



Microsoft® System Center

Operations Manager Field Experience

Danny Hermans, Uwe Stürtz, Mihai Sarbulescu
Mitch Tulloch, Series Editor

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Developmental Editor: Karen Szall
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Introduction

If you're responsible for designing, configuring, implementing, or managing a Microsoft System Center Operations Manager environment, then this book is for you. This book will help you understand what you can do to enhance your Operations Manager environment, and will give you the opportunity to better understand the inner workings of the product, even if you are a seasoned Operations Manager administrator.

This book assumes that you have a deep working knowledge of the Operations Manager product and its concepts, that you understand the concept of management packs, and that you are basically familiar with Microsoft Azure as an infrastructure-as-a-service platform. This is a book about best practices, design concepts, how-tos, and in-depth technical troubleshooting. It covers the role of the Operations Manager product, the best practices for working with management packs, how to use the reporting feature to simplify managing the product, how to thoroughly troubleshoot, and how to use and install Operations Manager in a Microsoft Azure Public Cloud environment.

About the companion content

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

<http://aka.ms/OpsMgrFE/files>

The companion content includes the following:

- The SQL query in Chapter 1 that you can run in SQL Server Management Studio to determine which collation settings you are using
- The series of commands used in the example in Chapter 2 to run workflow tracing manually
- The Windows PowerShell script used in Chapter 4 to view all TLMEs that exist order per resource pool and per current owning pool member (management server)
- The various SELECT queries included in Chapter 4
- A PDF file titled HealthService Event Reference that provides information about the events that Operations Manager can log to its event log from the HealthService features.

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Getting the most out of Operations Manager visualizations

This chapter provides an overview of the reports and dashboards that you can use to check your Microsoft System Center Operations Manager environment for excessive data generation and collection. It also explains how to add more visualizations to your Operations Manager environment, including reports coming from an external source or reports and dashboards that you create. These visualizations can be published to Microsoft SharePoint, and you can connect Microsoft Visio with Operations Manager to create live-updating dashboards.

Tuning using the out-of-the-box reports

A default installation of Operations Manager includes an extensive number of reports. The following reports are most useful for tuning:

- Alerts
- Event Analysis
- Most Common Alerts and Most Common Events
- Data Volume by Management Pack
- Data Volume by Workflow and Instance

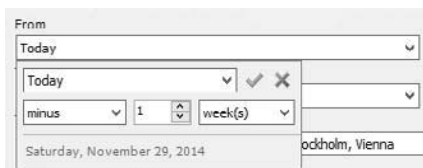
All of the reports can be accessed via the Operations Manager console on the Reporting pane. The overview on the Reporting pane is the same as the overview you see when you access SQL Server Reporting Services (SSRS) directly using your browser. The URL is <http://<servername>/Reports>, where <servername> is the name of your SSRS server. On this page is the link to Report Builder, which is the SSRS application that you can use to author your own reports or to edit existing reports. The first time you click the link, the Microsoft SQL Server Report Builder application is installed.

The two folders in the Reporting pane that contain the reports described later in this chapter are Microsoft Generic Report Library and Microsoft ODR Report Library. Depending on the management packs that you have imported, you might see additional folders, such as SQL Server 2012 (Monitoring). These folders contain the reports that come with product management packs, such as Microsoft Exchange, SQL Server, Active Directory, and more.

You can also import reports created by third parties. As always, be careful when you import something into your environment. Test it first in a test environment. Make sure the reports are useful and working correctly. Some well-known third-party reports that are free to download (although you might need to register first) include the following:

- **System Center Central's SCC Health Check reports**
<http://www.systemcentercentral.com/opsmgr-database-hygiene-scc-health-check-reports-management-pack-by-oskar-landman-pete-zerger/>
- **Veeam Report Library for System Center** *<http://www.veeam.com/report-library-system-center.html>*
- **The Approved Operations Manager Health Check Dashboard** (providing a single page overview of where tuning is needed) *www.approvedconsulting.com/downloads*

Most of the available reports contain a date and time picker field to select the start and end time for the report. You can select a fixed date and time, or you can click the down arrow to set more advanced options. In the advanced options, you can select a time offset to make the report independent of a fixed date. If you schedule the report with a fixed date, you will get the same report every time you run it because the start and end time will always be the same. If, on the other hand, you choose Today – 1 week as the start time for the report and Today as the end time, you will always get the report for the previous seven days (see Figure 3-1).



The image shows a date and time picker interface. At the top, there is a label 'From' and a dropdown menu set to 'Today'. Below this is another dropdown menu also set to 'Today', with a checkmark and an 'X' icon to its right. Underneath, there is a dropdown menu set to 'minus', followed by a numeric input field containing '1', and another dropdown menu set to 'week(s)'. At the bottom left, the calculated date is displayed as 'Saturday, November 29, 2014'. At the bottom right, the location is displayed as 'Stockholm, Vienna'.

FIGURE 3-1 Advanced date and time picker

Alert reports

In the Microsoft Generic Report Library, you will find the Alerts and the Most Common Alerts reports. The Alerts report shows alerts raised during the selected report duration and for given filter parameters for selected objects. The Most Common Alerts report shows the most common alerts raised during the selected report duration and for given filter parameters for selected objects.

Alerts report

To run or schedule the report, select a time frame and a group or an object to run the report against. If you want to select all the Windows-based computers in your Operations Manager environment, click Add Group and type **Windows computers** in the field next to Contains. Click Search and the results will show a group called All Windows computers. Click Add to add this group, and click OK to close the object picker dialog box. Click Run at the top left of the report window to run the report. You can sort the results by alert name or repeat count by clicking the column header. To sort the report results from low to high, click the header once. To sort them from high to low, click the header again. For the tuning purposes discussed in this chapter, the report should be sorted beginning with the highest repeat count first.

In the Alerts report, the alert name appears in the first column. This alert name is the same as the one that appears in the Operations Manager console in the Alerts view. To get to the Alerts view from the report, expand one of the alerts and click Alert View. This opens the corresponding Alert view in the Operations Manager console. The next column shows the repeat count, which is how many times the alert was generated in the time frame specified in the report parameters. The Object column identifies the Windows-based computer where the alert was generated. In the expanded view of the alert, you can click Alert Detail Report to show all occurrences of the alert during the specified time frame (see Figure 3-2).

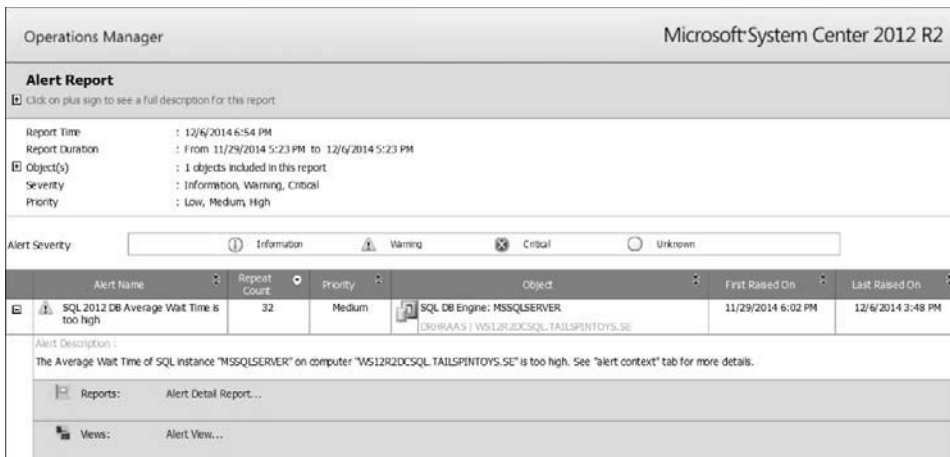


FIGURE 3-2 A sample Alerts report with an expanded view on one alert

Most Common Alerts report

The Most Common Alerts report differs from the Alerts report because it shows the alerts per management pack whereas the Alerts report shows the alerts for a specified server. By default, the Most Common Alerts report shows the alerts coming from all the installed management packs. You can deselect management packs if you don't want to include them in the report. Since the report parameter is based on management packs, you don't need to specify the monitored systems it applies to.

When the report runs, it shows the most common alerts from the selected management packs. It also provides a drill down of the alerts per each management pack that is part of the top N most generated alerts. N is the number of most common alerts that you have chosen to show. By default, the report lists the top five most commonly generated alerts. You can change this in the report parameters. By scrolling down in the report, you can see how many alerts are coming from a specified management pack and which monitor or rule was responsible for generating the alert. The report details also show how long it took to resolve the alert on average and in total (see Figure 3-3).

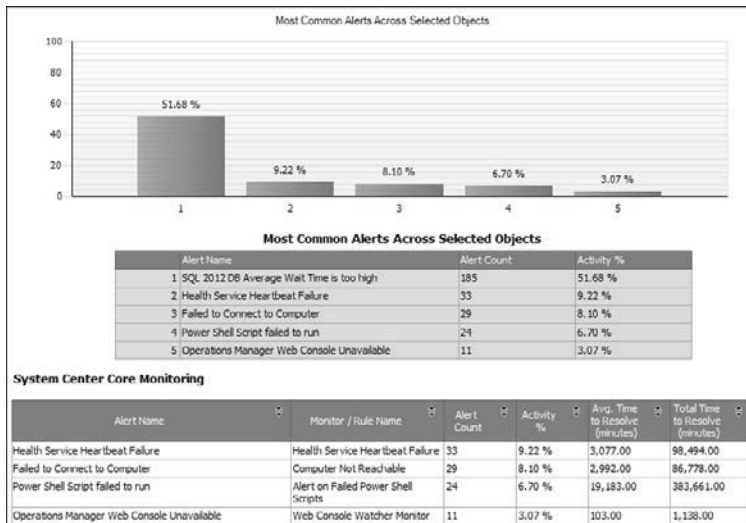


FIGURE 3-3 A sample Most Common Alerts report

Event reports

In the Microsoft Generic Report Library, you will also find the Event Analysis and the Most Common Events reports. The Event Analysis report shows a table of events and a count by server filtered by all entered parameters. The Most Common Events report shows the most common events raised during the selected report duration and for given filter parameters for selected objects.

Event Analysis report

The Event Analysis report is similar to the Alerts report, only it shows an analysis of the events that were collected rather than the alerts. To run this report, select the object to show collected events for, such as All Windows Computers, a more specific group of computers, or a specific object. You can filter the report by the source event log you want to see the collected events from, and by type, category, and event ID. You can sort report results by repeat count to view the most collected event IDs. In the details of each event, you have the option to open the Event view in the Operations Manager console or the Alert view for the object from which the event was collected. A sample Event Analysis report is shown in Figure 3-4.

Object	Event Type	Time	Source	Repeat Count	Event ID	Rule
Health Service: WS12R25COM.TAILSPINTOYS.SE (DR RAAS) WS12R25COM.TAILSPINTOYS.SE	Information	11/29/2014 7:45:00 PM	Health Service Script	192	6022	Collect Distributed Workflow Test Event

Sample Description:
LogEndToEndEvent.is : This event is logged to the Windows Event Log periodically to test an event collection.

Views:
Event view...
Alert view...

FIGURE 3-4 A sample Event Analysis report with the detailed view for one event ID

If you click the Event view link, the report opens the specified Event view in the Operations Manager console. On the right side of the window, you can see additional tasks, navigation options, and event actions. Click Show Associated Rule Properties to open the properties of the rule that is collecting the specified event (see Figure 3-5). If necessary, you can create overrides directly in this dialog box, which makes it easier to tune the event collection rule since you don't have to search for it in the Authoring pane under Management Pack Objects and then Rules.

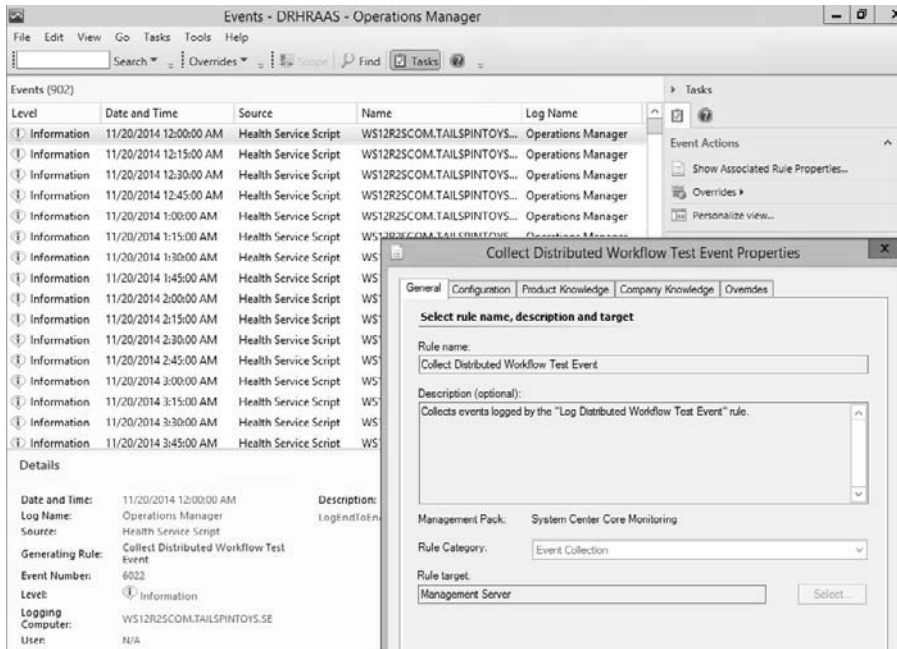


FIGURE 3-5 The Event view in the Operations Manager console, opened from the report

Most Common Events report

Similar to the Event Analysis report, the Most Common Events report shows the events per event log, source, and type of event. You need to specify which objects, such as All Windows Computers, you want to run the report for. You will get an overview of the most collected events according to the filters that you specified. For each event, you can also see a sample description of the event with the specified event ID in the details (see Figure 3-6). The option to go directly to the Event view in the Operations Manager console is not available in this report.

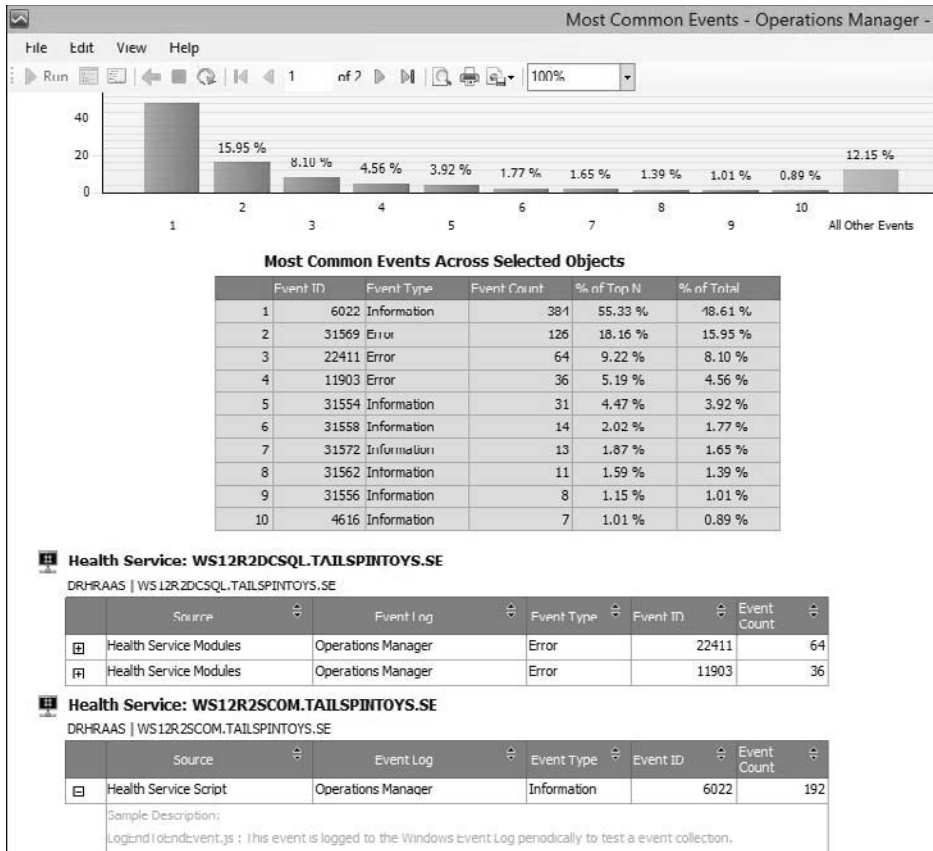


FIGURE 3-6 A sample Most Common Events report

Data Volume reports

The Data Volume by Workflow and Instance and the Data Volume by Management Pack reports can be accessed in the Operations Manager console, in the Reporting pane, under System Center Core Monitoring Reports.

Data Volume by Workflow and Instance report

The Data Volume by Management Pack report is a useful overview of the management packs generating the most data. In the report results, you can drill down by clicking each underlined link to generate a new report, tailored to the link you selected, using the Data Volume by Workflow and Instance report.

The Data Volume by Workflow and Instance report compiles information on the volume of data generated, broken down by workflows (discoveries, rules, monitors, and so on) as well as by instances. There are two ways to access this report: drilling down in the Data Volume by Management Pack report or running the report directly.

When running the report directly, you can select the management pack to show data from and the data type: discovery, alerts, events, performance, or state change data. By default, the report generates data for all data types and all installed management packs. This gives you another view of the overall data contained in your Operations Manager Operational database.

Data Volume by Management Pack report

Figure 3-7 shows a sample Data Volume by Management Pack report.

Operations Manager		Microsoft System Center 2012 R2							
Data Volume by Management Pack									
Click on plus sign to see a full description for this report.									
Time Span : 11/7/2014 11:06 AM - 12/7/2014 11:06 AM									
Aggregation : Daily									
Management Groups									
Counts by Management Pack									
Management Pack	% of total Data Vol.	Trend	Discovery Data	Alert Count	Perf Count	Event Count	State Changes		
SQL Server 2012 (Monitoring)	88.12	↓	0	193	936209	0	642		
Data Warehouse Internal Library	13.93	↓	0	12	186868	1322	328		
System Center Core Monitoring	6.25	↓	0	126	79734	2731	9457		
Windows Server 2012 Operating System (Monitoring)	3.54	↓	0	2	4841	178	1		
Microsoft Windows Server 2012 Internet Information Services.8	1.99	↓	46	2	27255	0	62		
Windows Server 2012 R2 Operating System (Monitoring)	1.78	↓	0	0	24516	24	0		
Health Library	1.58	↓	0	0	0	0	21251		
Windows Service Library	0.87	↓	0	0	11904	0	0		
System Center Core Library	0.50	↓	103	0	0	0	2769		
Microsoft SystemCenter OperationsManager Summary Dashboard	0.56	↓	0	0	7714	0	0		
Grand Total	99.20	↓	239	335	1322781	4355	37080		

FIGURE 3-7 A sample Data Volume by Management Pack report

From the sample report shown in Figure 3-7, it is obvious that there is tuning to be done on the SQL Server 2012 (Monitoring) management pack. In this specific Operations Manager environment, 68 percent of all data in the Operations Manager database is coming from this management pack. You can click the name of a management pack to generate a more detailed report tailored to this specific management pack, using the Data Volume by Workflow and Instance report.

The best thing about the Data Volume by Management Pack report is that you can see on one page where tuning will be most useful. You can click any link to generate a drill-down report. When you're done with the drill-down report, you can return to the parent report by clicking the blue arrow on top of the child report, as is shown in Figure 3-8.

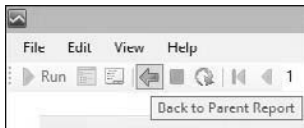


FIGURE 3-8 Return to the parent report by clicking the blue arrow at the top menu in the child report

For example, tuning discovery data would not provide much benefit in this specific case. You can sort by value of the discovery data by clicking the up and down arrows next to the column title. If you encounter a problem with continuous rediscovery of objects, you can follow the guidance in the Microsoft Knowledge Base article at <http://support.microsoft.com/kb/2603913> and in Kevin Holman's blog about config churn at <http://blogs.technet.com/b/kevinholman/archive/2009/10/05/what-is-config-churn.aspx>.

In this case, there aren't many alerts. Clicking the number of alerts generated by the SQL Server 2012 (Monitoring) management pack (193 in this case) generates a new report that shows which rules or monitors in the management pack are generating these alerts. As shown in Figure 3-9, in this example, the Average Wait Time monitor is the culprit—all 193 alerts come from that monitor.

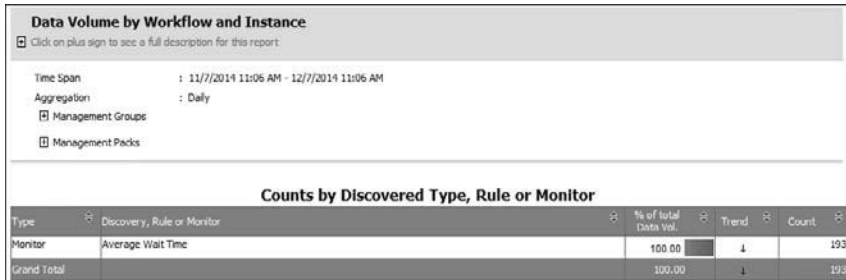


FIGURE 3-9 A drill-down report showing the monitors and rules generating the alerts from the SQL Server 2012 (Monitoring) management pack

Based on the numbers in the parent report, it is obvious and expected that most data comes from performance counter collections. Since this is one of the main purposes of Operations Manager, this is nothing to worry about, per se. However, you need to make sure that you are collecting only the performance counters that you actually need. For example, Figure 3-10 shows the top performance counter collections from the SQL Server 2012 (Monitoring) management pack.

Counts by Discovered Type, Rule or Monitor				
Type	Discovery, Rule or Monitor	% of total Data Vol.	Trend	Count
Rule	MSSQL_2012: Collect DB Disk Read Latency (ms)	9.87	↓	92412
Rule	MSSQL_2012: Collect DB Disk Write Latency (ms)	9.87	↓	92412
Rule	MSSQL_2012: Collect DB Active Connections count	3.37	↓	31597
Rule	MSSQL_2012: Collect DB Active Requests count	3.37	↓	31595
Rule	MSSQL_2012: Collect DB Active Sessions count	3.37	↓	31595
Rule	MSSQL_2012: Collect Database Allocated Size (MB)	3.37	↓	31536
Rule	MSSQL_2012: Collect Database Total Free Space (MB)	3.37	↓	31536
Rule	MSSQL_2012: Collect Database Total Free Space (%)	3.37	↓	31536
Rule	MSSQL_2012: Collect DB Used Space (MB)	3.37	↓	31536
Rule	MSSQL_2012: Collect Transaction Log Free Space (%)	3.37	↓	31536
Grand Total		46.20	↓	437291

FIGURE 3-10 Top performance counter collections from the SQL Server 2012 (Monitoring) management pack

It is always good to monitor free space. The Windows Server Operating System management pack also checks free space, but it is free disk space visible to the operating system. The performance counter collections shown in Figure 3-10 gather the free space within the actual database as seen by SQL Server.

For an example how this environment can be tuned, assume that it is not necessary to collect disk read and write latency, maybe because there is another management pack specifically designed to measure disk latency. In this case, it would be possible to override the collection rule and remove almost 20 percent of the collected performance counter data for this management pack (almost 10 percent multiplied by 2).

Apart from alerts and events and performance counter collections, continuous state changes can also have a big influence on the performance of your Operations Manager environment. For instance, when a monitored object changes from green to red, it changes state. Only monitors (not rules) can change the state of an object. Sometimes, the object changes state so fast that you don't see any alerts in the Operations Manager console. The Data Volume by Management Pack report shows whether there is a continuous state change problem by showing large numbers in the State Changes column. If this problem is present, try to determine why the object is changing state so frequently.

Using Health Explorer

You can identify an affected object by drilling down in a report, and, using the Operations Manager console, you can view the affected object in Health Explorer. Within Health Explorer is a tab showing the state changes. On this tab, you can see the threshold being breached (see Figure 3-11). This can help you determine the root cause of a problem.

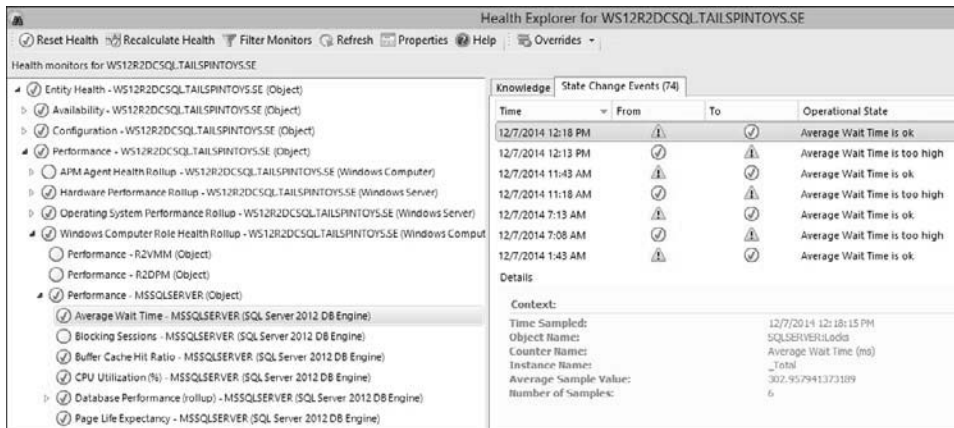


FIGURE 3-11 Health Explorer showing the state change events

See also On Kevin Holman's blog, you can find a further explanation about state changes and how to clean out old state changes from the Operations Manager Operational database. See <http://blogs.technet.com/b/kevinholman/archive/2009/12/21/tuning-tip-do-you-have-monitors-constantly-flip-flopping.aspx>.

Publishing visualizations

You can publish reports and dashboards you create so that other people can easily access them. Publishing reports saves everyone time. You can also distribute reports automatically by email. Reports can be stored on a file share, where they can be collected and saved for later use, exported, scheduled, or saved to your favorites or a management pack, and you can print them, as shown in Figure 3-12.

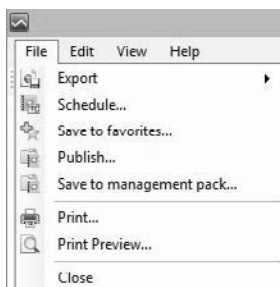


FIGURE 3-12 Actions to take on a report

Publishing and scheduling reports

After you generate a report with the necessary and correct parameters, you can save it for later use. Saving the report means you don't have to re-enter all the parameters since they are saved with the report.

You can save a report with your favorites, but that means only you can use and see it. Favorite reports are visible in the Operations Manager console, in the Reporting pane, under Favorite Reports. You can also publish reports. Publishing means you save the report in its current state, with all the parameters you selected, so that everyone else can access this report without having to select the parameters. This is also why it is a good idea to use a relative date and time for the report, as explained earlier. You can do this by selecting Advanced in the date and time picker and setting an offset date and time instead of a fixed date and time.

Published reports appear in the Operations Manager console, in the Reporting pane, under Authored Reports. However, they do not appear in the console for other users because this folder behaves like a personal profile, the same as the My Workspace folder in the Operations Manager console. This means that other user roles cannot access those reports by default. The advantage of having the reports in the Authored Reports folder is that you can move them easily in SQL Server Reporting Services (SSRS). To move the reports, open the SQL Server Reporting Services webpage, for instance <http://reportserver/reports/>, and create a new custom folder for the custom reports you want to share. Go to the My Reports folder, select the Show Details view, and move both files (the report .rdl file and the .rptdl file) to the newly created custom folder by clicking Move (see Figure 3-13).

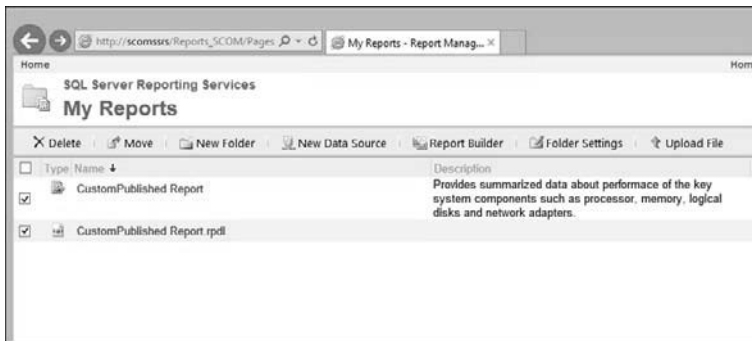


FIGURE 3-13 Move custom published reports from the My Reports folder in SSRS to a custom folder

You can also schedule the report to run automatically on a regular basis. This auto-generates a new report according to the set schedule and it saves to a file. Figure 3-14 shows the options for scheduling a report.

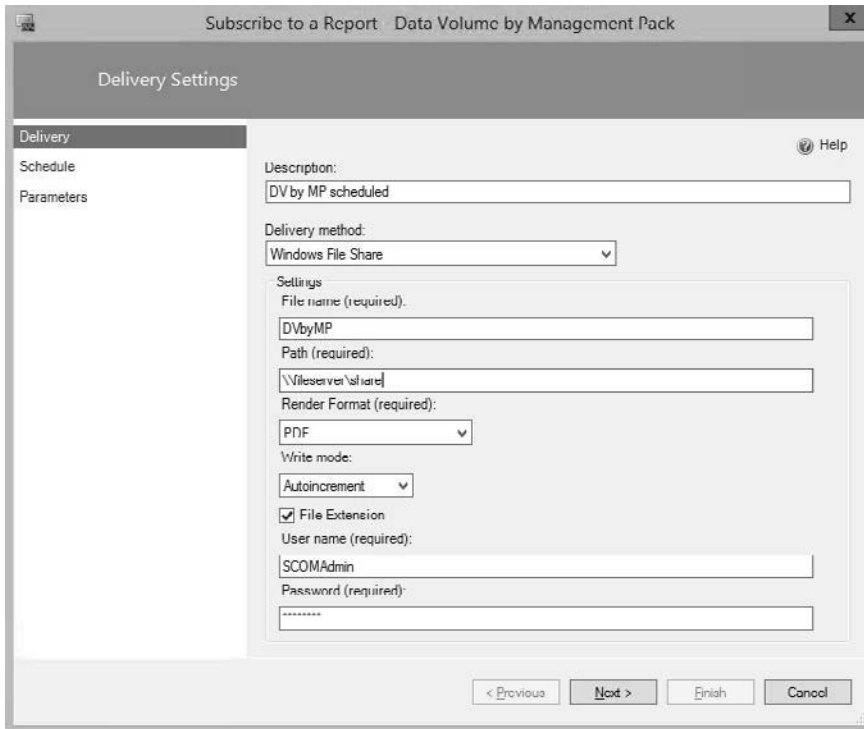


FIGURE 3-14 Scheduling a report

Another option is to email the scheduled report. Before you can schedule a report for email delivery, you must configure the email settings in the report server using the Reporting Server Configuration Manager. This process is explained at <http://technet.microsoft.com/en-us/library/hh212769.aspx>.

Publishing to SharePoint

Reports and dashboards are accessible through the Operations Manager console. However, sometimes it is better to publish the reports outside of the Operations Manager environment, for instance so that managers can quickly review how things are going without having to log in to the Operations Manager environment.

Publishing reports to SharePoint

Using the reports outside of the Operations Manager console, based on pre-populated parameters (for example, a published report) is possible through the `http://<servername>/Reportserver` URL. The URLs published on this SSRS webpage need to render without the smart header (the parameter control part). A URL report viewed on the SSRS webpage looks similar to the one shown in Figure 3-15.

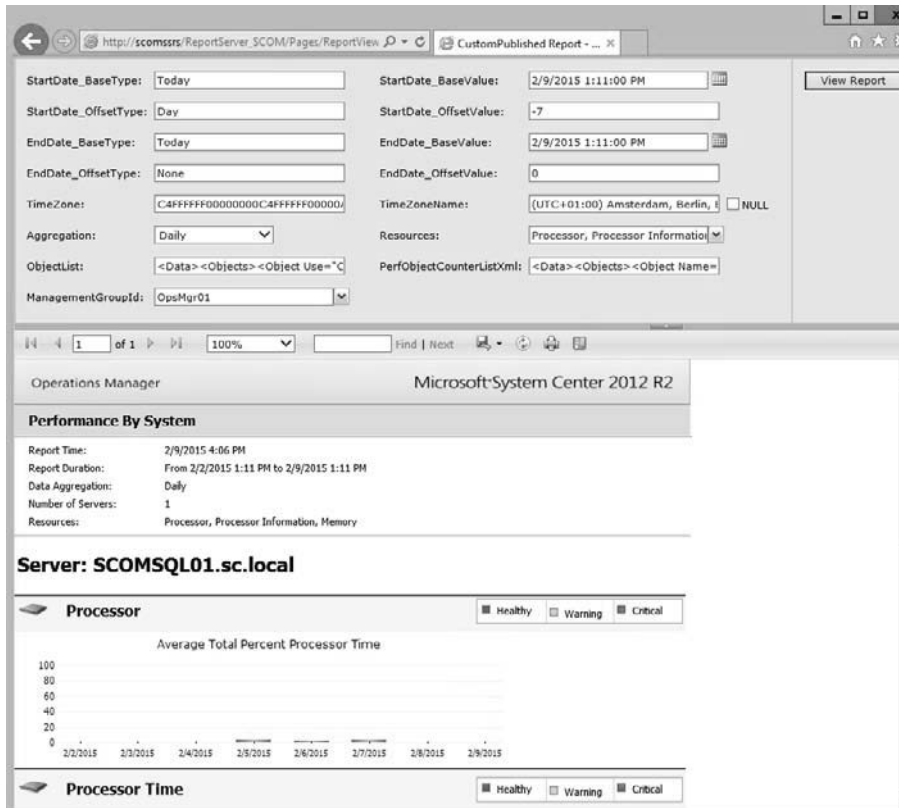


FIGURE 3-15 Rendering a report from the SSRS report server URL

You can copy the URL to a SharePoint Report Viewer web part where it can be easily administered using SSRS and SharePoint security. You can modify the URL to show or hide the toolbar or parameters by adding additional control options in the URL text. For example, you could hide the toolbar by editing the URL to include `&rc:toolbar=false` as shown in Figure 3-16, which shows the same report that's in Figure 3-15, but without the toolbar.

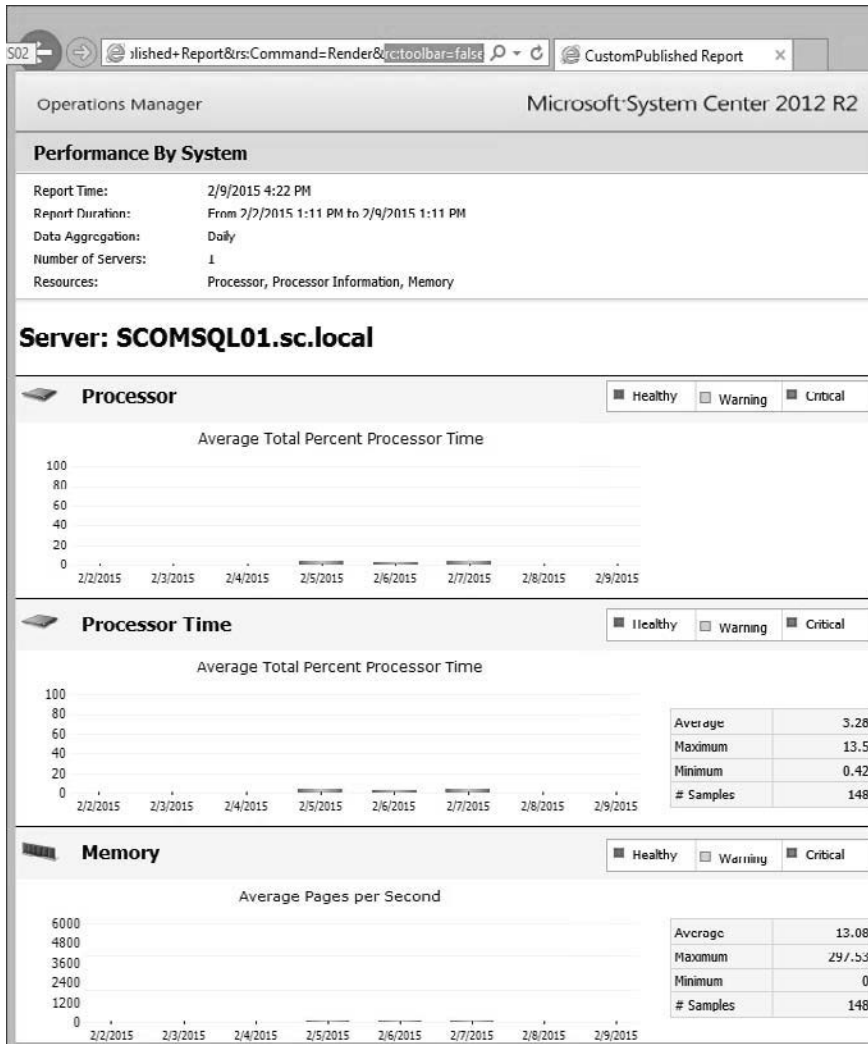


FIGURE 3-16 Rendering a report without the toolbar by updating the URL

Other URL examples to customize the appearance of reports include the following:

- **&rc:Parameters=collapsed** Parameter in the URL
- **&rc:Parameters=true** Shows the parameter bar (default)
- **&rc:Parameters=false** Hides the parameters
- **&rc:toolbar=true** Shows the toolbar

Publishing dashboards to SharePoint

Update Rollup 2 for Operations Manager 2012 R2 and Update Rollup 6 for Operations Manager 2012 SP1 introduced newer and richer dashboard widgets. The list of new widgets now available are described at <http://social.technet.microsoft.com/wiki/contents/articles/24133.operations-manager-dashboard-widgets.aspx> and at <http://blogs.technet.com/b/momteam/archive/2014/04/24/new-widgets-and-dashboard.aspx>. A video with demos can be found at Channel 9 at <http://channel9.msdn.com/Events/TechEd/NorthAmerica/2014/DCIM-B329>.

A well-configured widget allows you to see the availability and performance metrics of the applications in your environment, and with SharePoint web parts, this view can be transferred out of Operations Manager. Typically, these SharePoint web parts are useful for providing holistic operational state views to everyone in your organization who does not have an Operations Manager role. Operations Manager includes a SharePoint web part that displays selected dashboards from the web console. The SharePoint farm must be running SharePoint 2013, SharePoint Server 2010 Standard, SharePoint Server 2010 Enterprise, or SharePoint Foundation 2010, and the procedure to configure it is described at <https://technet.microsoft.com/en-us/library/hh212924.aspx>.

Using Visio with Operations Manager

To show health states of Operations Manager, you can also use the Visio 2010 add-in as an intermediate integration solution. You can export complex distributed applications (such as for your infrastructure applications or custom business services) or create diagrams directly in Visio and connect them with live health state views of Operations Manager. The add-in allows filtering of data, automatic generation of diagrams, and an automatic refresh of the associated data.

Installing and using the Visio 2010 add-in with SharePoint

You can download the Visio 2010 extensions from <http://www.microsoft.com/en-us/download/details.aspx?displaylang=en&id=29268>. Although the add-in was designed for Visio 2010 and SharePoint 2010, it has been shown to work with Visio 2013 and SharePoint 2013. However, since it has not officially been tested by the Microsoft product group, its use with the 2013 versions is not officially supported.

You also need Visual Studio 2010 Tools for Office Runtime, which is required to run Microsoft Office-based solutions built using Microsoft Visual Studio 2010, 2012, and 2013 (<https://www.microsoft.com/en-us/download/details.aspx?id=44074>). In addition, you need Microsoft Visio Professional or Premium edition, the Operations Manager console, and Microsoft .NET Framework 4.0 to install the Visio 2010 add-in.

After you install the add-in and open Visio, a new tab for Operations Manager appears (see Figure 3-17). Click this tab to start configuring, adding your infrastructure and data links to the represented Operations Manager objects.



FIGURE 3-17 The Operations Manager tab in Visio 2013

The Visio 2010 add-in and SharePoint 2010 Visio Services Data Provider offers the following features:

- Live health state information from distributed applications exported from Operations Manager
- Automatic updates of the current state information published in Visio documents or in hosted SharePoint document libraries
- Possibility to create new Visio documents with your available stencils and to link live data to the managed objects
- Option to create summary displays reflecting your company's infrastructure or process pictures in Visio documents and ability to transfer these documents to SharePoint with automatically refreshed health states
- Predefined data graphics to update shapes with colored health states representing the overall status of your services

A sample Visio drawing with objects connected directly to Operations Manager is shown in Figure 3-18. (More complex drawings can, of course, be made—this one simply shows the possibility.)

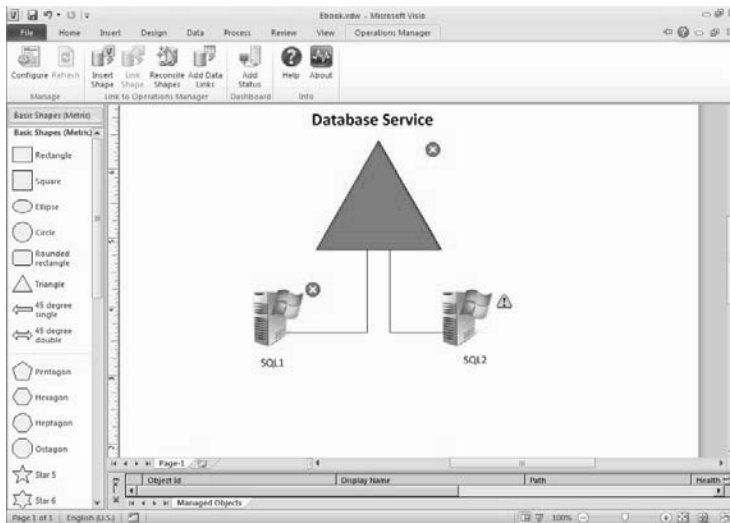


FIGURE 3-18 A sample Visio drawing with some basic shapes showing the live connection with Operations Manager

Tim McFadden has developed a good description of how to install the SharePoint 2013 Integration extensions and use the Visio Services Data Provider and Visio Web Access to add the web part you created in a Visio 2013 document (saved as a Visio 2010 Web Drawing with extension *.vdw). Tim's explanation can be found at <http://www.scom2k7.com/installing-scom-2012-visio-dashboards-in-sharepoint-2013/>. Figure 3-19 shows how to save a Visio 2013 created Web Drawing as a Visio 2010 Web Drawing (*.vdw).

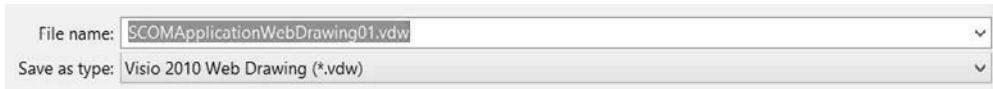


FIGURE 3-19 Saving a Visio 2013 Web Drawing as a Visio 2010 Web Drawing