Storage Center Management Pack Version 4.1

for Microsoft System Center Operations Manager Administrator's Guide



Notes, Cautions, and Warnings

(i) NOTE: A NOTE indicates important information that helps you make better use of your product.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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About this Guide

This document describes how to install the Dell management packs and use the functionality to monitor Storage Centers using the Microsoft System Center Operations Manager (SCOM) console. For complete information about the Microsoft System Center Operations Manager (SCOM), see the Microsoft documentation on the Microsoft System Center Operations Manager website.

Revision History

Document Number: 680-038-005

Revision	Date	Description
А	August 2019	Initial release

Audience

The target audience for this guide is Microsoft System Center Operations Manager (SCOM) administrators who monitor Storage Centers from the Microsoft SCOM console. The intended reader has a working knowledge of Storage Center and Microsoft System Center Operations Manager functionality.

Contacting Dell

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services might not be available in your area.

To contact Dell for sales, technical support, or customer service issues, go to Dell.com/support.

- · For customized support, type your system service tag on the support page and click **Submit**.
- · For general support, browse the product list on the support page and select your product.

Related Publications

In addition to this guide, the following related publications are available from the Dell support site:

- Dell Storage Center Management Pack for Microsoft System Center Operations Manager Release Notes
- Describes important release information, including known issues.
- Storage Manager Administrator's Guide

Provides instructions for using the Storage Manager software.

Getting Started

Introduction to Storage CenterManagement Pack

The SCOM console provides basic system monitoring; however, detailed monitoring of the Storage Center requires additional management packs. The Dell Storage Management Pack monitors, collects, and displays the following Storage Center storage area network (SAN) information:

- Active alerts
- · Dashboards that provide Storage Center performance data, including controller, disk, enclosure, server, and volume status
- Storage types
- Replications
- · Data Collector discovery and health status
- · Windows Management Instrumentation (WMI) Provider discovery and health status

Storage Center Management Pack Components

The Storage Center Management Pack 4.1 for Microsoft System Center Operations Manager consists of the components listed in the following table.

Table 1. Storage Center Management Pack Components

Component	Description
 Management Packs: Dell Storage Management Pack for SCOM Dell VMM Storage Management Pack for SCOM Microsoft System Center Virtual Machine Manager (SCVMM) 	Defines the various components that make up a management pack. When a management pack is installed, instances of the classes defined by the management pack are automatically discovered and monitored. For more information, see Management Pack Classes and Virtual Machine Discovery Management Pack Classes.
Windows Management Instrumentation (WMI) Provider	A dynamic link library (DLL) that implements the WMI classes that provide the data discovered and monitored by the management pack. The provider is configured to connect to one or more Dell API endpoints using the Dell Storage WMI Provider Configurator tool.

Installation Requirements

The following table provides the installation requirements for the Storage Center Management Pack Version 4.1.

i NOTE: The Management pack upgrade from 4.0.1 to 4.1 is not required for SCOM 2012 R2 as there are no new features added in SCOM 4.1 release.

Table 2. Installation Requirements

Requirement	Description
Microsoft System Center operations Manager	The server must meet all SCOM requirements and must be one of the following supported versions:
	 SCOM 2012 R2 SCOM 2016 SCOM 2019
Add requirement for TLS 1.2 setupTLS 1.2 Protocol	To use Storage Manager 2018 and later, follow the prerequisites described in the article TLS 1.2 Protocol Support Deployment Guide for System Center 2012 R2.

Requirement	Description	
Microsoft System Center Virtual Machine	The following versions of SCVMM are supported:	
Manager (SCVMM)	SCVMM 2012 R2	
	• SCVMM 2016	
	SCVMM 2019	
Storage Manager	Dell Storage Manager 2016 R1	
	Dell Storage Manager 2018 R1	
	Dell Storage Manager 2019 R1	
Storage Center Operating System	The Storage Center Operating System version depends on the version supported by Storage Manager.	
Dell EMC Storage Systems	The following storage systems are supported:	
	SCv2000 series	
	SCv3000 series	
	• SC4020	
	· SC5020/SC5020F	
	• SC7020/SC7020F	
	· SC8000	
	· SC9000	
Operating System	The following Windows Server operating system versions are supported:	
	 Microsoft Windows Server 2012 R2 	
	Microsoft Windows Server 2016	
	Microsoft Windows Server 2019	
Microsoft .NET Framework	Microsoft .NET Framework 4.0 or later	
Processor	x64	
Memory	See the Microsoft System Center Technical Documentation Library website for the latest memory requirements.	
Network Connection	Gigabit Ethernet is highly recommended by Dell EMC	
	Visibility to each monitored Storage Center	
TCP Port	By default, port 3033 is used for communication between the Windows Management Instrumentation (WMI) Provider and the Storage Manager Data Collector.	
Server	Must be monitored by SCOM and have a monitoring agent installed. For more information, see the Microsoft Operations Manager Agent Installation Methods web page.	

Connecting Virtual Machine Manager with Operations Manager

Connecting the Virtual Machine Manager (VMM) with Operations Manager integrates them so that they work together. Before the Dell VMM Storage Management Pack for SCOM is installed, connect the VMM with Operations Manager and choose and configure a version of Operations Manager that is compatible with the version of VMM that you are using.

(i) NOTE: The version of the Operations Manager operations console that is installed on the VMM management server must match the version of Operations Manager with which you intend to integrate. For instructions, see the Microsoft System Center website.

Installing the Management Pack

Storage Center Management Pack 4.1 provides a standard installer that is used to install both the Dell Storage Management Pack for SCOM and the Dell VMM Storage Management Pack for SCOM.

To install the Storage Center Management Pack 4.1 for Microsoft SCOM:

- 1. Download the Storage Center Management Pack for Microsoft SCOM software from Dell Digital Locker.
- 2. Unpack the Storage Center Management Pack for Microsoft SCOM Setup compressed (.zip) file and specify a directory to extract its contents.

(i) NOTE: The Dell Storage Management Pack.msi file is used to install both the management packs and the Windows Management Instrumentation (WMI) provider.

3. Navigate to the directory where you extracted the contents of the setup file and double-click the Dell Storage Management Pack.msi file to start the installation wizard.

Figure 1. DellStorage Management Pack Installation Wizard

4. Click Next. The License Agreement page opens.

, , , , , , , , , ,	
😸 Dell Storage Management Pack - InstallShield Wizard	×
License Agreement Please read the following license agreement carefully.	5
Dell End User License Agreement - A Version	^
THIS END USER LICENSE AGREEMENT ("EULA") IS A LEGAL AGREEMENT BETWEEN YOU (EITHER AN INDIVIDUAL OR AN ENTITY) AND DELL PRODUCTS L.P., A TEXAS LIMITED PARTNERSHIP, OR DELL GLOBAL B.V. (SINGAPORE BRANCH), THE SINGAPORE BRANCH OF A COMPANY INCORPORATED IN THE USET HERE AND SWITCH THE DELL DELLARD OF A COMPANY INCORPORATED IN THE Print I accept the terms in the license agreement I do not accept the terms in the license agreement	•
InstallShield 	

Figure 2. Dell End User License Agreement

 To continue the installation, read the agreement, select the l accept the terms in the license agreement check box, and then click Next. The Custom Setup page opens.

💕 Dell Storage Manager	ment Pack - Insta	allShield Wizard		×
Custom Setup Select the program feat	ures you want inst	alled.		2
Click on an icon in the list	anagement Pack fo MI Provider	or SCOM	alled. Feature Description Installs the Dell St Management Pack Systems Center Op Manager. This feature requir your hard drive.	orage for Microsoft perations
Install to: C:\Program Files (x86)\Sy Pack\ InstallShield	stem Center Mana	gement Packs\Dell S	torage Management	Change
Help	Space	< Back	Next >	Cancel

Figure 3. Custom Setup

6. Use the drop-down menus for each management pack to select from the following options:

	This feature will be installed on local hard drive. This feature, and all subfeatures, will be installed on local hard drive.
P	This feature will be installed when required.
×	This feature will not be available.

- 7. Verify that the **Dell Storage Management Pack for SCOM** and the **Dell VMM Storage Management Pack for SCOM** options are selected for installation.
 - () NOTE: The Dell Storage Management Pack for SCOM is required for using the Dell VMM Storage Management Pack for SCOM.
- 8. Clear the Dell Storage WMI Provider option.
- 9. (Optional) To change the default installation location, click **Change** and then type the path.
- 10. Click Next. The Ready to Install the Program page opens.

Dell Storage Management Pack - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
nstallShield
< Back Sack Cancel

Figure 4. Ready to Install the Program

11. Click Install. A progress page opens.

討 Dell Stora	ige Management Pack - InstallShield Wizard 📃 💼 💌
-	Dell Storage Management Pack ram features you selected are being installed.
1	Please wait while the InstallShield Wizard installs Dell Storage Management Pack. This may take several minutes. Status:
InstallShield –	< Back Next > Cancel

Figure 5. Installation Progress

12. When the installation is complete, the following page opens.

📴 Dell Storage Management Pack - InstallShield Wizard				
2	InstallShield Wizard Completed			
	The wizard was interrupted before Dell Storage Management Pack could be completely installed.			
	Your system has not been modified. To install this program at a later time, please run the installation again.			
	Click Finish to exit the wizard.			
	< Back Einish Cancel			

Figure 6. Installation Completed

- 13. Click Finish.
- 14. Import Management Pack 4.1 using the SCOM console.

For more information, see the How to Import an Operations Manager Management Pack web page.

Importing Management Pack Bundle Files

After installing the management packs, the following management pack bundle (.mpb) files are available in the C:\Program Files (x86)\System Center Mangement Packs\Dell Storage Management Pack directory.

- Dell.Storage.Library.mpb
- Dell.Storage.VMMDiscovery.mpb

To import the .mpb files:

1. Select Administration > Management Packs > Import Management Packs.

- After successfully importing the Dell.Storage.Library.mpb and the Dell.Storage.VMMDiscovery.mpb files, select Administration > Run as Configuration > Profiles.
- 3. Select Dell.Storage.VMMDiscovery.RunAsProfile.
- 4. Click Properties.
- 5. Select Run As Accounts.
- 6. Click Add.
- 7. From the Run As Account drop-down menu, select Virtual Machine Manager Connection Account and then click OK.
- 8. Click Save

When the wizard is finished, close the window.

Removing a Management Pack

The Dell Storage VMM Discovery management pack depends on the Dell Storage management pack. The VMM Discovery management pack must be removed before the Dell Storage management pack is removed.

() NOTE: The VMM Discovery management pack is referenced by the Secure Reference Override management pack; therefore, follow the steps in the following procedure before removing the VMM Discovery management pack from the System Center Operations Manager (SCOM).

To remove the management pack .mpb files:

- 1. Select Administration > Run as Configuration > Profiles.
 - a) Select Dell.Storage.VMMDiscover.RunAsProfile.
 - b) Click Properties.
 - c) Select Run as Accounts and Virtual Machine Manager Connection and then click Remove.
 - d) Click **Save**.

When the wizard is finished, close the window.

- 2. Open Windows PowerShell and run the following script. The script removes any references in the Microsoft Secure Reference Override management pack.
 - > \$MP = Get-SCOMManagementPack -Name "Microsoft.SystemCenter.SecureReferenceOverride"
 - > \$MP.References.Remove("Storage")
 - > \$MP.Verify()
 - > \$MP.AcceptChanges()
- 3. Select Administration > Management Packs.
- 4. Select the management pack that you want to delete.
- 5. Click Delete.

Using the Windows Management Instrumentation Provider

During discovery, the Storage Center Management Pack looks for target hosts in the SCOM Management Group that have the Windows Management Instrumentation (WMI) Provider installed.

() NOTE: The Storage Center Management Pack discoveries run every 4 hours by default. Initial discoveries of instances of the management pack classes might take up to 4 hours.

Install the WMI Provider on the same server as the Storage Manager Data Collector. Installing the WMI Provider on a standalone computer is recommended only if one of the following conditions applies:

- The WMI Provider will be connected to multiple Data Collectors.
- Installing the WMI Provider on the same computer as the Data Collector will cause a performance impact. A performance impact could be caused by computing resource issues (CPU and memory) or a large number of discovered components.

WMI Provider Requirements

Before SCOM can monitor Storage Centers, the Windows Management Instrumentation (WMI) Provider must be configured using a Storage Manager administrator-level user account. To allow SCOM to monitor a Storage Center, the following requirements for the Storage Manager user and environment apply:

- The WMI Provider must be installed on a host with the ability to communicate with the Storage Manager Data Collector.
- The WMI Provider must be configured with a Dell Storage Manager user with administrator-level user privileges.
- Storage Centers must be added to the Storage Manager Client using a Storage Center user with administrator-level user privileges.

For more information about using Storage Manager, see the Dell Storage Manager Administrator's Guide.

Install the WMI Provider

Use the following procedure to install the Windows Management Instrumentation (WMI) Provider.

(i) NOTE: Storage Manager administrator-level user privileges are required to install the WMI Provider.

1. Launch the Dell Storage Management Pack.msi file from the extracted location. The Welcome page opens.



Figure 7. Dell Storage Management Pack Installation Wizard

2. Click Next. The License Agreement page opens.

📅 Dell Storage Management Pack - InstallShield Wizard	×
License Agreement Please read the following license agreement carefully.	2
Dell End User License Agreemer Version	nt - A 🍵
THIS END USER LICENSE AGREEMENT ("EULA") IS A LEGAL A BETWEEN YOU (EITHER AN INDIVIDUAL OR AN ENTITY) AND L.P., A TEXAS LIMITED PARTNERSHIP, OR DELL GLOBAL B.V BRANCH), THE SINGAPORE BRANCH OF A COMPANY INCORP	DELL PRODUCTS /. (SINGAPORE
I do not accept the terms in the license agreement InstallShield	Cancel

Figure 8. Dell End User License Agreement

3. To continue the installation, read the license terms, select the **I accept the terms in the license agreement** check box, and then click **Next**. The **Custom Setup** page opens.

🗒 Dell Storage Management Pack - InstallShield Wizard	—
Custom Setup Select the program features you want installed.	E
Click on an icon in the list below to change how a feature is in	stalled.
Dell Storage Management Pack for SCOM 20 Dell Storage WMI Provider Dell VMM Storage Management Pack for SCC	Feature Description Installs the Dell Storage WMI provider.
	This feature requires 338KB on your hard drive.
C:\Program Files (x86)\Dell\Dell Storage WMI Provider\	
InstallShield	
Help < Back	Next > Cancel

Figure 9. Custom Setup for WMI Provider

- 4. Clear the Dell Storage Management Pack for SCOM and Dell VMM Storage Management Pack for SCOM options.
- 5. Select Dell Storage WMI Provider for installation and then click Next.
- 6. (Optional) Click Change to change the default installation folder and then click Next. The Ready to Install the Program page opens.

😼 Dell Storage Management Pack - InstallShield Wizard	×
Ready to Install the Program	
The wizard is ready to begin installation.	
Click Install to begin the installation.	
If you want to review or change any of your installation settings, click Back. Click Cance exit the wizard.	el to
InstallShield	
< Back Sack Car	cel

Figure 10. Ready to Install the Program

- 7. Click Install. The installation wizard displays a progress page and then the Completed page.
- 8. When the installation is complete, click **Finish**.

Configure the WMI Provider

After installing the WMI Provider, configure the provider to connect to the Storage Manager Data Collector.

- (i) NOTE: To monitor for target hosts, a SCOM monitoring agent must be installed on the same server as the WMI Provider. For more information, see the Microsoft System Center Operations Manager website.
- 1. Open Windows Explorer and go to C:\Program Files (x86)\Dell\Dell Storage WMI Provider.
- 2. Double-click the Dell.Storage.Configurator.exe file to run the WMI Provider Configurator. The Dell Storage WMI Provider Configurator dialog box opens.

Dell Storage WMI Provider Configurator	r		_ 🗆 ×
Dell Storage	WMI Prov	ider Config	urator
Allow discovery of this provider from the D	ell Storage Management	Pack for Systems Center Op	perations Manager
172.20.21.8			
172.20.64.93	Host Name :	172.20.21.8	
	Port :	3033	
	User Name :	admin	
	Password :		
	Confirm Password :		
			Test Connection
Add <u>R</u> emove		Save	<u>C</u> ancel

Figure 11. Dell Storage WMI Provider Configurator

() NOTE: On rare occasions, a load failure might occur if the WMI Provider is installed, uninstalled, and reinstalled continuously over a short period. If the Dell Storage WMI Provider Configurator returns a load failure, run the following command: C:\Windows\Microsoft.NET\Framework64\v4.0.30319\InstallUtil.exe C:\Windows

\Microsoft.NET\assembly\GAC_64\Dell.Storage.Instrumentation\v4.0_4.1.0.2__07519b417fc2eafb
\Dell.Storage.Instrumentation.dll.

- 3. Select the Allow discovery of this provider from the Dell Storage Management Pack for System Center Operations Manager check box.
- 4. Click Add.
- 5. Type the Host Name or IP address of the Storage Manager Data Collector. The default number for the Port (3033) is input automatically.
- 6. Type the required information in the User Name and Password fields, and confirm the password for the Storage Manager Data Collector. The user must have administrator-level user privileges.
- 7. Click **Test Connection** to verify that the information provided for the Data Collector is correct. If the connection is not successful, verify the hostname and login credentials and then click **Test Connection** again.
- 8. After the connection is successful, click Save to save the entry.
- 9. Add the computer where the WMI Provider is installed to the SCOM Management Group. Dell Storage Management Pack will not discover the WMI Provider unless the computer is added to this group. For more information, see the Microsoft System Center Operations Manager website.

Repairing an Installation

The Dell Storage Management Pack installation wizard provides an option for repairing an installation.

To repair the installation:

1. Run the Dell Storage Management Pack.msi file. The Welcome page opens.



Figure 12. Installation Welcome

2. Click Next. The Program Maintenance page opens.

闄 Dell Storage M	lanagement Pack - InstallShield Wizard
Program Main Modify, repair,	tenance , or remove the program.
O Modify	Change which program features are installed. This option displays the Custom Selection dialog in which you can change the way features are installed.
Repair I	Repair installation errors in the program. This option fixes missing or corrupt files, shortcuts, and registry entries.
Remove	Remove Dell Storage Management Pack from your computer.
InstallShield	< Back Next > Cancel

Figure 13. Program Maintenance

- 3. Select Repair and then click Next. The Ready to Repair the Program page opens.
- **4.** Click **Install**. A progress screen displays the progress of the installation.
- 5. After the process is complete, click **Finish**.

Viewing and Monitoring Storage Centers

Using the Monitoring Navigation Tree

Monitoring

All discovered objects and their associated dashboards can be found in the **Dell Storage Center Monitoring** folder in the **Monitoring** navigation tree.

- 1. Open System Center Operations Manager (Start > All Programs > System Center *[version]* Operations Manager > Operations Console).
- 2. Click the Monitoring Monitoring button.
- 3. In the navigation tree, expand the Dell Storage Center Monitoring folder.
 - 4 Monitoring Controller Ports UNIX/Linux Computers Agentless Exception Monitoring Application Monitoring Data Warehouse 👂 🚺 Dell 4 🙀 Dell Storage Center Monitoring Active Alerts Storage Center Diagram View Storage Center IO Performance Dashboard Storage Center Usage Dashboard Storage Centers Storage Center Controllers Storage Center Disks Storage Center Enclosures Storage Center Replications Storage Center Servers Storage Center Storage Types Storage Center Volumes VMM Discovery MMI Provider

Figure 14. Storage Center Monitoring Menu

Viewing and Acknowledging Alerts

The management pack polls the Storage Manager Data Collector for Storage Center alerts and displays them in the **Active Alerts** pane. SCOM administrators can then acknowledge the alerts using the SCOM console and synchronize any actions taken through the console with the Storage Manager Data Collector.

After an alert is acknowledged, SCOM runs the alert rule once every 150 seconds. The alert must remain in the acknowledged state in the SCOM console for the required time period before being closed. If the alert is closed before the alert rule finishes running, the alert will not be acknowledged in Storage Manager.

() NOTE: If the SCOM console is used as the primary console for monitoring Storage Center alerts, use the SCOM console Acknowledge feature to acknowledge them. Acknowledging alerts using the Storage Manager client or the Windows PowerShell Storage Manager API will not acknowledge the alert in the SCOM console.

To view and acknowledge SCOM active alerts:

1. In the **Dell Storage Center Monitoring** folder, click **Active Alerts**. The active alerts for the Storage Center appear in the **Active Alerts** pane.

Look fee		Find Nove Star				
😵 icon	Source	Name ~	Resolution State	Created	Age	Priority
Severity: Critic	el (49)					
0	MMT 4	Unable to communicate with remote system, S/N 64065	New	1/23/2014 5:11:25 PM	5 Days, 20 Hour	. High
•	3867.4	Unable to communicate with remote system, 5/N 570	New	3/23/2014 3:17:23 PM	\$ Days, 33 Hour	High
0	584T-4	Server 'win-7dtu/5d92mv' not visible on any path	New	\$/23/2014 3/11/25 PM	\$ Days, 20 Hour	High
	MMT 4	Server 'win-Sequo'ImOllip' not visible on any path	New	3/25/2014 5:11:25 PM	5 Days, 20 Hour	High
0	MMT 4	Server 'windth1 applications.lab' not visible on any path	New	1/25/2014 5:11/25 PM	S Days, 20 Hour	High
•	6667.4	Server 'win2012ExcVer.Applications.lab' not visible on any path	New	1/23/2014 5:15:25 PM	5 Days, 20 Hour	High
•	MMT 4	Server Wainfload' not visible on any path	Nevi	3/23/2014 5:11:25 PM	5 Days, 20 Hout	High
0	MMT 4	Server 'w2k8r2s2008m1 applications lab' not visible on any path	New	1/23/2014 3/11/25 PM	5 Days, 20 Hour	High
0	MM7.4	Server 'w2k8x2x2010in3.ex2010large.applications.lab' not visibl	New	1/23/2014 5:15:25 PM	\$ Days, 20 Hour	High
•	NB/F 4	Server 'w2k0/2e/2010k/.ex2010/sege.applications.lab' not visibl	New	3/23/2014 5:33:25 PM	\$ Days, 20 Hour	High
	MMT4	Server 'w2k8basic.applications.lab' not visible on any path	New	1/23/2014 5:15/25 PM	5 Days, 20 Hour	High
0	5857.4	Server 'w2k3c2m2k3c2m1.ex2003.applications.lab' not visible e	New	3/28/2014 3:13:25 PM	5 Days, 20 Hour	High
0	MMT-4	Server 'Temp Test Machine' not visible on any path	New	1/23/2014 5/11/25 PM	\$ Days, 20 Hour	High
•	MMIT 4	Server 'Roosevelt' not visible on any path-	New	1/23/2014 5:11:25 PM	5 Days, 20 Hour	High
0	MMIT 4	Server 'RnsiW2k3R2Basic' not visible on any path	New	1/23/2014 5:11:25 PM	5 Days, 20 Hour	High
liert Details						
Server 'm	2wBr2s2006m3.app	Scattons.lab' not visible on any path		Aliert De	scription	
Source: Colored Science Sector			Storage Descript Niert Stri Autors II Acknow	basi Drivers	inf applications.lab' not withle an any path	

Figure 15. SCOM Active Alerts Pane

- 2. Click an alert to display more information about the alert in the Alert Details pane.
- 3. For more detailed information, double-click the alert to open the Alert Properties pane.
- 4. To acknowledge an alert, right-click the alert and select the **Acknowledge** resolution state to resolve the alert and synchronize the resolution with the Storage Manager Data Collector.
- (Optional) To configure notifications for alerts, click Administration and configure notifications (Administration > Notifications > Subscriptions).

For more information, see the Microsoft System Center Operations Manager website.

Viewing Health Indicators

Click **Storage Centers** to view the health information for all monitored Storage Centers. Type the name of a specific Storage Center in the **Look for** field to filter the list.

The following table describes the Health Indicator alerts.

Table 3. Health Indicator Alert Types

Alert Type	Description	
Critical	A component has failed or failure is imminent.	
Warning	A monitored component is above or below an acceptable threshold.	
Healthy	The component is working as expected.	
Maintenance Mode	The component is being repaired or replaced.	
Unknown Status	The component is not currently being monitored.	

A health state is assigned to the Storage Center and also to its components (Controller, Enclosure, Server, Volume, Center Disk Class, Storage Type, and Replication).

Shoraga Caritari	623										
🔍 Look for	Ľ			End New	Quar						
State	0	Name	SerialHumber	Vesion	Storage Center Controller	Center Disk Enclosure	Storage Canter Server	Storope Center Volume	Center Elsk Class	Center Storage Type	Center Replication
Critical		MIGTI	64039	43.10.108	@Healthy	@ Healthy	Q Critical	A Warning	@ Healthy	@ Healthy	@ Healthy
😫 Criscal		586/T 4	538	5:5.10.28	Critical	A Healthy	🔕 Critical	Critical	Healthy	Wealthy	
Detail View		Instance	Availability	Cordparation	C Performance	Security					
	1					1					
1 Warning		VSS 3/SSSnepsh.		& Warning		. O Not munit					
L maning		VSI //SSSnapilt		A Warning	O Not monits.						
 Multity 		\$55.1613	Ø Healtry	A Healthy	O Not monito.	-					
1 Warning		V55 (/555napsh		3 Warning	O Not monits.						
8. Warning		replicit New Yol		A Warning	O Not monito.						
Healthy		#NUM0301	(2) Healthy	@ Healthy	O Not monito.						
Critical		VSS 3/SSSnapsh.		@ Healthy	O Not monito.						
C Huality		VES DIX Dates.		Healthy	O fist monits.						
1 Harring		ESIC 5.0 GA Gold	@ Healthy	& Warning	O Not monito.	-					
C Healthy		VSS BRIVELER		A Healthy	O flat wonits.						
10 Winning		20 gib	Healthy	🚖 Warning	 Bot manifa. 	 O Not monit 	10-m				

Figure 16. Health Indicator View

Viewing Dashboards

The dashboards included with the management pack display performance metrics and usage data for the monitored Storage Centers. NOTE: The Storage Center Management Pack 4.1 for Microsoft System Center 2012 Operations Manager is sealed and therefore the dashboards contained within the management pack cannot be edited. However, SCOM can be used to

create unique dashboards outside of the management pack.

The following figure provides an example of the Storage Center IO Performance Dashboard.



Figure 17. Storage Center IO Performance Dashboard

Select a Dashboard to View

Select a dashboard in the navigation tree to view its associated metrics. Each dashboard displays the selected components for the Storage Centers being monitored. Select one or more components on a dashboard to view the values specific to the component.

The following table describes the dashboards included with the management pack.

Table 4. Management Pack Dashboards

Dashboard	Displays
Storage Center IO Performance	Front- and back-end IO and MB per second for the monitored Storage Centers
Storage Center Usage	Historical usage for the monitored Storage Centers
Controller IO Performance	Controller IO performance metrics
Disk Class IO Performance	Disk class IO performance metrics
Server IO Performance	Server IO performance metrics
Server Usage	Historical usage for the monitored Storage Center servers

Dashboard	Displays
Volume IO Performance	Volume IO performance metrics
Volume Usage	Historical usage for the monitored Storage Center volumes

Personalize a Dashboard View

Although changes cannot be saved to a management pack dashboard, the display options can be saved as a personalized view outside of the management pack. Making a personalized view creates a copy of the dashboard and allows the display options to be modified.

- 1. In the Monitoring tree, click Settings 🌼 > Personalize. The Personalize view dialog box opens and shows the default settings of the dashboard.
- 2. In Columns to display, select any properties that you want to be displayed in your personalized view.
- 3. In the Sort columns by drop-down box, click the arrow to choose a property for sorting the monitored objects.
- 4. Click OK to save the personalized view.

Specifying Override Parameters

Customize the Storage Center Management Pack for Microsoft System Center Operations Manager by using overrides.

- 1. From the SCOM console, click Authoring.
- 2. Expand Authoring and select Management Pack Objects.
- 3. Select the management page object that you want to override.
- 4. Right-click on any of the components of a management pack object and from the pop-up menu select **Overrides** > **Override the** *object_name*. The **Override Properties** dialog box opens.
- 5. Select the object to override and modify the override values.
- 6. Click Apply.

Management Pack Classes

The following table describes the classes discovered by the management pack. **Table 5. Management Pack Classes**

Class Name	Description
Dell.Storage.StorageCenterWMIProvider	Represents the WMI Provider.
Dell.Storage.StorageCenterComponent	Represents a Storage Center component.
Dell.Storage.DataCollector	Represents a Storage Manager Data Collector. The Data Collector credentials are provided to the WMI Provider.
Dell.Storage.StorageCenter	Represents a Storage Center.
Dell.Storage.StorageCenterVolume	Represents a volume on the Storage Center.
Dell.StorageCenterReplication	Represents a Storage Center replication.
Dell.Storage.StorageCenterType	Represents the Storage Center storage type.
Dell.Storage.StorageCenterController	Represents a Storage Center controller.
Dell.Storage.StorageCenterControllerPort	Represents a port on the Storage Center controller.
Dell.Storage.StorageCenterControllerPowerSupply	Represents a power supply on the Storage Center controller.
Dell.Storage.CenterControllerTemperatureSensor	Represents a temperature sensor on the Storage Center controller.
Dell.Storage.StorageCenterControllerFanSensor	Represents a fan sensor on the Storage Center controller.

Class Name	Description
Dell.Storage.StorageCenterControllerVoltageSensor	Represents a voltage sensor on the Storage Center controller.
Dell.Storage.StorageCenterControllerCacheCard	Represents a cache card on the Storage Center controller.
Dell.Storage.StorageCenterEnclosure	Represents a Storage Center enclosure.
Dell.Storage.StorageCenterEnclosureIOModule	Represents an IO module on a Storage Center enclosure.
Dell.Storage.StorageCenterPowerSupply	Represents a power supply on a Storage Center enclosure.
Dell.Storage.StorageCenterEnclosureTemperatureSensor	Represents a temperature sensor on a Storage Center enclosure.
Dell.Storage.StorageCenterEnclosureFanSensor	Represents a fan sensor on a Storage Center enclosure.
Dell.Storage.StorageCenterEnclosureDisk	Represents a disk on a Storage Center enclosure.
Dell.StorageCenterServer	Represents a Storage Center server.
Dell.StorageCenterDiskClass	Represents the Storage Center disk class.
Dell.Storage.StorageCenterDisk	Represents a Storage Center disk.
Dell.Storage.StorageCenterAlert	Represents a Storage Center alert. Alerts are displayed in Active Alerts.

Virtual Machine Discovery Management Pack Classes

The following table describes the virtual machine (VM) discovery classes for the management pack. **Table 6. Management Pack VM Discovery Classes**

Class Name	Description
Dell.Storage.VMMDiscovery.VirtualMachine	Represents the VM.
Dell.Storage.VMMDiscovery.VirtualMachineVolume	Represents the volume mapped to the VM.
Dell.Storage.VMMDiscovery.VMHost	Represents the VM host.
Dell.Storage.VMMDiscovery.VMHostVolume	Represents the volume mapped to the VM host.

Health Monitors

The following table describes the health monitors for the management pack. **Table 7. Management Pack Health Monitors**

Monitor Name	Туре	Description	
ControllerCacheCardMonitor	Dependency	Rolls up the cache card health to the controller.	
ControllerCacheCardStatusMonitor	Unit	Jnit Monitors the status of the cache card.	
ControllerFanSensorMonitor	Dependency	Rolls up the fan sensor health to the controller.	
ControllerFanSensorRpmMonitor	Unit	Monitors the RPM of the fan sensor.	
ControllerPortMonitor	Dependency	Rolls up the port health to the controller.	
ControllerPortStatusMonitor	Unit	Monitors the status of the controller port.	
ControllerPowerSupplyMonitor	Dependency	Rolls up the power supply health to the controller.	
ControllerPowerSupplyStatusMonitor	Unit	Monitors the status of the controller's power supply.	

Monitor Name	Туре	Description	
ControllerStatusMonitor	Unit	Monitors the status of the controller.	
ControllerTemperatureSensorMonitor	Dependency	Rolls up the temperature sensor health to the controller.	
ControllerTemperatureSensorStatusMonitor	Unit	Monitors the status of the temperature sensor.	
ControllerVoltageSensorMonitor	Dependency	Rolls up the health of the voltage sensor to the controller.	
ControllerVoltageSensorStatusMonitor	Unit	Monitors the status of the voltage sensor.	
DataCollectorStatusMonitor	Unit	Monitors the status of a Data Collector.	
DataCollectorStorageCenterMonitor	Dependency	Rolls up the health of a Storage Center to the Data Collector.	
DiskClassDiskMonitor	Dependency	Rolls up the health of a disk to the disk class.	
DiskStatusMonitor	Unit	Monitors the status of the disk.	
EnclosureDiskMonitor	Dependency	Rolls up the health of an enclosure disk to the enclosure.	
EnclosureDiskStatusMonitor	Unit	Monitors the status of an enclosure disk.	
EnclosureFanSensorMonitor	Dependency	Rolls up the health of the fan sensor to the enclosure.	
EnclosureFanSensorStatusMonitor	Unit	Monitors the status of an enclosure fan sensor.	
EnclosureloModuleMonitor	Dependency	Rolls up the health of an IO module to the enclosure.	
EnclosureloModuleStatusMonitor	Unit	Monitors the status of an enclosure IO module.	
EnclosurePowerSupplyMonitor	Dependency	Rolls up the health of a power supply to the enclosure.	
EnclosurePowerSupplyStatusMonitor	Unit	Monitors the status of an enclosure power supply.	
EnclosureStatusMonitor	Unit	Monitors the status of an enclosure.	
EnclosureTemperatureSensorMonitor	Dependency	Rolls up the health of an enclosure temperature sensor.	
EnclosureTemperatureSensorStatusMonitor	Unit	Monitors the status of an enclosure temperature sensor.	
ReplicationStatusMonitor	Unit	Monitors the status of a replication.	
ServerStatusMonitor	Unit	Monitors the status of a server.	
ServerVolumesMappedMonitor	Unit	Monitors whether a server has any volumes mapped to it.	
StorageCenterControllerMonitor	Dependency	Rolls up the health of a controller to the Storage Center.	
StorageCenterDiskClassMonitor	Dependency	Rolls up the health of the disk class to the Storage Center.	
StorageCenterEnclosureMonitor	Dependency	Rolls up the health of the enclosure to the Storage Center.	
StorageCenterReplicationMonitor	Dependency	Rolls up the health of a replication to the Storage Center.	
StorageCenterServerMonitor	Dependency	Rolls up the health of a server to the Storage Center.	
StorageCenterStatusMonitor	Unit	Monitors the status of a Storage Center.	
StorageCenterStorageTypeMonitor	Dependency	Rolls up the health of a storage type to the Storage Center.	
StorageCenterVolumeMonitor	Dependency	Rolls up the health of a volume to the Storage Center.	
StorageTypeStatusMonitor	Unit	Monitors the status of a storage type.	
VolumeMappedMonitor	Unit	Monitors whether a volume has been mapped to a server.	
VolumeStatusMonitor	Unit	Monitors the status of a volume.	
WMIProviderDataCollectorMonitor	Dependency	Rolls up the health of a Data Collector to the WMI Provider.	

Performance Counter Rules

The following table lists the performance counters included with the management pack. **Table 8. Management Pack Performance Counters**

Performance Counter Rule	Description
ControllerAverageloSizeCounter	Controller average IO count
ControllerReadloSecCounter	Controller read IO count per second
ControllerReadKBSecCounter	Controller read IO per second in KB
ControllerReadLatencyCounter	Controller IO read latency
ControllerReadMBSecCounter	Controller read IO per second in MB
ControllerTotalloSecCounter	Controller total IO per second count
ControllerTotalKBSecCounter	Controller total IO per second in KB
ControllerTotalMBSecCounter	Controller total IO per second in MB
ControllerWriteloSecCounter	Controller write IO count per second
ControllerWriteKBSecCounter	Controller write IO per second in KB
ControllerWriteLatencyCounter	Controller IO write latency
ControllerWriteMBSecCounter	Controller write IO per second in MB
DiskClassAverageloSizeCounter	Disk class average IO count
DiskClassloPendingCounter	Disk class pending IO count
DiskClassReadloSecCounter	Disk class read IO count per second
DiskClassReadKBSecCounter	Disk class read IO per second in KB
DiskClassReadLatencyCounter	Disk class read latency
DiskClassReadMBSecCounter	Disk class read IO count per second in MB
DiskClassTotalloSecCounter	Disk class total IO count per second
DiskClassTotalKBSecCounter	Disk class total IO per second in KB
DiskClassTotalMBSecCounter	Disk class total IO per second in MB
DiskClassWriteloSecCounter	Disk class write IO count per second
DiskClassWriteKBSecCounter	Disk class write IO per second in KB
DiskClassWriteLatencyCounter	Disk class write latency
DiskClassWriteMBSecCounter	Disk class write IO per second in MB
ServerActiveSpaceCounter	Active space count on the server
ServerActualSpaceCounter	Actual space count on the server
ServerAverageloSizeCounter	Average IO count on server
ServerConfiguredSpaceCounter	Configured space count on the server
ServerRaidOverheadCounter	Overhead count on the server RAID
ServerReadloSecCounter	Server read IO count per second
ServerReadKBSecCounter	Server read IO per second in KB
ServerReadLatencyCounter	Server read latency
ServerReadMBSecCounter	Server read IO per second in MB
ServerReplaySpaceCounter	Replay space count on the server

Performance Counter Rule	Description
ServerTotalDiskSpaceCounter	Total disk space count on the server
ServerTotalloSecCounter	Server total IO per second count
ServerTotalKBSecCounter	Server total IO per second in KB
ServerTotalMBSecCounter	Server total IO per second in MB
ServerWriteloSecCounter	Server write IO count per second
ServerWriteKBSecCounter	Server write IO per second in KB
ServerWriteLatencyCounter	Server write latency
ServerWriteMBSecCounter	Server write IO per second in MB
ServerXferLatencyCounter	Server transfer latency
StorageCenterAlertThresholdSpaceCounter	Storage Center alert threshold space count
StorageCenterAllDiskAverageloSizeCounter	Average IO size of all disks on the Storage Center count
StorageCenterAllDiskloPendingCounter	Pending IO count of all disks on the Storage Center
StorageCenterAllDiskReadloSecCounter	Storage Center all disk read IO per second count
StorageCenterAllDiskReadKBSecCounter	Storage Center all disk read IO per second count in KB
StorageCenterAllDiskReadLatencyCounter	Storage Center all disk read latency
StorageCenterAllDiskTotalloSecCounter	Storage Center all disk total IO per second count
StorageCenterAllDiskTotalKBSecCounter	Storage Center all disk total IO per second in KB
StorageCenterAllDiskWriteloSecCounter	Storage Center all disk write IO per second count
StorageCenterAllDiskWriteKBSecCounter	Storage Center all disk write IO per second in KB
StorageCenterAllDiskWriteLatencyCounter	Storage Center all disk write latency
StorageCenterAllServerXferLatencyCounter	Storage Center all server transfer latency
StorageCenterAllocatedSpaceCounter	Count of allocated space on the Storage Center
StorageCenterAllServerAverageloSizeCounter	Average IO size of all servers on Storage Center count
StorageCenterAllServerReadloSecCounter	Storage Center all server read IO per second count
StorageCenterAllServerReadKBSecCounter	Storage Center all server read IO per second in KB
StorageCenterAllServerReadLatencyCounter	Storage Center all server read latency
StorageCenterAllServerTotalloSecCounter	Storage Center all server total IO per second count
StorageCenterAllServerTotalKBSecCounter	Storage Center all server total IO per second in KB
StorageCenterAllServerWriteloSecCounter	Storage Center all server write IO per second count
StorageCenterAllServerWriteKBSecCounter	Storage Center all server write IO per second in KB
StorageCenterAllServerWriteLatencyCounter	Storage Center all server write latency
StorageCenterAllVolumeAverageloSizeCounter	Storage Center all volume average IO size count
StorageCenterAllVolumeloPendingCounter	Storage Center all volume IO pending count
StorageCenterAllVolumeReadloSecCounter	Storage Center all volume read IO per second count
StorageCenterAllVolumeReadKBSecCounter	Storage Center all volume read IO per second in KB
StorageCenterAllVolumeReadLatencyCounter	Storage Center all volume read latency
StorageCenterAllVolumeTotalloSecCounter	Storage Center all volume total IO per second count
StorageCenterAllVolumeTotalKBSecCounter	Storage Center all volume total IO per second in KB

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StorageCenterUsedSpaceCounterStorage Center used space counterVolumeActiveSpaceCounterVolume active space counterVolumeActualSpaceCounterVolume actual space counterVolumeAverageloSizeCounterVolume average IO size counterVolumeFreeSpaceCounterVolume free space counterVolumeIoPendingCounterVolume IO pending counter	Storage Center front-end write IO per second in MB	
VolumeActiveSpaceCounterVolume active space counterVolumeActualSpaceCounterVolume actual space counterVolumeAverageloSizeCounterVolume average IO size counterVolumeFreeSpaceCounterVolume free space counterVolumeIoPendingCounterVolume IO pending counter	Storage Center IO pending counter	
VolumeActualSpaceCounterVolume actual space counterVolumeAverageIoSizeCounterVolume average IO size counterVolumeFreeSpaceCounterVolume free space counterVolumeIoPendingCounterVolume IO pending counter	Storage Center used space counter	
VolumeAverageIoSizeCounterVolume average IO size counterVolumeFreeSpaceCounterVolume free space counterVolumeIoPendingCounterVolume IO pending counter	Volume active space counter	
VolumeFreeSpaceCounter Volume free space counter VolumeIoPendingCounter Volume IO pending counter	Volume actual space counter	
VolumeIoPendingCounter Volume IO pending counter		
	Volume IO pending counter	
VolumeRaidOverheadCounter Volume RAID overhead counter	Volume RAID overhead counter	
VolumeReadIoSecCounter Volume read IO per second counter	Volume read IO per second counter	
VolumeReadKBSecCounter Volume read IO per second in KB		
VolumeReadLatencyCounter Volume read latency counter		
VolumeReadMBSecCounter Volume read IO per second in MB	Volume read IO per second in MB	
VolumeReplaySpaceCounter Volume replay space counter	Volume replay space counter	
VolumeTotalDiskSpaceCounter Volume total disk space counter	Volume total disk space counter	
VolumeTotalloSecCounter Volume total IO per second counter		
VolumeTotalKBSecCounter Volume total IO per second in KB		

Performance Counter Rule	Description
VolumeTotalMBSecCounter	Volume total IO per second in MB
VolumeWriteloSecCounter	Volume write IO per second counter
VolumeWriteKBSecCounter	Volume write IO per second in KB
VolumeWriteLatencyCounter	Volume write latency
VolumeWriteMBSecCounter	Volume write IO per second in MB

Viewing Storage Centers

The SCOM Management Pack 4.1 provides a graphical topology (diagram) view that lets SCOM administrators view Storage Center components and their mappings and associations to other Storage Center components on the same storage area network (SAN).

To open a Storage Center diagram view:

1. In the **Dell Storage Center Monitoring** folder, click **Storage Center Diagram View**. The **Storage Center Diagram View** pane opens.



Figure 18. Storage Center Diagram View

- 2. Click the plus (+) or minus (-) sign on a Storage Center node to expand or collapse its associated components.
- 3. (Optional) Right-click the Storage Center node for a menu of applicable commands. For example, you can open the Object Properties dialog box and change the diagram view layout.

Viewing Virtual Machines

The Dell VMM Storage Management Pack for SCOM discovers Storage Center virtual machines (VMs) managed by the System Center Virtual Machine Manager (SCVMM). This management pack allows SCOM administrators to view and monitor Storage Center VMs, including Windows Hyper-V hosts.

(i) NOTE: The Dell VMM Storage Management Pack for SCOM is a separate management pack and depends on the Microsoft SCVMM management packs provided by Microsoft. After installing the management pack, the Virtual Machine Manager (VMM) must be connected and configured to work with SCOM. For more information, see How to Connect VMM with Operations Manager.

Volumes can be mapped to a Hyper-V or VM in various ways. The following table provides a summary of connectivity supported as part of the VM discovery. For more information, see the *Dell Storage Center Management Pack for Microsoft System Center Operations Manager Release Notes*.

Table 9. Mapping Volumes

System/Connectivity	Fibre Channel	iSCSI	Pass-Through
Hyper-V host	Supported	Supported	Not applicable
Virtual machine	Supported	Not supported	Not supported

(i) NOTE: The Virtual Machine Volumes state and the Virtual Machine Volume Diagram View do not display iSCSI volumes mapped to Hyper-V hosts. For more information about Hyper-V hosts, see the Microsoft Hyper-V web page.

In addition to discovering VMs and providing a standard list view, SCOM provides two types of diagram views:

- Virtual Machine Volume Diagram View
- VM Host Volume Diagram View

To open a VMM Discovery diagram view:

- 1. In the **Dell Storage Center Monitoring** folder, expand the **VMM Discovery** folder.
- 2. To view VM volumes, select Virtual Machine Volume Diagram View. The Virtual Machine Volume Diagram View pane opens.



Figure 19. Virtual Machine Volume Diagram View

3. To view VM host volumes, select VM Host Volume Diagram View. The VM Host Volume Diagram View pane opens.



Figure 20. VM Host Volume Diagram View

- 4. Click the plus (+) or minus (-) sign on a VM node to expand or collapse its associated components.
- 5. (Optional) Right-click the VM node for a menu of applicable commands. For example, you can open the Object Properties dialog box, change the diagram view layout, and so on.