPUB, and Mobi for Kindle formats, ready for you to download at:

<http://aka.ms/mspressfree>

Check back often to see what is new!

## Errata, updates, & book support

---

We've made every effort to ensure the accuracy of this book and its companion content. You can access updates to this book—in the form of a list of submitted errata and their related corrections—at:

<http://aka.ms/SCopsmgr/errata>

If you discover an error that is not already listed, please submit it to us at the same page.

If you need additional support, email Microsoft Press Book Support at [mspinput@microsoft.com](mailto:mspinput@microsoft.com).

Please note that product support for Microsoft software and hardware is not offered through the previous addresses. For help with Microsoft software or hardware, go to <http://support.microsoft.com>.

## We want to hear from you

---

At Microsoft Press, your satisfaction is our top priority, and your feedback our most valuable asset. Please tell us what you think of this book at:

<http://aka.ms/tellpress>

The survey is short, and we read every one of your comments and ideas. Thanks in advance for your input!

## Stay in touch

---

Let's keep the conversation going! We're on Twitter: <http://twitter.com/MicrosoftPress>.

# Working with reports

The reports in Microsoft System Center Operations Manager present the raw data collected and aggregated within the Operations Manager data warehouse into a presentation format that is not only easy to read and comprehend, but also provides a visual representation of your IT environment. Whether creating reports for a specific performance metric or creating a report to show a consolidated view of an entity's capacity, Operations Manager provides a familiar set of tools to deliver reports on-demand or on a subscription basis.

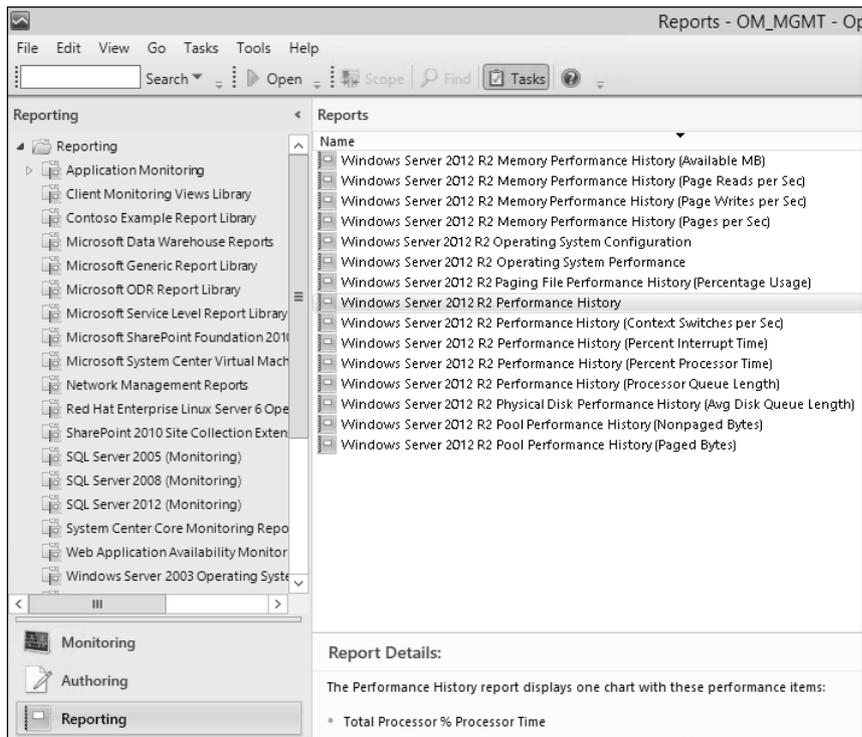
Understanding how and when to create specific reports is a fundamental step toward leveraging Operations Manager data without overwhelming your customers with information. It is critical to know when the built-in reports from Operations Manager can be used and when to consider creating custom reports that provide exactly what customers want.

## Using built-in reports

---

Most of the management packs available for Operations Manager are deployed with reports. An extensive collection of reports are available to you upon installation of the Operations Manager Reporting server. You can access reports in the Reporting workspace in the Operations Manager console (see Figure 3-1). These reports provide a way to visualize all the collected data so you can monitor and make educated decisions about your environment. The built-in reports are helpful for understanding your environment on a deeper level.

Whether you're new to reporting or have many years' experience, the built-in reports can provide insight and guidance for creating your own custom reports. You can leverage tools such as Report Builder or SQL Server Data Tools to review the syntax and structure of the built-in reports. However, you should never edit a report provided by a vendor in a management pack; you should always download a copy of the report and edit the copy instead of the original.



**FIGURE 3-1** The Reporting workspace in the Operations Manager console

Most Operations Manager reports can be described as belonging to one of the following categories:

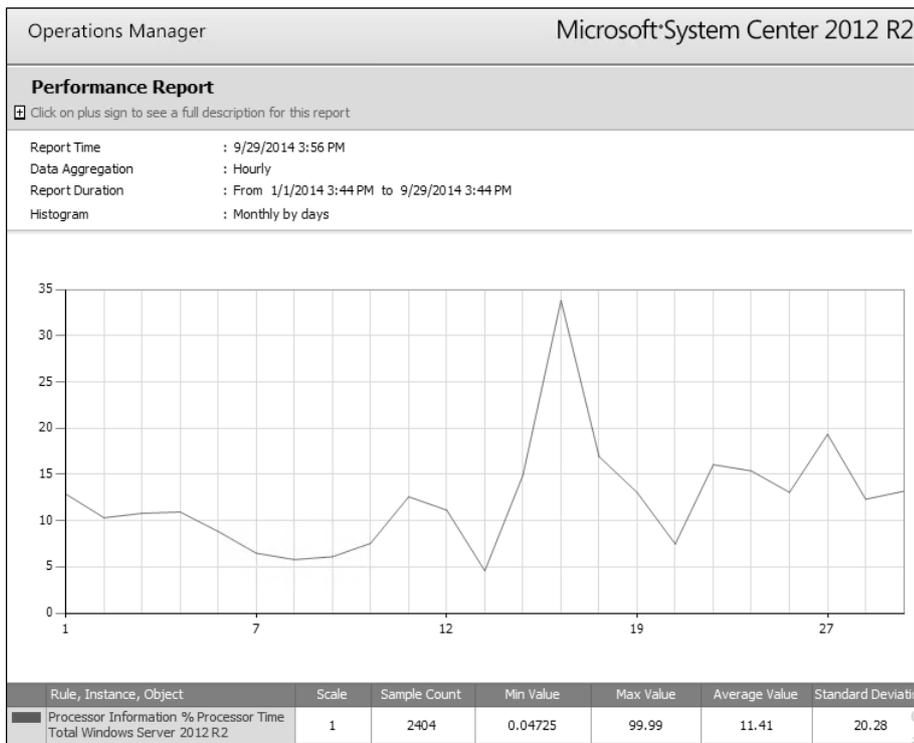
- **Performance report** Displays performance counters graphically based on the objects that are provided for the report
- **Performance detail report** Displays performance counters graphically but also shows minimum, maximum, and standard deviation of the counters
- **Configuration report** Displays configuration data and how configuration has changed over time
- **Availability report** Shows the health of objects as it relates to uptime and downtime and whether the health is in a critical, warning, or healthy state
- **Service level report** Shows service levels and how the objects being reported on follow those service levels

While the previous list of the different types of reports is by no means exhaustive, it does cover the majority of the reports you will use or create as an Operations Manager administrator.

# Using custom reports

There are several good reasons to create your own reports. Internal or external customers may request reports that appear different than the built-in ones, they may want additional or less data on a report, or they may ask for a company-branded report on custom business applications and service monitoring. All of these reasons can justify creating your own reports; however, it is imperative to remember that custom reporting can be time consuming, so it is important to make sure that everyone understands both the cost and the value of the customizations needed. The following example illustrates the tradeoffs involved when deciding whether to customize a report to address a specific customer's needs:

*Josh Pollock is an administrator for Litware, Inc. He is the Operations Manager administrator for his company. One of his internal customers reaches out to him about the performance report he gets for his servers (shown in Figure 3-2). The customer prefers a bar graph to the line graph used in the standard report. Josh is uncomfortable with this request, but he wants to make his internal customer happy, so he spends two weeks scouring TechNet forums and blogs to find out how to change this report.*



**FIGURE 3-2** A performance report for the Windows Server 2012 R2 computer group

In this scenario, do you think changing the report was worth Josh's effort? Two weeks to customize this report is quite a lot of time. When considering custom reporting, be sure to weigh the level of effort needed to create the custom report against the urgency of the requirement. The hours Josh worked to change the report's graphs equate to money that his time cost. Ultimately, whether the level of effort to change the graph is worth the cost comes down to a business decision.

## Duplicating existing reports

If you must change an existing report, it is best to copy the .rdl file from SQL Server Reporting Services (SSRS) and duplicate it in another folder on the report server. Follow these steps to copy and duplicate an .rdl file:

1. Navigate to the Report Manager of your SSRS server by typing its URL in the address bar of a Web browser. By default, the URL is `http://<reportservername>/reports`.
2. Select a report to duplicate. Most likely your report will be in the `Microsoft.SystemCenter.DataWarehouse.Report.Library` folder where the generic reports that are linked to by other reports are stored.
3. Click Details View on the ribbon, click the down arrow to the right of the report you want to duplicate, and then click Manage.
4. On the Report Properties screen, click Download. This saves the .rdl file on your computer. If the report has a corresponding .rpd file, download that file as well.
5. Navigate to the folder where you want to upload the report and click Upload File on the ribbon.
6. Upload the .rdl and .rpd files to SSRS and use your favorite report authoring tool (Report Builder or SSDT) to edit the report as necessary.

**NOTE** It is not advised to modify a built-in report from any management pack. The recommended practice is to copy the report file, which is an XML file with the report definition language extension (.rdl), from its original folder within SQL Server Reporting Services to another folder before making any changes. Any modifications to the built-in reports can be lost if the management pack is upgraded.

## Creating custom reports

Occasionally, business needs demand a custom report that contains more specific data and looks different than any of the existing reports. In this case, it is more feasible to create a new report rather than use a copy of an existing report. To create a new report customized to meet your business requirements and save it in a new management pack, follow the steps outlined in Chapter 6, "Authoring reports in SQL Server Data Tools," and Chapter 7, "Bringing it all together into a management pack."

## Examples of reporting scenarios

---

Many reporting scenarios are developed in response to the information gathered in the planning stage, as detailed in the “Planning reports” section of Chapter 2, “Operations Manager reporting basics.” Each report requires a clear understanding of how the information is going to be used. Often, however, reports are created without a clearly defined purpose. Whether the report is being delivered to a system administrator or a business executive, you should always know what information is being presented and how it's going to be used. This may appear to be an obvious consideration, but because many reports are requested without a defined purpose or target audience, it's worth examining closer. To demonstrate the benefit of creating Operations Manager reports that meet specific, defined needs, the sections that follow provide several examples of different scenarios and the kinds of reports that they typically require.

### Database administrator

*Nancy Anderson is a database administrator for Litware, Inc. She has requested a daily report to monitor the growth of the Operations Manager data warehouse database. Nancy is concerned about exceeding the storage capacity of the clustered SQL Server instance hosting the Operations Manager data warehouse database. Although the SQL Server Management Pack has been configured and tuned to monitor the health, state, and performance of the SQL Server instance, she would like a report delivered each Monday at 7:00 a.m. in an easy-to-read format.*

In this scenario, your target audience is primarily technical staff. The purpose of the report is to proactively monitor the growth of the Operations Manager data warehouse database to measure storage consumption and to forecast any additional storage allocation needs. Since you are creating a report with a scheduled weekly delivery to a specific email address, there's no need to provide drill-down capabilities. Nancy's only directive about the format of the report is that she can quickly and easily read it to determine the storage capacity. The final decision about the format is up to you. Creating a subscription schedule allows you to monitor the system resource usage during the report rendering to determine if any performance enhancement techniques are needed.

You have a general idea of the information requested, how it will be used, at what frequency, and by whom. At a minimum, this is enough to ensure that the report created will solve a specific problem; Nancy has provided enough information to determine the reporting parameters needed to create the report. You use this information to create a performance detail report based on the MSSQL 2012: Collect Database Total Free Space (MB) rule for the OperationsManagerDW database (see Figure 3-3).

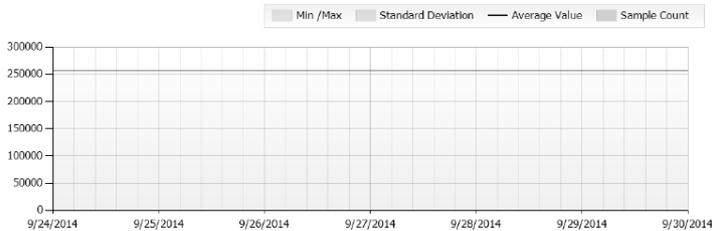
## Performance Detail Report

Click on plus sign to see a full description for this report

Report Time : 10/15/2014 2:20 PM  
 Data Aggregation : Daily  
 Report Duration : From 9/24/2014 to 10/1/2014  
 Histogram : No

Rule : MSSQL 2012: Collect Database Allocated Size (MB)  
 Instance :  
 Object : SQL Database: OperationsManagerDW  
 OM\_HQ | CONTOSO.COM;SCOM

## Actions



Sample Count : 607  
 Min Value : 31.28  
 Max Value : 32.96  
 Average Value : 32.96  
 Standard Deviation : 0.1684

Interval	Sample Count	Min Value	Max Value	Average Value	Standard Deviation
9/24/2014	30	32.17	32.5	32.32	0.06752
9/25/2014	96	32.31	32.96	32.6	0.1766
9/26/2014	97	31.97	32.73	32.41	0.211
9/27/2014	96	31.78	32.38	32.09	0.1755
9/28/2014	96	31.5	32.13	31.82	0.1671
9/29/2014	96	31.46	32.14	31.54	0.1506
9/30/2014	96	31.28	31.54	31.54	0.1788

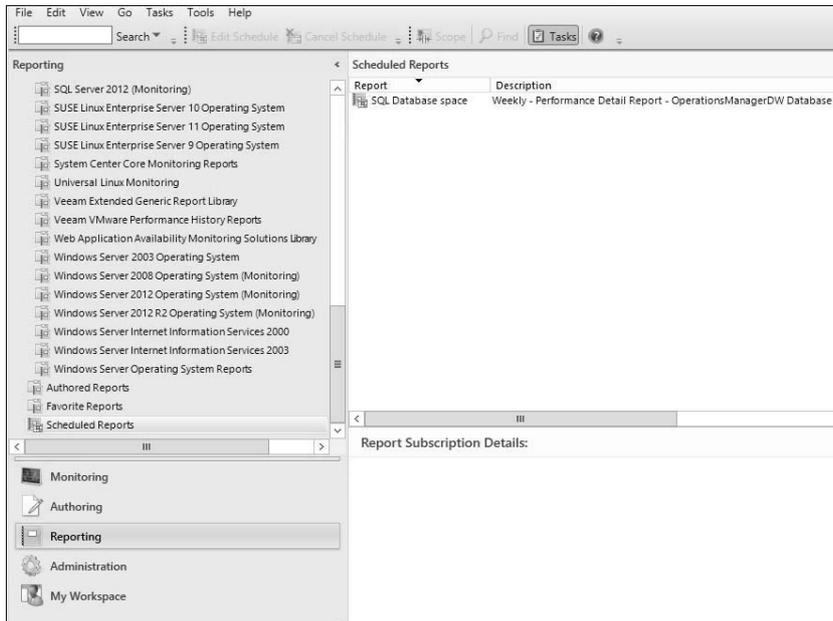
**FIGURE 3-3** A performance detail report for the MSSQL 2012 Collect Database Total Free Space (MB) rule

After the report is created, you can determine how it will be delivered based on the information you gathered before the report's creation. You know that Nancy wants the report delivered to her email address on a daily basis. However, she didn't specify a preference for the report format other than it should be easy to read. With this knowledge, you can create a subscription schedule to automate the delivery of the report. After rendering the report, you can schedule the report to be sent via email delivery to one or more email addresses or email distribution lists, specify the rendered format to an XML Paper Specification or .xps file format, and configure the daily schedule of the file at a specific time. If needed, you can configure the report schedule to end at a specific date.

The following list details the criteria used to schedule the report delivery settings:

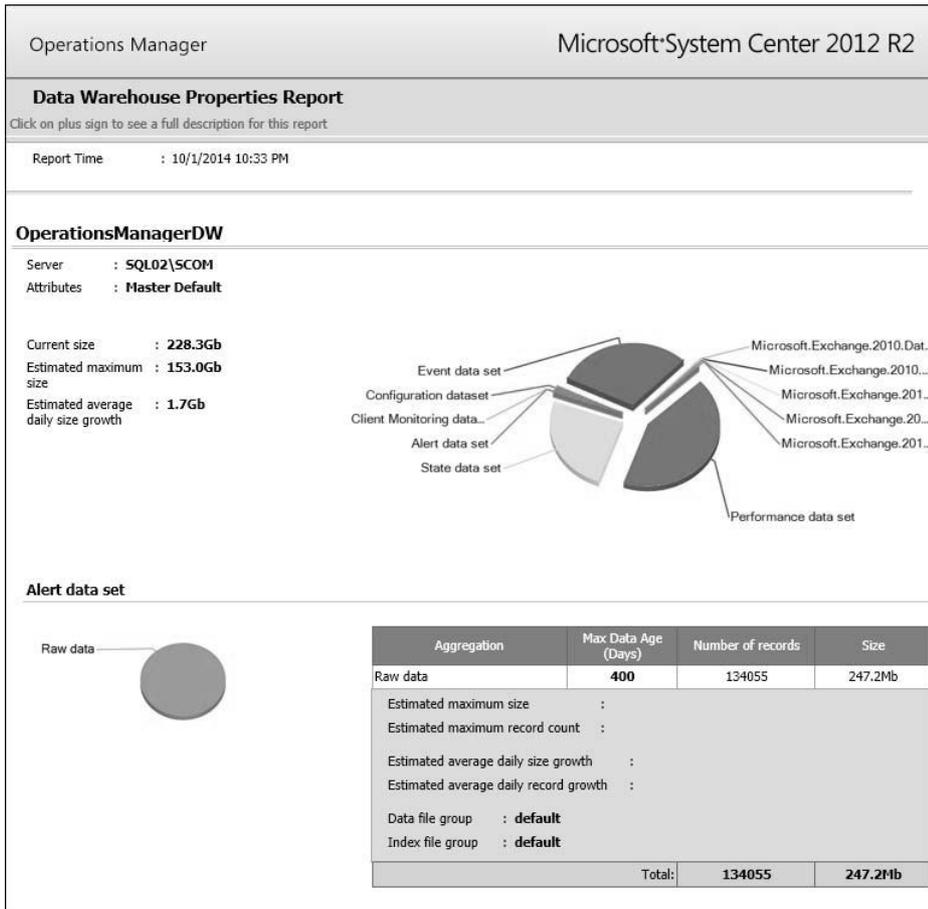
- **Delivery Method** E-mail
- **To** name@litware.com
- **Render Format** PDF
- **Subject** MSSQL 2012 Database Free Space Performance Detail Report
- **Schedule** Weekly

Figure 3-4 displays the report subscription as shown in the Scheduled Reports view of the Reporting workspace.



**FIGURE 3-4** The Reporting workspace showing the Scheduled Reports properties

As an alternative to creating the report from scratch, you can deliver more valuable insight to your database administrator by creating a scheduled delivery of the Data Warehouse Properties report located in the Microsoft Data Warehouse Reports folder. This is a built-in report provided to show the Data Warehouse properties and grooming settings (see Figure 3-5).



**FIGURE 3-5** The Data Warehouse Properties report

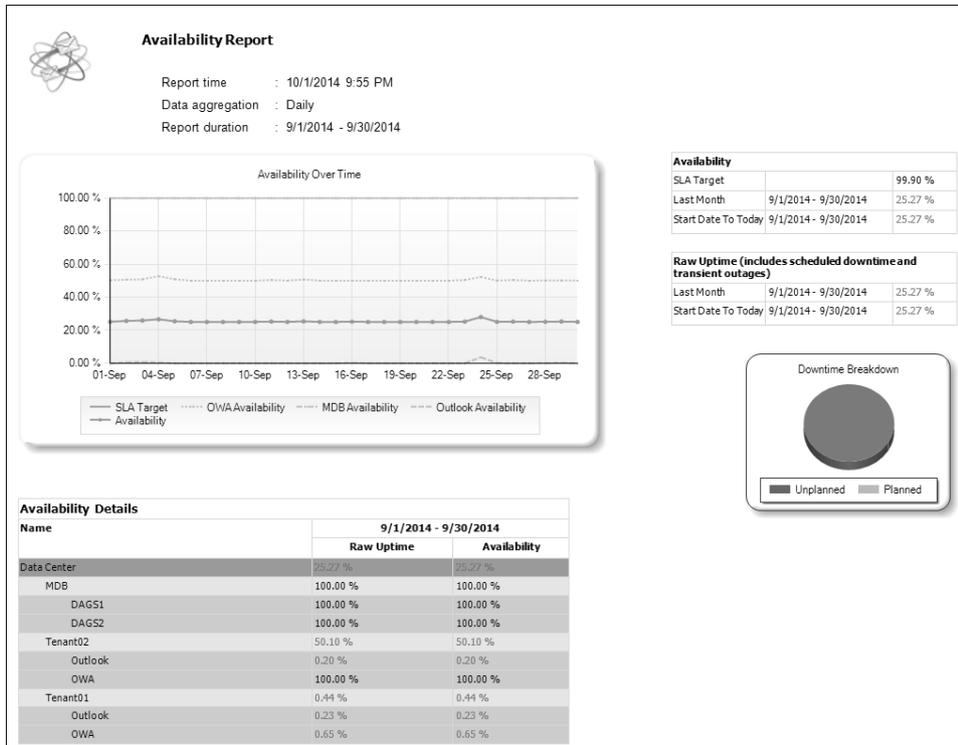
## Chief Information Officer

*Andreas Herbinger is the CIO for Litware, Inc., an application hosting provider delivering email as a service to small businesses. Andreas has a customer satisfaction problem with one of his most valued customers, Contoso, Inc. Contoso has complained repeatedly about disruptions in service and slow response time in email delivery. He has asked you to provide him with a report detailing the customer's Microsoft Exchange 2010 availability to determine if any service level agreements (SLAs) were missed during the monthly billing cycle. Andreas wants the report delivered immediately to his email address in Microsoft Word format, and he wants to be able to drill down into the report sections as needed.*

From this scenario, you determine that your target audience is executive leadership. Andreas has clearly defined the report parameters including the duration, rendering format, and drill-down requirements. As with the previous scenario, you are creating a report with a scheduled delivery to an email address. Most importantly, you must provide the capability to

drill down into the report. You decide to create another subscription schedule to send the CIO the report and to include a link to the report on the Operations Manager Reporting server, enabling him to drill down into the report for more detailed information.

With the report parameters clearly defined, you can fulfill the CIO's request by immediately scheduling the delivery of the Microsoft Exchange 2010 Reports SLA report located in the Exchange 2010 folder. This is a built-in report provided to show the Microsoft Exchange 2010 SLA availability numbers (see Figure 3-6).



**FIGURE 3-6** The Microsoft Exchange 2010 Reports SLA report

*This page intentionally left blank*