Dell Storage Center Management Pack Version 4.0.1 for Microsoft System Center 2012 Operations Manager Administrator's Guide



Notes, Cautions, and Warnings

NOTE: A NOTE indicates important information that helps you make better use of your computer.

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

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

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Preface

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.



NOTE: For complete information about the Microsoft System Center Operations Manager (SCOM), see the Microsoft documentation on the <u>Microsoft System Center Operations Manager</u> website.

Revision History

Document Number: 680-038-004

Revision	Date	Description
А	December 2015	Version 4.0 initial release
В	July 2016	Version 4.0.1 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 www.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 Knowledge Center:

 Dell Storage Center Management Pack for Microsoft System Center Operations Manager Release Notes

Describes important release information, including known issues.

- Dell Storage Center System Manager Administrator's Guide
 Describes the Storage Center System Manager software that manages an individual Storage Center.
- Dell Storage Manager Administrator's Guide Contains in-depth feature configuration and usage information.

Getting Started

The Dell Storage Center Management Pack 4.0.1 for Microsoft System Center 2012 Operations Manager allows monitoring of Storage Center devices from the Microsoft System Center Operations Manager (SCOM) console.

The SCOM console provides basic system monitoring; however, detailed monitoring of the Dell Storage Center requires additional management packs. The Dell Storage Management Pack 4.0.1 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

New in This Release

The Dell Storage Center Management Pack has added the following new functionality. Version 4.0.1 adds support for Dell Storage Manager 2016 R1.

Version 4.0 added the following new features:

- Alert Correlation Provides a mechanism in the SCOM console that lets SCOM administrators acknowledge Storage Manager alerts generated by one or more supported Storage Centers. Alert correlation provides SCOM administrators with a method for resolving and synchronizing all Storage Center alerts.
- Virtualization Discovery Provides a method used to discover Windows Hyper-V hosts and virtual machines (VMs) managed by the System Center Virtual Machine Manager (SCVMM). This management pack depends on the Microsoft SCVMM Management Pack.
- Storage Center Diagram View Provides a topology view of a selected Storage Center and its associated components.

SCOM Components

The Storage Center Management Pack 4.0.1 for Microsoft System Center 2012 Operations Manager consists of the components listed in the following table. **Table 1. SCOM Components**

Component	Description
5	Defines the various components that make up a management pack. When a management pack is

Component	Description
 Dell Storage Management Pack for SCOM 2012 Dell VMM Storage Management Pack for SCOM 2012 	installed, instances of the classes defined by the management pack are automatically discovered and monitored. For more information, see <u>Management</u> <u>Pack Classes</u> and <u>Virtual Machine Discovery</u> <u>Management Pack Classes</u> .
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 4.0.1 for Microsoft System Center 2012 Operations Manager (SCOM). **Table 2. Installation Requirements**

Requirement	Description
Microsoft SCOM	 The server must meet all SCOM requirements and must be one of the following supported versions: SCOM 2012 R2 SCOM 2012 SP1
Microsoft System Center Virtual Machine Manager (SCVMM)	The following versions of SCVMM are supported:SCVMM 2012 R2SCVMM 2012 SP1
Storage Manager	 Enterprise Manager 2015 R2 Enterprise Manager 2015 R3 Dell Storage Manager 2016 R1 or later
Storage Center Operating System	The Storage Center Operating System version depends on the version supported by Storage Manager.
Dell Storage Systems	 The following storage systems are supported: SCv2020 SC4020 SC8000 SC9000
Operating System	 The following Windows Server operating system versions are supported: Microsoft Windows Server 2008 R2 SP1 Microsoft Windows Server 2012 Microsoft Windows Server 2012 R2
Microsoft .NET Framework	Microsoft .NET Framework 4.0 or later
Processor	x64

Requirement	Description
Memory	See the <u>Microsoft System Center Technical Documentation</u> <u>Library</u> website for the latest memory requirements.
Network Connection	Gigabit Ethernet is highly recommended by DellVisibility 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 <u>Microsoft Operations</u> <u>Manager Agent Installation Methods</u> web page.

Updating the Management Pack

The System Center Operations Manager (SCOM) Management Pack Upgrade wizard can be used to update the software from version 3.x or 4.0 to version 4.0.1.

If you are updating the Windows Management Instrumentation (WMI) Configurator, the list of Data Collectors and their credentials are retained.

NOTE: The SCOM version and the operating system must be the same versions as the versions used before the update. If a previous version of the SCOM Management Pack is installed, the Installation wizard issues a warning that the update is going to be installed. An option to cancel the update is provided.

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 2012 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.



U

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 <u>Microsoft System Center</u> website.

Installing the Management Pack

The Storage Center Management Pack 4.0.1 provides a standard installer that is used to install both the Dell Storage Management Pack for SCOM 2012 and the Dell VMM Storage Management Pack for SCOM 2012.

To install the Storage Center Management Pack 4.0.1 for Microsoft SCOM:

- 1. Download the Storage Center Management Pack for Microsoft SCOM software.
 - a. Go to the Dell Storage Customer Portal.
 - b. Log in to the customer or partner portal.
 - c. Click Knowledge Center, then download the Storage Center Management Pack for Microsoft SCOM Setup file.
- 2. Unpack the Storage Center Management Pack for Microsoft SCOM Setup compressed (.zip) file and specify a directory to extract its contents.

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.

The Dell Storage Managem	ent Pack installation wizard starts and the Welcome page opens.
😸 Dell Storage Management Pac	k - InstallShield Wizard
٤	Welcome to the InstallShield Wizard for Dell Storage Management Pack Dell Storage Management Pack Setup is preparing the InstallShield Wizard which will guide you through the program setup process. Please wait.
	<back next=""> Cancel</back>

Figure 1. Dell Storage Management Pack Installation Wizard

4. Click Next. The License Agreement page opens.



Figure 2. Dell End User License Agreement

5. To continue the installation, read the agreement, select the I accept the terms in the license agreement checkbox, and then click Next. The Custom Setup page opens.

-			
🗒 Dell Storage Management Pack - InstallShield Wizard			
Custom Setup Select the program features you want installed.			
Click on an icon in the list below to change how a feature is in: Dell Storage Management Pack for SCOM 2012 Dell Storage WMI Provider Dell VMM Storage Management Pack for SCOM 2012 	stalled. Feature Description Installs the Dell Storage Management Pack for Microsoft Systems Center 2012 Operations Manager. This feature requires 148KB on your hard drive.		
Install to: C: \Program Files (x86) \System Center Management Packs \Dell Storage Management Pack \			
InstallShield Space < Back	Next > Cancel		

Figure 3. Custom Setup

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



7. Verify that the **Dell Storage Management Pack for SCOM 2012** and the **Dell VMM Storage Management Pack for SCOM 2012** options are selected for installation.

NOTE: The Dell Storage Management Pack for SCOM 2012 is required for using the Dell VMM Storage Management Pack for SCOM 2012.

- 8. (Optional) To change the default installation location, click **Change** and then type the path.
- 9. Clear the Dell Storage WMI Provider option.

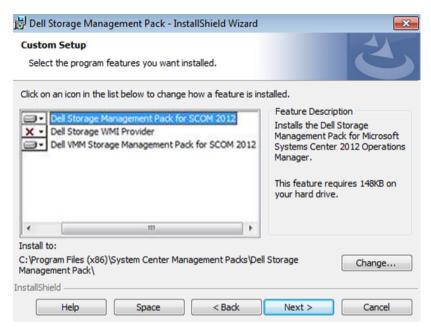


Figure 4. Custom Setup, continued

10. Click Next. The Ready to Install the Program page opens.

😸 Dell Storage Management Pack - Inst	allShield Wizard		×
Ready to Install the Program The wizard is ready to begin installation			2
Click Install to begin the installation.			
If you want to review or change any of exit the wizard.	your installation s	ettings, click Back. C	lick Cancel to
InstallShield			
	< Back	😗 Install	Cancel

Figure 5. Ready to Install the Program

11. Click Install. A progress page opens.

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

Figure 6. 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 Finish Cancel	

Figure 7. Installation Completed

- 13. Click Finish.
- 14. Import Management Pack 4.0.1 using the SCOM console.For more information, see the <u>How to Import an Operations Manager Management Pack</u> 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 Management 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.
- 2. 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 \rightarrow Run as Configuration \rightarrow 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.

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.

📴 Dell Storage Management Pack - InstallShield Wizard 📃 👘 💌		
	Welcome to the InstallShield Wizard for Dell Storage Management Pack Dell Storage Management Pack Setup is preparing the InstallShield Wizard which will guide you through the program setup process. Please wait.	
	< Back Next > Cancel	

Figure 8. 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.	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	Ŧ
I accept the terms in the license agreement Print I do not accept the terms in the license agreement	
InstallShield 	

Figure 9. Dell End User License Agreement

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

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

Figure 10. Custom Setup for WMI Provider

- 4. Clear the Dell Storage Management Pack for SCOM 2012 and Dell VMM Storage Management Pack for SCOM 2012 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.

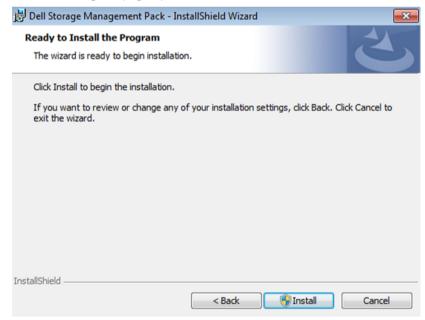


Figure 11. Ready to Install the Program

- 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.

NOTE: To allow monitoring, a SCOM monitoring agent must be installed on the same server as the WMI Provider. For more information, see the <u>Microsoft System Center Operations Manager</u> website.

- 1. Open Windows Explorer and navigate 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			_ [] ×
Dell Storage	WMI Prov	ider Configu	urator
Allow discovery of this provider from the D	ell Storage Management	Pack for Systems Center Ope	erations Manager
Provider Data Collectors			
172.20.64.93	Host Name :	172.20.21.8	
	Port :	<u></u> .	
	User Name :	admin	
	Password :		
	Confirm Password :		
			Test Connection
<u>A</u> dd <u>R</u> emove		Save	Gancel

Figure 12. 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 C: \Windows\Microsoft.NET

\Framework64\v40.30319\installutil.exe on the C:\Windows\Microsoft.NET
\assembly\GAC 64\Dell.Storage.Instrumentation

\v4.0 4.0.0.2 07519b417fc2eafb\Dell.Storage.Instrumentation.dll file.

- **3.** Select the Allow discovery of this provider from the Dell Storage Management Pack for System Center Operations Manager checkbox.
- 4. Click Add to add a new host.
- **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 host name 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. The WMI Provider will not be discovered by the Dell Storage Management Pack unless the computer is added to this group. For more information, see the <u>Microsoft System Center Operations Manager</u> 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.

😸 Dell Storage Management Pack - InstallShield Wizard 🗾 🗾							
2	Welcome to the InstallShield Wizard for Dell Storage Management Pack						
	The InstallShield(R) Wizard will allow you to modify, repair, or remove Dell Storage Management Pack. To continue, dick Next.						
	< Back Next > Cancel						

Figure 13. Installation Welcome

2. Click Next. The Program Maintenance page opens.

📸 Dell Storage M	lanagement Pack - InstallShield Wizard
Program Maint 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	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 14. 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

The Storage Center Management Pack 4.0.1 for Microsoft System Center 2012 Operations Manager allows IT departments to monitor Storage Center devices from the Microsoft SCOM console. Using the management pack, users can view Storage Center alerts, monitor the health of Storage Center components, and view performance data.

Using the Monitoring Navigation Tree

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

Mo	nitoring
4	Monitoring
	Controller Ports
	UNIX/Linux Computers
Þ	🙀 Agentless Exception Monitoring
Þ	Application Monitoring
Þ	📴 Data Warehouse
Þ	🔁 Dell
Þ	📴 Dell Storage Center Monitoring
Þ	🙀 Microsoft Audit Collection Services
Þ	Microsoft SQL Server
Þ	🙀 Microsoft System Center Virtual Machine Manager
Þ	🙀 Microsoft System Center Virtual Machine Manager PRO
Þ	🧾 Microsoft System Center Virtual Machine Manager Views
Þ	Microsoft Windows Client
Þ	Microsoft Windows Internet Information Services
Þ	🙀 Microsoft Windows Server
Þ	🙀 Network Monitoring
Þ	Gerations Manager
Þ	🚰 Synthetic Transaction
Þ	🙀 System Center Advisor
Þ	Team Foundation Server Synchronization
Þ	📴 UNIX/Linux Computers
Þ	🙀 Web Application Transaction Monitoring
Þ	G Windows Service And Process Monitoring

Figure 15. Monitoring Navigation Tree

- Open System Center Operations Manager (Start → All Programs → System Center 2012 R2 Operations Manager → Operations Console).
- 2. Click the Monitoring Monitoring button.
- 3. In the navigation tree, expand the Dell Storage Center Monitoring folder.

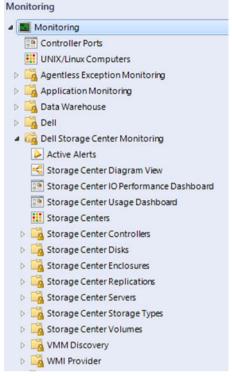


Figure 16. Dell Storage Center Monitoring Menu

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.

🕹 Leak for:		Find Now Clear				
icon 😵	Source	Name	Resolution State	Created	Age	Priority
Severity: Critic	al (49)					
0	MMAT 4	Unable to communicate with remote system, S/N 64065	New	1/23/2014 5:11:25 P	M 5 Days, 20 Hour	High
•	MMIT 4	Unable to communicate with remote system, 5/N 570	New	3/23/2014 5:11:23 P	M S Days, 33 Hour	High
0	5887-4	Server win-7dtu65d82mv' not visible on any path	New	5/23/2014 3:11:25 P	M S Days, 20 Hour	High
0	NB/T-4	Server 'win-Sequo7m000p' not visible on any path	New	1/25/2014 5:11:25 P	M 5 Days, 20 Hour	Figh
0000	MMT4	Server 'win2k3n1 applications.leb' not visible on any path	New	1/25/2014 3:11:25 P	M S Days, 20 Hour	High
0	5/6/(7.4	Server 'win2012ExcVier.Applications.lab' not visible on any path	New	1/23/2014 5:11:25 P	M S Days; 20 Hour	High
0	MMT 4	Server Warlload not visible on any path	New	3/23/2014 5:11/25 P	M 5 Days, 20 Hout	High
0	MMT4	Server 'w2kth2s2008n1.applications.lab' not visible on any path	New	1/23/2014 5/11/25 P	M 5 Days, 20 Hour	High
0	MMT-4	Server 'w2kBi2xx2010in3.w2010large.applications.lab' not visibl	. New	1/23/2014 3:15:25 P	M \$ Days 20 Hour	High
0	MMT 4	Server 'w2k8/2e/2010/n7.ex2010/arge.applications.lab".not visibL.	New	1/23/2014 5:11:25 P	M S Days, 20 Hour	High
	MMT 4	Server 'w2k8basic.applications.lab' not visible on any path	New	1/20/2014 5:11:25 P	M S Days, 20 Hour	High
0	54547-4	Server 'w2k3r2ex2k3r2m1.ex2003.applications.leb' not visible o	New	1/25/2014 3:13:25 P	M 5 Days, 20 Hour	High
•	MMT-4	Server 'Temp Test Machine' not visible on any path	New	1/23/2014 5/11/25 P	M S Days, 20 Hour	High
0	MMT 4	Server 'Roosevelt' not visible on any path-	New	1/23/2014 5:11:25 P	M 5 Days, 20 Hour	High
•	MM/T 4	Server RendW2k3R2Basic' not visible on any path	New	1/23/2014 5:11/25 P	M 5 Days, 20 Hour	High
Vert Details						
🥹 Server 's	2k8r2s2008rs3.apg	lications.fab' not visible on any path.		Aiert	Description	
Source: Fuit: Path Name Ainst Rote: Createst	WSI2SCVN Stanage Ce 1/23/2014 1		543a35a21a4;0000T 4	Starg Deso Net Autor Autor	nen (538-332) wolndkzezbolk gar Genber, 5487-4 iption: Server 'wizhikezszood Status: Devien n: Inue: wolnistgoch fatur Hally Scatted: 12/15/2013 32	in's applications. Jab' not wisible on any path

Figure 17. 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.

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.

Table 3. Health Indicator Alert Types

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).

	s (2)											
🔍 Look for:	E			End New	Qear							
State	3	Name	SerialNumber	Vesion	Storage Canter Controller	Derage Center Disk Enclosure	Storage Canter Server	Center Volume	Storage CenterStuk Class	Storage Center Storage Type	Center Replication	
Critical		MSGTT	64039	6.3.10.108	@ Healthy	@ Healthy	Q Critical	A Warning	@ Healthy	@ Healthy	@ Healthy	
😫 Critical		8867.4	536	5:5.70.28	😳 Cifical	Healthy	🔕 Crisical	G Critical	@ Healthy	Healthy		
Detail View												
		Instance	Availability	Configuration	Performance	Security						
Statler		Instance VSI-0/SSSnapsh	-	Configuration	 Performance Not manite. 							
State			(2) Healthy			O fest monit						
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Figure 18. 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 4.0.1 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.

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Figure 19. 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
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** $\xrightarrow{\otimes} \rightarrow$ **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 4.0.1 for Microsoft System Center 2012 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.
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.

Class Name	Description
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 Monitors the status of the ca		
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.	

Monitor Name	Туре	Description
ControllerPowerSupplyStatusMonitor	Unit	Monitors the status of the controller's power supply.
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.
EnclosureIoModuleMonitor	Dependency	Rolls up the health of an IO module to the enclosure.
EnclosureIoModuleStatusMonitor	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.

Monitor Name	Туре	Description	
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	
ControllerAverageIoSizeCounter	Controller average IO count	
ControllerReadIoSecCounter	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	

Performance Counter Rule	Description	
ControllerTotalKBSecCounter	Controller total IO per second in KB	
ControllerTotalMBSecCounter	Controller total IO per second in MB	
ControllerWriteIoSecCounter	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	
DiskClassAverageIoSizeCounter	Disk class average IO count	
DiskClassIoPendingCounter	Disk class pending IO count	
DiskClassReadIoSecCounter	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	
DiskClassWriteIoSecCounter	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	
ServerReadIoSecCounter	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	
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	

Performance Counter Rule	Description	
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	
StorageCenterAllDiskAverageIoSizeCounter	Average IO size of all disks on the Storage Center count	
StorageCenterAllDiskIoPendingCounter	Pending IO count of all disks on the Storage Center	
StorageCenterAllDiskReadIoSecCounter	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	
StorageCenterAllDiskWriteIoSecCounter	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	
StorageCenterAllServerAverageIoSizeCounter	Average IO size of all servers on Storage Center count	
StorageCenterAllServerReadIoSecCounter	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 K	
StorageCenterAllServerWriteIoSecCounter	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	
StorageCenterAllVolumeAverageIoSizeCounter	Storage Center all volume average IO size count	
StorageCenterAllVolumeIoPendingCounter	Storage Center all volume IO pending count	

Performance Counter Rule	Description	
StorageCenterAllVolumeReadIoSecCounter	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	
StorageCenterAllVolumeWriteIoSecCounter	Storage Center all volume write IO per second count	
StorageCenterAllVolumeWriteKBSecCounter	Storage Center all volume write IO per second in KB	
StorageCenterAllVolumeWriteLatencyCounter	Storage Center all volume write latency	
StorageCenterAvailableSpaceCounter	Count of available space on the Storage Center	
StorageCenterBeReadIoSecCounter	Storage Center back-end read IO per second counter	
StorageCenterBeReadKBSecCounter	Storage Center back-end read IO per second in KB	
StorageCenterBeReadMBSecCounter	Storage Center back-end read IO per second in MB	
StorageCenterBeTotalloSecCounter	Storage Center back-end total IO per second counter	
StorageCenterBeTotalKBSecCounter	Storage Center back-end total IO per second in KB	
StorageCenterBeTotalMBSecCounter	Storage Center back-end total IO per second in MB	
StorageCenterBeWriteIoSecCounter	Storage Center back-end write IO per second counter	
StorageCenterBeWriteKBSecCounter	Storage Center back-end write IO per second in KB	
StorageCenterBeWriteMBSecCounter	Storage Center back-end write IO per second in MB	
StorageCenterFeReadIoSecCounter	Storage Center front-end read IO per second counter	
StorageCenterFeReadKBSecCounter	Storage Center front-end read IO per second in KB	
StorageCenterFeReadMBSecCounter	Storage Center front-end read IO per second in MB	
StorageCenterFeTotalloSecCounter	Storage Center front-end total IO per second counter	
StorageCenterFeTotalKBSecCounter	Storage Center front-end total IO per second in KB	

Performance Counter Rule	Description
StorageCenterFeTotalMBSecCounter	Storage Center front-end total IO per second in MB
StorageCenterFeWriteIoSecCounter	Storage Center front-end write IO per second counter
StorageCenterFeWriteKBSecCounter	Storage Center front-end write IO per second in KB
StorageCenterFeWriteMBSecCounter	Storage Center front-end write IO per second in MB
StorageCenterIoPendingCounter	Storage Center IO pending counter
StorageCenterUsedSpaceCounter	Storage Center used space counter
VolumeActiveSpaceCounter	Volume active space counter
VolumeActualSpaceCounter	Volume actual space counter
VolumeAverageIoSizeCounter	Volume average IO size counter
VolumeFreeSpaceCounter	Volume free space counter
VolumeloPendingCounter	Volume IO pending counter
VolumeRaidOverheadCounter	Volume RAID overhead counter
VolumeReadIoSecCounter	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
VolumeReplaySpaceCounter	Volume replay space counter
VolumeTotalDiskSpaceCounter	Volume total disk space counter
VolumeTotalloSecCounter	Volume total IO per second counter
VolumeTotalKBSecCounter	Volume total IO per second in KB
VolumeTotalMBSecCounter	Volume total IO per second in MB
VolumeWriteIoSecCounter	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 4.0.1 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:

Center Diagram View pane opens.

Figure 20. 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.

In the Dell Storage Center Monitoring folder, click Storage Center Diagram View. The Storage

Viewing Virtual Machines

The Dell VMM Storage Management Pack for SCOM 2012 discovers Storage Center virtual machines (VMs) managed by the System Center Virtual Machine Manager (SCVMM). This management pack lets SCOM administrators view and monitor Storage Center VMs, including Windows Hyper-V hosts (Windows Server versions 2012 and 2012 R2).



1.

NOTE: The Dell VMM Storage Management Pack for SCOM 2012 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 <u>How to Connect VMM with Operations Manager</u>.

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 4.0.1 for Microsoft System Center 2012 Operations Manager Release Notes*.

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

Table 9. Mapping Volumes



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 <u>Microsoft Hyper-V</u> 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.

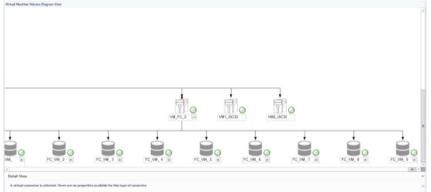


Figure 21. Virtual Machine Volume Diagram View

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

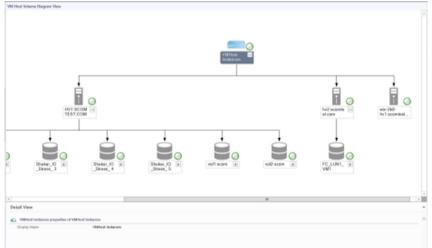


Figure 22. VM Host Volume Diagram View

- 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.