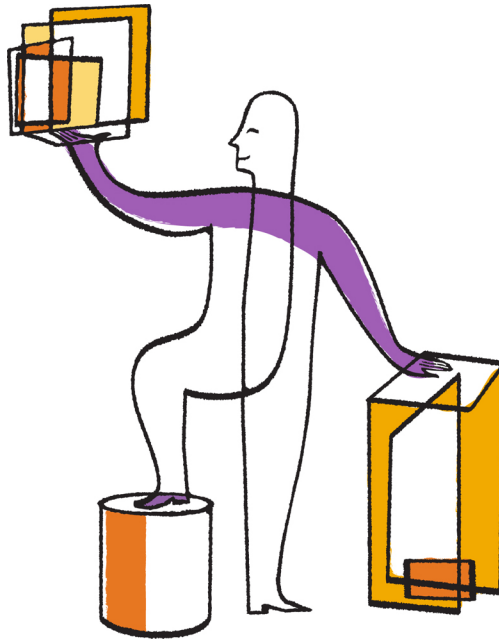




NetApp®

OnCommand® Plug-in 4.1 for Microsoft®

Administration Guide



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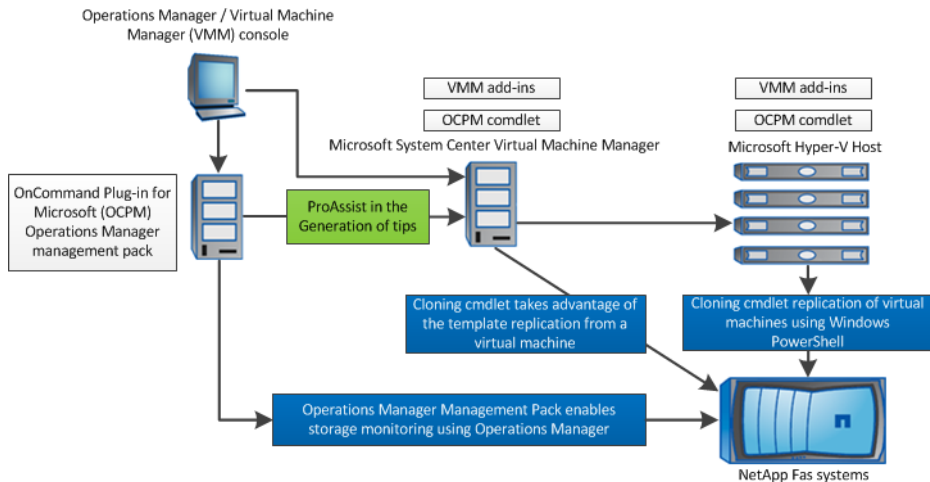
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Product overview

The NetApp OnCommand Plug-in for Microsoft is an enterprise-class storage monitoring and provisioning application that integrates with Microsoft System Center Operations Manager (SCOM) and System Center Virtual Machine Manager (SCVMM). The plug-in enables administrators to monitor, manage, and report on NetApp storage.

The following diagram provides a high level overview of OnCommand Plug-in for Microsoft:



The following provides additional information related to the diagram:

- System Center Virtual Machine Manager (SCVMM) discovers VMs supported in Data ONTAP operating in both cluster and 7-Mode environments. Data ONTAP operating in 7-Mode supports VMs on LUNs, while clustered Data ONTAP supports VMs on LUNs and SMB shares.
- System Center Operations Manager (SCOM) displays and monitors VMs in the virtualization views.
- The System Center Virtual Machine Manager (SCVMM) add-in applies to Data ONTAP operating in 7-Mode only, while the OnCommand Plug-in for Microsoft add-ins apply to both 7-Mode and cluster environments.

OnCommand Plug-in for Microsoft features

Before you use OnCommand Plug-in for Microsoft, it might be helpful to understand OnCommand Plug-in for Microsoft features.

OnCommand Plug-in for Microsoft includes the following features:

- Simplified management of servers and storage systems using Microsoft System Center
- Ability to clone storage using Windows PowerShell cmdlets
- Support for clustered Data ONTAP
- Support for NetApp MetroCluster monitoring
- Support for discovery and monitoring of the following:

- Data ONTAP 8.2 and later clusters and Storage Virtual Machines (SVMs, formerly known as Vservers)
- SMB shares in clustered Data ONTAP
- VMs and virtual hard disk files on LUNs and SMB shares in clustered Data ONTAP
- Plots of system performance metrics and alerts when those metrics exceed thresholds

OnCommand Plug-in for Microsoft components

NetApp OnCommand Plug-in for Microsoft uses Microsoft System Center components to monitor Data ONTAP storage. System Center is a set of Microsoft management products that help you manage physical and virtual IT environments.

OnCommand Plug-in for Microsoft uses the following System Center products:

Component	Description
System Center Operations Manager (SCOM)	<p>A member of the System Center family of products. The end-to-end service management product that works with Microsoft software and applications, helping organizations increase efficiency while enabling greater control of the IT environment.</p> <p>SCOM includes the following components:</p> <p>SCOM agent</p> <p>The location where the SCOM SDKs and connectors are installed but not the SCOM software. This installation does not have the user interface and is used on systems that must communicate monitoring and other information to the SCOM server. The agent can be installed remotely on systems using the SCOM console on the SCOM server.</p> <p>SCOM console or server</p> <p>User interface used to view managed objects and perform administrative tasks. The server refers to the computer where the SCOM console is installed.</p> <p>SCOM console integration</p> <p>A feature that enables you to perform tasks on a SCOM system remotely.</p> <p>SCOM management packs</p> <p>Options that enable agents to monitor a specific service or application. Management packs might also contain tasks, reports, views, diagnostics, and recovery tools.</p>

Component	Description
System Center Virtual Machine Manager (SCVMM)	<p data-bbox="602 254 1284 310">A member of the System Center product family that enables the following:</p> <ul data-bbox="602 338 1360 590" style="list-style-type: none"><li data-bbox="602 338 1230 365">• Unified management of physical and virtual machines<li data-bbox="602 392 1360 449">• The use of PRO Tips features that provide dynamic management of the virtual infrastructure<li data-bbox="602 476 1187 504">• The consolidation of underutilized physical servers<li data-bbox="602 531 1360 588">• Rapid provisioning of new VMs by leveraging Microsoft Windows Server technology <p data-bbox="630 615 1377 705">Note: SCVMM is supported on both clustered Data ONTAP and Data ONTAP operating in 7-Mode; however, the SCVMM add-in is supported only in 7-Mode environments.</p>

Upgrading OnCommand Plug-in for Microsoft

If you have OnCommand Plug-in 3.2.1 for Microsoft or later installed, you can upgrade to plug-in version 4.1. If you want to use the plug-in to monitor storage systems running clustered Data ONTAP, you must also install additional management packs that are not imported during the upgrade, and run the installer a second time.

Steps

1. From the NetApp Support Site at mysupport.netapp.com, download the OnCommand Plug-in for Microsoft executable file to a directory on your hard drive.
2. Double-click the installer icon and then click **Run** to start the installation wizard.
3. Follow the instructions in the installation wizard to install the software.
4. In the **Ready to Install** dialog box, click **Install** to begin the installation or click **Back** if you want to make any changes to the settings.
5. Click **Finish** to complete the upgrade, which does not include the clustered Data ONTAP management packs.
6. If you are installing the MetroCluster Data ONTAP management pack or the Clustered Data ONTAP Virtualization management pack, which are a part of the Clustered Data ONTAP management pack, repeat Step 2.

After you start the installation wizard, you are prompted to modify, repair, or remove the program.
7. Select **Modify**.
8. Expand **SCOM Management packs > Clustered Data ONTAP management packs**.
9. Select the management packs you want to install.

You must select a specific management pack, such as the MetroCluster Data ONTAP management pack or the Clustered Data ONTAP Virtualization management pack.
10. Click **Next**.
11. Click **Finish** to complete the upgrade, including installing the management packs.

How the plug-in works with SCOM (7-Mode environments)

System Center Operations Manager (SCOM) is a data center management system for operating systems and hypervisors. The plug-in provides an interface through SCOM that you can use to view state, health, and performance information about your monitored objects. The plug-in also generates alerts for particular availability, performance, configuration, or security situations that affect your storage system.

How the plug-in works with the management pack for Data ONTAP (7-Mode environments)

There are several tasks you can perform with the management pack for Data ONTAP operating in 7-Mode. These tasks include adding controllers, discovering and configuring the controllers, and defining the management pack rules.

Related tasks

[Adding Data ONTAP storage controllers in 7-Mode environments](#) on page 14

[Adding Data ONTAP storage controller credentials in 7-Mode environments](#) on page 14

[Running discovery \(7-Mode environments\)](#) on page 20

[Running virtualization discovery in 7-Mode environments](#) on page 21

[Running PRO discovery \(7-Mode environments\)](#) on page 20

[Overriding Data ONTAP management pack rules in 7-Mode environments](#) on page 16

Management pack features for Data ONTAP (7-Mode environments)

When you install OnCommand Plug-in for Microsoft, the installation wizard installs the components that you select. Each management pack and its associated features are installed on the specified server.

You can install the following management packs, to use its associated features:

Management pack	Feature	Subfeature
System Center Operations Manager (SCOM) Management Packs	Storage Monitoring	Reporting
	Hyper-V storage Monitoring and Management	Reporting

List of OnCommand Plug-in for Microsoft permissions needed to discover and monitor a 7-Mode environment

To discover and monitor components of your array, you must have a specific set of permissions.

You can use the administrator login or root login to perform all storage discovery and monitoring; however, it is a good practice to use the role-based access control (RBAC) feature provided by Data ONTAP to create one or more custom accounts with limited access privileges.

For basic monitoring in Data ONTAP operating in 7-Mode, you need the following permissions:

- api-aggr-list-info

- api-aggr-options-list-info
- api-cf-status
- api-cifs-status
- api-disk-list-info
- api-disk-san-own-list-info
- api-ems-autosupport-log
- api-IscsiPortalListInfo
- api-IscsiServiceStatus
- api-license-list-info
- api-lun-get-attribute
- api-lun-get-serial-number
- api-lun-get-space-reservation-info
- api-lun-initiator-list-mapinfo
- api-lun-list-info
- api-lun-map-list-info
- api-nfs-status
- api-perf-object-get-instances
- api-qtree-list
- api-quota-report-iter-end
- api-quota-report-iter-next
- api-quota-report-iter-start
- api-snapmirror-get-status
- api-snapshot-list-info
- api-snapshot-reserve-list-info
- api-snmp-get
- api-storage-shelf-environment-list-info
- api-storage-shelf-list-info
- api-system-get-info
- api-system-get-ontapi-version
- api-system-get-vendor-info
- api-system-get-version
- api-Vfiler-Get-Allowed-Protocols
- api-Vfiler-Get-Status
- api-vfiler-list-info

- `api-volume-autosize-get`
- `api-Volume-CloneSplit-Estimate`
- `api-Volume-GetRoot-Name`
- `api-volume-list-info`
- `api-volume-options-list-info`
- `login-http-admin`

The following example illustrates the proper assignment of these permissions:

```
useradmin role add ocpm_7mode_role -a api-aggr-list-info,api-aggr-
options-list-info...login-http-admin
useradmin group add ocpmgroup -r ocpm_7mode_role
useradmin user add ocpmuser -g ocpmgroup
```

Monitoring your Data ONTAP storage in 7-Mode environments

The System Center Operations Manager (SCOM) monitors the health and performance data that it collects from the discovered storage systems running Data ONTAP in 7-Mode environments. SCOM generates events when the status is abnormal or when a predefined threshold has been reached. If configured to do so, SCOM sends a notification when an event triggers an alert.

Adding Data ONTAP storage controllers in 7-Mode environments

Before you can monitor the performance and health of your storage, you must add a storage controller that has been either automatically or manually discovered in System Center Operations Manager (SCOM).

Steps

1. Click **Monitoring**.
2. In the navigation pane, select **Data ONTAP > Storage Systems > Management Server**.
3. In the **Tasks** pane, click **Data ONTAP: Add Controller**.
The Add Controller dialog box opens.
4. Type the name or IP address and the SNMP string of the controller that you want to add.
5. Click **Add**.

After you finish

You can use the Credentials Manager dialog box to set the credentials for the controller.

Adding Data ONTAP storage controller credentials in 7-Mode environments

When working in a 7-Mode environment, after you add Data ONTAP controllers to the plug-in, you must ensure that the access credentials to those controllers are added to secure your data. The user interface for managing controller credentials is running on the System Center Operations Manager (SCOM) account, and the SCOM account might be different from the login user account.

About this task

The default protocol that the plug-in uses to communicate with the controller is HTTPS, to ensure a secure connection. For vFiler units, you can use only HTTP.

Steps

1. Click **Monitoring**.
2. In the navigation pane, select **Data ONTAP > Storage Systems > Management Server**.
3. In the **Tasks** pane, click **Data ONTAP: Manage Controller Credentials**.
The Credentials Manager dialog box opens.
4. Select a storage system for which you want to add the user credentials.
5. To add the user credentials for the selected storage system, type the user name or password for the system and click **Apply**.

After you finish

If you cannot connect to the controller entered into the Manage Storage System, the Run as action account might need to be configured:

- Add the OnCommand Plug-in for Microsoft Run As action account as an administrator on the local host.
- Change the credentials of the OnCommand Plug-in for Microsoft Run As action account to a user with privileges that will allow it to run.
The credentials can be edited by navigating **SCOM Administration > Run As Configuration > Accounts > Action Account**.

Removing Data ONTAP storage controllers in 7-Mode environments

You can remove storage controllers and their objects such as aggregates, volumes, and LUNs from OnCommand Plug-in for Microsoft when you no longer need to monitor their health and performance.

About this task

If you remove a storage controller or other object from the plug-in, you also remove it from the list of network devices. When you run the discovery process, the storage controller is no longer discovered.

Steps

1. Click **Monitoring**.
2. In the navigation pane, select **Data ONTAP > Storage Systems > Controllers**.
3. Select the storage system that you want to remove.
4. In the **Tasks** pane, click **Data ONTAP: Remove Controller**.
5. Click **Remove** when prompted to confirm removal of the storage system.

How to deploy the plug-in for use in multiple server environments

In System Center Operations Manager (SCOM) 2012, a multiple management server environment consists of management servers that have peer-to-peer relationships. Each management server can communicate directly with the SDK service and database of the other servers, on the condition that all servers in the environment are running OnCommand Plug-in 3.2 for Microsoft or later.

Even though you can install the plug-in on as many SCOM management servers as you like, only one management server can be actively collecting data at any time in multiserver environments. Because discovery is not enabled by default, you should only enable it on one SCOM server at a time.

Related tasks

[Overriding Data ONTAP management pack rules in 7-Mode environments](#) on page 16

Overriding Data ONTAP management pack rules in 7-Mode environments

After you verify that the Data ONTAP management pack rules have been successfully imported into System Center Operations Manager (SCOM), you can override any rules to enable or disable, alter the frequency, or change the start time for a rule.

Steps

1. Click **Authoring**.
2. In the navigation pane, select **Management Pack Objects > Rules**.
3. In the search field, type **Data ONTAP** and click **Find Now**.
4. Right-click the selected rule and select **Overrides > Override the Rule > For a specific object of class: Management Server**.

Select one management server to enable the rule on.

5. Select the overrides that you want to set depending on whether you want to enable or disable the rule, alter the frequency, or change the start time for the rule.
6. Save the changes to the management pack.

You can create a new management pack for your overrides or one management pack for all of your overrides. However, you should not save changes to the default management pack.

Related tasks

[Viewing and overriding Data ONTAP monitors in 7-Mode environments](#) on page 26

Related information

[Microsoft TechNet](#)

Lists of Data ONTAP management pack rules (7-Mode environments)

OnCommand Plug-in for Microsoft includes rules that enable you to more effectively manage your storage resources: Data ONTAP: Management Server rules, Data ONTAP: Management Server Reporting rules, Data ONTAP PRO: Hyper-V Host rules, and Data ONTAP Virtualization: Management Server rules.

Data ONTAP: Management Server rules

- Data ONTAP: Aggregate Space Utilization Rule
- Data ONTAP: Aggregate State Rule
- Data ONTAP: Collect Events Rule
- Data ONTAP: Collect SnapMirror Lag Time Counter Rule
- Data ONTAP: Controller Connection Check Rule
- Data ONTAP: Controller Global Status Rule
- Data ONTAP: Controller HA Status Rule
- Data ONTAP: Controller Storage Utilization Rate of Change Rule

- Data ONTAP: Discover Recent Network Devices Rule
- Data ONTAP: Discovery Rule
- Data ONTAP: Disk State Rule
- Data ONTAP: Enclosure State Rule
- Data ONTAP: LUN Latency Rule
- Data ONTAP: LUN State Rule
- Data ONTAP: Quota Limits Rule
- Data ONTAP: Refresh Dashboard Rule
- Data ONTAP: SnapMirror Status Rule
- Data ONTAP: Storage Statistics Rule
- Data ONTAP: Trigger Controller Discovery Rule
- Data ONTAP: Trigger vFiler Discovery Rule
- Data ONTAP: vFiler Status Rule
- Data ONTAP: Volume Space Utilization Rule
- Data ONTAP: Volume State Rule
- Data ONTAP: Volume Used Inodes Rule

Data ONTAP: Management Server Reporting rules

- Data ONTAP Reporting: Aggregate Committed Space Percentage Rule
- Data ONTAP Reporting: Average Total Latency on All Controllers Rule
- Data ONTAP Reporting: Controller Committed Space Percentage Rule
- Data ONTAP Reporting: Controller Rate of Change on Storage Utilization Rule
- Data ONTAP Reporting: Controller Storage Efficiency Rule
- Data ONTAP Reporting: Group Average System Latency Rule
- Data ONTAP Reporting: Group Committed Space Percentage Rule
- Data ONTAP Reporting: LUN Average Latency Rule
- Data ONTAP Reporting: SnapMirror Average Lag Time Per Controller Rule
- Data ONTAP Reporting: SnapMirror Longest Lag Time Rule
- Data ONTAP Reporting: Volume Average Latency Rule
- Data ONTAP Reporting: Volume Storage Efficiency Rule
- Data ONTAP Reporting: Volume Storage Utilization Rule

Data ONTAP PRO: Hyper-V Host rules

- Data ONTAP PRO: Collect Hyper-V Host Events Rule
- Data ONTAP PRO: Hyper-V Replication Status PRO Tip Recovery Rule

- Data ONTAP PRO: Hyper-V Virtual Machine Thin Provisioning Volume Auto Grow PRO Tip Recovery Rule
- Data ONTAP PRO: LUN Online PRO Tip Recovery Rule
- Data ONTAP PRO: LUN Space Reservation PRO Tip Recovery Rule
- Data ONTAP PRO: Volume Deduplication Status PRO Tip Recovery Rule
- Data ONTAP PRO: Volume Online PRO Tip Recovery Rule
- Data ONTAP PRO: Volume Snapshot Autodelete PRO Tip Recovery Rule
- Data ONTAP PRO: Volume Space Utilization PRO Tip Recovery Rule

Data ONTAP Virtualization: Management Server rules

- Data ONTAP Virtualization: Collect Events Rule
- Data ONTAP Virtualization: Hyper-V Virtual Machine Replication Status Rule
- Data ONTAP Virtualization: Hyper-V Virtual Machine Space Utilization Rate Rule
- Data ONTAP Virtualization: Hyper-V Virtual Machine Thin Provisioning Volume Autogrow Rule
- Data ONTAP Virtualization: Hyper-V Virtual Machine Thin Provisioning Volume Snapshot auto delete Rule
- Data ONTAP Virtualization: LUN Alignment Rule
- Data ONTAP Virtualization: LUN Igroup Type Configuration Rule
- Data ONTAP Virtualization: LUN Online Rule
- Data ONTAP Virtualization: LUN Space Reservation Rule
- Data ONTAP Virtualization: LUN Space Utilization Rule
- Data ONTAP Virtualization: Usage Records Update Controllers Registry Rule
- Data ONTAP Virtualization: Usage Records Update Database Rule
- Data ONTAP Virtualization: VHD Alignment Rule
- Data ONTAP Virtualization: VHD Discovery Rule
- Data ONTAP Virtualization: Volume Deduplication Status Rule
- Data ONTAP Virtualization: Volume Online Rule
- Data ONTAP Virtualization: Volume Space Utilization Rule

Related tasks

[Overriding Data ONTAP management pack rules in 7-Mode environments](#) on page 16

Configuring SNMP traps in 7-Mode environments

SNMP traps can automatically send you an unsolicited SNMP message or trap to inform you of significant events. If you want to use the plug-in to receive SNMP traps in a 7-Mode environment, you must first configure SNMP.

Before you begin

If you use Windows Server 2008 R2, you must have installed Microsoft hotfixes 958936 and 967718.

About this task

For detailed information about how to complete the steps of this task, see the *Data ONTAP System Administration Guide* for your Data ONTAP version.

Steps

1. Navigate to the **Server Manager > Configuration > Services > SNMP Service > Properties > Security** tab.
2. Ensure that **Accepted community names** contains the names of the SNMP communities that you are configuring the storage systems to use, and ensure that they have read and create privileges.
3. Select **Accept SNMP packets from any host**.
4. On each managed storage system, enable SNMP.
5. If necessary, set up the community.
6. Configure the trap destination to be the System Center Operations Manager server on which you installed the plug-in.

The SNMP monitors are targeted at the Data ONTAP Controller class.

7. Enable the non-emergency trap monitors using monitor overrides.

What storage discovery in Data ONTAP 7-Mode environments is

Storage discovery is the process by which OnCommand Plug-in for Microsoft uses rules that discover controllers, their associated objects, and their configurations so that you can monitor the state of each object and troubleshoot when necessary.

If your storage system is running Data ONTAP 7.3 or later, SNMP versions 1, 2C, and 3 support discovery rules.

Some monitored storage object properties, such as the state, total space, or used space, might be out of sync until the next time storage discovery operation is run with the default time set at four hours.

Related concepts

[Controller discovery using Data ONTAP: Discovery Rule \(7-Mode environments\)](#) on page 20

Types of Data ONTAP discovery in 7-Mode environments

There are three types of discovery that you can use to configure your plug-in: Data ONTAP storage discovery, Data ONTAP virtualization discovery, and Data ONTAP PRO discovery.

You can use Data ONTAP storage discovery and Data ONTAP virtualization discovery to discover storage controllers and their associated objects on System Center Virtual Machine Manager (SCVMM). Data ONTAP virtualization discovery discovers storage on all Hyper-V hosts that SCVMM manages.

You can also run Data ONTAP PRO discovery to discover Hyper-V hosts with PRO integration in SCVMM. PRO discovery enables PRO tips to be triggered on your Hyper-V hosts.

Related tasks

[Running discovery \(7-Mode environments\)](#) on page 20

[Running PRO discovery \(7-Mode environments\)](#) on page 20

[Running virtualization discovery in 7-Mode environments](#) on page 21

Controller discovery using Data ONTAP: Discovery Rule (7-Mode environments)

Although the Data ONTAP: Discovery Rule is disabled by default, it is important that you enable it. Discovery using the Data ONTAP: Discovery Rule is the only way to enable scheduled discovery of your controllers, their associated objects, and their configurations, so that you can monitor and troubleshoot object status when necessary.

After you import the Data ONTAP management packs, you can enable this rule on a Microsoft System Center Operations Manager (SCOM) management server by overriding the default setting and selecting the management server that manages the Data ONTAP objects that you want to discover.

Running discovery (7-Mode environments)

You must run discovery to discover all of your storage. Discovery is required for the plug-in to recognize your controllers and begin the management of your storage.

Steps

1. Click **Monitoring**.
2. In the navigation pane, select **Data ONTAP > Storage Systems > Management Server**.
3. In the **Tasks** pane, click **Data ONTAP: Run Discovery Task**.
The Data ONTAP: Run Discovery Task dialog box opens.
4. Select the storage targets that you want to run discovery on and click **Run**.

Running PRO discovery (7-Mode environments)

You can run Data ONTAP PRO discovery to discover Hyper-V hosts with PRO integration in System Center Virtual Machine Manager (SCVMM). PRO discovery enables PRO tips to be triggered on your Hyper-V hosts.

Before you begin

The OnCommand management pack must be installed and you must have typed valid credentials for the newly added storage systems.

You must have added all of your Hyper-V hosts to SCVMM before you run discovery, because Data ONTAP PRO discovery discovers only those Hyper-V hosts that are on SCVMM.

Steps

1. Click the **Monitoring** workspace option.
2. In the navigation pane, select **Data ONTAP > Storage Systems > Management Server**.
3. In the **Tasks** pane, click **Data ONTAP: Run PRO Discovery Task**.
The Data ONTAP: Run PRO Discovery Task dialog box opens.
4. Select the storage targets that you want to run discovery on and click **Run**.

Running virtualization discovery in 7-Mode environments

You can run Data ONTAP virtualization discovery to discover storage on all Hyper-V hosts in System Center Virtual Machine Manager (SCVMM).

Before you begin

You must have added all of your Hyper-V hosts to SCVMM, because Data ONTAP virtualization discovery discovers only those Hyper-V hosts that are monitored by SCVMM.

You must have the OnCommand Discovery Agent installed on a Hyper-V host if the Hyper-V host has Fibre Channel-mapped LUNs.

About this task

The Data ONTAP Virtualization: Discovery Rule targets the management server and has a default interval of four hours and a default timeout of one hour. It automatically discovers storage on Hyper-V hosts, Hyper-V LUNs, Hyper-V virtual machines, and Hyper-V virtual hard disks.

Steps

1. Click the **Monitoring** workspace option.
2. In the navigation pane, select **Data ONTAP > Storage Systems > Management Server**.
3. In the **Tasks** pane, click **Data ONTAP: Run Virtualization Discovery Task**.

The Data ONTAP: Run Virtualization Discovery Task dialog box opens.

4. Select the storage targets that you want to run discovery on and click **Run**.

Information displayed in views for Data ONTAP 7-Mode environments

You can use different views in OnCommand Plug-in for Microsoft to monitor the state of your storage resources and to identify usage patterns. You can use the tasks listed in the Actions pane to perform specific tasks related to managing your storage.

Data ONTAP views display the following information:

Aggregates

Displays information about Data ONTAP aggregates, including the total size of the aggregate, the number of disks that belong to the aggregate, and the percentage of space committed to the aggregate.

Controllers

Displays information about different attributes of your storage controllers such as the fully qualified domain name (FQDN) of the storage controller and whether the controller is in a high-availability configuration.

Dashboard

Displays information about the overall state and health of your storage resources, including the number and state of all storage controllers and SnapMirror relationships. This view displays how efficiently the storage is currently being used by all storage controllers that are monitored by the plug-in.

LUNs

Displays information about different attributes of a LUN such as the full path of the LUN and the type of operating system environment for the LUN.

Management Server

Displays the name of the management server. You can use this view for a variety of tasks, including starting the manual storage discovery or PRO discovery processes, and managing the servers and controller credentials.

Qtrees

Displays information about different attributes of a qtree such as the volume containing the qtree, the security style of the qtree, and the state of the qtree.

SnapMirror Status

Displays the status of all SnapMirror relationships that are monitored by the plug-in.

Storage Utilization

Displays information about how much space is being used by the controller such as aggregate and volume levels. You can use this view to make any necessary changes to utilize your space more efficiently.

vFilers

Displays information about vFiler attributes such as the vFiler unit's storage, health, and utilization.

Volumes

Displays information about different attributes of a volume such as the name of the volume, the total size of the volume, and the amount of used space as a percentage of the total space available.

Hyper-V Hosts

Displays information about all Hyper-V hosts and the number of virtual machines being hosted by each.

Hyper-V LUNs

Displays information about the location of all Hyper-V LUNs so that you can see all of the monitored LUNs that are mapped to Hyper-V hosts.

Hyper-V Virtual Hard Disks

Displays information about all Hyper-V virtual hard disks.

Hyper-V VMs

Displays information about different attributes of a monitored Hyper-V virtual machine such as the fully qualified domain name (FQDN) of the virtual machine and the fully qualified domain name (FQDN) of the Hyper-V host that is hosting the virtual machine.

Performance monitoring in 7-Mode environments

OnCommand Plug-in for Microsoft is designed to scale to large numbers of controllers. As the number of storage controllers increases, you can manage the monitoring load by changing the run frequency of the various discovery and monitoring rules.

If you run discovery and monitoring rules less frequently, you place less burden on the Microsoft Operations Manager (SCOM) infrastructure, but you receive less timely alert information. You should run discovery rules less frequently than monitoring rules to avoid situations where rules overlap and conflict with each other.

Types of performance metrics in 7-Mode environments

OnCommand Plug-in for Microsoft monitors CPU and space utilization, as well as I/O operations, throughput, latency, and protocols, so that you can monitor and identify usage patterns.

Information displayed by the CPU utilization graphs

You can use the **CPU utilization** graphs to determine how much processing space you have used, how you have used it, and how much space you have left on your storage controllers.

Information displayed by the I/O operations graph

You can use the I/O operations graph to monitor the communication between your storage controllers and servers.

Information displayed by the I/O throughput graph

You can use the **I/O throughput** graph to monitor the productivity of your storage controllers.

Information displayed by the Latency graph

You can use the **Latency** graph to monitor for any unusual delays among your storage controllers, such as LUN or volume latency. Having this information enables you to address issues more quickly and efficiently.

What the Diagram view is (7-Mode environments)

The Diagram view enables you to see a pictorial representation of all of the storage and hardware currently being monitored by the plug-in, so that you can more easily isolate problems to a specific storage object.

You can expand this view to display storage hierarchy, so that you can isolate problems to the exact component on which they occur. When you select a storage object, you can view information about it in the Detail View window.

If you right-click a storage object and select **Open > Event View**, no events are generated and displayed in the Events window because all System Center Operations Manager (SCOM) events appear only in the Windows event log.

What the Controllers View is (7-Mode environments)

You can view a list and overall health of the storage controllers that OnCommand Plug-in for Microsoft is currently monitoring. When you select a controller, you can also view information about it in the Controllers View window. If a controller is in either a warning or critical state, you can launch the **Health Explorer** in System Center Operations Manager (SCOM) to find the root of the problem.

Managing storage controller information in 7-Mode environments

There are many tasks that you must perform to maintain your storage controllers, including managing the storage controller credentials and modifying that credential information.

Managing controller credentials (7-Mode environments)

You can set credentials for all of the controllers and vFiler units that you want to monitor from either the Diagram View or the Controllers View in the Monitoring pane. You can change these credentials as necessary.

About this task

If you have socket security layer (SSL) set up and enabled, the connection uses the HTTPS protocol to connect to the storage controller. If SSL is not set up and enabled, the connection uses the HTTP protocol. Regardless, if you want to connect to a vFiler unit, you must use the HTTP protocol.

Steps

1. From the **Monitoring > Discovered Inventory** window, change the target type to **Management Server**.
2. Go to **Actions > Health Services Tasks > Data ONTAP: Manage Controller Credentials**.
3. Enter credentials for each storage controller that you want OnCommand Plug-in for Microsoft to monitor.

You can select multiple controllers at one time and set their passwords if they use the same credentials, but you should not select both vFiler units and controllers when you select multiple credentials.

If you have domain credentials for the storage controller, you should type the domain name in the Domain field and type the domain user name in the **User Name** field.

4. Click **OK**.

Launching System Manager from the plug-in in 7-Mode environments

To use the System Manager interface to change controller configuration information in a 7-Mode environment, you can select the storage controllers that are monitored by OnCommand Plug-in for Microsoft and then launch System Manager.

Before you begin

You must have installed and configured OnCommand Plug-in for Microsoft. You also must have System Manager installed on the System Center Operations Manager server on which the plug-in is installed.

Steps

1. Navigate to the **Controllers** view or the **Diagram** view.
2. Select a storage controller group or storage controller.
3. From the **Actions** pane, go to the **Data ONTAP Controller Tasks** pane.
4. Select **Data ONTAP: Launch OnCommand System Manager**.

Refer to your System Manager documentation for more information about System Manager tasks.

Remote operation of SCOM tasks

You can run System Center Operations Manager (SCOM) tasks from a remote machine that has only the SCOM Console installed, so that you do not have to log in to the plug-in management server to perform the same tasks. You can perform any tasks through the remote console that you perform from the management server.

Linking to DataFabric Manager server (7-Mode environments)

Using the plug-in, you can enable Microsoft System Center Operations Manager (SCOM) to launch DataFabric Manager from the plug-in. You can set HTTPS options, and configure DataFabric Manager server cluster nodes.

Before you begin

You must have installed and configured OnCommand Plug-in for Microsoft.

Steps

1. Select a storage controller.
2. In the **Tasks** pane, click **Data ONTAP: Manage DFM Servers**.
The DataFabric Manager dialog box opens.
3. Type the name of the DataFabric Manager server and click **Add > OK**.

List of OnCommand Plug-in for Microsoft monitors in 7-Mode environments

You can use monitors to track and report alerts and events related to SCVMM storage controllers and virtualization objects. The monitors advise you of events that you can view through the event log, so that you can determine a way to mitigate any problems. You can also use overrides to change the values of monitors.

The following list displays all of the OnCommand Plug-in for Microsoft base management pack monitors:

- Data ONTAP: Aggregate Space Utilization Monitor
- Data ONTAP: Aggregate State Monitor
- Data ONTAP: Controller Connection Monitor
- Data ONTAP: Controller Critical Trap Monitor
- Data ONTAP: Controller Emergency Trap Monitor
- Data ONTAP: Controller Global Status Monitor
- Data ONTAP: Controller HA Status Monitor
- Data ONTAP: Controller Informational Trap Monitor
- Data ONTAP: Controller Latency Monitor
- Data ONTAP: Controller Warning Trap Monitor
- Data ONTAP: Disk State Monitor *
- Data ONTAP: Enclosure State Monitor
- Data ONTAP: Fan State Monitor
- Data ONTAP: Informational Trap Monitor
- Data ONTAP: LUN State Monitor
- Data ONTAP: Power Supply State Monitor
- Data ONTAP: Processor Utilization Monitor
- Data ONTAP: Qtree Quota Monitor
- Data ONTAP: Qtree SnapMirror Monitor
- Data ONTAP: SnapMirror Status Monitor
- Data ONTAP: vFiler Monitor
- Data ONTAP: Volume Inode Utilization Monitor
- Data ONTAP: Volume Quota Monitor
- Data ONTAP: Volume SnapMirror Monitor

- Data ONTAP: Volume Space Utilization Monitor
- Data ONTAP: Volume State Monitor

* If a disk is unhealthy, the Disk State Monitor generates an unhealthy event. The Disk State Monitor, instead of generating an OK event each time a disk is healthy, generates an OK event only if a disk is healthy but was previously in an unhealthy state.

List of Data ONTAP PRO monitors in 7-Mode environments

The Data ONTAP PRO management pack monitors check the functions of the volumes, virtual machines, and LUNs.

Following is a list of all of the Data ONTAP PRO management pack monitors:

- Data ONTAP PRO: Hyper-V Virtual Machine Replication Not Replicated Monitor
- Data ONTAP PRO: Hyper-V Virtual Machine Replication Status Monitor
- Data ONTAP PRO: Hyper-V Virtual Machine Thin Provisioning Configuration Monitor
- Data ONTAP PRO: Hyper-V Virtual Machine Used Space Rate Monitor
- Data ONTAP PRO: LUN Online Monitor
- Data ONTAP PRO: LUN Used Space Monitor
- Data ONTAP PRO: Snapshot Auto-Delete Disabled Monitor
- Data ONTAP PRO: Space Reservation Monitor
- Data ONTAP PRO: Volume ASIS Enabled Monitor
- Data ONTAP PRO: Volume ASIS Licensed Monitor
- Data ONTAP PRO: Volume Online Monitor
- Data ONTAP PRO: Volume Space Utilization Monitor

Viewing and overriding Data ONTAP monitors in 7-Mode environments

You can modify or override the threshold values of the Data ONTAP monitors to trigger alerts based on specified threshold values.

Steps

1. Click **Authoring**.
2. In the navigation pane, click **Monitors**.
3. In the search field, type **Data ONTAP** and click **Find Now**.
4. Select the monitor that has threshold values that you want to view or override.
5. Right-click the selected monitor and select **Overrides > Override the Monitor > For all objects of class: Data ONTAP: Object name**.

You can set the overrides for all objects or specific objects, or to the entire group.

The Override Properties dialog box opens.

6. Select the **Override** check box and specify an override value from the Override Value list.
7. Save the changes to the management pack.

You can create a new management pack for your overrides or one management pack for all of your overrides. However, you should not save changes to the default management pack.

Related tasks

[Overriding Data ONTAP management pack rules in 7-Mode environments](#) on page 16

Related information

[Microsoft TechNet](#)

Alerts and the health of your storage system (7-Mode environments)

You can monitor alerts to locate and isolate problems with your storage systems and storage objects. You can also customize many rules, such as the volume latency rule and the LUN latency rule, to meet your specific needs.

Related references

[Types of PRO Tips](#) on page 29

Latency rule customization

You can customize two rules, the volume latency rule and the LUN latency rule, to meet your specific needs.

You can find alerts, as well as locate the source of the alert, by looking at the Alerts View, Diagram View, or Controllers View windows.

You can modify the following two customizable rules to better meet your needs:

Data ONTAP: Volume Latency Rule

This rule triggers an alert based on when the average volume latency exceeds a critical threshold. This rule runs by default every 30 minutes but can be customized to meet your needs.

Data ONTAP: LUN Latency Rule

This rule triggers an alert based on when the average LUN latency exceeds a critical threshold (the default is 500 ms and 1000 ms). This rule runs by default every hour but can be customized to meet your needs.

Where to view active alerts

The Alerts view displays a list of every active alert found by OnCommand Plug-in for Microsoft. You can also view specific alerts corresponding to your Data ONTAP storage or Hyper-V hosts and virtual machines. You can monitor alerts to locate and isolate problems with your storage systems and storage objects.

You can view active alerts from any of the following SCOM interface locations:

Active Alerts view

You can view all alerts in the Active Alerts view. You can view information about an individual alert in the Alert Details view, and you can view the cause of the problem in Health Explorer in System Center Operations Manager (SCOM).

Alerts view

You can view the alerts in the Alerts view for Storage Systems.

Alerts view in Dashboard

You can view alerts specific to Data ONTAP storage in the Alerts view of the Dashboard.

Virtualization alerts

You can view alerts specific to Hyper-V hosts and virtual machine storage in the Alerts view for Virtualization.

For more information about formatting the email notification for an alert, refer to the Microsoft TechNet web site.

Related information

[Microsoft TechNet](#)

Checking the alignment of your VHDs in 7-Mode environments

To ensure the best performance of those virtual machines that are hosted on VHDs in 7-Mode environments, it is important that you run the alignment check on a regular schedule. You can also periodically check the alignment of the VHDs on demand.

About this task

You must have enabled PowerShell remoting on all Hyper-V hosts: [Microsoft TechNet Enable-PSRemoting](#).

Steps

1. Navigate to the **Hyper-V VHDs** view and select the names of all of the VHDs that you want to check for misalignment.
2. Click **Data ONTAP Virtualization: Check VHD Alignment Status** in the **Actions** panel.
The SCOM Run Task dialog box opens.
3. Click **Run** to begin the misalignment check on the selected VHDs.

You can dismiss the Run Task dialog box and monitor the progress of the VHD alignment check in the Task Status view to see the output of the tasks upon completion.

After you finish

You can navigate to the Hyper-V VHDs view, in which the `state` attribute displays the alignment of the VHDs.

Related information

[Microsoft TechNet](#)

Checking the alignment of your Hyper-V LUNs in 7-Mode environments

To ensure the best performance of those virtual machines that are hosted on Hyper-V LUNs, it is important that the alignment check run on a regular schedule. You can also periodically check the alignment of your Hyper-V LUNs on demand.

Steps

1. From the **Hyper-V LUNs** view, select the names of all of the LUNs that you would like to check for misalignment.
2. Click **Data ONTAP Virtualization: Check LUN Alignment Status** in the **Actions** pane.
The SCOM Run Task dialog box opens.
3. Click **Run** to begin the alignment check on the selected LUNs.

After you finish

You can dismiss the Run Task dialog box and monitor the progress of the LUN alignment check in the Task Status view to see the output of the tasks upon completion.

You can navigate to the Hyper-V LUNs view and launch the Health Explorer to view the details if any misaligned LUNs are found.

What PRO Tips are in 7-Mode environments

OnCommand Plug-in for Microsoft PRO Tips are alerts that you can use on System Center Virtual Machine Manager (SCVMM) to notify you when storage-related problems occur in your virtual environment. If you choose, you can also enable PRO Tips to automatically repair many of those problems.

You must have a subscription to the SCVMM event log to receive notification of issues related to virtual machines and CSVs. When OnCommand Plug-in for Microsoft receives these events, PRO rules are triggered in the management pack to immediately generate PRO Tips.

PRO Tips are part of the OnCommand Plug-in for Microsoft management pack. The **PRO Tips** button in the SCVMM toolbar displays the number of tips that are currently available. Optionally, you can configure PRO Tips to display in a pop-up window whenever a new tip is added.

Types of PRO Tips

OnCommand Plug-in for Microsoft includes several types of PRO Tips to help you identify storage-related issues that occur between Data ONTAP LUNs, Cluster Shared Volumes (CSVs), and Hyper-V virtual machines. Some of the PRO Tips offer automatic remediation so that you can enable OnCommand Plug-in for Microsoft to fix the issue automatically.

The PRO Tips are generated at the host level unless the description states otherwise. The following PRO Tips are generated on the OnCommand Plug-in for Microsoft:

High LUN space utilization

This tip is generated when space utilization on a LUN that is hosting one or more virtual machines crosses a specified threshold. The default threshold is 95 percent. All nodes in a Hyper-V cluster must be monitored by Microsoft System Center Operations Manager (SCOM). Information about the virtual cluster is collected from the active node. The LUN must be mapped to one or more drives on a host but must not be mapped to any other host.

Hyper-V protection is broken or long lag time

This tip is generated when the volume in which a LUN resides has a broken SnapMirror relationship or a long lag time. This tip offers automatic remediation to perform a SnapMirror update.

Hyper-V VM space utilization rate

This tip is generated when OnCommand Plug-in for Microsoft determines that storage space might soon be depleted on the volume on which a LUN resides. The default threshold rate is two percent, indicating that the storage could be consumed within approximately 50 days. The default setting for displaying this tip is once a day. A sampling rate of one day is used for the storage usage calculation. You can configure both the threshold percentage rate and the frequency that the tip is displayed. There is no automatic remediation for this tip.

Hyper-V LUN not replicated

This tip is generated when SnapMirror is licensed but is not enabled on a volume that contains LUNs that are hosting virtual machines.

LUN offline

This tip is generated for a virtual machine if one or more storage system LUNs that serve that virtual machine is offline. This tip offers automatic remediation to bring the LUNs back online.

LUN-type igroup-type misconfiguration

This tip is generated when the Hyper-V LUN type and the igroup type are mapped incorrectly between the storage system and the Hyper-V host for either Windows or non-Windows types. If OnCommand Plug-in for Microsoft determines that the igroup type and LUN type are the incorrect Windows types, the plug-in generates a warning tip. If the plug-in determines that the LUN type and igroup type are the incorrect non-Windows types, it generates a critical tip. This PRO Tip is generated only when the installed version of Data ONTAP supports Hyper-V LUN and igroup types.

Misaligned LUNs or misaligned unattached VHDs

These are two separate PRO Tips: the misaligned LUNs PRO Tip is at the host level; the misaligned VHDs PRO Tip is at the virtual machine level if the VHDs are attached or the host level if the VHDs are unattached.

Thin provisioning LUN space reservation enabled

This tip is generated when the LUN space reservation setting is enabled on LUNs that are hosting virtual machines. To provide thinly provisioned LUNs, the LUN space reservation must be disabled. This tip offers automatic remediation to disable LUN space reservation.

Thin provisioning Snapshot auto delete disabled

This tip is generated when automatic deletion of Snapshot copies is not set for volumes that contain LUNs hosting virtual machines. This tip offers automatic remediation to enable automatic Snapshot copy deletion on the volumes.

Thin provisioning volume autogrow for volumes hosting Hyper-V VMs

This tip is generated when the `volume autogrow` option is not set for volumes that contain LUNs that are hosting virtual machines. This tip offers automatic remediation to enable `volume autogrow`.

Volume deduplication not enabled

This tip is generated for a virtual machine when deduplication is licensed but not enabled on a storage controller that hosts storage system volumes that serve two or more virtual machines. This tip offers automatic remediation to enable deduplication on the affected volumes.

Volume deduplication not licensed

This tip is generated for a virtual machine when deduplication is not licensed on a storage controller that hosts storage system volumes that serve two or more virtual machines. This tip does not provide automatic remediation, but it recommends that you install a deduplication license in virtualized environments.

Volume offline

This tip is generated for a virtual machine when one or more storage system volumes serving that virtual machine is offline. This tip offers automatic remediation to bring the volumes back online.

Volume space utilization exceeded threshold

This tip is generated for a virtual machine when one or more storage system volumes that serve that virtual machine is full. This tip offers two configurable thresholds: a warning level that defaults to 95 percent and a critical level that defaults to 99 percent. This tip offers automatic remediation to increase the volume size so that space utilization is reduced to 85 percent. The tip also recommends that the virtual machine be paused by the SCVMM administrator to avoid running out of space.

Related concepts

[Alerts and the health of your storage system \(7-Mode environments\)](#) on page 27

Related tasks

[Implementing PRO Tips automatically](#) on page 32

[Implementing PRO Tips manually](#) on page 32

Related references

[Performance and resource optimization issues](#) on page 103

Enabling PRO Tips

You can enable PRO Tips to discover objects in your virtual environment and to automatically repair many of the storage-related problems that are detected.

Before you begin

All requirements for SCOM and SCVMM PRO integration have been met.

About this task

SCVMM can take up to six hours to enable PRO Tips.

Steps

1. In SCVMM, open the **Properties** dialog box in Operations Manager server.
The **Properties** dialog box displays the Add Operations Manager Introduction window.
2. Click **Next**.
3. On the **Connection to Operations Manager** page, type the name of the root management server (RMS) emulator.
4. Select the **Enable Performance and Resource Optimization (PRO)** check box.
5. On the **Connection to VMM** page, type the user name and password.
6. Click **Next** to confirm the settings.
7. Click **Finish** to launch a jobs window and create a PRO connection.
8. Optional: If desired, track the progress of this process from the **PRO Diagnostics** task in the **Jobs** window.
9. If desired, click **Test PRO** in the **Properties** window to verify the status of the operation.

Related concepts

[What PRO Tips are in 7-Mode environments](#) on page 29

Related information

[Microsoft TechNet](#)

Implementing PRO Tips automatically

To ensure that problems are resolved quickly, you can configure PRO Tips to automatically implement solutions for storage-related problems in your virtual environment.

Before you begin

You must have installed the OnCommand Plug-in for Microsoft PRO management pack and enabled the Data ONTAP PRO discovery rule.

Steps

1. Navigate to the **Fabric** pane of **SCVMM Console**.
2. Select **Servers** and select the **All Hosts** menu.
3. Click **All Hosts** and select **Properties**.
4. Select **PRO Configuration**.
5. Select **Remediate** for the appropriate PRO Tip.
6. Click **OK**.

Related tasks

[Implementing PRO Tips manually](#) on page 32

Related references

[Types of PRO Tips](#) on page 29

[Performance and resource optimization issues](#) on page 103

Implementing PRO Tips manually

You can implement PRO Tips manually to resolve one or more storage-related problems when you choose, rather than waiting for PRO Tips to run automatically. You can use this option to control when a solution is implemented.

Before you begin

You must have met the following requirements:

- You must have installed the OnCommand Plug-in for Microsoft PRO management pack.
- You must have enabled the Data ONTAP discovery rule.
- You must have enabled PRO Tips.

Steps

1. From the SCVMM toolbar, select **PRO Tips**.
2. In the **PRO Tips** window, select one or more tips to implement.
3. Click either **Implement** or **Dismiss**.

Related tasks

Implementing PRO Tips automatically on page 32

Related references

Types of PRO Tips on page 29

Performance and resource optimization issues on page 103

Types of Data ONTAP reports available through the plug-in 7-Mode environments

Using OnCommand Plug-in for Microsoft in 7-Mode environments, you can view reports about different aspects of your storage over a specific period of time. These reports can help you to make decisions about the health of your storage system.

The default time period is from the first day of the month to the current day. You can view the following reports from the Reporting pane:

Data ONTAP Aggregate Storage Utilization Report

Displays up to 50 aggregates with the highest (default) or lowest storage utilization on all monitored controllers over a specific period of time. The default number of aggregates is five.

Data ONTAP Controller Average System Latency Report

Displays the average I/O or network latency of the top five of all monitored systems over a specific period of time. This report helps you to determine if you can load-balance more effectively.

Data ONTAP Controller Rate Of Storage Utilization Report

Displays the rate at which storage controller utilization changes over a specific period of time.

Data ONTAP Controller Storage Utilization Report

Displays the amount of free space of the top five of all monitored systems over a specific period of time.

Data ONTAP Controllers Availability Report

Displays the controller availability of one or more monitored storage controllers over a specific period of time. The report selects all monitored storage controllers if none are selected.

Data ONTAP Group Average System Latency Report

Displays the average I/O or network latency of all monitored storage controllers over a specific period of time.

Data ONTAP Group Storage Utilization Report

Displays the storage utilization for all monitored storage controllers over a specific period of time.

Data ONTAP Most Common Alerts Report

Displays up to 50 of the most common alerts on all monitored storage controllers over a specific period of time. The default number of alerts shown is five.

Data ONTAP SnapMirror Average Lag Time Per Controller Report (Unit: Hours)

Displays the average lag time, in hours, of all SnapMirror relationships per storage controller over a specific period of time.

Data ONTAP SnapMirror Longest Lag Time Report (Unit: Hours)

Displays the five SnapMirror relationships with the longest lag time, in hours, over a specified period of time. Both the source and destination storage controllers must be monitored.

Data ONTAP Virtualization LUN Alignment Report

Displays a summary of alignment statuses for Hyper-V LUNs over a specific period of time.

Data ONTAP Virtualization VHD Alignment Report

Displays a summary of alignment statuses for Hyper-V VHDs over a specific period of time.

Data ONTAP Volume Storage Utilization Report

Displays up to 50 volumes with the highest or lowest storage utilization on all monitored controllers over a specific period of time. The report defaults to the highest volume storage utilization. The default number of volumes is five.

Related concepts

[Custom reports](#) on page 34

Related tasks

[Viewing reports](#) on page 34

Viewing reports

You can view reports generated by OnCommand Plug-in for Microsoft by using the **Reports** tab of System Center Operations Manager (SCOM). These reports can help you to make decisions about the health of your storage system.

Before you begin

You must have installed and imported the Data ONTAP Reports Management Pack.

Steps

1. From the **Reporting** pane, click **Data ONTAP Reports**.
2. Right-click the name of the report you want to view.

Custom reports

With OnCommand Plug-in for Microsoft, you can create custom reports to monitor your system. These reports can help you to make decisions about the health of your storage system.

You can create reports to monitor the status of the LUNs, virtual machines, and cluster-shared volumes (CSVs) on your system, including but not limited to the following statistics:

- Volume space utilization
- Volume latency
- LUN space utilization

- LUN latency

If you want to generate reports specific to only the CSVs on your system, you can write a Microsoft System Center Operations Manager (SCOM) filter for the LUNs that you want to use in the reports. Alternatively, you can manually select the CSVs as objects to report on by using the Reporting window.

How the plug-in works with SCOM for clustered Data ONTAP environments

System Center Operations Manager (SCOM) is a data center management system for operating systems and hypervisors. The plug-in provides an interface through SCOM that you can use to view state, health, and performance information about your monitored objects. The plug-in also generates alerts for particular availability, performance, configuration, or security situations that affect your storage system.

How the plug-in works with the management pack for clustered Data ONTAP

There are several tasks you can perform with the management pack for clustered Data ONTAP. These tasks include adding storage systems including clusters in a MetroCluster configuration, discovering and configuring the storage systems, and defining the management pack rules.

Related tasks

[Adding a clustered Data ONTAP storage system](#) on page 39

[Running discovery on clustered Data ONTAP](#) on page 45

[Running virtualization discovery on clustered Data ONTAP](#) on page 45

[Initiating clustered Data ONTAP storage discovery in SCOM](#) on page 44

[Overriding clustered Data ONTAP management pack rules](#) on page 41

Management pack features for clustered Data ONTAP

When you install OnCommand Plug-in for Microsoft, the installation wizard installs only the components that you select. Each management pack and its associated features are installed on the specified server.

You can install the following management pack and then use its associated features:

Management pack	Feature	Subfeature
System Center Operations Manager (SCOM) Management Packs	Storage Monitoring	Reporting
	Hyper-V storage Monitoring and Management	Reporting
	Clustered Data ONTAP management pack	Clustered Data ONTAP Virtualization management pack MetroCluster Data ONTAP management pack Reporting

List of OnCommand Plug-in for Microsoft permissions needed to discover and monitor in clustered Data ONTAP

To discover and monitor components of your array, you need to have a specific set of permissions on the storage array.

You can use the administrator or root login to perform all storage discovery and monitoring; however, it is a good practice to use the role-based access control (RBAC) feature provided by Data ONTAP to create one or more custom accounts with limited access privileges.

You can create a user who has the permissions required to discover and monitor all of the objects in clustered Data ONTAP. The following example shows the clustered Data ONTAP CLI commands necessary to create a user named “ocpm” and assigned the role named “ocpm” :

```
security login role create -role ocpm -access readonly "command"
```

The role “ocpm” must have permissions set for all of the following commands:

- cluster-identity-show
- cluster-peer-get-iter
- cluster-peer-show
- cluster-show
- diagnosis-alert-get-iter ClusterSeveredAllLinksAlert
- diagnosis-alert-get-iter ClusterInSwitchedOverStateAlert
- diagnosis-alert-get-iter InterclusterBrokenConnectionAlert
- diagnosis-alert-get-iter RaidLeftBehindAggrAlert
- diagnosis-alert-get-iter RaidLeftBehindSpareAlert
- diagnosis-alert-get-iter StorageFCAdapterOfflineAlert
- lun-show
- metrocluster-check-aggregate-get-iter
- metrocluster-check-get-iter
- metrocluster-interconnect-adapter-get-iter
- metrocluster-interconnect-mirror-get-iter
- metrocluster-node-get-iter
- metrocluster-vserver-get-iter
- network-interface-show
- network-port-show
- snapmirror-policy-show
- snapmirror-show
- statistics-show
- storage-aggregate-show
- storage-bridge-cooling-info temperature-sensor-operational-status

- storage-bridge-fc-port-info administrative-state
- storage-bridge-fc-port-info operational-state
- storage-bridge-get-iter
- storage-bridge-info is-being-monitored
- storage-bridge-info status
- storage-bridge-sas-port-info administrative-state
- storage-bridge-sas-port-info operational-state
- storage-disk-show
- storage-failover-show
- system-node-show
- version
- volume-efficiency-show
- volume-get-iter
- volume-qtrees-show
- volume-quota-report
- volume-show
- vservers-cifs-share-access-control-show
- vservers-cifs-share-show
- vservers-cifs-show
- vservers-fcp-show
- vservers-iscsi-show
- vservers-peer-show
- vservers-show

The user named “ocpm” with role of “ocpm” must have permissions set for the following parameters:

- -application http
- -application ontapi

The following example illustrates the proper assignment of these permissions:

```
security login role create -role ocpm -access readonly -cmddirname
"cluster-identity-show"
...
security login role create -role ocpm -access readonly -cmddirname
"vservers-show"
create -username ocpm -role ocpm -application http -authmethod password
create -username ocpm -role ocpm -application ontapi -authmethod password
```

Monitoring your clustered Data ONTAP storage

The System Center Operations Manager (SCOM) monitors the health and performance data that it collects from the discovered storage systems running clustered Data ONTAP. SCOM generates events when the status is abnormal or when a predefined threshold has been reached. If configured to do so, SCOM sends a notification when an event triggers an alert.

Adding a clustered Data ONTAP storage system

Before you can monitor the performance and health of your clustered Data ONTAP storage, you must add a Storage Virtual Machine (SVM), a cluster, or clusters in a MetroCluster configuration.

About this task

When you add a clustered Data ONTAP storage system, the storage objects for the system are automatically discovered or you can initiate discovery by clicking **Discover** in the Manage Storage Systems dialog box.

Steps

1. Click **Monitoring**.
2. In the navigation pane, select **Clustered Data ONTAP > Management Servers**.
3. In the **Tasks** pane, click **Clustered Data ONTAP: Manage Storage System**.
The Manage Storage Systems dialog box opens.
4. Click **Add**.
The Add Storage System dialog box opens.
5. Type the name or IP address of the storage system, whether it is a cluster or a Storage Virtual Machine (SVM), and the user credentials of the system that you want to add.
6. If the specified cluster is in a MetroCluster configuration, the dialog box expands and automatically populates the name and user credentials of the second cluster.
Note: If the storage system name of the second cluster does not resolve to an IP address, then you have to specify the IP address of the system.
7. Click **Add**.

After you finish

If you cannot connect to the controller entered into the Manage Storage System, the run-as action account might need to be configured:

- Add the OnCommand Plug-in for Microsoft Run As Action Account as an administrator on the local host.
- Change the credentials of the OnCommand Plug-in for Microsoft Run As Action Account to a user with privileges that will allow it to run.
The credentials can be edited by navigating **SCOM Administration > Run As Configuration > Accounts > Action Account**.

Related tasks

Initiating clustered Data ONTAP storage discovery in SCOM on page 44

Modifying the user credentials for a clustered Data ONTAP storage system

You can modify the user credentials for a clustered Data ONTAP storage system at any time by updating the IP address, user name, and password.

About this task

You can modify the user credentials for multiple storage systems if you want the credentials to be the same for all systems. If a storage system has multiple management LIFs, you can select the LIF you want to change from the drop-down list.

Steps

1. Click **Monitoring**.
2. In the navigation pane, select **Clustered Data ONTAP > Management Servers**.
3. In the **Tasks** pane, click **Clustered Data ONTAP: Manage Storage System**.
The Manage Storage Systems dialog box opens.
4. Select a storage system for which you want to modify the user credentials and click **Modify**.
5. To change the user credentials for the selected storage system, type the IP address, user name, or password for the system and click **Save**.

Removing a clustered Data ONTAP storage system

You can remove a clustered Data ONTAP storage system when you no longer need to monitor it. After it has been added, you should keep your storage system in the database, but if you want to stop monitoring the storage system or clusters in a MetroCluster configuration with OnCommand Plug-in for Microsoft, you can remove it.

Steps

1. Click **Monitoring**.
2. In the navigation pane, select **Clustered Data ONTAP > Management Servers**.
3. In the **Tasks** pane, click **Clustered Data ONTAP: Manage Storage System**.
The Manage Storage Systems dialog box opens.
4. Select the storage system or cluster in a MetroCluster configuration that you want to remove and click **Remove**.
5. Click **Remove** in response to the confirmation prompt for a storage system or a cluster and click **Close** to close the dialog box.
Note: Clusters in a MetroCluster configuration are removed at the same time when one of the selected clusters is removed.
6. Click **Close** to close the dialog box.

Overriding clustered Data ONTAP management pack rules

After you verify that the clustered Data ONTAP management pack rules have been successfully imported into System Center Operations Manager (SCOM), you can override any rules to enable or disable, alter the frequency, or change the start time for a rule.

Steps

1. Click **Authoring**.
2. In the navigation pane, select **Management Pack Objects > Rules**.
3. In the search field, type **Clustered Data ONTAP** and click **Find Now**.
4. Select the rule that you want to override.
5. Right-click the selected rule and click **Overrides > Override the Rule > For all objects of class: Clustered Data ONTAP: Rule**.

You can set the overrides for all objects or specific objects, or to the entire group.

6. Select the overrides that you want to set depending on whether you want to enable or disable the rule, alter the frequency, or change the start time for the rule.
7. Save the changes to the management pack.

You can create a new management pack for your overrides or one management pack for all of your overrides. However, you should not save changes to the default management pack.

Related tasks

[Modifying or overriding clustered Data ONTAP monitor thresholds](#) on page 53

Related information

[Microsoft TechNet](#)

Lists of clustered Data ONTAP management pack rules

OnCommand Plug-in for Microsoft includes virtualization, management server, and MetroCluster rules from the clustered Data ONTAP Virtualization management pack and the MetroCluster Data ONTAP management pack that enable you to more effectively manage your storage resources.

Clustered Data ONTAP: LUN rule

- Clustered Data ONTAP: LUN Average Latency Rule

Clustered Data ONTAP: Management Server Resource Pool rules

- Clustered Data ONTAP: Discovery Rule
- Clustered Data ONTAP: Virtualization Discovery Rule
- Clustered Data ONTAP: Initial Storage Virtual Machine Discovery Rule
- Clustered Data ONTAP: Initial Cluster Discovery Rule
- Clustered Data ONTAP: Storage Virtual Machine Discovery Rule
- Clustered Data ONTAP: Cluster Discovery Rule

Clustered Data ONTAP: Node rules

- Clustered Data ONTAP: Aggregate Performance Data Collection Rule
- Clustered Data ONTAP: Node Disk State Monitoring Rule
- Clustered Data ONTAP: Node State Monitoring Rule
- Clustered Data ONTAP: Port State Rule

Clustered Data ONTAP: Performance rules

- Clustered Data ONTAP: Average Latency Performance Rule
- Clustered Data ONTAP: CIFS Operations Performance Rule
- Clustered Data ONTAP: CPU Average Utilization Performance Rule
- Clustered Data ONTAP: CPU Resource Utilization Performance Rule
- Clustered Data ONTAP: CPU Total Utilization Performance Rule
- Clustered Data ONTAP: Disk Data Read Performance Rule
- Clustered Data ONTAP: Disk Data Written Performance Rule
- Clustered Data ONTAP: Enclosure State Monitoring Rule
- Clustered Data ONTAP: FCP Operations Performance Rule
- Clustered Data ONTAP: HTTP Operations Performance Rule
- Clustered Data ONTAP: iSCSI Operations Performance Rule
- Clustered Data ONTAP: Network Data Received Performance Rule
- Clustered Data ONTAP: Network Data Sent Performance Rule
- Clustered Data ONTAP: NFS Operations Performance Rule
- Clustered Data ONTAP: Read Latency Performance Rule
- Clustered Data ONTAP: Read Operations Performance Rule
- Clustered Data ONTAP: SNMP Trap Performance Rule
- Clustered Data ONTAP: Total Operations Performance Rule
- Clustered Data ONTAP: Write Latency Performance Rule
- Clustered Data ONTAP: Write Operation Performance Rule

Clustered Data ONTAP: SMB Server rule

- Clustered Data ONTAP: SMB Server State Rule

Clustered Data ONTAP: Storage System rules

- Clustered Data ONTAP: LIF Performance Data Collection Rule
- Clustered Data ONTAP: LIF State Rule
- Clustered Data ONTAP: Storage System Connection Rule
- Clustered Data ONTAP: Storage Efficiency Rule

Clustered Data ONTAP: Storage Virtual Machine (SVM) rules

- Clustered Data ONTAP: Storage Virtual Machine (SVM) FCP Performance Statistics Collection Rule
- Clustered Data ONTAP: Storage Virtual Machine (SVM) iSCSI Performance Statistics Collection Rule
- Clustered Data ONTAP: Storage Virtual Machine (SVM) Performance Statistics Collection Rule
- Clustered Data ONTAP: Storage Virtual Machine (SVM) SMB Performance Statistics Collection Rule
- Clustered Data ONTAP: Storage Virtual Machine (SVM) State Monitoring Rule
- Clustered Data ONTAP: Storage Virtual Machine (SVM) Volume LUN State Rule
- Clustered Data ONTAP: Storage Virtual Machine (SVM) Volume State Monitoring Rule
- Clustered Data ONTAP: Volume Performance Data Collection Rule

Clustered Data ONTAP MetroCluster: MetroCluster rules

- Clustered Data ONTAP MetroCluster: Cluster Peer Monitoring Rule
- Clustered Data ONTAP MetroCluster: MetroCluster Aggregate Monitoring Rule
- Clustered Data ONTAP MetroCluster: MetroCluster Health Monitoring Rule
- Clustered Data ONTAP MetroCluster: MetroCluster Monitoring Rule
- Clustered Data ONTAP MetroCluster: MetroCluster Node Interconnect Monitoring Rule
- Clustered Data ONTAP MetroCluster: MetroCluster Node Monitoring Rule
- Clustered Data ONTAP MetroCluster: Storage Virtual Machine (SVM) DR Replication Monitoring Rule
- Clustered Data ONTAP MetroCluster: MetroCluster Version Rule

Clustered Data ONTAP Virtualization: Hyper-V Virtual Hard Disk rules

- Clustered Data ONTAP: Virtual Hard Disk LUN Monitoring Rule
- Clustered Data ONTAP: Virtual Hard Disk SMB Share Monitoring Rule
- Clustered Data ONTAP: Virtual Hard Disk Volume Monitoring Rule

Clustered Data ONTAP Virtualization: Virtual Hard Disk on LUN rules

- Clustered Data ONTAP: Virtual Hard Disk LUN Monitoring Rule
- Clustered Data ONTAP: Virtual Hard Disk SMB Share Monitoring Rule
- Clustered Data ONTAP: Virtual Hard Disk Volume Monitoring Rule

Clustered Data ONTAP Virtualization: Virtual Hard Disk on SMB Share rules

- Clustered Data ONTAP: Virtual Hard Disk LUN Monitoring Rule
- Clustered Data ONTAP: Virtual Hard Disk SMB Share Monitoring Rule
- Clustered Data ONTAP: Virtual Hard Disk Volume Monitoring Rule

Storage discovery for clustered Data ONTAP

You must first discover your clustered Data ONTAP storage before you can view all of your clustered Data ONTAP storage objects such as, Storage Virtual Machines (SVMs), volumes, aggregates, and disks. Then you can monitor your entire cluster storage infrastructure in System Center Operations Manager (SCOM).

You can launch the discovery process from the Manage Storage Systems dialog box or run discovery for a selected storage system from the Management Servers view.

Some monitored storage object properties such as the state, total space, or used space might be out of sync until the next time storage discovery is run with the default time set at four hours.

Initiating clustered Data ONTAP storage discovery in SCOM

You can initiate the process of discovering your clustered Data ONTAP storage in case the discovery of a management server fails because OnCommand Plug-in for Microsoft is not installed on the System Center Operations Manager (SCOM) management server or the server was not added to the resource pool.

Steps

1. Click **Monitoring**.
2. In the navigation pane, select **Clustered Data ONTAP > Management Servers**.
3. In the **Tasks** pane, click **Clustered Data ONTAP: Manage Storage System**.
The Manage Storage Systems dialog box opens.
4. Click **Discover**.
5. Select the storage targets that you want to run discovery on and click **Run**.

Related tasks

[Adding a clustered Data ONTAP storage system](#) on page 39

Types of clustered Data ONTAP discovery

There are two types of discovery that you can use to configure your plug-in: clustered Data ONTAP storage discovery and clustered Data ONTAP virtualization discovery.

\You can use both clustered Data ONTAP storage discovery and clustered Data ONTAP virtualization discovery to discover storage controllers and their objects connected to servers that are recognized by System Center Virtual Machine Manager (SCVMM). Clustered Data ONTAP virtualization discovery alone discovers storage on all Hyper-V hosts that SCVMM manages.

After you run **Clustered Data ONTAP: Discovery Task**, discovery finishes and might appear to return a low number of objects. As of OnCommand Plug-in 4.1 for Microsoft, discovery is performed using a distributed execution on multiple management servers. The discovery is split into two stages: the first stage discovers only SVMs and clusters, finishing quickly and reporting a low object count. The second stage is distributed among multiple management servers and starts within five minutes after the first stage discovery for each discovered cluster or SVM.

Related tasks

[Running discovery on clustered Data ONTAP](#) on page 45

[Running virtualization discovery on clustered Data ONTAP](#) on page 45

Running discovery on clustered Data ONTAP

You must run discovery for the plug-in to recognize your clustered Data ONTAP systems and add them to the System Center Operations Manager (SCOM) database. All storage objects must be discovered before you can monitor them.

About this task

If one node of a multinode cluster is down, the discovery task displays `Failed` in the `Task Status` view because the storage system is in an unhealthy state. However, the discovery process continues for other storage objects.

Steps

1. Click **Monitoring**.
2. In the navigation pane, select **Clustered Data ONTAP > Management Servers**.
3. In the **Tasks** pane, click **Clustered Data ONTAP: Discovery Task**.
The Clustered Data ONTAP: Discovery Task dialog box opens.
4. Select the storage targets that you want to run discovery on and click **Run**.

Result

After you run **Clustered Data ONTAP: Discovery Task**, discovery finishes and might appear to return a low number of objects. As of OnCommand Plug-in 4.1 for Microsoft, discovery is performed using a distributed execution on multiple management servers. The discovery is split into two stages: the first stage discovers only SVMs and clusters, finishing quickly and reporting a low object count. The second stage is distributed among multiple management servers and starts within five minutes after the first stage discovery for each discovered cluster or SVM.

Running virtualization discovery on clustered Data ONTAP

You must run clustered Data ONTAP virtualization discovery to find storage on all Hyper-V hosts in System Center Virtual Machine Manager (SCVMM) before you can manage that storage.

Before you begin

You must have established a connection between System Center Operations Manager (SCOM) and SCVMM prior to running virtualization discovery.

You must have added all of your Hyper-V hosts to SCVMM before you run discovery, because clustered Data ONTAP virtualization discovery discovers only those Hyper-V hosts that are monitored by SCVMM.

About this task

If there are Hyper-V hosts not in the same domain as the SCOM and SCVMM servers, the virtualization discovery task status displays `Failed` but the plug-in discovers and monitors all Hyper-V hosts within the domain.

Virtualization discovery runs automatically after you run discovery or add a new storage system. When you add a new storage system, the discovery task does not appear in the `Task Status` view but a virtualization discovery task does appear. The virtualization discovery task status displays more than once in the `Task Status` view.

Steps

1. Click **Monitoring**.

2. In the navigation pane, select **Clustered Data ONTAP > Management Servers**.
3. In the **Tasks** pane, click **Clustered Data ONTAP: Virtualization Discovery Task**.
The Clustered Data ONTAP: Virtualization Discovery Task dialog box opens.
4. Select the storage targets that you want to run discovery on and click **Run**.

What a resource pool is

A resource pool is a collection of management servers that you can use to distribute work in a clustered Data ONTAP environment. The management group contains all management servers in the management group, not only the members of the resource pool. System Center Operations Manager (SCOM) uses resource pools for load balancing and high availability among management servers.

When you install OnCommand Plug-in for Microsoft on a management server in the management group, the management server is automatically added to the OCPM resource pool. You can also choose other management servers in the group to add to the OCPM resource pool.

You can use the Management Server View monitor to determine the management servers that are part of the OCPM resource pool and have the plug-in installed on the server.

Adding a management server to the resource pool

When you add a management server to the resource pool, OnCommand Plug-in for Microsoft is automatically installed on the new management server. You can add more management servers to the resource pool if the servers in the pool are overloaded.

About this task

You should not use the **Resource Pools** task from the list of **Administration** tasks in the System Center Operations Manager (SCOM) console to add or remove management servers from the OCPM resource pool, because it might cause the OCPM resource pool to become out of sync.

Steps

1. Click **Monitoring**.
2. In the navigation pane, select **Clustered Data ONTAP > Management Servers**.
3. Select a management server that does not have the plug-in installed on it.
4. In the **Tasks** pane, click **Clustered Data ONTAP: Add Management Server to OCPM Resource Pool**.
The Management Server Credentials dialog box opens.
5. Type the required information and click **Next**.
The Status window opens.
6. Click **Close** after you verify the status of the management server.

Related tasks

[Rescanning a management server in OnCommand Plug-in for Microsoft](#) on page 47

Removing a management server from the resource pool

You can remove a management server from the resource pool if the servers are underutilized and OnCommand Plug-in for Microsoft is uninstalled from it.

About this task

You should not use the **Resource Pools** task from the list of **Administration** tasks in the System Center Operations Manager (SCOM) console to add or remove management servers from the OCPM resource pool.

Steps

1. Click **Monitoring**.
2. In the navigation pane, select **Clustered Data ONTAP > Management Servers**.
3. Select a management server from those displayed.
4. In the **Tasks** pane, click **Clustered Data ONTAP: Remove Management Server from OCPM Resource Pool**.
5. Click **Remove** when prompted.

Rescanning a management server in OnCommand Plug-in for Microsoft

It might be necessary to rescan a management server before you can add it to the OCPM resource pool. If you need to install System Center Operations Manager (SCOM) on additional management servers and add them to an existing management group, you must first rescan each server.

About this task

A successful rescan of a management server enables OnCommand Plug-in for Microsoft to recognize the new server and to show updated information.

Steps

1. Click **Monitoring**.
2. In the navigation pane, select **Clustered Data ONTAP > Management Servers**.
3. Select a management server that you want configured for the resource pool.
4. In the **Tasks** pane, click **Clustered Data ONTAP: Rescan Management Server**.

In the Management Servers view, the status of the management server changes from **Not Configured** to **Configured** when the rescan is complete.

After you finish

After you rescan a management server, you can add it to the resource pool.

Related tasks

[Adding a management server to the resource pool](#) on page 46

List of OnCommand Plug-in for Microsoft monitors for clustered Data ONTAP environments

You can use the state and performance monitors for cluster environments to track and report alerts and events related to your clustered Data ONTAP infrastructure. The monitors advise you of events that you can view using the event log, so that you can determine a way to mitigate any problems.

A *state monitor* maps a storage object's status, state, or properties to a health state in SCOM. For a volume, a value of “online” would map to a healthy SCOM volume state monitor, a value of “restricted” would map to a warning, and a value of “offline” would map to a critical state.

A *performance monitor* maps a storage object's value to a health state in SCOM. For volume space utilization, the percentage value is added to the SCOM database and the volume space utilization monitor checks if the value in the database is greater than the acceptable thresholds. The thresholds are set to default values, but you can override them per storage object.

The following monitors are contained in the clustered Data ONTAP management pack:

- Clustered Data ONTAP: Aggregate Available Space (GB) Monitor
- Clustered Data ONTAP: Aggregate Space Utilization (%) Monitor
- Clustered Data ONTAP: Aggregate State Monitor
- Clustered Data ONTAP: Average Processor Utilization (%) Monitor
- Clustered Data ONTAP: Cluster Connection Monitor
- Clustered Data ONTAP: Cooling Element State Monitor
- Clustered Data ONTAP: Data Protection Lag Time Monitor
- Clustered Data ONTAP: Data Protection State Monitor
- Clustered Data ONTAP: Disk Data Read (Gbps) Monitor
- Clustered Data ONTAP: Disk State Monitor
- Clustered Data ONTAP: Disk Data Written (Gbps) Monitor
- Clustered Data ONTAP: Enclosure State Monitor
- Clustered Data ONTAP: FCP Read Operations/sec Monitor
- Clustered Data ONTAP: FCP Total Operations/sec Monitor
- Clustered Data ONTAP: FCP Write Operations/sec Monitor
- Clustered Data ONTAP: iSCSI Read Operations/sec Monitor
- Clustered Data ONTAP: iSCSI Write Operations/sec Monitor
- Clustered Data ONTAP: LIF Network Data Received (Gbps) Monitor
- Clustered Data ONTAP: LIF Network Data Sent (Gbps) Monitor
- Clustered Data ONTAP: LIF State Monitor
- Clustered Data ONTAP: LUN Latency Monitor
- Clustered Data ONTAP: LUN State Monitor
- Clustered Data ONTAP: Node Average Processor Utilization (%) Monitor
- Clustered Data ONTAP: Node CPU Resource Utilization (%) Monitor

- Clustered Data ONTAP: Node Disk Data Read (Gbps) Monitor
- Clustered Data ONTAP: Node Disk Data Written (Gbps) Monitor
- Clustered Data ONTAP: Node Global Status Monitor
- Clustered Data ONTAP: Node HA State monitor
- Clustered Data ONTAP: Node HTTP Operations/sec Monitor
- Clustered Data ONTAP: Node Latency (ms) Monitor
- Clustered Data ONTAP: Node NFS Operations/sec Monitor
- Clustered Data ONTAP: Node State Monitor
- Clustered Data ONTAP: Port State Monitor
- Clustered Data ONTAP: Power Supply State Monitor
- Clustered Data ONTAP: Qtree Quota Monitor
- Clustered Data ONTAP: SMB Operations/sec Monitor
- Clustered Data ONTAP: SMB State Monitor
- Clustered Data ONTAP: Storage Virtual Machine (SVM) Connection Monitor
- Clustered Data ONTAP: Storage Virtual Machine (SVM) FCP Service Monitor
- Clustered Data ONTAP: Storage Virtual Machine (SVM) HTTP Operations Per Second Monitor
- Clustered Data ONTAP: Storage Virtual Machine (SVM) iSCSI Service Monitor
- Clustered Data ONTAP: Storage Virtual Machine (SVM) Network Data Received (Gbps) Monitor
- Clustered Data ONTAP: Storage Virtual Machine (SVM) Network Data Sent (Gbps) Monitor
- Clustered Data ONTAP: Storage Virtual Machine (SVM) NFS Operations Per Second Monitor
- Clustered Data ONTAP: Storage Virtual Machine (SVM) SMB Service Monitor
- Clustered Data ONTAP: Storage Virtual Machine (SVM) State Monitor
- Clustered Data ONTAP: Storage Virtual Machine (SVM) Total Operations Per Second Monitor
- Clustered Data ONTAP: Volume Available Space (GB) Monitor
- Clustered Data ONTAP: Volume Latency Monitor
- Clustered Data ONTAP: Volume Quota Monitor
- Clustered Data ONTAP: Volume SnapMirror Monitor
- Clustered Data ONTAP: Volume Space Utilization (%) Monitor
- Clustered Data ONTAP: Volume State Monitor
- Clustered Data ONTAP: Volume Used Inodes (%) Monitor

OnCommand Plug-in for Microsoft monitor default threshold values for clustered Data ONTAP environments

You can use the state and performance monitors for cluster environments to track and report alerts and events related to your clustered Data ONTAP infrastructure. The monitors advise you of events that you can view using the event log. Then you can determine a way to mitigate any problems.

The default threshold values within the OnCommand Plug-in for Microsoft Clustered Data ONTAP Management Pack, double threshold monitors, are as follows:

Monitor name	Monitor rule	Default threshold value (lower threshold-upper threshold)
Aggregate Available Space (MB) Monitor	Aggregate Performance Data Collection Rule	50GB-100GB
Aggregate Space Utilization (%) Monitor	Aggregate Performance Data Collection Rule	85%-90%
Volume Available Space (MB) Monitor	Volume Performance Data Collection Rule	10GB-50GB
Volume Space Utilization (%) Monitor	Volume Performance Data Collection Rule	85%-90%
Data Protection Lag Time Monitor	Data Protection Lag Time Performance Data Collection Rule	720mins-1440mins

The default threshold values within the OnCommand Plug-in for Microsoft Clustered Data ONTAP Management Pack, consecutive samples monitors, are as follows:

Monitor name	Monitor rule	Default threshold value
Storage Virtual Machine (SVM) Network Data Sent (Gbps) Monitor	Storage Virtual Machine (SVM) Performance Statistics Collection Rule	5 Gbps
Storage Virtual Machine (SVM) Network Data Received (Gbps) Monitor	Storage Virtual Machine (SVM) Performance Statistics Collection Rule	5 Gbps
Node Latency Monitor	Node Performance Statistics Collection Rule	50 ms
Volume Latency Monitor	Volume Performance Data Collection Rule	50 ms
LUN Latency Monitor	LUN Performance Collection Rule	50 ms
SMB Operations/sec Monitor	SMB Performance Statistics Collection Rule	1000 Ops/sec
Average Processor Utilization (%) Monitor	Node Performance Statistics Collection Rule	90%
CPU Resource Utilization (%) Monitor	Node Performance Statistics Collection Rule	90%
Disk Data Read (Gbps) Monitor	Node Performance Statistics Collection Rule	1 (Gbps)

Monitor name	Monitor rule	Default threshold value
Disk Data Written (Gbps) Monitor	Node Performance Statistics Collection Rule	1 (Gbps)
HTTP Operations/sec Monitor	Node Performance Statistics Collection Rule	1000 Operations/sec
NFS Operations/sec Monitor	Node Performance Statistics Collection Rule	1000 Operations/sec
iSCSI Read Operations/sec Monitor	Storage Virtual Machine (SVM) iSCSI Performance Statistics Collection Rule	1000 Operations/sec
iSCSI Write Operations/sec Monitor	Storage Virtual Machine (SVM) iSCSI Performance Statistics Collection Rule	1000 Operations/sec
FCP Read Operations/sec Monitor	Storage Virtual Machine (SVM) FCP Performance Statistics Collection Rule	1000 Operations/sec
FCP Write Operations/sec Monitor	Storage Virtual Machine (SVM) FCP Performance Statistics Collection Rule	1000 Operations/sec
LIF Network Data Sent (KB/sec) Monitor	LIF Performance Statistics Collection Rule	5 (Gbps)
LIF Network Data Received (Gbps) Monitor	LIF Performance Data Collection Rule	5 (Gbps)
SMB Latency (microseconds)	SMB Performance Statistics Collection Rule	50 ms

Monitoring MetroCluster configurations by using the MetroCluster Data ONTAP management pack

The Clustered Data ONTAP management pack contains the management pack for MetroCluster configurations and provides the monitoring support for MetroCluster configurations in OnCommand Plug-in for Microsoft, which enables you to check for any connectivity issues in your MetroCluster configuration. Discovering a connectivity issue early enables you to manage your MetroCluster configurations effectively.

Discovering clusters in a MetroCluster configuration

OnCommand Plug-in for Microsoft does not include a separate function to discover MetroCluster configurations. You must discover clusters in a MetroCluster configuration using the clustered Data ONTAP discovery task if you want to monitor the clusters using the plug-in.

Steps

1. To use the MetroCluster Data ONTAP management pack, you must provide the user credentials for a cluster when you add a storage system.
See [Adding a clustered Data ONTAP storage system](#) on page 39 for information on adding a cluster in a MetroCluster configuration.
2. Clusters in a MetroCluster configuration are removed at the same time when one of the selected clusters is removed.
See [Removing a clustered Data ONTAP storage system](#) on page 40 for information on removing a cluster in a MetroCluster configuration.
3. To enable MetroCluster monitoring, you must discover the clusters in a MetroCluster configuration.

See *Running discovery on clustered Data ONTAP* on page 45 for information on discovering a cluster in a MetroCluster configuration.

List of monitors for MetroCluster configurations in a clustered Data ONTAP environment

You can use the monitors for MetroCluster configurations in a clustered Data ONTAP environment to track and report alerts and events related to your MetroCluster configuration. The monitors advise you of events that you can view using the event log, so that you can determine a way to mitigate any problems.

The following monitors are contained in the MetroCluster Data ONTAP management pack:

- Clustered Data ONTAP MetroCluster: Aggregate Redundancy Monitor
- Clustered Data ONTAP MetroCluster: Aggregate Replication Monitor
- Clustered Data ONTAP MetroCluster: Back Hoe Detection Monitor
- Clustered Data ONTAP MetroCluster: Health Monitor
- Clustered Data ONTAP MetroCluster: Intercluster Connection Status Monitor
- Clustered Data ONTAP: MetroCluster: Node Interconnect Adapter Status Monitor
- Clustered Data ONTAP: MetroCluster: Node Interconnect Mirror Status Monitor
- Clustered Data ONTAP MetroCluster: Node Interconnect Redundancy Monitor
- Clustered Data ONTAP MetroCluster: Node Object Limit Monitor
- Clustered Data ONTAP MetroCluster: Node Root Volume Configuration Monitor
- Clustered Data ONTAP MetroCluster: Node State Monitor
- Clustered Data ONTAP MetroCluster: Storage Bridge Status Monitor
- Clustered Data ONTAP MetroCluster: Storage FCP Adapter Status Monitor
- Clustered Data ONTAP MetroCluster: Storage Virtual Machine DR Replication Monitor
- Clustered Data ONTAP MetroCluster: SwitchBack Effect Monitor
- Clustered Data ONTAP MetroCluster: SwitchOver Detection Monitor
- Clustered Data ONTAP MetroCluster: Version Monitor

What the MetroCluster Topology Diagram view is

The MetroCluster Topology Diagram view enables you to see a pictorial representation of all of the clusters in a MetroCluster configuration in a clustered Data ONTAP environment currently being monitored by the plug-in, so that you can more easily isolate problems to a specific storage object.

You can expand this view to display storage hierarchy, so that you can isolate problems to the exact component on which they occur. When you select a cluster in a MetroCluster configuration, you can view information about it in the Detail View window.

Information displayed in views for MetroCluster configurations in a clustered Data ONTAP environment

You can use different views in OnCommand Plug-in for Microsoft to monitor your MetroCluster configuration in a clustered Data ONTAP environment, enabling you to quickly discover connectivity issues. You can use the tasks listed in the Actions pane to perform specific tasks related to managing your MetroCluster configuration.

Clustered Data ONTAP MetroCluster views display the following information:

Aggregates

Displays information about the aggregate in a MetroCluster configuration, including the total size of the aggregate and the amount of used space as a percentage of the total space available.

Cluster

Displays information about the cluster in a MetroCluster configuration, including the status of the cluster and remote cluster operations.

Interconnect Adapter

Displays information about the cluster interconnect adapter, which enables the cluster nodes to communicate with each other and to move data within the cluster. You can monitor the status of the link and verify whether both nodes are running.

Interconnects

Displays information about the interconnect between the node controllers. You can monitor this connection and troubleshoot if an interconnect is down, is not present, or has experienced a partial failure.

MetroCluster

Displays information about the MetroCluster configuration such as the state of the configuration and the display name of each cluster in the configuration.

Nodes

Displays information about the nodes in a MetroCluster configuration, including the name of the DR partner cluster and HA partner nodes in an HA pair.

Storage Bridge

Displays information about the storage bridge in a MetroCluster configuration, such as whether the bridge is being monitored, so that you can detect, diagnose, and quickly resolve any issues.

Storage Virtual Machines (SVMs)

Displays information about SVMs in a MetroCluster configuration such as the root volume, type, and the allowed protocols on the SVM.

Modifying or overriding clustered Data ONTAP monitor thresholds

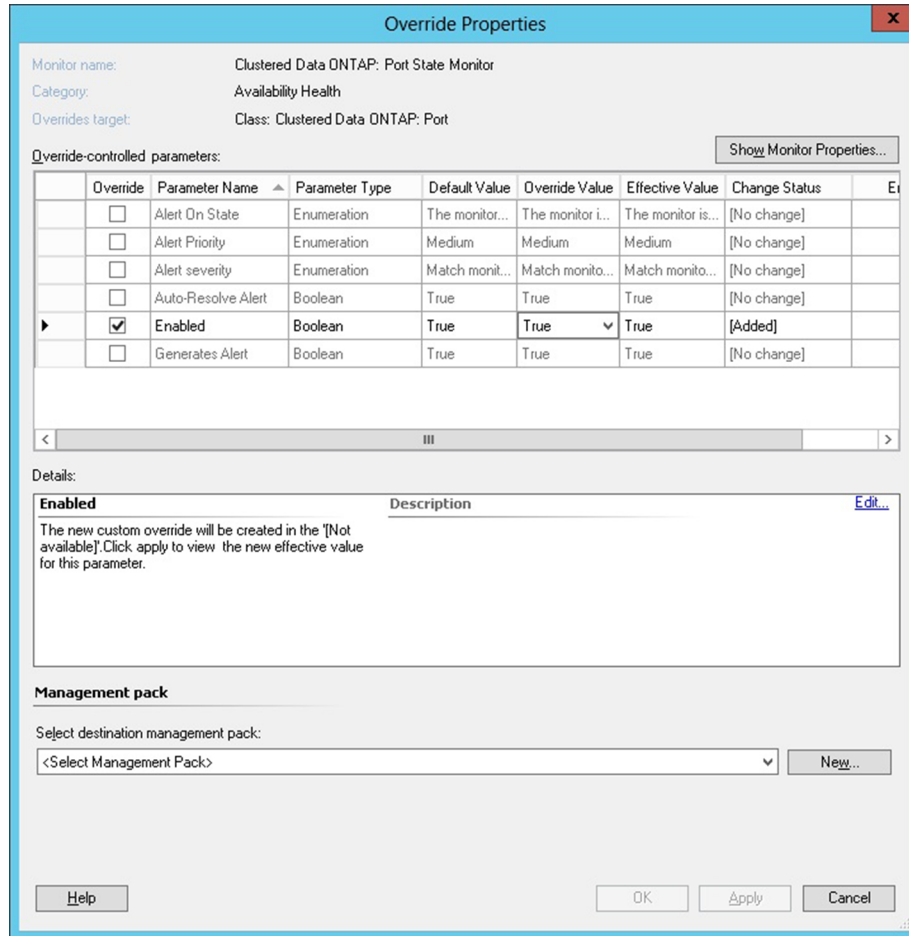
You can view and then either modify or override the threshold values of the clustered Data ONTAP monitors to trigger alerts based on specified threshold values.

Steps

1. Click **Authoring**.
2. In the navigation pane, click **Monitors**.
3. In the search field, type **Clustered Data ONTAP** and click **Find Now**.
4. Select the monitor that you want to view and monitor or override.
5. Right-click the selected monitor and click **Overrides > Override the Monitor > For all objects of class: Clustered Data ONTAP: Object name**.

You can set the overrides for all objects or specific objects, or to the entire group.

6. In the **Override Properties** dialog box, select the **Override** check box and an override value from the Override Value list.



7. Save the changes to the management pack.

You can create a new management pack for your overrides or one management pack for all of your overrides. However, you should not save changes to the default management pack.

Related tasks

[Overriding clustered Data ONTAP management pack rules](#) on page 41

Related information

[Microsoft TechNet](#)

Information displayed in views for clustered Data ONTAP environments

You can use different views in OnCommand Plug-in for Microsoft to monitor the state of your clustered Data ONTAP storage objects and to identify usage patterns. You can use the tasks listed in the Actions pane to perform specific tasks related to managing your clustered Data ONTAP storage.

Note: Events are displayed only in the Windows event log, and performance information might not display because some objects do not have any.

All the views for clustered Data ONTAP physical storage objects such as aggregates, controllers, disks, ports, and nodes do not contain any data if you add only Storage Virtual Machines (SVMs) in OnCommand Plug-in for Microsoft.

Clustered Data ONTAP views display the following information:

Aggregates

Displays information about your clustered Data ONTAP aggregate, including the total size of the aggregate and the amount of used space as a percentage of the total space available.

Clusters

Displays information about the storage systems running clustered Data ONTAP, including the state of the system and the display name of the system.

Dashboard

Displays information about the overall state and health of your clustered Data ONTAP storage resources, including the number and state of all clusters, nodes, and virtual machines. This view displays how efficiently the storage is currently being used by all clusters that are monitored by the plug-in.

Disks

Displays information about different attributes of a disk in cluster environments. You can monitor the disk's health and diagnose any issues by viewing the disk type, state, and rotational speed of the disk.

LIFs

Displays information about different attributes of a logical interface in cluster environments such as the interface name, IP address, current node, current port, and whether or not logical interfaces are currently located on their home node and port.

LUNs

Displays information about different attributes of a LUN in cluster environments such as the LUN path, multiprotocol type, volume, and total size of the LUN.

Management Servers

Displays information about different attributes of a management server in cluster environments, such as the state of the server and whether the server is contained in a resource pool.

Nodes

Displays information about node attributes such as the size of the nodes and the name of the systems running clustered Data ONTAP.

Ports

Displays information about port attributes such as the state of the port and the node name.

Qtrees

Displays information about different attributes of a qtree in cluster environments such as the volume containing the qtree, the security style of the qtree, and the status of the qtree.

Storage Virtual Machine (SVM) Dashboard

Displays information about SVMs with the highest amount of used space as a percentage of the total space available and the recent trends in space utilization for the monitored Storage Virtual Machines (SVMs).

Storage Virtual Machines (SVMs)

Displays information about SVMs storage system attributes such as the root volume, state, and the allowed protocols on the SVM.

Volumes

Displays information about different attributes of a volume in cluster environments such as the name of the volume, the total size of the volume, and the amount of used space as a percentage of the total space available.

Data Protection Policies

Displays information about all data protection policies for the virtual machines that monitored by the plug-in such as the name of the data protection policy and the total number of data protection rules.

Data Protection Status

Displays information about the status of all SnapMirror relationships that are monitored by the plug-in such as the source and destination location of the SnapMirror pair and the state of the pair.

Peering Cluster

Displays information about the cluster peer relationship and the availability of the cluster peer connection for the cluster peers that are monitored by the plug-in.

Peering Storage Storage Virtual Machines (SVMs)

Displays information about the cluster peer relationships for all SVMs that are monitored by the plug-in.

SMB Permissions

Displays information about SMB permissions such as the SMB share name, permissions, and the user or group authorized to access the data.

SMB Server

Displays information about the SMB server such as the name of the server, authentication style, and the domain name and workgroup.

SMB Shares

Displays information about SMB shares such as the volume name, share name, path, and properties.

Hyper-V Hosts

Displays information about all Hyper-V hosts and the number of virtual machines being hosted by each.

Hyper-V Virtual Hard Disks on LUNs

Displays information about the location of all Hyper-V virtual hard disks on a LUN.

Hyper-V Virtual Hard Disks on SMB shares

Displays information about SMB statistics.

Hyper-V VMs

Displays information about different attributes of a monitored Hyper-V virtual machine such as the fully qualified domain name (FQDN) of the virtual machine and the fully qualified domain name (FQDN) of the Hyper-V host that is hosting the virtual machines.

What performance counters do

You can use the performance counters in OnCommand Plug-in for Microsoft to monitor the state of your storage controllers. After these counters collect information, the information is displayed in a performance graph in the System Center Operations Manager (SCOM) Console.

The plug-in monitors CPU and space utilization, as well as I/O operations, throughput, latency, and protocols, so that you can monitor and identify performance trends over time.

If you save a performance graph as an image in the SCOM Console, a performance counter such as `Operations/sec` displayed in the graph's title does not appear in the saved image. Each axis of the saved graph does not display a counter, which only appears in the title of the graph.

What the Cluster Topology Diagram view is

The Cluster Topology Diagram view enables you to see a pictorial representation of all of the clusters currently being monitored by the plug-in, so that you can more easily isolate problems to a specific storage object.

You can expand this view to display storage hierarchy, so that you can isolate problems to the exact component on which they occur. When you select a cluster, you can view information about it in the Detail View window.

What the Storage Virtual Machine (SVM) Topology Diagram view is

The Storage Virtual Machine (SVM) Topology Diagram view enables you to see a pictorial representation of all of the SVMs currently being monitored by the plug-in, so that you can more easily isolate problems to a specific storage object.

You can expand this view to display storage hierarchy, so that you can isolate problems to the exact component on which they occur. When you select an SVM, you can view information about it in the Detail View window.

What an alert is

OnCommand Plug-in for Microsoft includes numerous rules that monitor the health of various discovered clustered Data ONTAP storage objects. If the conditions of a rule are broken, OnCommand Plug-in for Microsoft generates an alert and sends it to System Center Operations Manager (SCOM).

You can view active alerts from any of the following SCOM interface locations:

Active Alerts view

You can view all alerts in the Active Alerts view. You can view information about an individual alert in the Alert Details view, and you can view the cause of the problem in Health Explorer in SCOM.

Cluster Alerts view

You can view alerts specific to clustered Data ONTAP storage in the Cluster Alerts view of the Dashboard.

Storage Virtual Machine (SVM) Dashboard

You can view alerts specific to SVMs in the New Storage Virtual Machine Alerts view of the Storage Virtual Machine Dashboard.

For information about formatting the email notification for an alert, refer to the Microsoft TechNet web site.

Related information

[Microsoft TechNet](#)

Types of clustered Data ONTAP reports available through the plug-in

Using OnCommand Plug-in for Microsoft, you can view reports about different aspects of your clustered Data ONTAP storage over a specific period of time. These reports can help you to make decisions about the health of your storage system.

Clustered Data ONTAP reports

The default reporting time period is from the first day of the month to the current day. You can view the following reports from the Reporting pane:

Clustered Data ONTAP Aggregate Committed Space (%) report

Displays up to 50 aggregates with the highest (default) or lowest committed space (%) on all monitored aggregates over a specific period of time. The default time period is from the first day of the month to the current day, and the default number of aggregates is five.

Clustered Data ONTAP Storage Virtual Machine (SVM) Average Latency (ms) report

Displays up to 50 SVMs with the highest (default) or lowest average latency (ms) on all monitored SVMs over a specific period of time. The default time period is from the first day of the month to the current day, and the default number of SVMs is five.

Clustered Data ONTAP Storage Virtual Machine (SVM) Deduplication and Compression (%) report

Displays up to 50 SVMs with the highest (default) or lowest storage efficiency (%) on all monitored SVMs over a specific period of time. The default time period is from the first day of the month to the current day, and the default number of SVMs is five.

Clustered Data ONTAP Volume Overwrite Reserve Used Rate (KB/day) report

Displays up to 50 volumes with the highest or lowest overwrite reserve used space (KB/day) on all monitored volumes over a specified period of time. The report defaults to the highest overwrite reserve used space (KB/day). The default time period is from the first day of the month to the current day, and the default number of volumes is five.

Clustered Data ONTAP Volume Used Space (%) report

Displays up to 50 volumes with the highest (default) or lowest used space (%) on all monitored volumes over a specific period of time. The default time period is from the first day of the month to the current day, and the default number of volumes is five.

Clustered Data ONTAP MetroCluster report

You must select the MetroCluster Data ONTAP management pack during installation to view the following report:

Clustered Data ONTAP MetroCluster Most Common Alerts report

Displays up to 50 of the most common alerts on all monitored storage controllers over a specific period of time. The default number of alerts shown is five.

Using the SCVMM Console add-ins

SCVMM Console add-ins enable partners to extend the System Center Virtual Machine Manager (SCVMM) Console by adding new actions or additional configurations for SCVMM objects and new views to help create a more fully integrated user experience. You can use the SCVMM Console add-ins to perform tasks, such as cloning virtual machines or managing controller credentials, through the user interface rather than through the command line. SCVMM add-ins are not supported for clustered Data ONTAP.

Remotely installing and uninstalling OnCommand Plug-in for Microsoft using the Manage OCPM Hosts add-in

You can use the System Center Virtual Machine Manager (SCVMM) **Manage OCPM Hosts** add-in to remotely install and uninstall OnCommand Plug-in for Microsoft on multiple hosts, including hosts in a cluster environment.

Before you begin

- You have OnCommand Plug-in for Microsoft installed on your SCVMM server.
- You have administrative rights on the SCVMM server and on any targeted machine.

Nondomain administrator users must invoke SCVMM Console using **Run as Administrator**.

About this task

If OnCommand Plug-in for Microsoft is not installed on your SCVMM server, you are prompted to install the plug-in whenever every time you try to load an add-in. You can do this installation remotely and for a clustered SCVMM server.

Steps

1. In the **Manage OCPM Hosts** add-in, click the names of the unconfigured hosts you want to remotely install.
Choose from the available hosts in the Host Configuration screen.
2. Configure OnCommand Plug-in for Microsoft web service.
Use the same user name, password, and port number that you provided for web services during the OnCommand Plug-in for Microsoft installation.
3. Configure or connect to the OnCommand Plug-in for Microsoft database.
Specify the local or remote SQL server instance on which the OnCommand Plug-in for Microsoft database resides.
4. When you have finished, click **OK**.

Configuring the SCVMM server with the Manage OCPM Hosts add-in for the SCVMM Console

If the SCVMM server does not have OCPM installed and configured, you can install the plug-in and configure the server by using the **Manage OCPM Hosts** add-in for the SCVMM Console. If the

SCVMM server is not configured, the plug-in presents a warning. None of the add-ins function if the SCVMM server is not configured.

Before you begin

You must have administrative rights on the SCVMM server and on any targeted machine.

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

Steps

1. In SCVMM Console, click the **Manage OCPM Hosts** add-in on the toolbar.
2. In the **Configure SCVMM Server** dialog box, type the user name, password, and port number.
3. Click **Configure**.

The status of the host changes from Not Configured to Configured in the Hosts view. You might need to refresh the Hosts view.

After you finish

To view the controller credentials that are stored in the database, you must configure the web service server so that your storage system can communicate with a web server.

Importing console add-ins to the SCVMM Console

Before you can create clones, manage controllers, or manage hosts with the System Center Virtual Machine Manager (SCVMM) Console add-ins, you must import the add-ins to the SCVMM Console.

Before you begin

You have administrative rights on the SCVMM server and on any targeted machine.

About this task

The installation folder contains one .zip file called `addins_for_NetApp_OCPM.zip` from which you can select an add-in package.

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

Steps

1. In the SCVMM Console, click **Settings** in the **VMs and Services** pane.
2. In the navigation pane, click **Console Add-ins**.
3. Click **Import Console Add-in**.
4. Follow the steps of the **Import Console Add-in** wizard to import the add-ins from the OnCommand Plug-in for Microsoft installation directory.

Removing console add-ins from the SCVMM Console

When you no longer need an add-in, you can remove it from the System Center Virtual Machine Manager (SCVMM) Console. The add-ins must be removed manually; they are not removed when

you uninstall the plug-in. You may wish to remove an add-in if your configuration or requirements change.

Before you begin

You must have administrative rights on the SCVMM server and on any targeted machine.

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

Steps

1. In the SCVMM Console, click **Settings** in the **VMs and Services** pane.
2. In the navigation pane, click **Console Add-ins**.
3. Select an add-in from the list.
4. Click **Remove**.
A dialog box opens to confirm that you want to remove the add-in.
5. Click **Yes** to confirm and remove the add-in from the list.

What the Jobs view is

When an action is launched from a System Center Virtual Machine Manager (SCVMM) Console add-in, you can check the progress of the operation in the SCVMM Jobs view. This enables you to observe the operations, see any errors, and find error log locations.

The SCVMM Jobs view lists all active operations and displays their status. The status includes the percentage of the operation that is complete and whether completed operations have succeeded or failed.

If there is an error noted in the Jobs view, the entry specifies the location of the log that has further details, including any available corrective action.

Note: You cannot view the status of a cloning operation on a host managed by SCVMM 2012 SP1 using the Jobs view. You must use the Job Status window in the SCVMM Console by specifying the `VMMServer` parameter.

Using the Clone Virtual Machine add-in for the SCVMM Console

The Clone Virtual Machine add-in for the System Center Virtual Machine Manager (SCVMM) Console enables you to clone a virtual machine from the remote console so that you can perform cloning tasks remotely.

Cloning a virtual machine with the Clone a VM add-in for the SCVMM Console

The Clone a Virtual Machine add-in for the SCVMM Console provides you with a GUI interface from which you can clone a virtual machine. This is an advantage for users who prefer using a GUI rather than the PowerShell command-line interface.

Before you begin

You must have administrative rights on the SCVMM server and on any targeted machine.

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

Steps

1. Go to the navigation pane and select **VMs and Services**.
2. Select a host from the list of hosts that appears in the navigation pane.
3. Select a virtual machine from the list of virtual machines in the **VMs** view.
4. From the **Virtual Machine** tab on the SCVMM toolbar, click **Clone VM**.
5. In the **Clone VM** dialog box, type or select the following information:
 - The clone base name
 - The number of clones
 - One of the following locations for the cloned virtual machine:
 - An existing mount point
 - The source LUN
6. Select **Start VMs after clone** if you want to start the virtual machine after it is created.

After you finish

You can track the progress of the cloning operation in the Jobs window, unless the host is managed by SCVMM 2012 SP1. In this case, the status of a cloning operation is displayed in the Job Status window in the SCVMM Console by specifying the `VMMServer` parameter.

Using the Clone VM from a Template add-in for the SCVMM Console

You can use the Clone VM from a Template add-in for the SCVMM Console on the host to clone a virtual machine from a template that resides on NetApp storage. The plug-in must be installed on the same host as the library server where the template resides.

Cloning virtual machines from a template with the Clone VM from a Template add-in for the SCVMM Console

The SCVMM Clone VM from a Template add-in for the SCVMM Console provides you with a GUI interface from which you can create a clone of a virtual machine from a template. Cloning a virtual machine from a template enables you to create the clone without shutting down a virtual machine.

Before you begin

You must have administrative rights on the SCVMM server and on any targeted machine.

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

Steps

1. Go to the navigation pane and select **VMs and Services**.
2. Select a host from the list of hosts that appears in the navigation pane.
3. From the **Host** tab on the SCVMM toolbar, click **Clone VM from Template**.

4. In the **Clone VM from Template** dialog box, type or select the following information:
 - The template name
 - The clone base name
 - The number of clones
 - An existing mount point
5. Select **Start VMs after clone** if you want to start the virtual machine after it is created.

After you finish

You can track the progress of the cloning operation in the Jobs window, unless the host is managed by SCVMM 2012 SP1. In this case, the status of a cloning operation is displayed in the Job Status window in the SCVMM Console by specifying the `VMMServer` parameter.

Using the Manage Controllers add-in for the SCVMM Console

The Manage Controllers add-in for System Center Virtual Machine Manager (SCVMM) Console enables you to manage remote controllers that you start from an SCVMM Console. The add-in enables you to add, modify, and remove controllers, and to check controller credentials, without using cmdlets.

Checking controller credentials using the Manage Controllers add-in for the SCVMM Console

You can use the Manage Controllers add-in for the System Center Virtual Machine Manager (SCVMM) Console to check your controller credentials using the GUI interface with the SCVMM Console rather than with cmdlets. Using the GUI simplifies the process and reduces the risk of error.

Before you begin

- You have OnCommand Plug-in for Microsoft installed on your SCVMM server.
- You have administrative rights on the SCVMM server and on any targeted machine.

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

About this task

If you have a machine with the SCVMM Console installed and pointing to a SCVMM server on another node, when you attempt to select **Manage Controllers** under **Fabric** in the SCVMM console machine, the plug-in asks you to install OnCommand Plug-in for Microsoft on the SCVMM server machine also.

Steps

1. In the SCVMM Console, click **Fabric > Storage**.
The **Manage Controllers add-in** icon appears on the SCVMM toolbar.
2. Click **Manage Controllers add-in**.
In the Manage Controllers view, a list of controllers appears.
3. Select the name of the controller for which you want to check the credentials.

The details for that controller, including controller name, IP address, validity status, and protocol, appear in the lower pane of the Manage Controllers view.

Modifying controller credentials with the Manage Controllers add-in for the SCVMM Console

You can use the Manage Controllers add-in for the System Center Virtual Machine Manager (SCVMM) to modify your controller credentials through a GUI rather than through the CLI, which simplifies the process and reduces the risk of error. You can use this procedure to change the user name, password, and protocol.

Before you begin

- You have OnCommand Plug-in for Microsoft installed on your SCVMM server.
- You have administrative rights on the SCVMM server and on any targeted machine.

About this task

If you have a machine with the SCVMM Console installed and pointing to a SCVMM server on another node, when you attempt to select **Manage Controllers** under **Fabric** in the SCVMM console machine, the plug-in asks you to install OnCommand Plug-in for Microsoft on the SCVMM server machine also.

The credentials that you create for a controller are used only for actions that involve the plug-in, not for other SCVMM actions.

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

Steps

1. In the SCVMM Console, select **Fabric > Storage**.
The Manage Controllers add-in icon appears on the SCVMM toolbar.
2. Click **Manage Controllers add-in**.
In the Manage Controllers view, a list of credentials appears.
3. Select the name of the controller for which you want to modify the credentials.
The details for that controller, including the controller name, IP address, validity status, and protocol, appear in the lower pane of the Manage Controllers view.
4. Click **Modify**.
5. In the **Modify Controller** dialog box, type the user name, password, and protocol.
6. Click **Confirm**.

Removing controller credentials using the Manage Controllers add-in for the SCVMM Console

You can use the Manage Controllers add-in for the System Center Virtual Machine Manager (SCVMM) Console to remove controller credentials through a GUI rather than by using the CLI. Using the add-in simplifies the process and reduces the risk of error.

Before you begin

- You have OnCommand Plug-in for Microsoft installed on your SCVMM server.
- You have administrative rights on the SCVMM server and on any targeted machine.

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

About this task

If you have a machine with the SCVMM Console installed and pointing to a SCVMM server on another node, when you attempt to select **Manage Controllers** under **Fabric** in the SCVMM console machine, the plug-in asks you to install OnCommand Plug-in for Microsoft on the SCVMM server machine also.

Steps

1. In the SCVMM Console, click **Fabric > Storage**.
The Manage Controllers add-in icon appears on the SCVMM Console toolbar.
2. Click **Manage Controllers add-in**.
In the Manage Controllers view, a list of controllers appears.
3. Select the name of the controller that you want to remove.
4. Click **Yes** in the confirmation dialog box.

Adding controllers using the Manage Controllers add-in for the SCVMM Console

You can use the Manage Controllers add-in for the System Center Virtual Machine Manager (SCVMM) Console to add a controller to your SCVMM system through a GUI, which saves time and minimizes errors. The credentials that you create for that controller are used only for actions that involve the plug-in.

Before you begin

- You have OnCommand Plug-in for Microsoft installed on your SCVMM server.
- You have administrative rights on the SCVMM server and on any targeted machine.

About this task

If you have a machine with the SCVMM Console installed and pointing to a SCVMM server on another node, when you attempt to select **Manage Controllers** under **Fabric** in the SCVMM console machine, the plug-in asks you to install OnCommand Plug-in for Microsoft on the SCVMM server machine also.

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

Steps

1. In the SCVMM Console, click **Fabric > Storage**.
The **Manage Controllers add-in** icon appears on the SCVMM Console toolbar.
2. Click **Manage Controllers add-in**.
In the Manage Controllers view, a list of credentials appears.
3. Click **Add**.
4. In the **Add Controller** dialog box, enter the controller name, user name, and password.
5. Optional: Select the **Require HTTPS** check box if you want to use HTTPS only.
6. Click **Confirm**.

The new controller is added to the list of controllers in the Manage Controllers view and is available to all plug-in products.

Using the Manage OCPM Hosts add-in for SCVMM Console

With the Manage OCPM Hosts add-in for System Center Virtual Machine Manager (SCVMM) Console, you can configure the web service server in the SCVMM Console, install the plug-in remotely on the host, or remove the plug-in and the host configuration from a host.

Additionally, you can refresh the Manage Hosts view to check the configuration status of all the hosts, and check if any new hosts have been added to SCVMM.

Invoking the Manage OCPM Hosts Add-in installs only cmdlets and associated web services on the target server. To install any component besides cmdlets and associated web services, you must use the OnCommand Plug-in for Microsoft installer manually on the target server.

Configuring hosts using the Manage OCPM Hosts add-in for the SCVMM Console

You can install the plug-in remotely and configure the host with the credentials that you specify for the web service. If the SCVMM server is not configured, the plug-in presents a warning. None of the add-ins function if the SCVMM server is not configured.

Before you begin

You have administrative rights on the SCVMM server and on any targeted machine.

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

Steps

1. In the SCVMM Console, click the **Manage OCPM Hosts** add-in on the SCVMM toolbar.
2. In the **Host Configuration** pane, select a host from the list to configure.
3. In the **Configure Host** dialog box, enter the user name, password, and port number, and click **Next**.

The port box is automatically populated with port 808, the recommended port number.

4. In the **Configure OCPM Database** dialog box, enter the server name, port number, SQL server instance name, and authentication method.

If the credentials that you enter for authentication are invalid, the configuration operation finishes but also returns an error.

The Configure Host Status dialog box opens and shows the progress of the operation.

Configuring clusters using the Manage OCPM Hosts add-in for the SCVMM Console

You can configure the nodes of a cluster with the Manage OCPM Hosts add-in for the SCVMM Console so that you can perform cloning operations with the cluster.

Before you begin

- All the nodes of a cluster are installed and configured.
- You have OnCommand Plug-in for Microsoft installed on your SCVMM server.
- You have administrative rights on the SCVMM server and on any targeted machine.

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

About this task

The parameters that you choose are used for all cluster nodes that you configure.

Steps

1. In the SCVMM Console, click the **Manage OCPM Hosts** add-in on the toolbar.
2. In the **Hosts** view, select a cluster that does not have the plug-in installed.
3. From the **Configure Cluster** wizard, enter the parameters to install the plug-in.

The plug-in is installed on all nodes of the cluster that do not have a supported version of the plug-in. The Configure Cluster Status dialog box opens and shows the progress of the installation on each of the nodes.

Removing the plug-in configuration from a host using the Manage OCPM Hosts add-in from the SCVMM Console

When you no longer need them, you can remove the plug-in from a host using the Manage OCPM Hosts add-in. You may wish to remove a plug-in if your configuration or requirements change.

Before you begin

You have administrative rights on the SCVMM server and on any targeted machine.

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

About this task

A remote uninstall operation freezes SCVMM and disables access to any objects until the operation finishes. It could take several seconds before access is restored.

Steps

1. In the SCVMM Console, click the **Manage OCPM Hosts** add-in on the toolbar.
2. In the **Hosts** view, select the host from which you want to remove the plug-in.
3. In the confirmation dialog box, click **Remove**.

The name of the host remains in the Hosts view but appears as `Not Configured`.

Refreshing the Manage Hosts view with the Manage OCPM Hosts add-in for the SCVMM Console

You can use the Manage OCPM Hosts add-in for the System Center Virtual Machine Manager (SCVMM) Console to refresh the Manage Hosts view, to check the configuration status of all hosts, and to discover if any new hosts have been added to the SCVMM Console.

Before you begin

You have administrative rights on the SCVMM server.

About this task

Non-domain administrator users need to invoke SCVMM Console using **Run as Administrator**.

Steps

1. In the SCVMM Console, click the **Manage OCPM Hosts** add-in on the toolbar.
All SCVMM hosts and the latest configuration status appear in the Manage Hosts view. This process might take a few seconds.
2. In the **Configure Hosts** view, click **Refresh**.

Using System Center Orchestrator with the plug-in

System Center 2012 Orchestrator is a workflow management solution for your storage system. You can use the Orchestrator graphical user interface, Runbook Designer, to automate the creation, monitoring, and deployment of resources in your environment.

What OIPs are

In a Microsoft System Center Orchestrator (SCO) environment, you can register and deploy Orchestrator integration packs (OIPs), which contain activities that you can use to create workflows to automate complex processes. There is an OIP for provisioning and cloning, one for disaster recovery, and another for commonly used data storage operations.

To use OIPs, you must have an Orchestrator installation configured to Microsoft specifications. For information about Microsoft specifications, see the Microsoft TechNet web site.

Related information

[Microsoft TechNet](#)

Preparing the OIPs for use

Before you can use the Orchestrator user interface and the Orchestrator activities to create workflows and automate tasks, you must register and deploy the Orchestrator integration packs (OIPs) for disaster recovery and provisioning and cloning.

Registering the OIPs with the integration server

You must register the Orchestrator integration packs (OIPs) with the integration server before you can use the Orchestrator activities.

Before you begin

- You must have downloaded the OnCommand Plug-in for Microsoft software.
- You must have the System Center Orchestrator 2012 SP1 license and have met all of the requirements for Orchestrator 2012 SP1.
If you are not sure what the requirements are, refer to the Microsoft TechNet web site.
- You must have an integration (management) server with which to register the integration packs and an action server on which to deploy the integration packs.

Steps

1. Navigate to **Orchestrator Integration Server Deployment Manager** by clicking **Start > All Programs > Microsoft System Center 2012 > Orchestrator > Deployment Manager**.
2. Right-click **Integration Packs** in the left panel and select **Register IP with the Orchestrator management server**.
3. In the **Integrations Pack Registration** wizard, click **Next**.

4. Complete the pages of the wizard.

You can register multiple integration packs using the wizard by adding multiple integration packs when prompted.

Result

A green check mark appears in the Log Entries panel of the Orchestrator integration server window, indicating that the registration of the OnCommand Plug-in for Microsoft OIPs with the integration server was successful.

After you finish

Next you must deploy the OIPs to the Orchestrator Runbook Designer.

Related information

[Microsoft TechNet](#)

Deploying Orchestrator integration packs to the Orchestrator Runbook Designer and server

You must deploy the Orchestrator integration packs (OIPs) to the Runbook Designer or the Runbook server before you can run activities.

Before you begin

The OIPs are registered on the integration server.

Steps

1. Navigate to **Orchestrator Integration Server Deployment Manager** by going to **Start > All Programs > Microsoft System Center 2012 > Orchestrator > Deployment Manager**.
2. Right-click **Integration Packs** in the upper right panel and select **Deploy IP to Runbook Designer**.
3. Complete the pages of the wizard.

A green check mark appears in the Log Entries panel of the Orchestrator integration server window, indicating that the deployment of the OnCommand Plug-in for Microsoft OIPs to the integration server or client was successful.

After you finish

You must install the Virtual Infrastructure Management (VIM) web service to use the Orchestrator activities.

Unregistering the OIPs from the runbook server

When you no longer need the Data ONTAP Toolkit integration pack, disaster recovery integration pack, or provisioning and cloning integration pack, you can use the Orchestrator integration server deployment manager to unregister them from the runbook server. When you unregister these Orchestrator integration packs, they are removed from the server.

For more information about unregistering the OIPs from the runbook server, refer to the Microsoft TechNet web site.

Related information

[Microsoft TechNet](#)

What VIM web service configurations are

The Virtual Infrastructure Management (VIM) web service is used only with System Center Orchestrator integration packs. You can create configurations to set options for the VIM web service so that you do not have to set the options manually each time that you use the VIM web service with a particular Orchestrator activity.

You can also create multiple web service configurations, based on your needs.

Configuring VIM web service

You can configure the Virtual Infrastructure Management (VIM) web service for cloning and provisioning activities. You cannot use the Data ONTAP configurations with provisioning and cloning activities, however.

Before you begin

You must have installed VIM web service on your storage system.

Steps

1. From the **Start** menu, select **Runbook Designer**.
2. From the **Options** menu, select the name of the integration pack for which you want to create a configuration.
3. Click **Add** to open the **Add Configuration** window.
4. Type a name for your new configuration and select the type of controller.
5. In the **Properties** pane, type the server name and the port number, and then click **OK**.

The new configuration is added to the list.

Specifying VIM web service configurations for activities

After you configure the Virtual Infrastructure Management (VIM) web service, you must apply the configuration to plug-in activities to ensure that your runbook functions correctly.

Before you begin

You must have installed VIM web service on your storage system.

Steps

1. From the Orchestrator workspace, double-click the icon for an activity.
2. From the **Properties** dialog box for the selected activity, click **Configuration**.
3. In the **Configuration** dialog box, select the ellipsis (...) to specify a configuration for the activity.
4. Click **Finish**.

Editing configurations for VIM web service

You can edit the configuration of the Virtual Infrastructure Management (VIM) web service so that you do not have to change the options manually each time that you use VIM web service with a particular activity.

Before you begin

You must have installed VIM web service on your storage system.

Steps

1. From the Start menu, select **Runbook Designer**.
2. From **Runbook Designer**, go to the **Options** menu.
3. From the **Options** menu, select the name of the integration pack for which you want to edit a configuration.

The options window for that integration pack opens and displays a list of configurations.

4. In the **Properties** dialog box, select the configuration that you want to edit.

The properties for that configuration appear in the lower pane.

5. Click **Edit** to edit the configuration.
6. Click **OK** in the options window.
7. Click **Finish** in the **Prerequisite Configuration** window.

Removing configurations for VIM web service

You can choose remove the Virtual Infrastructure Management (VIM) web service configuration when it is no longer required to run activities.

Before you begin

None of your current activities requires the configuration to operate properly.

Steps

1. From Windows, select **Runbook Designer**.
2. From Runbook Designer, go to the Options menu.
3. Select the OnCommand Plug-in VIM web service for which you want to remove a configuration.

The options window opens and displays a list of configurations.

4. Select a configuration and click **Remove**.

The configuration is removed from the list on the options window.

What Data ONTAP Toolkit activities are

Data ONTAP Toolkit 3.1 activities enable you to invoke Data ONTAP commands from System Center Orchestrator. You can also use the activities individually, as an alternative to using the Data ONTAP command-line interface and PowerShell scripting workflows. The Data ONTAP Toolkit 3.1 is supported only for Data ONTAP 7-Mode.

Using PowerShell cmdlets with the plug-in

The Windows PowerShell interface is a task-based command-line shell that you can use to manually call cmdlets in the plug-in to manage, administer, and protect your data.

Windows PowerShell execution policies and administration profiles

To be able to run cmdlets from Windows PowerShell, you must first set execution policies to the correct levels and create administrator profiles on your local host.

PowerShell execution policy values

You must set the proper execution policies to run cmdlets in the plug-in. The following list includes the possible values for Windows PowerShell execution policies:

AllSigned

Allows scripts that have been verified with security certificates to run. To run the cmdlets securely, you should set the Windows PowerShell execution policy to AllSigned.

Restricted

Restricts any scripts from being run, downloaded, or installed. Restricted is the default policy.

RemoteSigned

Allows scripts to be run, downloaded, or installed. This policy is not secure, and malicious code can easily exploit and damage any PowerShell .ps1 or VB script files.

Bypass

Nothing is blocked and there are no warnings or prompts.

Undefined

There is no execution policy set in the current scope.

PowerShell Administration Profiles

You must import the OC.Cmdlets module to your local Windows PowerShell profile if you want the cmdlets to be available from any Windows PowerShell session. This enables you to use the OC.Cmdlets module through PowerShell sessions from Microsoft applications, such as System Center Virtual Machine Manager (SCVMM) and System Center Operations Manager (SCOM).

You can run the following command from Windows PowerShell to get complete information about execution policies:

```
get-help about_execution_policies
```

For more information about how to set Windows PowerShell execution policies, see the Microsoft TechNet web site.

Purpose of storage system credential cmdlets and activities

You use the storage system credential cmdlets and activities to add storage systems to the storage systems database. These cmdlets and activities add, retrieve, or remove user credentials to and from a local database so that you can use other cmdlets without entering credential information.

Common cmdlet parameters

The Windows PowerShell cmdlets include both common cmdlet parameters and risk-mitigation parameters that you can use to customize the operation that the cmdlet performs.

Cmdlets and parameters are not case-sensitive.

Cmdlet parameters

You can use the following parameters with all cmdlets:

`[-Debug {True | False}]`

Displays information about the operation.

`[-ErrorAction {SilentlyContinue | Continue | Inquire | Stop}]`

Determines how the cmdlet responds to a warning when performing the operation. The following list describes what each value means:

SilentlyContinue

Suppresses the warning message and continues the operation.

Continue

Displays the warning message and continues the operation. This is the default value for this parameter.

Inquire

Displays the warning message and asks if you want to continue the operation.

Stop

Displays the warning message and stops the operation.

`-ErrorVariable | Variable_name`

Stores errors about the cmdlet in the specified variable.

`-OutBuffer | Object_number`

Determines the number of objects that can reside in the buffer before they are sent.

`-OutVariable | Variable_name`

Displays objects output by the cmdlet and then stores them in the specified variable.

`[-Verbose {True | False}]`

Displays detailed information about the operation.

`[-WarningAction {SilentlyContinue | Continue | Inquire | Stop}]`

Determines how the cmdlet responds to a warning when performing an operation. The following list describes what each value means:

SilentlyContinue

Suppresses the warning message and continues the operation.

Continue

Displays the warning message and continues the operation. This is the default value for this parameter.

Inquire

Displays the warning message and asks if you want to continue.

Stop

Displays the warning message and stops the operation.

-WarningVariable | *variable_name*

Stores warnings about the cmdlet in the specified variable.

Risk mitigation parameters

You can add the following parameters to cmdlets to request confirmation before cmdlets perform the specified action:

[-Confirm {True | False}]

Prompts you for input before executing the operation.

[-WhatIf {True | False}]

Displays a message that describes the effects of running the cmdlet before that action is performed.

Related information

[Microsoft TechNet](#)

Running provisioning and cloning cmdlets as a user other than the Windows administrator

You can avoid running the provisioning and cloning cmdlets as the built-in Windows administrator and run them as a user in the Administrators group.

Before you begin

You must have installed the provisioning and cloning cmdlets.

Steps

1. From Windows, select **Run**, type `secpol.msc`, and click **OK**.
2. From the **Local Security Settings** window, click **Local Policies** and then **Security Options**.
3. Double-click **User Account Control: Run all administrators in Admin Approve Mode**.
4. Select **Disabled** and click **OK**.
5. Close the **Local Security Settings** window.
6. Restart the Windows host.

Result

After you restart the server, you can run the provisioning and cloning cmdlets without being the Windows built-in administrator.

Provisioning storage

By using provisioning cmdlets with Microsoft System Center Virtual Machine Manager (SCVMM) applications, you can use your existing storage resources to perform faster and more space-efficient provisioning of Hyper-V virtual machines. Provisioning in OnCommand Plug-in for Microsoft is only supported for Data ONTAP 7-Mode.

Requirements for provisioning

Before you can implement provisioning in your Hyper-V environment, you must meet requirements such as those relating to access, architecture, and available software.

You must meet the following requirements to use provisioning:

- For Fibre Channel, initiators must be logged in to the target port.
- For cmdlets to operate on remote hosts, the following factors must be true:
 - You must have local administrator privileges on the remote host.
 - The remote host must be in a trusted domain or in the same domain as the system from which the cmdlet is launched.
- Microsoft Virtual Disk Service (VDS) must be installed and enabled.
- Microsoft Remote Procedure Call (RPC) Server must be enabled and started.
- Microsoft Distributed Component Object Model (DCOM) must be configured to allow VDS access from the remote computer.
- The host name must be the FQDN (fully qualified domain name) or a short name that is DNS resolvable.
- The storage system name must be the FQDN, the short name, or the IP address.
- Provisioning operations with Cluster Shared Volumes (CSVs) can be initiated only on the CSV owner node of the cluster.
- The computer name must not contain invalid characters; otherwise, the plug-in is not able to create software initiators.
- DNS host names cannot contain the following characters:
 - ampersand (&)
 - apostrophe (')
 - at sign (@)
 - braces ({})
 - caret (^)
 - colon (:)
 - comma (,)
 - dollar sign (\$)
 - exclamation point (!)

- number sign (#)
- parentheses (())
- percent (%)
- period (.)
- tilde (~)
- underscore (_)

Related information

[Microsoft TechNet](#)

Differences between the Connect Storage activity and the Provision Storage activity

Although both the **Connect Storage** and the **Provision Storage** activities connect storage to the host, only the **Provision Storage** activity also creates storage: **Connect Storage** can connect only storage that is already created.

Only LUNs already created with the **Provision Storage** activity can be connected using the **Connect Storage** activity.

What it means when WMI warnings appear in the event logs

When you see Windows Management Instrumentation (WMI) warnings in the Microsoft event log, you should check the administration events in the Hyper-V Virtual Machine Management Service (VMMS) event log for more information.

If the WMI warnings contain a Microsoft synthetic Ethernet port error, you should check and reconfigure the virtual machine network configurations for those cloned virtual machines that produced the warnings.

Because you do not know what other WMI warnings, issues, or errors Microsoft WMI might produce, you should always be vigilant in checking Microsoft administration events in the Hyper-V VMMS event log and look in the Microsoft event log for more information.

Cloning storage with OCPM

By using cloning cmdlets with Microsoft System Center Virtual Machine Manager (SCVMM) applications, you can use your existing storage resources to perform faster and more efficient use of the space on your Hyper-V virtual machines.

Requirements for cloning

Before you can implement cloning in your Hyper-V environment, you must meet requirements such as those relating to access, architecture, and available software.

You must meet the following requirements to use cloning:

- For Fibre Channel, initiators must be logged in to the target port.
- For cmdlets to operate on remote hosts, the following requirements must be met:
 - You must have local administrator privileges on the remote host.
 - The remote host must be in a trusted domain or the same domain as that from which the cmdlet is launched.
- Microsoft Virtual Disk Service (VDS) must be installed and enabled.
- Microsoft Remote Procedure Call (RPC) Server must be enabled and started.
- Microsoft Distributed Component Object Model (DCOM) must be configured to allow VDS access from the remote computer.
- The host name must always be the FQDN (fully qualified domain name) or a short name that can be resolved by DNS.
- The storage system name must be the FQDN, the short name, or the IP address.
- Cloning operations with cluster shared volumes (CSVs) can be initiated only on the CSV owner node of the cluster.
- The destination NTFS or cluster shared volume file system (CSVFS) for the cloning operation must have enough space to hold the cloned virtual machine data.
- To monitor your VHDs for alignment issues, you must have enabled PowerShell remoting on all Hyper-V hosts.
- A Windows Management Instrumentation (WMI) provider must be installed.

Some of these requirements can be verified using

```
Debug-OCHost-CheckSettings
```

.

Related information

[Microsoft TechNet](#)

What Sub-LUN cloning is

Sub-LUN cloning is a process by which you can create clones of one file or a few files that are stored on a LUN. Sub-LUN cloning enables you to create exact duplicates of existing files, without copying

them. Within the controller, Data ONTAP uses pointers to the individual files, thereby representing multiple files to Windows while keeping only one copy of the duplicates on the storage in the controller.

Cmdlets and activities for creating clones

You can create clones using the `New-OCCloneFile` cmdlet (**Clone NTFS File** activity) or the `New-OCClone` cmdlet (the **Clone VM** and the **Clone VM from SCVMM Template** activities). It is important to understand the differences among these operations and the guidelines for using each.

Cmdlets and activities to use for file cloning operations

After making sure that your environment meets certain requirements, you can use the `New-OCCloneFile` cmdlet (**Clone NTFS File** activity) to replicate your storage. These operations clone an existing file on a mounted file system or cluster-shared volume (CSV) on a LUN to another mounted file system or CSV.

These operations support Windows LUNs or CSV LUNs within a Windows cluster.

To use the `New-OCCloneFile` cmdlet (**Clone NTFS File** activity), your environment must meet the following requirements:

- If the source or destination path is on a CSV, the CSV must be owned by the node from which the operation is run.
- The directory of the destination path must exist.
- The existing NTFS or cluster shared volume file system (CSVFS) must have enough space to hold the new cloned file.

Sub-LUN cloning with cmdlets and activities

The `New-OCClone` cmdlet (the **Clone VM** activity) clones a virtual machine from an existing Hyper-V virtual machine that is currently in an off state. The cloned virtual machines can be deployed on either the same host or to a different host or host cluster.

To clone an existing virtual machine with the `New-OCClone` cmdlet (or **Clone VM** activity), you must enter either a virtual machine name or the GUID of an existing virtual machine in the operation's properties.

The `New-OCClone` cmdlet (or **Clone VM** activity) performs a sub-LUN clone operation first and then uses the cloned file to create the virtual machine.

Related concepts

[Virtual machine cloning from an SCVMM template](#) on page 79

Virtual machine cloning from an SCVMM template

The `New-OCClone` cmdlet (**Clone VM from SCVMM Template** activity) clones a virtual machine from an SCVMM virtual machine template. Cloning from a template enables you to create the clone without shutting down a virtual machine; it also enables you to, deploy the template at any time, without interrupting other virtual machines.

To clone from a template with the `New-OCClone` cmdlet (**Clone VM from SCVMM Template** activity), you must observe the following requirements:

- You must enter an SCVMM server name and template name in the properties.
- The template must be configured correctly in SCVMM.

The cloned virtual machines can be deployed on the same host as that on which the activity is run or to a different host or host cluster.

The `New-OCCLone` cmdlet (**Clone VM from SCVMM Template** activity) performs a sub-LUN clone operation first and uses the cloned file to create the virtual machine.

When to use the Clone VM activity

There are several situations in which you can use the Clone VM activity to clone a virtual machine. These situations include cloning into the same source LUN, cloning into a new single LUN, and cloning into an existing CSV on a LUN.

Creating clones of a virtual machine from one LUN into another LUN

You can use the **Clone VM** activity to replicate your storage by creating a clone of a virtual machine that is in an off state from one existing LUN, storing it on another LUN, and then starting the cloned virtual machine on a specified Hyper-V host.

Before you begin

The web service must be installed in the same location as the virtual machine and the **Clone VM** activity must be configured with the name of the web service server.

Steps

1. In the activity properties area, specify the following information:

- The virtual machine name
- The number of clones
- The virtual machine clone name prefix
- The Hyper-V host name

2. Run the **Clone VM** activity.

Storage for the virtual machine is cloned on the storage array and the cloned virtual machine is started.

Creating and storing clones in the same LUN

You can use the **Clone VM** activity to clone a virtual machine that is in an off state and store it in the same LUN in which you created it. You can then start the cloned virtual machine on the same Hyper-V host or on another Hyper-V host that is sharing the LUN.

Steps

1. Specify the following information in the activity properties:

- The virtual machine name
- The number of clones
- The virtual machine clone name prefix
- The Hyper-V host name
- The `AllinSingleLUN` property or `AllinSourceLUN` property

2. Run the **Clone VM** activity.

Storage for the virtual machines is cloned on the storage array and the cloned virtual machines are started on the same Hyper-V host.

Creating a clone of a LUN into an existing CSV on another LUN

You can use the **Clone VM** activity to create a clone of a virtual machine from a LUN, place that clone into another existing cluster-shared volume (CSV) on another LUN, and start the cloned virtual machine on the same Hyper-V host to replicate your data across your storage.

About this task

If you create clones in a CSV, then you can start those virtual machines on another Hyper-V host that shares that destination CSV. This operation is useful for replicating your data across your storage and avoiding a single point of failure.

Steps

1. To run the **Clone VM** activity in the activity properties, specify the following information:
 - The virtual machine name
 - The number of clones
 - The virtual machine clone name prefix
 - The Hyper-V host name
 - The mount point of another LUN, the existing CSV reparse point (a collection of user-defined data), or the CSV parameter to create a virtual machine on a new CSV

2. Run the **Clone VM** activity.

Storage for the virtual machine is cloned on the storage array in an existing CSV or in another LUN or CSV. The cloned virtual machine is started on either the same Hyper-V host or another Hyper-V node that is sharing the same CSV, if the destination is a CSV.

Free space with New-OCClone

The `New-OCClone` cmdlet might leave free space when you create or clone a new LUN for a virtual machine. If the free space is larger than 8 MB, it shows up in the Disk Management view. Disk Management is a windows tool that is used to manage system disks, both local and remote.

When you create or clone the LUN, the full space is not used in the partitioning and formatting of the LUN. You can leave the space as it is, and all the applications on the system that use formatted NTFS on the LUN still perform correctly.

Managing crash-consistent disaster recovery using cmdlets and activities

Crash-consistent disaster recovery uses the SnapMirror feature to replicate data across primary and secondary sites following a disaster.

To properly implement disaster recovery, you must be familiar with the SnapMirror feature, the requirements for disaster recovery, and several disaster recovery cmdlets and activities, including composite cmdlets and automated activities and their properties.

Related concepts

[What the disaster recovery plan is](#) on page 84

Requirements for crash-consistent disaster recovery

Your environment must meet some important requirements to enable crash-consistent disaster recovery.

The following list includes the requirements to enable disaster recovery:

- All disaster recovery virtual machines must be on NetApp storage.
- The secondary site must be used for the sole purpose of disaster recovery.
- Only a host administrator can invoke disaster recovery objects.
- The Data ONTAP version on the secondary storage system must be the same version or later than that on the primary storage system.
- For each volume on the primary storage system, a corresponding volume of equal or greater size must exist on the secondary storage system.
- You must invoke all replication objects from the Hyper-V host rather than a source or destination storage system.
- The web service login account must have administrative privileges on the local and remote hosts or clusters on both the primary and secondary sites.
- If you are using Orchestrator to perform the disaster recovery tasks, the Orchestrator server must have administrative rights on the hosts and clusters on which you want to perform any restore operations.
- Access to the disaster recovery plans requires that the proper permissions are provided for the ACL and NTFS folders.
- All virtual machines must be in the off state before you create or update your disaster recovery plans if you are in a Windows 2008 R2 environment.
This requirement does not apply to virtual machines on a Windows 2012 host.
- You must invoke the disaster recovery cmdlets on the primary and secondary site nodes on which the web service is installed.
- Invoking disaster recovery cmdlets or operations remotely is not supported.
- The storage system credentials on both the primary and the secondary sites must be configured on all storage systems and must be present on the nodes on which the plug-in is installed and disaster recovery cmdlets are invoked.

- All DNS, nslookup, ping, and forward and reverse lookups must be configured properly for disaster recovery and for live or quick migration of Hyper-V virtual machines in a Windows failover cluster setup.
- All virtual machines in a cluster need to be moved to the owner node so that when you create the disaster recovery plan all the virtual machine configuration files are in the disaster recovery plan folder.
- If the primary and secondary sites are in different Domains, you must properly establish two-way cross-domain trust policies across the primary and the secondary sites.
- You must ensure that firewalls do not interfere with disaster recovery operations.

Related information

[Microsoft TechNet](#)

SnapMirror requirements for disaster recovery

Your environment must meet some important requirements to enable crash-consistent disaster recovery and SnapMirror.

When you plan your SnapMirror configuration, you should consider the SnapMirror requirements for disaster recovery. See the Microsoft SnapMirror documentation for more details.

The following list includes the requirements for the use of SnapMirror with disaster recovery:

- You should use the short host name to configure SnapMirror on the storage system side and you should be able to use the short host names to ping the source and destination filers from each other.
- You must enable HTTP or HTTPS access across the source and destination storage systems.
- You should not use IP addresses to configure your SnapMirror relationships.
- The source volume must be online.
For information about how to bring a volume online, see the *Data ONTAP Storage Management Guide for 7-Mode*.
- For SnapMirror volume replication, the capacity of the destination volume must be greater than or equal to the capacity of the source volume.
For information about how to add disks to a volume, see the *Data ONTAP Storage Management Guide for 7-Mode*.

Because you might want more than one physical path for a SnapMirror relationship, SnapMirror supports up to two paths for a particular SnapMirror relationship. When you use multiple paths, you must set up the configuration in one of the following ways:

- Set up static routes to ensure that different routes are used for different IP connections.
- Use different subnets for the two connections.

The paths can be Ethernet, Fibre Channel, or a combination of Ethernet and Fibre Channel.

The two paths can be used in one of these two modes:

Multiplexing mode

SnapMirror uses both paths at the same time, essentially load balancing the transfers. If one path fails, the transfers occur on the remaining path.

After the failed path is repaired, the transfers resume using both paths.

Failover mode

SnapMirror uses the first specified path as the desired path and uses the second specified path only after the first path fails.

Failover using only one pair of connections is not supported with SnapMirror network compression.

Related information

[Microsoft TechNet](#)

What the disaster recovery plan is

The disaster recovery plan describes disaster recovery objects and determines how they behave during failover and failback. The plan is stored in a user-specified location as an XML file and can be replicated to your secondary site.

The naming convention is for the plan is

`PrimaryServerOrCluster_SecondaryServerOrCluster_DRPlan.xml`.

You create the plan on the primary site and it captures information about the primary setup so that the information can be used to replicate the configuration on the secondary site upon failover. The plan captures only the information that is required to perform failover and failback, including the following information:

- A list of the virtual machines on the primary site
- Details about virtual machine properties
- Storage information about virtual machine configuration, VHDs, and Snapshot data
- Information about the SnapMirror relationships for all volumes on the primary storage system on which the virtual machines are running
- The primary and secondary host-related or cluster-related information

In Windows Server 2008, the virtual machine configurations are exported to the disaster recovery plan folder prior to a failover or failback operation.

In Windows Server 2012, the virtual machine configurations are replicated from the secondary site and not imported to the plan folder.

Disaster recovery plan guidelines

You must follow certain guidelines when you update or create a new disaster recovery plan, because the disaster recovery plan plays a vital role in the success of the failover or failback of your storage system.

You must have performed the following tasks when you create or update a disaster recovery plan:

- Moved all virtual machines to the local node on which web service is installed
- For cluster shared volume configurations, verified that the local node on which you are running the cmdlet is also the owner of the cluster group resource
The available storage can be owned by other nodes.

It is important to run the disaster recovery plan on the appropriate site (Site A or Site B):

- You must run the `New-DRPlan` cmdlet on Site A.
- You must run the `Update-OCDRPlan` cmdlet (in the failover direction) on Site A.
- You must run the `Update-OCDRPlan` with the failback property on Site B.

If you perform the failover operation using Orchestrator, the **Create Plan** and **Update Plan** activities are executed automatically on the primary server indicated in the activity properties.

The role of cmdlets and activities in disaster recovery

There are three configuration cmdlets and three configuration activities that you can use to help you create, validate, and update your disaster recovery plan.

New-OCDRPlan cmdlet and Create DR Plan activity

You use the `New-OCDRPlan` cmdlet or the **Create DR Plan** activity to create a new disaster recovery plan.

Confirm-OCDRPlan cmdlet and Validate DR Plan activity

You use the `Confirm-OCDRPlan` cmdlet or the **Validate DR Plan** activity to validate the current state of the secondary host against the data captured in the specified disaster recovery plan whenever the primary or secondary site configuration changes. The `Confirm-OCDRPlan` cmdlet and the `Validate DR Plan` activity provide information about the following in the disaster recovery plan:

- The operating system of the secondary host is Windows 2008 R2 or later.
- The secondary site where virtual machine LUNs are to be connected have valid LUN paths and SnapMirror relationships.
- The status appears as `snapmirrored` for all the SnapMirror relationships.
- The virtual machine cluster and configuration resources against the live virtual machine
- The cluster and configuration resources on the secondary host do not conflict.
If a conflict is found in the mount points, the `Confirm-OCDRPlan` cmdlet checks the mount point that is connected in the secondary host to determine if it is connected to the required LUN on the secondary storage system.
- The storage system credentials are configured for all the storage systems in the disaster recovery process on the secondary site.
- The Hyper-V role is enabled on the secondary host or cluster.
- The cluster shared volume is active on the secondary cluster, and a valid cluster name and IP address resources are present and online if the disaster recovery plan is created in the context of a cluster.

What live virtual machine disaster recovery is

On the Windows 2008 R2 and Windows 2012 platforms, you can recover your live (online) virtual machines and bring them back online on your secondary site. Doing this enables you to restore all of your online primary virtual machines to secondary sites with just one click and very limited downtime.

There are two important differences between disaster recovery in Windows 2008 R2 and in Windows 2012:

- With Windows 2012, you can create and update your disaster recovery plan, which is required to perform failover and failback, by running the cmdlets `New-OCDRplan` and `Update-OCDRplan` while the virtual machines are online.
With Windows 2008 R2, all the virtual machines must be turned off or shut down to update the disaster recovery plan.

- For Windows 2012 servers, the virtual machine configuration files are not generated; however on Windows 2008 R2 servers, virtual machine configuration files are generated along with the disaster recovery plan file.

Differences between granular and composite cmdlets and activities

You can use individual (*granular*) cmdlets or Orchestrator activities to perform individual actions. Alternatively, you can use a *composite* cmdlet or activity, which performs the actions of several granular cmdlets or activities automatically, in a preset order. This choice gives you increased flexibility when performing disaster recovery tasks.

Failover and failback requirements

With crash-consistent disaster recovery, when you experience a complete site failure, you can fail over from a primary site to a secondary site, after which you must perform a failback to restore the SnapMirror relationships. There are different requirements depending on whether you want to perform a failover operation or a failback operation.

Failover requirements

You must have performed the following tasks on your system before a failover operation:

- Created a disaster recovery plan and stored it in a central location
You can also replicate the plan to your secondary site.
- Established SnapMirror relationships from the primary to the secondary site
- Updated the SnapMirror relationships
This ensures that the latest data is transferred from the primary to the secondary site before the actual disaster recovery failover is performed.
- Run the `Update-OCDRPlan` cmdlet or the **Update DR Plan** activity on the primary site (site A)

Failback requirements

You must have performed the following tasks on your system after a failover operation has finished and before you initiate a failback operation:

- Ensured that proper mirror relationships are established across your primary and secondary sites
- Run the `Update-OCDRPlan` cmdlet or the **Update DR Plan** activity, indicating failback as the operational direction on the primary site (Site B) to update the disaster recovery plan with the latest configuration information
- Used the `Invoke-OCDRMirrorReverseResync` cmdlet or the **Reverse Resync SnapMirror** activity on the secondary site (Site A) to reverse all of the relationships from Site B to Site A if there is no data loss
- Used the `Initialize-OCDRMirror` cmdlet or the **Initialize SnapMirror** activity to create new SnapMirror relationships from Site B to Site A if there is data loss
- Updated mirror relationships

Note: All transfers, initializations, and updates to your system are performed asynchronously, so you must wait and ensure that an operation is complete before you perform any additional operations.

Cmdlets used during failover workflow phases

To perform failover workflow, you must understand the various cmdlets used during particular stages of the workflow, and their options; on which failover site to use those cmdlets; the role of those sites at that stage of the workflow; and any additional information that you need about that stage.

Preparation for failover

The following table outlines the cmdlet or cmdlets that you must run to prepare to perform a failover operation. The site where each cmdlet should be performed and the role of that site (either primary or secondary) is included in the table.

Cmdlet	Site	Role	Result
Initialize-OCDRMirror -sourceloc filerA:sourcevol -destloc filerB:destvol -verbose	Any site		You can run the Initialize-OCDRMirror cmdlet for failback in the event of loss of Site A.
New-OCDRPlan -drf\\sunny\cher -drn pl.xml -prisvr <siteA> -secsvr <siteB> -ver	Site A	Primary	
Confirm-OCDRPlan -drp\\sunny\cher\pl.xml -ver	Any site		

The failover operation

The following table presents the cmdlet or cmdlets that you must run to perform a failover operation. The site where the cmdlet should be performed and the role of that site (either primary or secondary) is included in the table.

Cmdlet	Site	Role	Result
Invoke-OCDRFailover	Site B	Secondary	

Followup after failover

The following table outlines the cmdlet or cmdlets that you must run after the failover operation. You must perform a failback and then a second failover operation. The site where each cmdlet should be performed and the role of that site (either primary or secondary) is included in the table.

Cmdlet	Site	Role	Result
Update-OCDRPlan -Failback -prisvr <siteB> -secsvr <siteA>	Site B	Secondary > Primary	

Cmdlet	Site	Role	Result
Invoke-OCDRMirrorReverseResync	Site A	Secondary	This cmdlet establishes Site B as the mirror source, and takes the LUNs offline on Site A.
Reset-OCDRSite -force	Site A	Secondary	This step is optional and is part of the composite failback cmdlet. It removes the virtual machines and leaves the LUNs on Site A.
Confirm-OCDRPlan	Any site		This step is for failback and it reports conflicts because Site A contains the virtual machines and LUNs.
Invoke-OCDRFailback -Force	Site A	Secondary	The Site B to Site A failback was executed. You must include the <code>Force</code> parameter because the <code>Full</code> parameter was not used in the preceding <code>Reset-OCDRSite</code> cmdlet.
Update-OCDRPlan	Site A	Secondary > Primary	Site A is staged to fail over to Site B.
Reset-OCDRSite -force -full	Site B	Secondary	This cmdlet removes all virtual machines and LUNs in the disaster recovery plan on Site B.
Invoke-OCDRMirrorResync	Site B	Secondary	Site A is set as the mirror source.
Confirm-OCDRPlan	Any site		This step validates the Site A to Site B failover. It does not report conflicts.
Invoke-OCDRFailover	Site B	Secondary	The Site A to Site B failover is executed.

Consecutive failover

The following table outlines the cmdlet or cmdlets that you must run to perform consecutive failover operations. The site where each cmdlet should be performed and the role of that site (either primary or secondary) is included in the table.

Cmdlet	Site	Role	Result
Confirm-OCDRPlan	Any site		Success confirms that the mirrors are synchronized.
Start-OCDRSimulateFailover	Site B	Secondary	This cmdlet gives the same result as Invoke-OCDRFailover.
Update-OCDRPlan	Site A	Primary	
Stop-OCDRSimulateFailover -force	Site B	Secondary	Conflicting virtual machines and LUNs are removed from Site B.
Update-OCDRPlan	Site A	Primary	
Start-OCDRSimulateFailover -force	Site B	Secondary	The Force parameter is needed to successfully fail over because conflicting LUNs remain on the secondary site.
Update-OCDRPlan	Site A	Primary	
Stop-OCDRSimulateFailover -force	Site B	Secondary	Conflicting virtual machines and LUNs are removed from Site B.

Understanding the disaster recovery failover workflow

You use the `Invoke-OCDRFailover` composite cmdlet or **DR Failover** activity to run an automated workflow that fails over virtual machines from a primary site to a secondary site. With crash-consistent disaster recovery, when you experience a complete site failure of both the host and the storage, you can fail over from a primary site to a secondary site with limited and reasonable downtime.

About this task

The `Invoke-OCDRFailover` composite cmdlet (**DR Failover**) runs several individual operations to perform failover from the primary site (Site A) to the secondary site (Site B). It must be run with the `-Force` property if any of the entities to be failed over already exist.

When the disaster recovery cmdlet or activity is run, the plug-in performs the following steps automatically:

Steps

1. The `Confirm-OCDRPlan` cmdlet (**Validate DR Plan**) is run to validate the secondary site (site B) before the failover begins.
2. The `Reset-OCDRSite` cmdlet (**Clean-up a DR Site**) is run with the `-Force` parameter specified to clean up conflicting cluster resources and LUNs on the secondary site (site B).
3. The `Invoke-OCDRMirrorBreak` cmdlet (**Release SnapMirror**) is run to break all the SnapMirror relationships on the secondary site (site B).
4. The `Connect-OCDRLUN` cmdlet (**Connect DR Storage**) is run with the `-Force` parameter specified to connect all the LUNs on the secondary site (site B).
5. The `Restore-OCDRVm` cmdlet (**Restore VMs activity**) is run to restore all virtual machines on the secondary site (site B).

See the descriptions of the individual cmdlets or the activities in the *OnCommand Plug-in for Microsoft Windows PowerShell Cmdlet and Orchestrator Activity Reference Guide* for more details.

Related information

[NetApp Documentation: OnCommand Plug-in for Microsoft](#)

Understanding the disaster recovery failback workflow

With crash-consistent disaster recovery, after you fail over from a primary site (Site A) to a secondary site (Site B), you must perform an `Update-SCDRPlan -Failback` operation on Site B and an `Invoke-OCDRMirrorReverseResync` operation on Site A to restore the SnapMirror relationships from the secondary site to the primary site.

About this task

The `Invoke-OCDRFailback` composite cmdlet (**DR Failback** activity) runs several individual activities to perform the failback, and it must be run with the `-Force` parameter to perform failback from the primary site (now Site B) to the secondary site (now Site A).

The following steps are run automatically, based on the disaster recovery plan:

Steps

1. The `Confirm-OCDRPlan` cmdlet (**Validate DR Plan** activity) is run to validate the current state of the secondary host against the data captured in the specified disaster recovery plan file before the failback begins.
2. The `Reset-OCDRSite` cmdlet (**Clean-up DR Plan** activity) is run with the `-Force` parameter to remove conflicting cluster resources and LUNs on the secondary site (Site A).
This activity removes only the virtual machine conflicting resources from the secondary site.
3. The `Invoke-OCDRMirrorBreak` cmdlet (**Break SnapMirror** activity) is run to break all the SnapMirror relationships on the secondary site (Site A).
4. The `Connect-OCDRLUN` cmdlet (**Connect DR Storage** activity) or is run with the `-Force` parameter to connect all the LUNs on the secondary site (Site A).
5. The `Restore-OCDRVm` cmdlet (**Restore VMs** activity) is run to restore all virtual machines on the secondary site (Site A).

After you finish

After the failback operation is complete, you should update the disaster recovery plan for the next failover from Site A. Then you could run the `Reset-OCDRSite` cmdlet (**Clean-up a DR Site** activity) with the `-Force` and `-Full` options specified on Site B to resolve conflicting cluster resources on the secondary site.

See the descriptions of the individual cmdlets in the *OnCommand Plug-in for Microsoft Windows PowerShell Cmdlet and Orchestrator Activity Reference Guide* for more details.

Why you should perform a consecutive failover workflow

For crash-consistent disaster recovery, you should run a second failover (a consecutive failover) after the failback operation. For example, after you fail back from Site B to Site A, you must reestablish the SnapMirror relationships (which switches the primary and secondary sites).

The consecutive failover prepares your system for a future failover from Site A to Site B.

Preparing for a consecutive failover

You must take action before you run the consecutive failover operation to ensure that you still have SnapMirror relationships from Site A to Site B.

Before you begin

Ensure that proper mirror relationships are established.

Step

1. Perform the appropriate step before you run the `Invoke-OCDRFailover` cmdlet (**DR Failover** activity) to initiate the consecutive failover operation, based on your circumstances:
 - If there is no data loss, use the `Invoke-OCDRMirrorResync` cmdlet (**Resync SnapMirror** activity) on the secondary site (Site B) to resynchronize the relationships from Site A to Site B.
 - If there is data loss, use the `Initialize-OCDRMirror` cmdlet (**Initialize SnapMirror** activity) to create new SnapMirror relationships from Site A to Site B.

What happens during consecutive failover

During the consecutive failover workflow that follows a disaster recovery failback, the disaster recovery plan is validated, conflicting resources and LUNs are removed, SnapMirror relationships are broken, and virtual machines are restored.

You must ensure that you have performed all the tasks needed to run the `Invoke-OCDRFailover` cmdlet (**DR Failover** activity) with the `-Force` property for the consecutive failover.

- The `Confirm-OCDRPlan` cmdlet (**Validate DR Plan** activity) validates the secondary site (Site B) before the failover begins.
- The `Reset-OCDRSite` cmdlet (**Clean-up a DR Site** activity) is run with the `Secondary` and `Force` properties specified to remove conflicting cluster resources and LUNs on Site B.
- The `Invoke-OCDRMirrorBreak` cmdlet (**Break SnapMirror** activity) is run to break all the SnapMirror relationships on the secondary site (Site B).
- The `Connect-OCDRLUN` cmdlet (**Connect DR Storage** activity) is run to connect all the LUNs on Site B.

- The `Restore-OCDRVm` cmdlet (**Restore VMs** activity) is run to restore all virtual machines on Site B.

Once the consecutive failover operation finishes, all SnapMirror relationships are broken; however, they can be reestablished using a resync operation so the system can recover from another failure.

What the simulate failover cmdlet and activity do

You can use the `Start-OCDRSimulateFailover` cmdlet or the **Start DR Simulate Failover** activity to simulate an automated workflow that fails over virtual machines from a primary site to a secondary site. It is important to simulate failover to ensure that a site can successfully fail over during an actual disaster.

The `Start-OCDRSimulateFailover` cmdlet and the **Start DR Simulate Failover** activity are composite operations that run several individual activities or cmdlets to perform one failover simulation.

You can use the `Stop-OCDRSimulateFailover` cmdlet or the **Stop DR Simulate Failover** activity to stop the failover simulation.

For more information about the simulated failover workflow, see the *OnCommand Plug-in for Microsoft Windows PowerShell Cmdlet and Orchestrator Activity Reference Guide*.

Related information

NetApp Documentation: OnCommand Plug-in for Microsoft

Preparing to simulate failover

Even though the simulate failover workflow is automated, you must ensure that your disaster recovery plan and SnapMirror relationships are updated so that the information about the primary setup is captured and it can be used to replicate the configuration on the secondary site upon failover.

Steps

1. Run the `New-OCDRPlan` cmdlet (**Create DR Plan** activity) on the primary site to create a disaster recovery plan, and then store it in a central location.

The default folder location is `C:\ProgramData\OnCommand\MS_Plugin`.

2. Replicate the disaster recovery plan to the secondary site.
3. Create new SnapMirror relationships from the primary site to the secondary site by using the `Initialize-OCDRMirror` cmdlet (**Initialize SnapMirror** activity).
4. Update the SnapMirror relationships by using the `Invoke-OCDRMirrorUpdate` cmdlet (**Update SnapMirror** activity).

This ensures that the latest data is transferred from the primary to the secondary site before the actual disaster recovery failover is performed.

5. Run the `Update-OCDRPlan` cmdlet (**Update DR Plan** activity) on the primary site to update the disaster recovery plan with the latest configuration information.

After you finish

You can now run the `Start-OCDRSimulateFailover` cmdlet (**Start Test DR Failover** activity).

Failover simulation by the Start Test DR Failover activity

The `Start-OCDRSimulateFailover` cmdlet (**Start Test DR Failover** activity) performs the steps necessary to simulate a failover operation from the primary site to the secondary site.

No user intervention is required after the `Start-OCDRSimulateFailover` cmdlet (**Start Test DR Failover** activity) is begun. You can see descriptions of the individual objects for more details.

The `Start Test DR Failover` activity performs the following actions:

- The `Confirm-OCDRPlan` cmdlet (**Validate DR Plan** activity) validates the secondary site.
- The `Reset-OCDRSite` cmdlet (**Clean-up a DR Site** activity) with the `Force` property specified removes conflicting cluster resources and LUNs on the secondary site.
- The `Invoke-OCDRMirrorBreak` cmdlet (**Break SnapMirror** activity) breaks all the `SnapMirror` relationships on the secondary site.
- The `Connect-OCDRLUN` cmdlet (**Connect DR Storage** activity) connects all the LUNs on the secondary site.
- The `Restore-OCDRVm` cmdlets (**Restore VMs** activity) restores all virtual machines on the secondary site.

Preparing to repeat the simulate failover procedure

After you run the failover simulation, you must prepare the secondary sites for another failover operation. The `Stop-OCDRSimulateFailover` cmdlet (**End Test DR Failover** activity) resets the secondary site and performs a resynchronization on all the mirror relationships in the disaster recovery plan.

About this task

The `Stop-OCDRSimulateFailover` composite cmdlet (**End Test DR Failover** activity) comprises two individual operations to prepare your storage system to perform another failover simulation.

Steps

1. The `Stop-OCDRSimulateFailover` cmdlet (**End Test DR Failover** activity) with the `Force` property specified removes the virtual machines and cluster resources that were created in the previous failover operation.
2. The `Invoke-OCDRMirrorResync` cmdlet (**Resync SnapMirror** activity) resynchronizes all the `SnapMirror` relationships in the failover direction.

Related concepts

[Differences between granular and composite cmdlets and activities](#) on page 86

Related tasks

[Preparing to simulate failover](#) on page 92

Troubleshooting partial restore results following a failover or failback operation

Even though the system attempts to restore all virtual machines during failover and failback, sometimes only a subset of the total can be actually restored. It is important to know how to detect and address such partial operations.

About this task

You can scan the event log to determine the reasons for the partial restore results following a failover copy or failback operation. You can use either of two methods to remedy the problem.

Steps

1. Run the `Invoke-OCDRFailover` cmdlet using the `Force` parameter to connect the LUNs and restore virtual machines that were not successfully created.
2. Run the `Reset-OCDRSite` cmdlet with the `Force` parameter on the secondary site followed by the `Invoke-OCDRMirrorResync` cmdlet and reissue the `Invoke-OCDRFailover` cmdlet.

After you finish

Restore failures might also occur during a failback operation. Perform the corrective action in the failback direction.

For more information about restoring virtual machines, see the *OnCommand Plug-in for Microsoft Windows PowerShell Cmdlet and Orchestrator Activity Reference Guide*.

Related tasks

[Understanding the disaster recovery failover workflow](#) on page 89

[Understanding the disaster recovery failback workflow](#) on page 90

How the -Force parameter works in disaster recovery failover

If there is a high-availability virtual machine on the primary site and another high-availability virtual machine with the same name but a different GUID on the secondary site, you must use the `-Force` parameter to perform a disaster recovery failover.

After you issue the `Invoke-OCDRFailover` cmdlet with the `-Force` parameter, the disaster recovery failover removes the existing cluster resource with the duplicated name from the secondary site, moves the resource disk to the available storage group, and leaves the existing virtual machine configuration untouched on Hyper-V Manager. Then the disaster recovery failover creates the same cluster resource group on the HA virtual machine.

After the disaster recovery failover operation finishes, there are two virtual machines with the same name in Hyper-V Manager. The disaster recovery failover does not remove the virtual machine with the duplicated name from Hyper-V Manager, because this virtual machine has a different GUID.

SCOM Console and storage controller usage tips

The usage tips are intended to assist you with challenging issues related to your use of the plug-in, the System Center Operations Manager Console, and your storage controller.

Tips for solving SCOM Console issues

If you experience an issue with OnCommand Plug-in for Microsoft and the Microsoft System Center Operations Manager (SCOM) Console, consulting some documented tips can help you to find the source of the problem and quickly solve it.

Console tasks fail consistently

The Data ONTAP Storage Systems pane does not appear in the SCOM Monitoring window.

You must ensure that you imported all the Data ONTAP management packs.

Changes that are made to storage configuration are not reflected in the SCOM Console

Run the Discovery rule again or wait for it to run automatically. By default, this rule runs once in a 24-hour period.

SNMP traps are not appearing in the SCOM Console

Enable the non-emergency trap monitors globally or per storage controller. By default, they are disabled.

Alerts do not reappear after an issue reoccurs

Open Microsoft Health Explorer and select **Reset Health**. As a Microsoft System Center Operations Manager best practice, do not dismiss an alert without resetting its underlying monitor.

Network devices are not discovered when discovery timeout is increased

Ensure that you have met the following requirements:

- Used the correct SNMP version
- Used the default timeout value of two minutes or a value less than five minutes
- Run the System Center Operations Manager Discovery wizard

If you have met these requirements and your storage system still has not discovered the network devices, contact Microsoft for further assistance.

Related information

[Microsoft TechNet](#)

Tips for solving storage controller issues

If you experience an issue with OnCommand Plug-in for Microsoft and your storage controllers, consulting some documented tips can help you to find the source of the problem and quickly solve it.

Storage systems are not found using the Discovery wizard

Ensure that you have enabled SNMP on the storage controllers and that the SNMP community string matches the one that you set on the storage controllers.

Storage controllers appear in the Network Device Monitoring window but not in the Data ONTAP Storage Systems pane

Enable the Data ONTAP Discovery Rule for the Microsoft Operations Manager management server and set the credentials for that server.

Storage controllers appear in the Network Device Monitoring window but not in the Data ONTAP credentials tool

Select **Show all network devices** in the Data ONTAP Storage Systems pane. This identifies any devices that OnCommand Plug-in for Microsoft does not support.

Storage controllers do not appear after running Data ONTAP discovery

When you use the System Center Operations Manager Discovery wizard, ensure that you have selected **Network Devices**. After discovery finishes and finds the devices that are not managed, you can select these network devices to be managed by the host proxy agent. This allows OnCommand Plug-in for Microsoft to discover your Data ONTAP storage controllers.

Storage controllers are not found using the Discovery wizard

Ensure that you have enabled SNMP on the storage controllers and that the SNMP community string matches the one that you set on the storage controllers.

Troubleshooting

You should be familiar with certain OnCommand Plug-in for Microsoft issues and their causes so that you can solve problems with consoles, storage controllers, and performance and resource optimization.

Diagnostics using the Debug-OCHost cmdlet

The `Debug-OCHost` cmdlet runs diagnostics on the local machine that you can use to troubleshoot problems with the plug-in. The `Debug-OCHost` cmdlet also enables you to check the host configurations.

Troubleshooting OnCommand Plug-in for Microsoft installation and setup

If you encounter unexpected behavior during the installation or when configuring OnCommand Plug-in for Microsoft, you can use specific troubleshooting procedures to identify and resolve the cause of such issues.

Unable to install OnCommand Plug-in for Microsoft on a remote system with SCVMM Console add-ins installed on it

Description

If you have a system with the SCVMM Console add-ins installed and attempt to install a management server on the same machine by adding the management server to the OCPM resource pool, the installation fails and you are notified of the failure with a message to check the log for details.

Cause

This issue occurs because you cannot add a remote management server to the OCPM resource pool if you already have any OnCommand Plug-in for Microsoft components, such as the SCVMM Console add-ins, installed on the machine.

Corrective action

To add a remote management server to the OCPM resource pool, complete the steps of this task:

1. Uninstall the SCVMM Console add-ins on the first system.
2. Rescan the management server on the second system.
3. On the first system, select **Clustered Data ONTAP > Management Servers** in the navigation pane.
4. In the Tasks pane, click **Clustered Data ONTAP: Add Management Server to OCPM Resource Pool**.
5. Type the user name and password of an account with administrator privileges for the remote management server and click **OK**.

This adds the task name “Reserved” to the management server and adds it to the OCPM resource pool.

Remote installation silently fails if the remote system is missing software

Issue

When you run the installer remotely, the plug-in will not report if software is missing; the remote installation will appear to succeed. You must check the Windows Event log on the remote system to find the error.

If the Windows Event log shows a fatal error and the log files do not provide enough information, run the installer in GUI mode directly on the remote system.

Cause

This issue occurs if the plug-in detects that there is software missing. Instead of reporting the missing software, the installer silently fails. You must check the log on your remote system to discover the failure.

Corrective action

If you run the installer on the remote system and observe a silent failure:

1. Check your system's Windows Event log for details.
2. If the logs do not provide enough information, run the installer using the GUI directly on the remote system.
Using the GUI remote installer might allow you to see the error occurring.
3. Install the missing software.
4. Run the remote installer again.

OCPM is not installed

Description

This message occurs when you attempt to clone a virtual machine from the Clone VM from Template add-in for SCVMM Console under the following circumstances:

- SCVMM manages a remote cluster or node on which the plug-in is not installed.
- There are valid virtual machine templates on VHDs that reside on a NetApp LUN on the remote host or cluster.
- From the SCVMM server, you invoke the Clone VM from Template add-in.

When you click **OK** in the error message dialog box, the following additional error message, which is not correct, appears:

```
No valid VM Templates
```

Corrective action

Install OnCommand Plug-in for Microsoft on the remote host.

Uninitialized LUNs cannot be connected to the host

Issue

Attempts to connect LUNs to the host fail.

Cause

This issue occurs when you attempt to use the `Connect-OCStorage` cmdlet or the **Connect Storage to Host** activity to connect to the host uninitialized LUNs that were created using System Manager or the storage system console.

Corrective action

You must first map the LUN to the host and then use Windows Disk Management to initialize and format the disk before attempting to connect the LUN to the host.

Connect to controller failed: storage system credentials cannot be found

Description

This message occurs when the DNS contains multiple IP addresses for a host name and the host name does not always resolve to the same IP address.

Corrective action

You should add credentials for all IP addresses that a host name uses:

- If you add the storage system credentials with the IP address, the plug-in uses the IP address and DNS lookup for the fully qualified domain name (FQDN).
- If you add the storage system credentials with the host name, the plug-in looks up the IP addresses that are associated with the host and adds one of those IP addresses.
- If you perform a get or remove operation with one or more IP addresses, only those IP entries associated with the host name or names is displayed or removed from the OCPM database.
- If you have multiple IP addresses per host name and encounter this error, add the storage system credentials for all IP addresses that the host name can resolve, to ensure that any cmdlet and activity operations that are given host names succeed.

You need to format the disk in drive *x:* \ before you can use it

Description

When you attempt to create a LUN on a machine that is running Windows 2008 R2 SP1, the New-OCStorage cmdlet succeeds but OnCommand Plug-in for Microsoft returns the following error message:

```
You need to format the disk in drive X: before you can use it.
```

Corrective action

Format the newly created disk using Microsoft Disk Management. Right-click the name of the primary partition and select **Format**.

Troubleshooting using SCOM

You can use the System Center Operations Manager (SCOM) troubleshooting information to research, view, determine the cause of, and resolve or work around error messages and other issues.

%OCSCOMPAT%/executable.exe not found

Message

```
%OCSCOMPAT%/executable.exe not found
```

Cause

This message occurs when System Center Operations Manager (SCOM) has not recognized the environment variable and the path to the executable file is missing.

Corrective action

Log off and then log on to the system and reopen SCOM.

Errors occur in Eventvwr after discovery is run for a large cluster of Storage Virtual Machines (SVMs)

Issue

When you add and run discovery for a large cluster of SVMs, the PowerShell scripts for monitoring are dropped and fail to execute, causing errors to occur in Eventvwr.

Cause

This issue occurs when the script limits are exceeded by adding a large cluster of SVMs, which increases the number of monitoring rules that must run simultaneously.

Corrective action

1. Back up the current Windows registry settings.
2. Open the Windows registry editor by typing
`regedit`
at the Windows run prompt.
3. Navigate to the following registry key: [HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Microsoft Operations Manager\3.0\Modules\Global\PowerShell].
4. Set the DWORD value for multinode storage management servers to `ScriptLimit=100` and `QueueMinutes=60`.
5. Set the DWORD value for a single node storage management server to `ScriptLimit=150` and `QueueMinutes=60`.
6. Exit the registry editor and restart the Windows host.

Health status does not change when an existing SnapMirror pair of controllers is added in SCOM

Issue

When an existing SnapMirror pair of controllers is added, the pair's health status, as reported by SCOM, does not change from `Not Monitored` to `Healthy` even though the SnapMirror pair is healthy instead of being not monitored.

Cause

This issue occurs when there is a problem with the cache file.

Corrective action

1. Click **Monitoring**.
2. In the navigation pane, select **Data ONTAP > Storage Systems > Management Server**.
3. In the **Tasks** pane, click **Flush Health Service State and Cache**.
The health status of the controllers changes to `Healthy`.

SCOM interface appears distorted when scrolling horizontally across the screen

Issue

When you select an item in the navigation pane for a storage object running clustered Data ONTAP, the System Center Operations Manager (SCOM) interface sometimes appears distorted when scrolling horizontally across the screen.

Cause

This issue occurs when the SCOM user interface is not rendered correctly.

Corrective action

Click anywhere in the SCOM user interface to resolve this issue.

Failed to enumerate the disk**Message**

Failed to enumerate the disk. Discover Storage API failed to execute, Reason An error occurred while executing the EnumWindowsDisks. Creating the instance of VDS Loader failed on the host: msohv02.pmp.local Reason: Access is denied.

Corrective action

Ensure that the OCPM service account is an administrator on the Hyper-V hosts so that OCPM can discover and populate the hosts and virtual machines.

The root\MSCluster namespace is marked with the RequiresEncryption flag**Message**

The root\MSCluster namespace is marked with the RequiresEncryption flag. Access to this namespace might be denied if the script or application does not have the appropriate authentication level. Change the authentication level to Pkt_Privacy and run the script or application again.

Description

This event log message occurs because the plug-in and the application are using different security levels. The plug-in uses packet-level security.

Corrective action

If the plug-in receives this warning, the application temporarily modifies the security to match. No corrective action is needed.

The alignment of some VHDs is not checked when selecting a large number of VHDs in SCOM for VHD alignment checking**Issue**

If you select a large number of VHDs when you run the Data ONTAP Virtualization: Check VHD Alignment Status task, some of the VHDs might not be examined for alignment.

Cause

Microsoft restricts the number of PowerShell calls that you can make.

Corrective action

You should run the Data ONTAP Virtualization: Check Host VHD Alignment Status for Hyper-V Hosts task instead, which examines all VHDs on all selected hosts. Another alternative is to wait for the VHD alignment checking rule to run.

OnCommand Virtual Infrastructure Management Service (VIM_Service) on the local computer started and then stopped**Message**

The Virtual Infrastructure Management Service on Local Computer started and then stopped. Some services stop automatically if they are not in use by other services or programs.

Description

This message occurs when you use `Ctrl + Break` to end a PowerShell session while a cmdlet is still running.

In this case, OnCommand Virtual Infrastructure Management Service (VIM_Service) might not start. If, before you ended the session, the cmdlet had sent any requests to Microsoft Virtual Disk Service (VDS), that service might be left in a state that would prevent restarting.

Corrective action

Restart the VDS service and then restart VIM_Service.

Data ONTAP virtualization objects are not discovered**Issue**

Data ONTAP virtualization objects (Hyper-V Host, LUN, Virtual Machine, or VHD) or Data ONTAP PRO objects (Hyper-V Virtual Machine Storage) are not discovered.

Cause

This issue occurs for a variety of reasons. You should perform all of the corrective actions to determine the cause and resolve the issue.

Corrective action

Ensure that the following conditions exist:

- Data ONTAP management packs have been imported.
- If your Hyper-V host does not meet the requirements for agentless monitoring, you have installed the OnCommand Discovery Agent on these hosts.
- Your virtual machine VHD files reside on NetApp LUNs.
- Your virtual machines are on and appear in Microsoft System Center Virtual Machine Manager.

Errors 22406 and 3002 from SCOM event log**Issue**

Microsoft System Center Operations Manager (SCOM) event log reports two errors:

- Event ID 22406 from Health Service Modules
- Event ID 3002 from Health Service Script

```
Log Name:      Operations Manager
Source:        Health Service Modules
Date:          9/10/2014 3:47:40 AM
Event ID:      22406
Task Category: None
Level:         Error
Keywords:      Classic
User:          N/A
Computer:     lab.example.com
Description:   The PowerShell script failed with below exception
```

```
Log Name:      Operations Manager
Source:        Health Service Script
Date:          9/10/2014 3:47:40 AM
Event ID:      3002
Task Category: None
Level:         Error
```

```

Keywords:      Classic
User:         N/A
Computer:     lab.example.com
Description:
Monitoring.ps1 : Monitoring failed

```

Cause

These errors occur in two scenarios:

- A node is down in the cluster
- MetroCluster is in switchover mode

Corrective action

None; this is an expected behavior.

Troubleshooting SCVMM Console

You can use the System Center Virtual Machine Manager (SCVMM) Console troubleshooting information to research an issue, view any related error messages, determine the cause of that issue, and learn what the resolution or workaround for that issue is.

The OCPM add-ins for SCVMM Console require the plug-in be installed on the SCVMM server

Description

If you have a machine with the SCVMM Console installed and pointing to a SCVMM server on another node, when you attempt to manage controllers in the SCVMM Console machine, the plug-in instructs you to install OnCommand Plug-in for Microsoft on the SCVMM server machine also.

Cause

The OCPM add-ins for SCVMM Console are installed per console and require the OCPM web service on the SCVMM server.

Corrective action

Install OnCommand Plug-in for Microsoft on the SCVMM server.

SCVMM Console crashes after creating new virtual machines

Issue

The SCVMM Console crashes if, after you create new virtual machines using Hyper-V or the OnCommand Plug-in for Microsoft add-ins for SCVMM, you return to SCVMM and refresh the virtual machines.

Cause

This is a Microsoft issue.

Corrective action

To correct this issue, install the latest Microsoft System Center 2012 SP1 roll-up updates.

Performance and resource optimization issues

If you experience an issue with OnCommand Plug-in for Microsoft performance and resource optimization (PRO) Tips, you can use troubleshooting tips to help find the source of the problem and resolve it. If your PRO Tips implementation fails, ensure that you have the necessary credentials.

Related information

[Microsoft TechNet](#)

PRO Tips do not appear if your system is not configured correctly

Issue

Virtualization alerts do not show up as PRO Tips.

Cause

Your system is not configured correctly.

Corrective action

You can perform the following tasks:

- Ensure that the Data ONTAP management packs have been imported.
- Ensure that the Data ONTAP PRO Discovery Rule for the Microsoft System Center Operations Manager (SCOM) management server has been enabled and that the credentials for that server have been set.
- Ensure that alerts appear in the Hyper-V virtual machines in the storage folder. If alerts appear, ensure that System Center Virtual Machine Manager is configured to receive PRO Tips from the System Center Operations Manager management server that runs OnCommand Plug-in for Microsoft.
- In multinode and Network Load Balancing (NLB) SCOM server deployments, ensure that the SCVMM server is connected to the SCOM server having the Root Management Server (RMS) Emulator set to Yes.

View PRO script is not visible for PRO Tips

Issue

View PRO script is not visible for PRO Tips.

Cause

View PRO script is visible only if you use the built-in Microsoft PRO module. In SCVMM 2012, this module runs on the SCVMM server so that **View PRO script** is not visible.

Corrective action

Use the Microsoft PRO module to see the View PRO script.

Troubleshooting Orchestrator

You can use Orchestrator troubleshooting information to research an issue, including viewing error messages, determining the cause of the issue, and learning what the resolution or workaround for the issue is.

Published data is not visible even though you subscribed

Issue

Published data is not visible even though you subscribed to it in the user interface.

Corrective action

1. Double-click the name of the Orchestrator activity for which you want to receive published data.

2. In the properties window, go to the **Run Behavior** tab, click the **Flatten** check box, and then click **Finish**.
3. Link the selected activity to another activity, such as the **Append Line** activity.
4. Right-click in one of the text boxes in the properties window and select **Subscribe > Published Data**.
The Published Data window opens with the published data displayed.

You can go back to uncheck the **Flatten** check box. The properties remain.

VIM web service does not restart

Issue

If you try to halt an operation by restarting the VIM web service, the VIM web service might not restart.

Cause

A cmdlet operation was interrupted while the VIM web service was running.

Corrective action

Perform the following procedure:

1. Go to **Administrative Tools > Services**.
2. From **Virtual Disk service**, restart the VDS service.
3. Restart the VIM web service.

The Create Clone request is invalid

Message

```
The create clone request is invalid. Reason : Error: - SCVMM
Administrator console not installed on the local host. Exception:
FaultException`1 Target site: RealProxy.HandleReturnMessage Stack
trace: ...
```

Description

This message occurs when a user attempts to clone a virtual machine with an System Center Virtual Machine Manager (SCVMM) template on a system on which there is no SCVMM Console installed on the local host.

Corrective action

- Ensure that the correct web service server is specified in the activity properties where the template is located and the web service is installed.
- Ensure that the SCVMM Console is installed on the same server on which the template resides if it is not an SCVMM server.

The specified virtual machine is not found on your local host

Message

```
The specified Virtual machine <VM Name> is not found on your local
host <localhost>. Remote VM delete operations are not supported.
Please try the operation on the host where VM is present.
```

Corrective action

Ensure that when you build the **Delete VM** workflow, the VIM web service server used in the input field is the server where the virtual machine is located and where you have installed the VIM web service.

Troubleshooting provisioning

You can use the provisioning troubleshooting information to research an issue, view any error messages, determine the cause of that issue, and learn what the resolution or workaround for that issue is.

Storage connection operations fail and request MPIO

Issue

Storage connection operations fail and request multipath I/O (MPIO) regardless of whether the multiple initiators belong to the same or different hosts.

Cause

If the node on which you are running the `New-OCStorage` cmdlet or the `Connect-OCStorage` cmdlet does not have MPIO enabled and you try to specify more than one FCP initiator in the `InitiatorName` parameter, the storage connection operation fails.

When two FCP initiators are enabled from each host (which does not have MPIO enabled and for which no FCP initiators are provided), the plug-in selects one FCP initiator from each node by default and succeeds in creating the cluster disk.

Corrective action

Do not use the `InitiatorName` parameter when you provision new storage or when you connect LUNs to a host that has multiple FCP initiators.

Set-OCStorageSize cmdlet fails to resize the disks

Issue

The `Set-OCStorageSize` cmdlet fails to resize the LUNs.

Cause

The LUNs were created before multipath network I/O (MPIO) was installed but resized after MPIO was installed, which caused the failure to resize the disks.

Corrective action

You should either create and resize the LUNs with MPIO installed, or create and resize the LUNs without MPIO installed.

An Unexpected Error occurred while adding disk to the Cluster

Message

You might experience either of these messages:

- An Unexpected Error occurred while adding disk to the Cluster.
Generic failure
- Cannot create a file when that file already exists.

Description

The `New-OCStorage` cmdlet fails with an unspecific error when you try to use an existing `ResourceName` value. Two shared disks cannot have the same resource group and resource name.

Corrective action

Create a new `ResourceName` value when provisioning or connecting a LUN to the host.

Troubleshooting cloning

You can use the cloning troubleshooting information to research an issue, view any error messages, determine the cause of that issue, and learn what the resolution or workaround for that issue is.

When you try to create a clone from an SCVMM template, you receive an error

Issue

When you try to create a clone from an SCVMM template, you receive an error.

Cause

The specified destination server is not managed by an SCVMM server.

Corrective action

Add the clone destination server to the SCVMM server.

Highly available virtual machines are not created because of conflicting VM names

Issue

Clones created for CSV virtual machines with a name that is already in use are not highly available.

Cause

The failure to create highly available virtual machines is caused by conflicting virtual machine names if all the virtual machines in the CSV are not on the node where the plug-in cmdlet is executed. A virtual machine that is first created with a particular name is highly available; a virtual machine that is subsequently created with the same name is not highly available.

Corrective action

The plug-in does not create any virtual machine name conflicts if all the virtual machines that are created using the base name that is included in the cmdlet parameters are owned by the same node on which you run the operation.

ValidateCreateCloneRequest: Invalid mount point

Message

```
ValidateCreateCloneRequest: Invalid mount point for create clone request.
```

Description

This message occurs when you attempt to create a clone, and either the specified mount point format is invalid or the mount point is in use on the clone destination server.

Corrective action

Use another mount point or correct the mount point format.

ValidateLunOsType failed

Description

This message occurs when you attempt to create a LUN that contains the source virtual machine or template VHD with an unsupported OS type. The supported OS types are `Windows_2008` and `Hyper_V`.

Corrective action

Create a new LUN with the proper OS type and create a source virtual machine or template on it.

VMM is unable to complete the request**Message**

VMM is unable to complete the request. The connection to the agent on machine has been lost.

Description

This message occurs when you attempt to create a clone from a template and there is a connection problem from the System Center Virtual Machine Manager (SCVMM) server to the Hyper-V server on which the virtual machine was being deployed.

Corrective action

Check the network access from the SCVMM server to the Hyper-V server.

Check that the DNS name resolves to the proper I/O address for the SCVMM server and the Hyper-V server.

Error (10608) Cannot create a highly available virtual machine**Message**

The following error message appears in the System Center Virtual Machine Manager (SCVMM) 2012 Job Status window.

```
Error (10608) Cannot create a highly available virtual machine
because Virtual Machine Manager could not locate or access \\?
\Volume{47b16511-a9dd-4079-87bb-89ca6620cfc5}\. Recommended Action
Ensure that the path exists and that the path is for a cluster disk
in available storage, and then try the operation again.
```

Description

If you want to use an SCVMM template to create one new shared disk and clone three new virtual machines into that new shared disk, you can run the following script:

```
New-OCClone -Verbose -BaseVMName TestNWSHRD -VMMServer ocpmh3 -
Template Win2K8R2SP2EE_High -AllInSingleLUN -NumberOfClones 3
```

The cmdlet succeeds in creating the new shared disk and also succeeds in creating the first virtual machine into the new shared disk, however it fails to create the remaining two virtual machines and SCVMM returns an error.

Corrective action

If you want to clone multiple virtual machines into one single LUN, use the `-CSV` parameter along with the `-AllInSingleLun` parameter to create one new single CSV LUN, and then clone all the virtual machines into it.

If you want to clone multiple virtual machines into new shared disks, do not use the `-AllInSingleLun` parameter, because it creates one new LUN for each virtual machine.

New-OCClone cmdlet fails when cloning one virtual machine to each new LUN for a total of more than 255 virtual machine clones**Issue**

The `New-OCClone` cmdlet fails.

Cause

You tried to clone 255 or more virtual machines individually into 255 or more LUNs, one clone per LUN, but the Windows limit for each target is 254 LUNs.

Corrective action

- If you want to clone all the virtual machines into an existing LUN, you must use the `MountPoint` parameter to point to the existing LUN.
- If you want to clone all the virtual machines into a new LUN, you must use the `AllInSingleLun` parameter so that all the virtual machines are cloned into one new LUN.

Hyper-V virtual machine internal strings do not update consistently

Issue

Hyper-V virtual machine internal strings are not updating consistently.

Cause

The multilingual user interface (MUI) settings on an internationalized version of Microsoft Windows 2008 R2 were changed.

Corrective action

None; the MUI settings are not supported.

Troubleshooting disaster recovery

You can use disaster recovery troubleshooting information to research an issue, view any error messages, determine the cause of that issue, and learn what the resolution or workaround for that issue is.

Matrix of error and warning events

Live disaster recovery requires that the virtual machine configuration data be stored on the secondary site for a restore operation to be successful. Consequently, the disks are disconnected prior to deleting the virtual machine, which then causes the creation of erroneous event log messages.

All the errors and warnings that are generated on a host from any log are also reported in the Administrative Events log, which can be found in the Custom Views folder of the Event Viewer. The following matrix lists some of the possible events by their ID names and sources, and describes them. You can refer to this matrix to determine which events that you do not need to troubleshoot.

Event ID	Event source	Type and description
4096	Microsoft > Windows > Hyper-V > Config	Error. The virtual machine's configuration is no longer accessible. The device is not ready.
4657	Microsoft > Windows > Failover > ClusteringManager	Error. An error occurred opening resource virtual machine configuration for the virtual machine being removed.
16150	Microsoft > Windows > Hyper-V > VMMS	Warning. Cannot delete directory. The directory is not empty.
16300	Microsoft > Windows > Hyper-V > VMMS	Error. Cannot load a virtual machine configuration. Cannot create a file when that file already exists.

Event ID	Event source	Type and description
16410	Microsoft > Windows > Hyper-V > VMMS	Error. Cannot access the data folder of the virtual machine that is in the process of being removed.
20848	Microsoft > Windows > Hyper-V > VMMS	Error. Failed to lock the virtual machine's configuration. The specified network resource or device is no longer available.

Remove-OCVM and Reset-OCDRSite cmdlets do not remove the virtual machine record from SCVMM 2012

Issue

Neither the `Remove-OCVM` nor the `Reset-OCDRSite` cmdlets remove the virtual machine record from the SCVMM 2012 VMs and Services view.

Cause

The operation cannot be performed using cmdlets. You must manually delete the record using the SCVMM GUI.

Corrective action

To manually delete the record, perform the following steps:

1. From System Center Virtual Machine Manager (SCVMM), go to the VMs and Services view.
2. Select the appropriate cluster or host.
A list of virtual machines appears. The status of the virtual machine is "missing".
3. Right-click the name of the appropriate virtual machine and select **Delete**.

Reset-OCDRSite does not delete virtual machine configuration file and resource group

Issue

Using `Reset-OCDRsite` does not delete the virtual machine configuration file and resource groups from the secondary site.

Cause

This issue occurs when you run the `Reset-OCDRsite` cmdlet with the `-Force` and `-Full` parameters, to remove all virtual machines and LUNs that are in the disaster recovery plan from the secondary site. However, when virtual machines are on mount points, sometimes the virtual machine configuration file and the cluster resource are not deleted, although the LUNs are removed.

Corrective action

After you run the `Reset-OCDRSite` cmdlet with the `Force` and `Full` parameters, perform the following steps:

1. Go to Failover Cluster Manager.
2. Perform one of the following steps, based on your operating system:
 - If you are using Windows 2008 R2, in the Services and Applications pane, manually delete the remaining virtual machine resource groups that are associated with the deleted virtual machine.

- If you are using Windows 2012 SP1, in the Nodes pane, manually delete the remaining virtual machine resource groups that are associated with the deleted virtual machine.

This removes both the virtual machine cluster resource and the virtual machine configuration file.

You can avoid this issue in the future if you perform the following steps:

1. Run the `Reset-OCDRsite` cmdlet with the `-Force` parameter.
2. Run the `Reset-OCDRsite` cmdlet with the `-Force` and `-Full` parameters.

Uninstalling OnCommand Plug-in for Microsoft

You can uninstall OnCommand Plug-in for Microsoft from the server using the uninstall wizard, or you can perform a silent uninstall process. You can uninstall and reinstall if necessary to troubleshoot any issues with the software. The uninstall process uninstalls only the plug-in; it does not uninstall the management packs.

Uninstalling the plug-in by using the wizard

You can use the wizard to uninstall OnCommand Plug-in for Microsoft when you no longer need the plug-in or when you upgrade to a later version.

Steps

1. Open the Windows **Control Panel** on the appropriate management server.
2. From the **Control Panel**, double-click **Programs and Features**.
3. Select **OnCommand Plug-in for Microsoft**.
4. Click **Uninstall**.

Uninstalling the plug-in using silent mode

You can uninstall the OnCommand Plug-in for Microsoft software silently, without a wizard, when you no longer need the plug-in or when you upgrade to a later version.

About this task

During the silent uninstall process, no interface, progress bars, or error messages are displayed.

Step

1. From a command-line prompt, run the following command:

```
msiexec.exe /x{3FEDDDE8-6819-4D79-8444-1AB602C51F0B} /L*v  
C:your_log_file.log /q  
msiexec.exe /x{3FEDDDE8-6819-4D79-8444-1AB602C51F0B}
```

The uninstall process begins and runs in the background.

Any errors that occur during the uninstall process are saved to the log file that was included in the command input. If a log file is not specified in the command, then the log file is saved to the Temp folder after the procedure finishes.

After you finish

You can view the log file to ensure that the uninstallation is successful.

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