

IBM System Storage N series



OnCommand Plug-in 3.2 for Microsoft Installation and Administration Guide

Contents

| | |
|---|-----------|
| Preface | 11 |
| Supported features | 11 |
| Websites | 11 |
| Getting information, help, and service | 11 |
| Before you call | 12 |
| Using the documentation | 12 |
| Hardware service and support | 12 |
| Firmware updates | 12 |
| How to send your comments | 13 |
| OnCommand Plug-in for Microsoft features | 14 |
| OnCommand plug-in for Microsoft installation | 17 |
| Overview of the steps for installation of SCOM and OnCommand Plug-in for Microsoft | 17 |
| List of installation requirements for OnCommand Plug-in for Microsoft | 17 |
| OnCommand Discovery Agent requirements for installation | 18 |
| Data ONTAP requirements for OCPM installation | 18 |
| Hardware requirements for installation | 18 |
| Software requirements for installation | 18 |
| Required Microsoft licenses | 18 |
| System Center Operations Manager library requirements for installation | 19 |
| System Center Operations Manager requirements for installation | 19 |
| Requirements for adding SCVMM add-ins | 20 |
| Cloning requirements for installation | 20 |
| Orchestrator integration packs requirements for installation | 20 |
| Web service requirements for OCPM installation | 21 |
| Guidelines for installing OnCommand Plug-in for Microsoft | 21 |
| Installing and upgrading OnCommand Plug-in for Microsoft | 22 |
| Installing OnCommand Plug-in for Microsoft in silent mode | 23 |
| Silent install and uninstall process parameters and variables | 24 |
| Feature selection for installation | 25 |
| Plug-in feature names used with AddLocal parameter in silent installation cmdlets | 25 |

| | |
|---|-----------|
| Running provisioning and cloning cmdlets as a user other than the Windows administrator | 26 |
| Uninstalling OnCommand Plug-in for Microsoft | 28 |
| Uninstalling the plug-in by using the wizard | 28 |
| Uninstalling the plug-in using silent mode | 28 |
| Virtualization discovery does not return any values for Hyper-V host after ApplianceWatch PRO 2.1 or 2.1.1 is uninstalled | 29 |
| How the plug-in works with SCOM | 30 |
| Configuring the plug-in | 30 |
| Adding controllers | 30 |
| Adding controller credentials | 30 |
| Deploying the plug-in in multiple-server environments | 31 |
| What storage discovery is | 31 |
| Locating Data ONTAP management pack rules | 34 |
| Lists of Data ONTAP management pack rules | 35 |
| Configuring SNMP traps | 37 |
| Managing storage controllers | 37 |
| Managing controller credentials | 38 |
| Launching System Manager from the plug-in | 38 |
| Removing a storage controller | 39 |
| Remote operation of SCOM tasks | 39 |
| Linking to DataFabric Manager server and launching DFM | 39 |
| List of OnCommand Plug-in for Microsoft monitors | 40 |
| List of Data ONTAP PRO monitors | 41 |
| Overriding monitoring rules | 41 |
| Alert monitoring and rule customization | 41 |
| Performance monitoring | 43 |
| What PRO Tips are | 51 |
| Information displayed in the Events window | 56 |
| Types of Data ONTAP reports available through the plug-in | 57 |
| Checking the alignment of your VHDs | 59 |
| Checking the alignment of your Hyper-V LUNs | 60 |
| What the SCVMM Console add-ins are | 61 |
| Configuring the SCVMM server with the Manage OCPM Hosts add-in for the SCVMM Console | 61 |
| Importing console add-ins to the SCVMM Console | 61 |

| | |
|---|-----------|
| Removing console add-ins from the SCVMM Console | 62 |
| What the Jobs view is | 62 |
| Tasks you can perform with the Clone Virtual Machine add-in for the SCVMM Console | 62 |
| Cloning a virtual machine with the Clone a VM add-in for the SCVMM Console | 63 |
| Tasks that you can perform with the Clone VM from a Template add-in for the SCVMM Console | 63 |
| Cloning virtual machines from a template with the Clone VM from a Template add-in for the SCVMM Console | 64 |
| Tasks you can perform with the Manage Controllers add-in for the SCVMM Console | 64 |
| Checking controller credentials using the Manage Controllers add-in for the SCVMM Console | 64 |
| Modifying controller credentials with the Manage Controllers add-in for the SCVMM Console | 65 |
| Removing controller credentials with the Manage Controllers add-in for the SCVMM Console | 65 |
| Adding controllers using the Manage Controllers add-in for the SCVMM Console | 66 |
| Tasks you can perform using the Manage OCPM Hosts add-in for SCVMM Console | 66 |
| Configuring hosts with the Manage OCPM Hosts add-in for SCVMM Console | 67 |
| Configuring clusters with the Manage OCPM Hosts add-in for the SCVMM Console | 67 |
| Removing the configuration from a host | 68 |
| Refreshing the Manage Hosts view with the Manage OCPM Hosts add-in for the SCVMM Console | 68 |
| How the plug-in works with Orchestrator | 69 |
| What OIPs are | 69 |
| Preparing the OIPs for use | 69 |
| Registering the OIPs to the integration server | 69 |
| Deploying Orchestrator integration packs to the Orchestrator Runbook Designer and server | 70 |
| Unregistering the OIPs from the runbook server | 71 |

| | |
|---|-----------|
| What VIM web service configurations do | 71 |
| Creating configurations for VIM web service | 71 |
| Specifying VIM web service configurations for activities | 72 |
| Editing configurations for VIM web service | 72 |
| Removing configurations for VIM web service | 73 |
| How the plug-in works with PowerShell cmdlets | 74 |
| Windows PowerShell execution policies and administration profiles | 74 |
| Common cmdlet parameters | 75 |
| What Data ONTAP Toolkit activities are | 77 |
| Purpose of storage system credential cmdlets and activities | 78 |
| Provisioning storage | 79 |
| Requirements for provisioning | 79 |
| Differences between the Connect Storage activity and the Provision Storage activity | 80 |
| WMI warnings appear in the event logs | 80 |
| Cloning storage with OCPM | 81 |
| Requirements for cloning | 81 |
| What Sub-LUN cloning is | 81 |
| Cmdlets and activities for creating clones | 82 |
| When to use the Clone VM activity | 83 |
| Creating clones of a virtual machine from a LUN into a new LUN | 83 |
| Creating and storing clones in the same LUN | 84 |
| Creating a clone of a LUN into an existing CSV on another LUN | 84 |
| New-OCClone might result in excess free space | 85 |
| Disaster recovery cmdlets and activities | 86 |
| Requirements for disaster recovery | 86 |
| SnapMirror requirements for disaster recovery | 87 |
| What the disaster recovery plan is | 88 |
| Disaster recovery plan guidelines | 88 |
| Cmdlets and activities used with the disaster recovery plan | 89 |
| What live virtual machine disaster recovery is | 90 |
| Differences between granular and composite workflows | 90 |
| Failover and failback requirements | 90 |
| Failover workflow phases | 91 |
| Disaster recovery failover workflow | 95 |
| Disaster recovery failback workflow | 95 |

| | |
|---|------------|
| Why you should perform a consecutive failover workflow | 96 |
| Preparing for a consecutive failover | 97 |
| What happens during consecutive failover | 97 |
| What the simulate failover cmdlet and activity do | 98 |
| Preparing to simulate failover | 98 |
| Failover simulation by the Start Test DR Failover activity | 99 |
| Preparing to repeat the simulate failover procedure | 99 |
| Errors in Failover or Failback operations can result in partial restores | 100 |
| How the -Force parameter works in disaster recovery failover | 100 |
| SCOM Console and storage controller usage tips | 102 |
| Tips for solving SCOM Console issues | 102 |
| Tips for solving storage controller issues | 103 |
| Troubleshooting | 104 |
| Diagnostics using the Debug-OCHost cmdlet | 104 |
| Troubleshooting SCOM | 104 |
| Hyper-V hosts might take up to four hours to appear in SCOM | 104 |
| Failed to enumerate the disk | 104 |
| The root\MSCluster namespace is marked with the RequiresEncryption flag | 105 |
| PRO tip descriptions might not fit in the PRO tip window in SCVMM | 105 |
| The alignment of some VHDs is not checked when selecting a large number of VHDs in SCOM for VHD alignment checking | 105 |
| %OCSCOMPATHEXECUTABLE%\executable.exe not found | 105 |
| Clone operation failed to complete. Error The pipeline has been stopped. OnCommand Virtual Infrastructure Management Service (VIM_Service) on the local computer started and then stopped | 106 |
| Data ONTAP virtualization objects are not discovered | 107 |
| Performance and resource optimization issues | 107 |
| PRO Tips do not appear if your system is not configured correctly | 107 |
| View PRO script is not visible for PRO Tips | 108 |
| Troubleshooting Orchestrator | 108 |
| The published data is not visible even though you subscribed | 108 |
| VIM web service does not restart | 108 |
| The Create Clone request is invalid | 109 |
| The specified virtual machine is not found on your local host | 109 |
| Troubleshooting provisioning | 109 |

| | |
|--|------------|
| Storage connection operations fail and request MPIO | 110 |
| Set-OCStorageSize cmdlet fails to resize the disks | 110 |
| An Unexpected Error occurred while adding disk to the Cluster | 110 |
| Troubleshooting cloning | 110 |
| When you try to create a clone from an SCVMM template, you receive an error | 111 |
| Highly available virtual machines are not created due to conflicting virtual machine names | 111 |
| ValidateCreateCloneRequest: Invalid mount point | 111 |
| ValidateLunOsType failed | 111 |
| Misaligned VHD path | 112 |
| VMM is unable to complete the request | 112 |
| Error (10608) Cannot create a highly available virtual machine | 112 |
| New-OCClone cmdlet fails when cloning one virtual machine to each new LUN for a total of more than 255 virtual machine clones | 113 |
| Hyper-V virtual machine internal strings do not update consistently | 113 |
| Troubleshooting disaster recovery | 113 |
| What to do with the event matrix | 114 |
| Remove-OCVM and Reset-OCDRSite cmdlets do not remove the virtual machine record from SCVMM 2012 | 115 |
| Reset-OCDRSite does not delete virtual machine configuration file and resource group | 115 |
| Known issues | 117 |
| System Center Operations Manager issues | 117 |
| SCOM Tasks view reports success when controllers are not added | 117 |
| Microsoft VBScript runtime error: ActiveX component cannot create object | 117 |
| Cmdlets disabled from the installer for operating systems prior to Windows 2008 R2 | 117 |
| Show the Windows Installer log check box is not visible | 118 |
| View PRO script is not visible for PRO Tips | 118 |
| OC.SCOM.log rolls over into multiple logs | 118 |
| Calculation for projected savings can actually be less than the current savings | 118 |
| vFiler unit credentials are not removed if the physical storage system is removed | 119 |

| | |
|--|-----|
| After XenDesktop import failure, host names of virtual machines are not changed | 119 |
| You must add a string of MSvSCVMM as a connection name when you add an SCVMM host to Citrix Desktop Studio | 119 |
| Orchestrator issues | 119 |
| Orchestrator activities show success even when the operation fails | 120 |
| Provisioning issues | 120 |
| Delete virtual machine object cleanup is incomplete | 120 |
| Map LUNs to igroups with type Hyper_V only | 120 |
| A PowerShell execution policy set to Allsigned causes the New-OCClone cmdlet to fail | 121 |
| Virtual machine cloning into an existing CSV with the same base name fails | 121 |
| If the system clock is out of sync, the node loses connectivity | 121 |
| Resizing dedicated disks could take longer than expected | 121 |
| The storage path of FC connected disks owned by adjacent nodes in a cluster cannot be discovered | 121 |
| SCVMM crashes as a result of an attempt to remove a virtual machine | 122 |
| Cloning issues | 122 |
| TemplateCloneEngine::Clone: ValidateVHDDiskPaths failed | 122 |
| New-OCClone cmdlet fails because VHD path information already exists | 122 |
| The New-OCClone cmdlet fails on vFiler units that use Data ONTAP versions earlier than 7.3.3 | 123 |
| Cloning into an existing LUN on a remote system is not supported | 123 |
| Cannot clone a virtual machine from a SCVMM template into a new CSV | 123 |
| Neither source VHD nor clone destination is on an ONTAP LUN | 124 |
| When you try to create a clone from an SCVMM template, you receive an error | 124 |
| The Clone NTFS File activity changes the ownership of the available storage to the VIM web service server | 124 |
| Error: For template cloning in cluster environment, clones can only be created on an existing CSV | 125 |
| Disaster recovery issues | 125 |
| The restored virtual machine fails to start | 125 |

| | |
|--|------------|
| An error occurred while retrieving the GetHostData data. | 125 |
| The disaster recovery Invoke-OCDRMirrorReverseResync cmdlet fails because of an incorrect storage system name | 126 |
| During failover, two highly available virtual machines with the same name cause a failure | 126 |
| Copyright information | 127 |
| Trademark information | 128 |
| Index | 131 |

Preface

Supported features

IBM System Storage N series storage systems are driven by NetApp Data ONTAP software. Some features described in the product software documentation are neither offered nor supported by IBM. Please contact your local IBM representative or reseller for further details.

Information about supported features can also be found on the N series support website (accessed and navigated as described in [Websites](#) on page 11).

Websites

IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. The following web pages provide N series information:

- A listing of currently available N series products and features can be found at the following web page:

www.ibm.com/storage/nas/

- The IBM System Storage N series support website requires users to register in order to obtain access to N series support content on the web. To understand how the N series support web content is organized and navigated, and to access the N series support website, refer to the following publicly accessible web page:

www.ibm.com/storage/support/nseries/

This web page also provides links to AutoSupport information as well as other important N series product resources.

- IBM System Storage N series products attach to a variety of servers and operating systems. To determine the latest supported attachments, go to the IBM N series interoperability matrix at the following web page:

www.ibm.com/systems/storage/network/interophome.html

- For the latest N series hardware product documentation, including planning, installation and setup, and hardware monitoring, service and diagnostics, see the IBM N series Information Center at the following web page:

publib.boulder.ibm.com/infocenter/nasinfo/nseries/index.jsp

Getting information, help, and service

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains

information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your IBM N series product, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure they are connected.
- Check the power switches to make sure the system is turned on.
- Use the troubleshooting information in your system documentation and use the diagnostic tools that come with your system.
- Refer to the N series support website (accessed and navigated as described in [Websites](#) on page 11) for information on known problems and limitations.

Using the documentation

The latest versions of N series software documentation, including Data ONTAP and other software products, are available on the N series support website (accessed and navigated as described in [Websites](#) on page 11).

Current N series hardware product documentation is shipped with your hardware product in printed documents or as PDF files on a documentation CD. For the latest N series hardware product documentation PDFs, go to the N series support website.

Hardware documentation, including planning, installation and setup, and hardware monitoring, service, and diagnostics, is also provided in an IBM N series Information Center at the following web page:

publib.boulder.ibm.com/infocenter/nasinfo/nseries/index.jsp

Hardware service and support

You can receive hardware service through IBM Integrated Technology Services. Visit the following web page for support telephone numbers:

www.ibm.com/planetwide/

Firmware updates

IBM N series product firmware is embedded in Data ONTAP. As with all devices, ensure that you run the latest level of firmware. Any firmware updates are posted to the N series support website (accessed and navigated as described in [Websites](#) on page 11).

Note: If you do not see new firmware updates on the N series support website, you are running the latest level of firmware.

Verify that the latest level of firmware is installed on your machine before contacting IBM for technical support.

How to send your comments

Your feedback helps us to provide the most accurate and high-quality information. If you have comments or suggestions for improving this document, please send them by email to starpubs@us.ibm.com.

Be sure to include the following:

- Exact publication title
- Publication form number (for example, GC26-1234-02)
- Page, table, or illustration numbers
- A detailed description of any information that should be changed

OnCommand Plug-in for Microsoft features

You can use OnCommand Plug-in for Microsoft to configure, monitor, and maintain your storage. The plug-in includes management packs for Microsoft System Center Operations Manager (SCOM) 2012, PowerShell cmdlets, and System Center Orchestrator integration packs (OIPs) that you use to provision, clone, and recover Microsoft Hyper-V virtual machines.

OnCommand Plug-in for Microsoft consists of the following features:

| | | |
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| System Center Operations Manager (SCOM) management packs | Storage monitoring | Reporting These packs enable you to use your existing storage management tools to monitor, through one interface, all storage systems that are running Data ONTAP. The OnCommand management pack is required. |
| | Hyper-V storage monitoring and management | Reporting These packs enable you to monitor and report on your virtualized environment. They are required for use in a virtualized environment. |
| | SCOM Console | This pack enables you to access and perform tasks on a SCOM system remotely. |

Cmdlets The cmdlets are separate from the rest of the management packs and are not dependant on them to function correctly.

The OnCommand Web Service is installed with the cmdlets.

| | |
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| Cloning and provisioning | The cloning and provisioning cmdlets enable you to clone storage, provision storage, and manage storage system credentials. |
| Disaster recovery | The disaster recovery cmdlets enable you to replicate data across two sites to provide a disaster recovery solution. |

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

Orchestrator integration The cloning and provisioning management pack, the disaster recovery management pack, and the OnCommand Plug-in web service are installed by

default, but if you choose to install the OIP alone, the web service is not installed, although it is required to use the OIPs.

Cloning and Provisioning Integration Pack

This integration pack enables you to create workflows to provision storage, clone virtual machines, and manage storage system credentials.

Disaster Recovery Integration Pack

This integration pack enables you to create disaster recovery workflows that replicate data across two sites in both failover and failback scenarios.

Data ONTAP Toolkit Integration Pack

This integration pack enables you to invoke commands from System Center Orchestrator. You can also use the activities individually as an alternative to using the command-line interface and PowerShell scripting workflows.

OnCommand Plug-in VIM web service

The web service enables you to access the key features of storage discovery, storage provisioning, cloning virtual machines, and disaster recovery of virtual machines, based on a disaster recovery plan.

The OnCommand Plug-in web service is installed with the Orchestrator modules by default and can be installed on a server other than an Orchestrator runbook server. The web service is required to use the OIPs.

Documentation

This guide and the *OnCommand Plug-in for Microsoft Windows PowerShell Cmdlet and Orchestrator Activity Reference Guide* are available at `C:\Program Files\IBM\OnCommand\MS_PLUGIN\` after the installation.

OnCommand Discovery Agent

The agent assists you with SCOM host discovery, provisioning, cloning, and disaster recovery cmdlet functionality.

The agent enables the discovery of storage in environments in which LUNs are mapped using Fibre Channel.

Provisioning and cloning functionality requires the presence of the discovery agent for Hyper-V hosts with Fibre Channel initiators. For iSCSI initiators only, a discovery agent is not required.

Note: OnCommand Discovery Agent is needed only in environments in which LUNs are mapped using Fibre Channel.

SCVMM add-ins

The System Center Virtual Machine Manager (SCVMM) add-ins enable you to manage some controller activities and perform particular management tasks from a GUI that you can open from an icon on the SCVMM toolbar. The following list displays the names of the add-ins:

- The SCVMM clone a VM add-in
- The SCVMM clone a VM from a template add-in
- The SCVMM manage controllers add-in
- The SCVMM manage OCPM hosts add-in

OnCommand plug-in for Microsoft installation

The information that you need for the installation of the plug-in includes requirements and guidelines for installation, which you can perform either using a wizard or in silent mode. If you install in silent mode, you need information about the cmdlet and parameters that you can use.

Overview of the steps for installation of SCOM and OnCommand Plug-in for Microsoft

You can use the installation and preparation checklist to ensure proper installation and setup of OnCommand Plug-in for Microsoft on System Center Operations Manager (SCOM).

Before you begin

All installation requirements must be fulfilled and proper functionality confirmed. You should review your SCOM installation information for requirements.

Steps

1. Download and install OnCommand Plug-in for Microsoft.
2. Create overrides for the Data ONTAP discovery rule and the Data ONTAP virtualization discovery rule, but only for the management servers on which the plug-in is installed.
3. Save overrides to your own management pack rather than the default management pack, to avoid dependencies on the default management pack.
4. Run Data ONTAP discovery to discover any network devices that are already monitored in SCOM.

Related information

[Microsoft TechNet website](#)

List of installation requirements for OnCommand Plug-in for Microsoft

Your environment must meet all hardware, software, Data ONTAP, and Microsoft licensing requirements before you install and use OnCommand Plug-in for Microsoft, the various management packs, and the Orchestrator integration packs. The installer stops if the requirements for the

minimum Windows operating system, any service pack level, .Net 4.0, or PowerShell 3.0 are not met.

OnCommand Discovery Agent requirements for installation

Before you can install OnCommand Discovery Agent, you must ensure that the Hyper-V server role is enabled and that Windows Server 2012 is installed.

Data ONTAP requirements for OCPM installation

Before you can use the plug-in, you must have the correct version of Data ONTAP installed.

OnCommand Plug-in for Microsoft supports the following versions of Data ONTAP:

- Data ONTAP 7 product family:
 - 7.3.4 or later
- Data ONTAP 8 product family:
 - 8.0.1, 8.0.2, 8.0.3, and 8.0.4 operating in 7-Mode
 - 8.1.0, 8.1.1, and 8.1.2 operating in 7-Mode

Hardware requirements for installation

Microsoft System Center Operations Manager (SCOM) 2012 and Microsoft System Center Virtual Machine Manager (SCVMM) 2012 determine your hardware installation requirements. For more information about the requirements to install these Microsoft products, see the Microsoft TechNet website.

Related information

[Microsoft TechNet website](#)

Software requirements for installation

To ensure that the plug-in has all of the functionality that you require to perform your monitoring and management tasks, you must have the appropriate versions of software installed.

OnCommand Plug-in for Microsoft requires the following software versions:

- .NET Framework 4.0 for all features
- Microsoft System Center Operations Manager (SCOM) 2012 for SCOM Management packs
- Microsoft System Center Virtual Machine Manager (SCVMM) 2012 for cloning cmdlets
- Microsoft System Center Orchestrator 2012 for Orchestrator integration packs

Required Microsoft licenses

Before you can install the plug-in on your storage system, you must have specific Microsoft licenses.

OnCommand Plug-in for Microsoft requires the following Microsoft licenses:

- SQL database 2008 R2 SP2, 2012 SP1
- SQL Server 2008 or 2008 R2
- System Center Operations Manager 2012
- System Center Virtual Machine Manager 2012 Enterprise and Data Center (only necessary to receive PRO Tips)
- Windows PowerShell 3.0
- Windows Server 2012

You must have OnCommand Plug-in 3.2 for Microsoft installed if you want to run cmdlets with Windows Server 2012.

System Center Operations Manager library requirements for installation

There are several System Center Operations Manager libraries that are required for OnCommand Discovery Agent and reporting functionality.

The following System Center Operations Manager libraries are required for OnCommand Discovery Agent functionality:

- Microsoft.SystemCenter.InstanceGroup.Library
- Microsoft.SystemCenter.NetworkDevice.Library
- Microsoft.Windows.Library
- System.Health.Library
- System.Library
- System.Performance.Library
- System.Snmp.Library
- Microsoft.SystemCenter.VirtualMachineManager.Pro.2008.Library
- Microsoft.SystemCenter.VirtualMachineManager.2008.Library

The following System Center Operations Manager libraries are required for reporting functionality:

- Microsoft.SystemCenter.DataWarehouse.Report.Library
- Microsoft ODR Report Library
- Microsoft.SystemCenter.DataWarehouse.ServiceLevel.Report.Library

System Center Operations Manager requirements for installation

Before you install the plug-in on your system, your environment must meet some basic requirements in order for OCPM to function with System Center Operations Manager (SCOM).

Your environment must meet the following requirements to install OnCommand Plug-in 3.2 for Microsoft:

- The management packs must be installed on a SCOM management server to auto-import them.
- To monitor your VHDs for alignment issues, you must have enabled PowerShell remoting on all Hyper-V hosts.
- You must have configured System Center Operations Manager 2012 for reporting so that the Reports management pack appears with the other management packs.

To do this, you must correctly configure the SQL server data warehouse. For more information about configuring the SQL server data warehouse, see the Microsoft TechNet site.

- For multi-node SCOM setup to function, you must have the plug-in installed on the SCOM Server Node before you install the plug-in on any other non-SCOM Server node.

Related information

[Microsoft TechNet website](#)

Requirements for adding SCVMM add-ins

Before you can install the System Center Virtual Machine Manager (SCVMM) add-ins, your storage system must meet certain requirements.

You must have installed the following software on your storage system to use the SCVMM add-ins:

- SCVMM 2012 SP1
- .NET 4.0 or later
- Powershell 3.0 or later

Cloning requirements for installation

To use cloning to monitor your VHDs for alignment issues, you must have enabled PowerShell remoting on all Hyper-V hosts.

Orchestrator integration packs requirements for installation

Orchestrator integration packs (OIPs) enable you to use provisioning, cloning, and disaster recovery activities with the plug-in. To install the Orchestrator integration packs during the plug-in installation, you must meet some specific requirements.

You must meet the following requirements to install OnCommand Plug-in for Microsoft:

- You must install System Center Orchestrator 2012 and deploy the Orchestrator integration packs to the Orchestrator runbook server.
- To enable the PowerShell toolkit, cloning, provisioning, and disaster recovery functionality, the OnCommand Plug-in VIM web service must be installed in a Windows Server 2012 host.
- You must have .NET 4.0 installed in the runbook server host to use integration packs in the Orchestrator runbook server.
- You must manually upgrade all OIPs.
- You must recreate your provisioning, cloning and PowerShell toolkit workflows after you deploy the OIPs for version 3.2.

Version 3.1 provisioning, cloning and PowerShell toolkit workflows do not work with version 3.2 OIPs.

Web service requirements for OCPM installation

Before you install the plug-in on your system, you must meet some basic requirements for Virtual Infrastructure Management (VIM) web service.

Before you must meet the following requirements to install OnCommand Plug-in for Microsoft:

- The VIM web service login account must have administrative privileges on the local and remote hosts or clusters across the primary and secondary sites.
- You should use the preferred port number for all cmdlets, System Center Operations Manager, and Orchestrator functions.
The preferred port number is the port number value that is retrieved from the configuration reader file and stored in memory during installation.
- You must have the SQL database installed on your system to install the VIM web service.

Guidelines for installing OnCommand Plug-in for Microsoft

You must be prepared for the installation for it to go smoothly. Before you install OnCommand Plug-in for Microsoft, it is useful to have all of the installation information available. During installation, the installer automatically imports all the features that you want. If there is any missing software, a warning message informs you what you must download.

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| OnCommand Plug-in for Microsoft download | You must have downloaded the OnCommand Plug-in for Microsoft software from the N series support website (accessed and navigated as described in Websites on page 11). |
| Requirements | You must have met the requirements for proper installation of OnCommand Plug-in for Microsoft. |
| Credentials | You must have the appropriate credentials to install and run OnCommand Plug-in for Microsoft. |
| Installation features | You must have decided which features you want to install. You can customize your OnCommand Plug-in for Microsoft installation by choosing one or more of the features of the plug-in. You can perform the installation in silent mode as well. |

Related concepts

[OnCommand Plug-in for Microsoft features](#) on page 14

Related information

[The IBM N series support site - www.ibm.com/storage/support/nseries/](http://www.ibm.com/storage/support/nseries/)

Installing and upgrading OnCommand Plug-in for Microsoft

You can use the installation wizard to install OnCommand Plug-in for Microsoft, the management packs, the Orchestrator integration pack, the SCVMM add-ins, and the web service.

About this task

You cannot upgrade automatically from ApplianceWatch PRO or from versions prior to OnCommand Plug-in 3.1 for Microsoft; you must first uninstall the 3.0 or earlier version of the plug-in and then install the 3.2 version.

You can upgrade automatically from OCPM version 3.1 to 3.2. This is a major upgrade and you will not be prompted that you are upgrading from OCPM version 3.1 to version 3.2.

The installer imports the new management packs automatically. All features are installed by default unless the host is not a System Center Operations Manager (SCOM) management server, in which case the management pack features are not selected by default.

You can install the plug-in on any node in your environment and it will function as if it is installed on the SCOM Server node.

Steps

1. From the N series support website (accessed and navigated as described in [Websites](#) on page 11), download the OnCommand Plug-in for Microsoft executable file to a directory on your hard drive.
2. Use Microsoft Internet Explorer to launch the OnCommand Plug-in for Microsoft executable file. The InstallShield wizard opens.
3. Click **Next**.
The Destination Folder dialog box opens.
4. Click **Next** to install to the folder that is listed or click **Change** to install to a different folder.
5. Click **Next** to continue with the installation.
6. In the **Feature Selection** dialog box, select the program features that you want to install.
7. Optional: If you want to view the **Custom Setup Tips** dialog box that explains the icons and their meanings, click **Help**.
8. Optional: If you want to change the location to which the files are installed, click **Change** and type in the new path.
9. Optional: If you want to view the disk space usage, click **Disk Space**.
10. After you have specified those features that you want to install, click **Next**.
The Web Service Credentials dialog box opens.

11. Enter your web service credentials and click **Next**.
12. In the **Configure OCPM Database** dialog box, enter the information required.
You can include the instance in the Database server entry in the following format:
`<server_name>\<instance>`
If you do not include the instance, the default instance is used.
13. 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.
A status box opens and charts the progress of the installation. Then the InstallShield Wizard Completed box opens.
14. If the installer finds that required software is missing, a dialog box opens with information on where you can view the list of requirements and from which you can specify the installation of the missing software; the dialog box also includes a **Back** button that you can use to change your specifications, if necessary.
15. Click **Finish** to end the installation and to close the **InstallShield** wizard.

Installing OnCommand Plug-in for Microsoft in silent mode

You can install OnCommand Plug-in for Microsoft software in silent mode, without a wizard. Silent installation requires less intervention and is a less intrusive process than installing using the wizard.

About this task

During silent installation, no interface, progress bars, or error messages are displayed. Any error messages are written to a log file that is located in the Temp folder, if you do not provide a custom log file path in the silent install command line. A new log file is written if there is any software that you need to install before you install the plug-in.

Steps

1. From the N series support website (accessed and navigated as described in [Websites](#) on page 11), download the OnCommand Plug-in for Microsoft executable file to a directory on your hard drive.
2. From the command line, switch to the directory to which you saved the executable file.
3. Run the executable:

```
OnCommand-PlugIn-Microsoft_3.2_x64_IBM.exe /s /v"/qn SILENT_MODE=1 /L*v
<log_file_name> ADDLOCAL=<ALL|Feature Names> SVCUSERNAME=<domain_user>
SRV_PASSWORD=<passwd> SRV_CONFIRMUSERPASSWORD=<passwd>
DBCONNECTIONSTRING=\"Server=<server_name>; Integrated security=SSPI;
database=master;\""
```

The installation begins and runs in the background.

Related concepts

Guidelines for installing OnCommand Plug-in for Microsoft on page 21

Related tasks

Managing controller credentials on page 38

Related references

Plug-in feature names used with AddLocal parameter in silent installation cmdlets on page 25

Silent install and uninstall process parameters and variables on page 24

Silent install and uninstall process parameters and variables

When you want to run an install or uninstall process in the background, or *silently*, you construct a command to do so using a particular set of parameters and variables.

The plug-in passes the parameters to `setup.exe` in the following order:

```
OnCommand-PlugIn-Microsoft_3.2_x64_IBM.exe /s /v"/qn SILENT_MODE=1 /L*v
<log_file_name> ADDLOCAL=<ALL|Feature Names> SVCUSERNAME=<domain_user>
SRV_PASSWORD=<passwd> SRV_CONFIRMUSERPASSWORD=<passwd> DBCONNECTIONSTRING=
\"Server=<server_name>; Integrated security=SSPI; database=master;\""
```

Note: Do not leave a space between the "v" and the quotation mark.

The following list includes those parameters and variables that you can use with the silent installation command:

| | |
|-----------------|--|
| <code>/s</code> | Specifies silent mode |
| <code>/v</code> | Passes the parameters to the installer |
| <code>/q</code> | Specifies silent installation, with which you can use the following options: |
| b | Creates a basic user interface |
| f | Displays a full user interface |
| n | Does not create a user interface |
| r | Displays a reduced user interface |

`/w (Optional)` Waits until the installation is complete before exiting

If you are using the `/w` parameter in a batch file, you should precede the entire `setup.exe` command line with `start /WAIT`:

```
start /WAIT OnCommand-PlugIn-Microsoft_3.2_x64_IBM.exe /w ...
```

`ADDLOCAL=` In a custom installation, indicates the features that you want to install

If there is no *ADDLOCAL* element in the command, all features are installed by default.

Feature selection for installation

If you do not want to use the default OnCommand Plug-in for Microsoft installation (which includes all plug-in features), you must select the names of the features that you want and use the *ADDLOCAL* parameter to construct a command that silently runs a custom installation.

If you install a parent feature (such as ManagementPacks), then all of its child features are installed also. If you install a child feature (such as Hyper-V Storage Monitoring and Management), its parent feature (in this case, ManagementPacks) is also installed, along with any required sibling features (such as, in this case, StorageMonitoring).

The following example illustrates a custom installation of only cmdlets and documentation:

```
OnCommand-PlugIn-Microsoft_3.2_x64_IBM.exe /s /v"/qn
SILENT_MODE=1 /L*v <log_file_name> ADDLOCAL=<Cmdlets, Doc>
SVCUSERNAME=<domain_user> SRV_PASSWORD=<passwd>
SRV_CONFIRMUSERPASSWORD=<passwd> DBCONNECTIONSTRING=
\"Server=<server_name>; Integrated security=SSPI; database=master;\""
```

Plug-in feature names used with AddLocal parameter in silent installation cmdlets

There are specific feature names that you need to use with the *AddLocal* parameter to install the various plug-in features.

The feature names for the *AddLocal* parameter are listed in the following table:

| Parent feature | Child feature | Sub-child feature | AddLocal parameter |
|--|---|-------------------|---------------------|
| System Center Operations Manager (SCOM) Management Packs | | | ManagementPacks |
| | Storage Monitoring | | StorageMonitoring |
| | | Reporting | Reporting |
| | Hyper-V Storage Monitoring and Management | | HVStorageMonitoring |
| | | Reporting | HVStorageReporting |

| Parent feature | Child feature | Sub-child feature | AddLocal parameter |
|----------------------------------|--|-------------------|--------------------|
| | SCOM Console | | SCOMConsole |
| Cmdlets | | | Cmdlets |
| | Cloning and Provisioning Cannot be installed individually | | CmdletsCP |
| | Disaster Recovery Cannot be installed individually | | CmdletsDR |
| Orchestrator Integration Pack | | | Opalis |
| | Cloning and Provisioning Integration Pack | | OpalisCP |
| | Disaster Recovery Integration Pack | | OpalisDR |
| | Data ONTAP Toolkit Integration Pack | | OpalisDataOntap |
| | OnCommand Plug-in VIM Web Service | | OCWebServices |
| Documentation | | | Doc |
| OnCommand Discovery Agent | | | OCAgent |
| SCVMM Console Add-Ins | | | VMMAddins |

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

Result

After you restart the Windows 2008 R2 server, you can run the provisioning and cloning cmdlets without being the Windows built-in administrator.

Uninstalling OnCommand Plug-in for Microsoft

When you no longer need OnCommand Plug-in for Microsoft or when you upgrade to a later version, you can uninstall the plug-in two ways; you can use the uninstall wizard or you can perform a silent uninstall. 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 Windows **Control Panel** on the appropriate management server.
2. From **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 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 a 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{8B77D13A-B265-4A01-A8BB-DD4FB96FB912} /L*v  
C:your_log_file.log /q  
  
msiexec.exe /x{89443E98-5067-4291-8839-B9EC379DC11F}
```

The uninstall process begins and runs in the background.

A log file that lists any errors that occur during the uninstall process is 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 goes to the Temp folder after the procedure finishes.

Virtualization discovery does not return any values for Hyper-V host after ApplianceWatch PRO 2.1 or 2.1.1 is uninstalled

The virtualization discovery web service from the System Center Operations Manager (SCOM) host to the Hyper-V host finishes successfully but there are no values in the virtualization folder in SCOM after an upgrade.

Workaround:

Perform the following procedure after you uninstall ApplianceWatch PRO 2.1 or 2.1.1:

1. Install the OnCommand Plug-in for Microsoft discovery agent on the Hyper-V host.
2. Optional: Uninstall OnCommand Plug-in for Microsoft discovery agent if you do not need it. Installing and then uninstalling the discovery agent ensures that the `root\dataontap` namespace is properly cleaned up.

Contact Microsoft for SCOM updates to address this issue.

Related information

[Microsoft TechNet website](#)

How the plug-in works with SCOM

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

Configuring the plug-in

You must perform several tasks to prepare the plug-in for use. These tasks include such things as adding controllers, discovering and configuring the controllers and tasks with the management pack rules. These tasks are required before you can begin to monitor your storage.

Adding controllers

Adding controllers on System Center Operations Manager (SCOM) enables you to monitor their performance and health.

Steps

1. In the **Actions** pane, go to **Monitoring > Data ONTAP > Management Server** and select **Data ONTAP: Add Controller**.

The **Add Controller** window opens.

2. Enter the SNMP string and the controller name or IP address of the controller that you want to add.
3. Click **OK**.

After you finish

You can use **Data ONTAP: Manage Controller Credentials** to set the credentials.

Adding controller credentials

After you add controllers to the plug-in, you must ensure that the access credentials to those controllers are added to secure your data.

About this task

Note that the System Center Operations Manager (SCOM) manages controller credentials user interface is running on the SCOM account.

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

Steps

1. In the **Actions** pane, select **Data ONTAP: Manage Controller Credentials**.
2. Ensure that the appropriate roles and capabilities are assigned.

Result

If you cannot connect to the controller in the GUI, the run-as account might need to be configured.

Deploying the plug-in 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.

About this task

In multiserver environments, although 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. This behavior is controlled by overriding and then enabling the Data ONTAP discovery rule that ships as part of the plug-in.

You want to ensure that the discovery rule is enabled on only one management server at a time.

Steps

1. In the **Authoring** window in **Microsoft Operations Manager**, select the rule you want to override.
2. In the **Rule Details** pane, click **View Knowledge**.
3. Click the **Override** tab and follow the directions in the tab window.

Related tasks

[Locating Data ONTAP management pack rules](#) on page 34

What storage discovery is

OnCommand Plug-in for Microsoft utilizes 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 a Data ONTAP version earlier than 7.3, you must use SNMP version 1 for discovery rule support. If your storage system is running Data ONTAP 7.3 or later, SNMP versions 1, 2C, and 3 are supported for use with plug-in discovery rules.

The plug-in ignores traditional volumes during the discovery process.

Types of discovery

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 in SCVMM.

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.

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

Related concepts

What expedited discovery is on page 33

Related tasks

Enabling discovery on page 32

Expediting virtualization discovery on page 34

Expediting storage discovery on page 33

Enabling discovery

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

About this task

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

Running discovery

There are three types of discovery that you must run to discover all of your storage; discovery, virtualization discovery, and PRO discovery. Discovery is required for the plug-in to recognize your controllers and begin the management of your storage.

Steps

1. On the **Actions** pane, click **Monitoring > Data ONTAP > Management Server**.

2. Select the discovery task that you want to run.

The Run Discovery window opens.

3. Click **Run**.

A success message indicates that the discovery task has completed successfully.

What expedited discovery is

The plug-in utilizes rules that discover storage and virtualization and PRO objects to monitor the state of each object and troubleshoot when necessary. If you choose not to wait for the automated discovery process, which runs every four hours, you can expedite the discovery process by manually running it, also known as expediting discovery.

The main discovery rule (**Data ONTAP: Discovery Rule**) is disabled by default, as Microsoft recommends. After you import the management packs, you can enable this rule on a Microsoft SCOM management server by overriding the setting and selecting the management server that manages Data ONTAP objects.

If your storage system is running a Data ONTAP version earlier than 7.3, you must use SNMP version 1 for discovery rule support. If your storage system is running Data ONTAP 7.3 or later, SNMP versions 1, 2C, and 3 are supported for use with OnCommand Plug-in for Microsoft discovery rules.

The plug-in ignores traditional volumes during the discovery process.

Expediting storage discovery

Storage discovery is accomplished when the built-in Microsoft System Center Operations Manager (SCOM) discovery wizard using SNMP discovers the Data ONTAP storage devices. The controllers are recognized as Data ONTAP storage devices and, if valid credentials are set in the SCOM database, the storage devices in these controllers are discovered.

Before you begin

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

Steps

1. Navigate to the SCOM **Monitoring** pane.
2. Select the **Management Server** view.
3. Select the management server on which discovery is enabled.
4. In the **Actions > Health Services Tasks** pane, select **Data ONTAP: Run Discovery Task**.

Expediting virtualization discovery

Data ONTAP virtualization discovery finds storage on all Hyper-V hosts in System Center Virtual Machine Manager (SCVMM). You can perform virtualization discovery manually on every Hyper-V host by using the Data ONTAP Virtualization: Discovery Rule when you choose not to wait for automatic discovery.

About this task

This rule targets the management server and has a default interval of four hours and a default timeout of one hour. It discovers storage on Hyper-V hosts, Hyper-V LUNs, Hyper-V virtual machines, and Hyper-V virtual hard disks.

The following situations determine if you must have the OnCommand Discovery Agent installed on a Hyper-V host:

- If the Hyper-V host has LUNS with a Data ONTAP version earlier than 7.3.1
- If the Hyper-V host has Fibre Channel mapped LUNs
- If the Hyper-V host has dedicated LUNs with volume GUID and the SCOM server is not running Windows 2008 R2

Steps

1. Navigate to the **Management Server** view under the `Data ONTAP` node.
2. Click **Data ONTAP Virtualization: Run Virtualization discovery task** on the management server.

Locating Data ONTAP management pack rules

You can find the Data ONTAP management pack rules so that you can verify that they were successfully imported into System Center Operations Manager (SCOM) or to override the rules as necessary.

Before you begin

You must have correctly imported the 3.2 management packs that you installed into SCOM.

Steps

1. From the **Authoring** pane, select **Rules**.

2. In the **Name** column, go to **Type: Management Server** and search for **Data ONTAP**.
3. Then from the list of rules, right click any rule and set the overrides to the entire group.
4. Save the changes to the rule.

These changes can be either saved to the SCOM standard default management pack or to a new management pack which you create.

Related tasks

[Overriding monitoring rules](#) on page 41

Lists of Data ONTAP management pack rules

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

Data ONTAP: Management Server rules

The following list names all of the 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: Volume Space Utilization Rule
- Data ONTAP: Volume State Rule

- Data ONTAP: Volume Used Inodes Rule

Data ONTAP PRO: Hyper-V Host rules

The following list names all of the Data ONTAP PRO Hyper-V Host rules:

- Data ONTAP PRO: Discovery Rule
- 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 Auto-Delete PRO Tip Recovery Rule
- Data ONTAP PRO: Volume Space Utilization PRO Tip Recovery Rule

Data ONTAP Virtualization: Management Server rules

The following list names all of the 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

[Locating Data ONTAP management pack rules](#) on page 34

Configuring SNMP traps

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, you must first configure SNMP.

Before you begin

- If you use Windows 2008, you must have installed SNMP Service and SNMP WMI Provider.
- If you use Windows 2008 SP1, you must have installed Microsoft hotfixes 958936 and 967718.
- If you use Windows Server 2008 R1, you must have installed Microsoft hotfixes 958936 and 967718.

About this task

For detailed information about how to complete the following tasks, see the *Data ONTAP System Administration Guide* for your Data ONTAP version.

Steps

1. Navigate to **Server Manager > Configuration > Services > SNMP Service > Properties > Security** tab.
2. Ensure that **Accepted community names** contain 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 as your 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.

Managing storage controllers

There are many tasks that you must perform to maintain your storage controllers, including adding, removing, and configuring storage controllers. You also must manage the storage controller credentials and modify that credential information. Finally, you must configure SNMP if you want to receive SNMP traps.

Managing controller credentials

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

To use the System Manager interface to change controller configuration information, 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.

It is strongly recommended that you have System Manager installed to perform active management tasks on your system.

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.

Removing a storage controller

You can remove storage controllers and 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 will no longer be discovered.

Steps

1. From the **Monitoring** pane, select **Controllers**.
2. In the **Controllers** pane, select the controller that you want to remove.
3. From the **Actions > Data ONTAP Controller Tasks** pane, select **Remove Controller** and click **OK**.

Remote operation of SCOM tasks

You can run OnCommand Plug-in for Microsoft 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 and launching DFM

Using the plug-in, you can enable Microsoft System Center Operations Manager (SCOM) to launch DataFabric Manager (DFM) from the plug-in.

Before you begin

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

Steps

1. From the **Monitoring** pane, select either **State View** or **Diagram View**.
2. Select a storage controller.
3. From the **Actions > Data ONTAP Controller Tasks** pane, select **Manage Data ONTAP DFM Servers**.

4. Add the Operations Manager server and click **Apply > OK**.

List of OnCommand Plug-in for Microsoft monitors

You can use the monitors to track and report alerts and events related to storage controllers and virtualization objects that are provided by System Center Virtual Machine Manager (SCVMM). The monitors advise you of events that you can view through the event log. Then you can determine a way to mitigate any problems. You can also use overrides to change the values of the various monitors.

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

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

The Data ONTAP PRO management pack monitors monitor 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

Overriding monitoring rules

You can adjust (“override”) the frequency and timeout values of the monitoring rules as you scale your storage configuration to meet your needs.

Steps

1. In the **Authoring** window in **Microsoft Operations Manager**, select the rule you want to change.
2. In the **Rule Details** pane, click **View Knowledge**.
3. Click the **Override** tab and follow the directions in the tab window.

Related tasks

[Locating Data ONTAP management pack rules](#) on page 34

Alert monitoring and rule customization

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

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

the Controller performance collection rule, which is targeted at the Data ONTAP Controller class, to override these rules as necessary.

You can modify 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. |

All other periodic monitoring rules are targeted at the Data ONTAP Management Server class.

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.

Related concepts

Types of PRO Tips on page 51

What the Alerts view is

The Alerts view displays a list of every active alert found by OnCommand Plug-in for Microsoft, but you can filter the view to display a list limited to the alerts specific to Data ONTAP storage.

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

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

| | |
|---|---|
| All active alerts view | You can view all alerts in the Monitoring > Active Alerts pane. |
| Data ONTAP storage alerts view | You can view alerts specific to Data ONTAP storage in the Monitoring > Data ONTAP pane. |
| Hyper-V VMs on storage alerts view | You can view alerts specific to Hyper-V virtual machine storage in the Monitoring > Data ONTAP > Storage Systems > Alerts > Hyper-V VMs on Storage > Alerts pane. |
| Alerts pane | You can view the alerts in the Alerts pane of the Dashboard. |

What the Diagram view is

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.

What the Controllers View is

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.

Performance monitoring

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.

Performance metrics

OnCommand Plug-in for Microsoft monitors several performance metrics. You can use these metrics to monitor the state of your storage controllers and configurations, as well as to identify usage patterns.

Types of metrics include CPU utilization, space utilization, I/O operations, I/O throughput, latency, and protocols.

CPU utilization

You can use the **CPU utilization** graph 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.

The CPU utilization graphs display the following information:

| | |
|--------------------------------------|---|
| Average processor utilization | Displays the average processor utilization percentage at specified time intervals and generates a threshold alert if two successive measurements are above the threshold specified. |
| CPU resource utilization | Displays the system CPU resource utilization percentage at specified time intervals. |
| Total processor utilization | Displays the total processor utilization percentage at specified time intervals. |

Additional details are displayed in the Legend.

I/O operations

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

The I/O operations graph displays the following information:

| | |
|---------------------------|---|
| Reads | Displays the read operations per second at specified time intervals. |
| Writes | Displays the write operations per second at specified time intervals. |
| Total reads/writes | Displays the total operations per second at specified time intervals. |

Additional details are displayed in the Legend.

I/O throughput

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

The I/O throughput graphs display the following information:

| | |
|------------------------------|---|
| Disk data read | Displays the disk data read, in kilobytes per second, at specified time intervals. |
| Disk data written | Displays the disk data written, in kilobytes per second, at specified time intervals. |
| Network data received | Displays the network data received, in kilobytes per second, at specified time intervals. |
| Network data sent | Displays the network data sent, in kilobytes per second, at specified time intervals. |

Additional details are displayed in the Legend.

Latency

You can use the **Latency** graph to monitor for any unusual delays among your storage controllers.

The latency graph displays the following information:

| | |
|-----------------------|---|
| LUN latency | Displays the LUN read, write, and average latency at specified time intervals. |
| Read latency | Displays the average read latency, in milliseconds, at specified time intervals. |
| Write latency | Displays the average write latency, in milliseconds, at specified time intervals. |
| Total latency | Displays the average total latency, in milliseconds, at specified time intervals. |
| Volume latency | Displays the volume read, write, and average latency at specified time intervals. |

Additional details are displayed in the Legend.

Performance monitoring views

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.

Aggregates view

You can view different attributes of your aggregates so that you can monitor their health and diagnose any issues at the aggregate level.

The following attributes display in the **Aggregates** view:

- State** Displays the state of the aggregate, according to System Center Operations Manager. States include Healthy, Warning, and Critical.
- Aggregate** Displays the aggregate name.
- Controller** Displays the fully qualified domain name (FQDN) of the controller to which the aggregate belongs.
- Total size** Displays the total size of the aggregate.
- RAID type** Displays the RAID type of the aggregate.
- Disk count** Displays the number of disks that belong to the aggregate.

Controllers view

Viewing the different attributes of your storage controllers enables you to monitor controller health and to diagnose any issues at the controller level. OnCommand Plug-in for Microsoft displays only those storage controllers that are running supported versions of Data ONTAP.

The following attributes display in the **Controllers** view:

- State** Displays the state of the storage controller, according to System Center Operations Manager. States include Healthy, Warning, and Critical.
- Fully qualified domain name (FQDN)** Displays the fully qualified domain name of the storage controller.
- IP address** Displays the IP address of the storage system.
- Model** Displays the model type of the storage system.
- Version** Displays the version of Data ONTAP that the storage system currently runs.
- Clustered** Displays whether the controller is in an High Availability (HA) pair.

Dashboard view

You can use the **Dashboard** view to provide you with an overall picture of the state and health of your storage resources. This allows you to diagnose any potential issues regarding health and utilization using **Microsoft Health Explorer**.

The following attributes display in the **Dashboard** view:

| | |
|----------------------------|---|
| Health Summary | Displays the number and state of all storage controllers and SnapMirror relationships. |
| Alerts | Displays the icon, name, and created date of the alerts. |
| Controllers | Displays information about all storage controllers that are currently monitored by the plug-in. |
| vFilers | Displays information about all vFiler units that are currently monitored by the plug-in. |
| Storage Efficiency | Displays how efficiently the storage is currently being used by all storage controllers that are monitored by the plug-in. |
| Storage Utilization | Displays the percentage of storage that is currently being used, broken down by aggregates, disks, spare disks, LUNs, qtrees, volumes, and deduplication volumes. |

LUNs view

You can view different attributes of your LUNs so that you can monitor their health and diagnose any issues at the LUN level.

The following attributes display in the LUNs view:

| | |
|--------------------------|--|
| State | Displays the state of the LUN, according to System Center Operations Manager. States include Healthy, Warning, and Critical. |
| LUN | Displays the full path of the LUN. |
| Controller/vFiler | Displays the fully qualified domain name of the controller or vFiler unit to which the LUN belongs. |
| Total size | Displays the total size of the LUN. |
| Type | Displays the type of multiprotocol LUN, such as Windows or Linux. |

Management Server view

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.

The following attribute displays in the **Management Server** view:

Name Displays the name of the management server.

Qtrees view

You can view different attributes of your qtrees so that you can monitor their health and diagnose any issues at the qtree level.

The following attributes display in the **Qtrees** view:

| | |
|--------------------------|--|
| State | Displays the state of the qtree, according to System Center Operations Manager. States include Healthy, Warning, and Critical. |
| Qtree | Displays the full name of the qtree. |
| Volume | Displays the name of the volume to which the qtree belongs. |
| Controller/vFiler | Displays the fully qualified domain name of the controller or vFiler to which the qtree belongs. |
| Security style | Displays the security style of the qtree. Security styles include UNIX, NTFS, or mixed. |

SnapMirror status view

You can view the status of all SnapMirror relationships that are monitored by the plug-in.

The following attributes display in the SnapMirror status view:

| | |
|-------------------------|---|
| State | Displays the state of the SnapMirror relationship, according to System Center Operations Manager. States include Healthy, Warning, and Critical. |
| Source | Displays the source location of the SnapMirror pair. |
| Destination | Displays the destination location of the SnapMirror pair. |
| SnapMirror State | Displays the state of the SnapMirror pair. The possible SnapMirror states include the following: <ul style="list-style-type: none"> • Initialized • SnapMirrored • Broken-Off • Quiesced • Source • Unknown |
| Lag | Displays the amount of time since the most recent SnapMirror transfer. |

Storage Utilization view

You can use the **Storage Utilization** view to monitor how much space you have used at the controller, aggregate, and volume levels. The **Storage Utilization** view provides you the information you need to make any necessary changes to utilize your space more efficiently.

The following attributes display in the **Storage Utilization** view:

| | |
|-----------------------------------|--|
| Controller committed space | Displays, at specified time intervals, the percentage of total used controller space. |
| Aggregate committed space | Displays, at specified time intervals, the aggregate used-space percentage. |
| Volume used space | Displays, at specified time intervals, the volume used-space percentage. |
| Legend | Displays a list of all controllers, aggregates, and volumes for which you can track space utilization. |

vFiler attributes displayed in the vFilers view

You can view a vFiler unit as an individual object with different characteristics than a physical controller. The **vFilers** view displays vFiler attributes, including the vFiler unit's storage, health, and utilization.

The following attributes display in the **vFilers** view by default:

| | |
|--------------------------|---|
| State | Displays the state of the vFiler unit. States include Healthy, Warning, and Critical. |
| FQDN | Displays the fully qualified domain name. |
| Controller FQDN | Displays the fully qualified domain name of the physical controller. |
| IP Address | Displays the IP address of the vFiler unit. |
| Status | Displays whether the vFiler unit is running. |
| Total Volumes | Displays the number and total size of the volumes. |
| Total Volume Size | Displays the number and total size of the volumes. |
| Total QTrees | Displays the number and total size of the qtrees. |
| Total LUNs | Displays the number and total size of the LUNs. |
| Total LUN Size | Displays the number and total size of the LUNs. |

Volumes view

You can view different attributes of your volumes so that you can monitor their health and diagnose any issues at the volume level.

The following attributes display in the **Volumes** view:

| | |
|--------------------------|---|
| State | Displays the state of the volume, according to System Center Operations Manager. States include Healthy, Warning, and Critical. |
| Volume | Displays the volume name. |
| Aggregate | Displays the aggregate name. |
| Controller/vFiler | Displays the fully qualified domain name of the controller or vFiler unit to which the volume belongs. |
| Total size | Displays the total size of the volume. |

Hyper-V Hosts view

You can use the **Hyper-V Hosts** view to view all Hyper-V hosts that have monitored LUNs mapped to them.

The following attributes display in the **Hyper-V Hosts** view:

| | |
|-----------------------|---|
| State | Displays the state of this Hyper-V host. States include Healthy, Warning, and Critical. |
| FQDN | Displays the fully-qualified domain name for the Hyper-V host. |
| Number of VMs | Displays the number of virtual machines hosted by the Hyper-V host. |
| Number of LUNs | Displays the number of LUNs hosted by the Hyper-V host. |

Hyper-V LUNs view

You can use the **Hyper-V LUNs** view to view all of the **Hyper-V LUNs** (all of the monitored LUNs that are mapped to Hyper-V hosts).

The following attributes display in the **Hyper-V LUNs** view:

| | |
|-------------------|---|
| State | Displays the state of the LUN. States include Healthy, Warning, and Critical. |
| Host | Displays the FQDN of the Hyper-V host to which LUN is mapped. |
| LUN path | Displays the LUN path: for example, <code>mycontroller:/vol/vol2/lun1</code> . |
| iGroup | Displays the iGroup name. |
| Controller | Displays the controller name. If there is no controller name, this field displays the IP address. |

| | |
|-----------------------------|---|
| Windows path | Displays the Windows drive path, mount point, or volume GUID: for example, C:\ClusterStorage\Volume1. |
| Cluster name | Displays the name of the cluster or N/A. |
| CSV path | Displays the path of the CSV or N/A. |
| Alignment status | Displays <i>Aligned</i> or <i>unknown</i> if the alignment cannot be determined. |
| Last alignment check | Displays the timestamp of the last alignment check. |
| Available space | Displays the space available on this LUN (from the host side). |
| Used % | Displays the used space percentage for this LUN (from the host side). |
| Total space | Displays the total space in the host-side file system. |

Hyper-V VHDs view

The **Hyper-V VHDs** view shows all Hyper-V virtual hard disks so that you can monitor their health and diagnose any issues at the virtual hard disk level.

The following attributes display in the **Hyper-V VHDs** view:

| | |
|-----------------|---|
| State | Displays the alignment of the VHDs and whether they are attached to a virtual machine. There are three possible states: <ul style="list-style-type: none"> Healthy The VHD is aligned. Critical The VHD is misaligned but attached to a virtual machine. Warning The VHD is misaligned but not attached to a virtual machine. |
| VHD path | Displays the path to the VHD. |
| Host | Displays, for an attached VHD, the name of the Hyper-V host that is hosting the virtual machine. Displays, for an unattached VHD, the name of the host where the VHD resides. |
| Path | Displays the VHD path key. |

Hyper-V VMs view

You can view different attributes of your monitored Hyper-V virtual machines so that you can monitor their health and diagnose any issues at the virtual machine level.

The following attributes display in the **Hyper-V VMs** view:

| | |
|----------------|--|
| VM GUID | Displays the GUID of the virtual machine that was assigned by Hyper-V. |
| VM Name | Displays the name of the virtual machine. |

VM FQDN Displays the fully qualified domain name of the virtual machine.

Host Displays the fully qualified domain name (FQDN) of the Hyper-V host that is hosting the virtual machine.

What PRO Tips are

OnCommand Plug-in for Microsoft PRO Tips are a type of alert 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 problems 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 type, 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 and 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` parameter 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 | <p>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.</p> <p>This tip offers automatic remediation to enable deduplication on the affected volumes.</p> |
| Volume deduplication not licensed | <p>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.</p> <p>This tip does not provide automatic remediation, but it recommends that you install a deduplication license in virtualized environments.</p> |
| Volume offline | <p>This tip is generated for a virtual machine when one or more storage system volumes serving that virtual machine is offline.</p> <p>This tip offers automatic remediation to bring the volumes back online.</p> |
| Volume space utilization exceeded threshold | <p>This tip is generated for a virtual machine when one or more storage system volumes that serve that virtual machine is full.</p> <p>This tip offers two configurable thresholds: a warning level that defaults to 95 percent and a critical level that defaults to 99 percent.</p> <p>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.</p> |

Related concepts

[Alert monitoring and rule customization](#) on page 41

Related tasks

[Implementing PRO Tips automatically](#) on page 54

[Implementing PRO Tips manually](#) on page 55

Related references

[Performance and resource optimization issues](#) on page 107

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, enter 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, enter 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: Track the progress of this process from **PRO Diagnostics** task in the **Jobs** window.
9. Click **Test PRO** in the **Properties** window to verify the status of the operation.

Related information

[Microsoft TechNet website](#)

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 concepts

Types of PRO Tips on page 51

Related tasks

Implementing PRO Tips manually on page 55

Related references

Performance and resource optimization issues on page 107

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

Related concepts

Types of PRO Tips on page 51

Related tasks

[Implementing PRO Tips automatically](#) on page 54

Related references

[Performance and resource optimization issues](#) on page 107

Information displayed in the Events window

You can use the Events window to view information about the events that OnCommand Plug-in for Microsoft has logged. The plug-in monitors rules and logs events based on how you have configured the rules.

The Details view in the Events window displays standard Microsoft System Center Operations Manager details that summarize the event information.

For each event, the following information is displayed:

| | |
|----------------------|---|
| Level | The event level: Information, Warning, or Critical |
| Date and Time | The date and time, in the format <i>mm/dd/yyyy hh:mm:ss tt</i> |
| Source | The service or originator of the event |
| Name | The name of the Operations Manager server on which the event occurred |
| User | The account the event used |
| Event Number | The unique number for the event type |
| Log Name | The name of the log to which the event was sent: either the Data ONTAP MP Log or the Data ONTAP Debug Log |

Availability events

You can view availability events that are triggered by rules that you have configured to run. A monitor sends out an event to show you the state of your storage resources.

The Availability Events view displays events triggered by the following rules:

- LUN state rule
- Disk state rule
- Aggregate state rule
- Controller global status rule
- Volume state rule
- Shelf state rule
- Fan state rule
- Power supply state rule
- High availability state rule
- SnapMirror state rule

- SNMP trap rule

Configuration Events view

You can view information about the discovery and configuration rules in effect when you receive an event that has been triggered by one of these rules.

The Configuration Events view displays information about the following rules:

- Discovery rule
- Controller connection configuration rule
- High availability (HA) configuration rule
- SnapMirror configuration rule

Types of Data ONTAP reports available through the plug-in

Using OnCommand Plug-in for Microsoft, you can view reports about different aspects of your storage over a specific period of time.

The default time period is from the first day of the month to the current day.

You can view the following reports:

| | |
|---|--|
| Data ONTAP Aggregate Storage Utilization Report | Displays up to 50 aggregates with the highest or lowest storage utilization on all monitored controllers over a specific period of time. The report defaults to the highest aggregate storage utilization. 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 user-configurable storage controllers 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 user-configurable storage controllers 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 59

Related tasks

[Viewing reports](#) on page 58

Viewing reports

You can view reports generated by OnCommand Plug-in for Microsoft by using the **Reports** tab of System Center Operations Manager (SCOM).

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 report you want to view.

Custom reports

With OnCommand Plug-in for Microsoft, you can create custom reports to monitor your 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 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.

Checking the alignment of your VHDs

To ensure the best performance of those virtual machines that are hosted on VHDs, 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 to monitor your VHDs for alignment issues.

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 website](#)

Checking the alignment of your Hyper-V LUNs

To ensure the best performance of those virtual machines that are hosted on Hyper-V LUNs, it is important that the alignment check runs 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 misalignment 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 were found.

What the SCVMM Console add-ins are

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.

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.

Steps

1. In SCVMM, 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.

Steps

1. In SCVMM, 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.

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.

Steps

1. In SCVMM, 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** to remove the add-in.
5. A dialog box opens to confirm that you want to remove the add-in.
and shows that the add-in was removed 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.

If a host is managed by SCVMM 2012 SP1, the status of a cloning operation is displayed in the Job Status window in the SCVMM Console by specifying the `VMMServer` parameter.

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 a log location where further details are provided and a corrective action, if any, is described.

Tasks you can perform with 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 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.

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, enter 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.

Tasks that you can perform with 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 IBM N series 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 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.

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, enter 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.

Tasks you can perform with 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 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 with the SCVMM Console rather than with cmdlets.

Steps

1. In your 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.

About this task

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

Steps

1. In your 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 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) 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.

Steps

1. In your 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.

Steps

1. In your 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.

Tasks you can perform 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, remove the plug-in and the host configuration from a host, 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.

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

You can install and configure the plug-in remotely on the host with the credentials that you specify for the web service.

Steps

1. In SCVMM, 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, and authentication method.

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

Configuring clusters with 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.

About this task

All the nodes of a cluster must have been installed so that you can configure them, and you must configure all unconfigured nodes of the cluster. The parameters that you choose will be used for all nodes that you configure.

Steps

1. In SCVMM, 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. In 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 configuration from a host

You can remove the plug-in and the host configuration from a host using the Manage OCPM Hosts add-in when you no longer need it.

About this task

A remote uninstall freezes SCVMM and disables access to any objects until the uninstall completes. 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 and the host configuration.
3. In the confirmation dialog, click **Remove** to remove the plug-in.

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.

Step

1. From the **Configure Hosts** view in the SCVMM Manage OCPM Hosts add-in user interface, click **Refresh**.

All SCVMM hosts and the latest configuration status appear in the Manage Hosts view. This process might take a few seconds.

How the plug-in works with Orchestrator

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 the 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 the Orchestrator integration packs, you must have an Orchestrator installation configured to Microsoft's specifications. For information about Microsoft's specifications, see the Microsoft TechNet website.

Related information

[Microsoft TechNet website](#)

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 to the integration server

You must register the Orchestrator integration packs to the integration server before you can use the Orchestrator activities.

Before you begin

You must have met the following requirements:

- You must have downloaded the OnCommand Plug-in for Microsoft software.
- You must have the System Center Orchestrator 2012 license and have met all of the requirements for Orchestrator 2012.
If you are not sure what the requirements are, refer to the Microsoft TechNet website.
- You must have an integration (management) server to 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 steps in the wizard.

You can register multiple integration packs using the wizard once, 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 to the integration server was successful.

After you finish

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

Related information

[Microsoft TechNet website](#)

Deploying Orchestrator integration packs to the Orchestrator Runbook Designer and server

You must deploy the OIPs to the Runbook Designer or the runbook server before you can run activities.

Before you begin

The OIPs must have been 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 steps 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 website.

Related information

[Microsoft TechNet website](#)

What VIM web service configurations do

Virtual Infrastructure Management (VIM) web service is used only with System Center Orchestrator integration packs. You can create configurations to set options for 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.

Creating configurations for VIM web service

You can create configurations for VIM web services for cloning and provisioning activities and for Data ONTAP integration packs. 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 create VIM web service configurations, you must apply them 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 configurations to change the options for 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 remove Virtual Infrastructure Management (VIM) web service configurations when they are no longer required to run activities.

Before you begin

You must determine that none of your activities require the configuration to operate.

Steps

1. From the **Start** menu, 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.

How the plug-in works with PowerShell cmdlets

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: |
| | <p>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.</p> <p>Restricted Restricts any scripts from being run, downloaded, or installed. Restricted is the default policy.</p> <p>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.</p> |
| 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 into 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 website.

Related information

[Microsoft TechNet website](#)

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 website](#)

What Data ONTAP Toolkit activities are

The Data ONTAP Toolkit 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.

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.

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.

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 because if the computer name contains invalid characters, 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 website](#)

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 and mounted.

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

WMI warnings appear in the event logs

When you see Windows Management Instrumentation (WMI) warnings in the 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 the 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 factors must be true:
 - 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.

Related information

[Microsoft TechNet website](#)

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. 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 use any of the following operations to create clones: 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 three 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

[Cmdlets and activities to use for virtual machine cloning from an SCVMM template](#) on page 82

Cmdlets and activities to use for 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 allows you to create the clone

without shutting down a virtual machine, and you can 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 a LUN into a new LUN

You can use the **Clone VM** activity to replicate your storage by creating clones of a virtual machine in an off state from an existing LUN, storing them on a new LUN, and then starting the cloned virtual machines 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 machines are 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** function 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. If the clones are created in a CSV, those virtual machines can be started 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.

New-OCClone might result in excess free space

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.

Disaster recovery 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 88

Requirements for 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 IBM N series 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 website](#)

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 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*.

Related information

[Microsoft TechNet website](#)

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

`PrimaryServerOrCluster_SecondaryServerOrCluster_DRPlan.xml`.

You create the plan on the primary site and it captures information about the primary setup so that it 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
- The detailed virtual machine properties
- Storage information for the configuration of virtual machines, VHDs, and Snapshot data
- 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.

Cmdlets and activities used with the disaster recovery plan

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 confirm the following factors in the disaster recovery plan:

- The secondary host is running a Windows 2008 R2 or later operating system
- Virtual machine LUNs that are to be connected on the secondary site have valid LUN paths and SnapMirror relationships
- The SnapMirror status and the SnapMirror relationships and that all the SnapMirror relationships have the `snapmirrored` status
- The virtual machine cluster and configuration resources against the live virtual machine
- There is no conflict with the cluster and configuration resources on the secondary host
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 that 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

Update-OCDRPlan cmdlet and Update DR Plan activity

Before you update the existing disaster recovery plan, you must ensure that any new storage system volumes have a corresponding volume on the secondary storage system. You must run this cmdlet or activity after any addition or deletion of resources.

You can use the `Update-OCDRPlan` cmdlet and the `Update DR Plan` activity to update the plan.

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 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 down-time.

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 workflows

You can use individual (“granular”) cmdlets and Orchestrator automated activities to automate a workflow. Alternatively, you can create a group of cmdlets or Orchestrator automated activities to be performed together, in a preset order. The grouped cmdlets are referred to as “composite” workflows.

These two types of workflows provide you with increased flexibility in performing 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.

Failover workflow phases

To understand failover workflow, you must understand the various cmdlets and their options; where to use the 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 | Notes |
|---|----------|------|--|
| <code>Initialize-OCDRMirror -sourceloc filerA:sourcevol -destloc filerB:destvol -verbose</code> | Any site | | You can run the <code>Initialize-OCDRMirror</code> cmdlet for failback in the event of loss of Site A. |

| Cmdlet | Site | Role | Notes |
|--|----------|---------|-------|
| <pre>New-OCDRPlan -drf\\suny\cher -drn p1.xml -prisvr <siteA> -secsvr <siteB> -ver</pre> | Site A | Primary | |
| <pre>Confirm-OCDRPlan -drp\\suny\cher\p1.xml -ver</pre> | 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 | Notes |
|---------------------|--------|-----------|-------|
| Invoke-OCDRFailover | Site B | Secondary | |

Following the 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 | Notes |
|--|--------|------------------------|--|
| <pre>Update-OCDRPlan -Failback -prisvr <siteB> -secsvr <siteA></pre> | Site B | Secondary > Primary | |
| Invoke-OCDRMirrorReverseResync | Site A | Secondary | This cmdlet establishes Site B as the mirror source, and takes the LUNs offline on Site A. |

| Cmdlet | Site | Role | Notes |
|-----------------------------------|----------|------------------------|--|
| 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 Force parameter because the Full parameter was not used in the preceding Reset-OCDRSite 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. |

| Cmdlet | Site | Role | Notes |
|---------------------|--------|-----------|--|
| Invoke-OCDRFailover | Site B | Secondary | The Site A to Site B failover is executed. |

Performing consecutive failover operations

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 | Notes |
|-----------------------------------|----------|-----------|--|
| 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. |

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 the failover.

The `Invoke-OCDRFailover` composite cmdlet (**DR Failover**) performs failover from the primary site to the secondary site. 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.

Disaster recovery failback workflow

With crash-consistent disaster recovery, after you fail over from a primary site to a secondary site, 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 (Site B) to the secondary site (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 reestablished, and virtual machines are restored.

Before you begin

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

Steps

1. The `Confirm-OCDRPlan` cmdlet (**Validate DR Plan** activity) validates the secondary site (Site B) before the failover begins.
2. 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 the secondary site (Site B).
3. The `Invoke-OCDRMirrorBreak` cmdlet (**Break SnapMirror** activity) is run to break all the SnapMirror relationships on the secondary site (Site B).
4. The `Connect-OCDRLUN` cmdlet (**Connect DR Storage** activity) is run 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).

After you finish

After the consecutive failover operation completes, the SnapMirror relationships are broken, but can be reestablished with a resync operation so that the system is prepared to 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*.

Preparing to simulate failover

Although 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 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 with the `Initialize-OCDRMirror` cmdlet (**Initialize SnapMirror** activity).
4. Update the SnapMirror relationships with 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:

1. The `Confirm-OCDRPlan` cmdlet (**Validate DR Plan** activity) validates the secondary site.
2. 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.
3. The `Invoke-OCDRMirrorBreak` cmdlet (**Break SnapMirror** activity) breaks all the `SnapMirror` relationships on the secondary site.
4. The `Connect-OCDRLUN` cmdlet (**Connect DR Storage** activity) connects all the LUNs on the secondary site.
5. 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 workflows](#) on page 90

Related tasks

[Preparing to simulate failover](#) on page 98

Errors in Failover or Failback operations can result in partial restores

Although 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.

You can determine the reasons for the partial restore operation in the event log. When you experience a partial restore, you should remedy the problem, and proceed in one of two ways:

- Run the `Invoke-OCDRFailover` cmdlet using the `Force` parameter to the LUNs and virtual machines that were successfully created.
- Start over and 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.

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 concepts

[Information displayed in the Events window](#) on page 56

Related tasks

[Disaster recovery failover workflow](#) on page 95

[Disaster recovery failback workflow](#) on page 95

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, there are some tips you can use to find the source of the problem and solve it.

Console tasks fail consistently

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

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 done the following:

- 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 done all of the items in the list and your storage system still has not discovered the network devices, contact Microsoft for further assistance.

Related information

[Microsoft TechNet website](#)

Tips for solving storage controller issues

If you experience an issue with OnCommand Plug-in for Microsoft and your storage controllers, you can use these tips to help find the source of the problem and resolve it.

Storage systems 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 enables you to check the host configurations and connections to your storage systems.

Troubleshooting SCOM

You can use the System Center Operations Manager (SCOM) troubleshooting information to research an issue, view any error messages, determine the cause of that issue, and what the resolution or workaround for that issue is.

Hyper-V hosts might take up to four hours to appear in SCOM

| | |
|--------------------------|--|
| Description | Hyper-V hosts that are managed by the System Center Virtual Machine Manager (SCVMM) server with Hyper-V Virtual machines that have Hyper-V Snapshot copies associated with them might take up to four hours to appear in System Center Operations Manager (SCOM) after you run Data ONTAP: PRO Discovery for the first time. |
| Corrective action | None needed; the hosts appear in SCOM within four hours. |

Failed to enumerate the disk

| | |
|--------------------------|---|
| Message | <code>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.</code> |
| 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.

PRO tip descriptions might not fit in the PRO tip window in SCVMM

Description The PRO tip description might be too long to fit in the width of the PRO tip window in SCVMM.

Corrective action Use the `Get-PROTip` cmdlet to view the full description of the PRO tip. For example:

```
Get-PROTip | where {$_.Status -eq "Active" -and $_.Name -eq
"Data ONTAP Thin Provisioning LUN Space Reservation
Enabled" }
```

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, which examines all VHDs on all selected hosts. Another alternative is to wait for the VHD alignment checking rule to run.

%OCSCOMPATH%/executable.exe not found

Description After you install or upgrade OnCommand Plug-in for Microsoft, when you execute tasks such as discovery, adding and removing controllers, or managing controller credentials, your system might fail with the following error: %OCSCOMPATH%/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** You can try any of the following workarounds:
- Run the SCOM Console with the clear cache command:
`Microsoft.MOM.UI.Console.exe/ClearCache`
 - Log off and then log on to the system and reopen SCOM.

Clone operation failed to complete. Error The pipeline has been stopped

Description The `New-OCStorage`, `Connect-OCStorage`, and `New-OCClone` cmdlets map LUNs to the iSCSI qualified name (IQN) for iSCSI. If any of the LUNs are mapped to an IQN that is higher than 255, the operating system returns an error message that states:

```
Clone operation failed to complete. Error The
pipeline has been stopped.
```

```
New-OCClone : Operation failed. Exiting progress message
processing. Status An error occurred while processing the
ConnectStorage. VDSManager::ConnectDisk GetDisk failed
```

Cause The maximum number of LUNs that you can map to an iSCSI qualifying name (IQN) is 255 because that is the maximum number of LUNs that the Windows operating system can discover for an initiator and target.

Corrective action Map your first 255 LUNs to one IQN and map any remaining LUNs to other IQNs. Refer to the Microsoft *Storage Tip: How to calculate Windows Server 2008 LUN Limit per HBA* on the Microsoft TechNet website.

Related information

[Microsoft TechNet website](#)

OnCommand Virtual Infrastructure Management Service (VIM_Service) on the local computer started and then stopped

The following error is returned if you used `Ctrl + Break` to end a PowerShell session while a cmdlet was still running:

```
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.
```

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.

Workaround:

Restart the VDS service and then restart VIM_Service.

Data ONTAP virtualization objects are not discovered

| | |
|--------------------------|--|
| Description | Data ONTAP Virtualization: Hyper-V Host, LUN, Virtual Machine, or VHD, or Data ONTAP PRO: Hyper-V Virtual Machine Storage objects are not discovered. |
| Cause | There could be a variety of causes for this issue. You should perform all of the corrective actions until you determine what the cause was. |
| Corrective action | <p>Ensure that the following conditions exist:</p> <ul style="list-style-type: none"> • 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 IBM N series LUNs. • Your virtual machines are on and appear in Microsoft System Center Virtual Machine Manager. |

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 website](#)

PRO Tips do not appear if your system is not configured correctly

| | |
|--------------------------|--|
| Description | Virtualization alerts do not show up as PRO tips if your system is not configured correctly. |
| Corrective action | <p>You can perform the following tasks:</p> <ul style="list-style-type: none"> • 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

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 view the PRO script.

Troubleshooting Orchestrator

You can use the Orchestrator 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.

The published data is not visible even though you subscribed

| | |
|--------------------------|--|
| Issue | The published data is not visible even though you subscribed to it in the user interface. |
| Corrective action | <ol style="list-style-type: none">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** When a user attempts to create a clone and the following error message is returned:
 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 must be 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 multi-path I/O (MPIO) regardless of whether the multiple initiators belong to the same or different hosts. |
| Cause | <p>If the node on which you are running the <code>New-OCStorage</code> or the <code>Connect-OCStorage</code> cmdlet does not have MPIO enabled and you try to specify more than one FCP initiator in the <code>InitiatorName</code> parameter, the storage connection operation fails.</p> <p>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.</p> |
| Corrective action | Do not use the <code>InitiatorName</code> 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 <code>Set-OCStorageSize</code> cmdlet fails to resize the LUNs without multipath network I/O (MPIO). |
| Cause | The LUNs were created before MPIO was installed but resized after MPIO was installed which caused the failure to resize the disks. |
| Corrective action | <p>You should either create and resize the LUNs under with MPIO installed, or create and resize the LUNs without MPIO installed. If you do one of the following two processes to resize your LUNs, the resize operation will fail:</p> <ol style="list-style-type: none"> 1. With MPIO installed, create a new LUN. Uninstall MPIO and resize the LUN. 2. Without MPIO installed, create a new LUN, then install MPIO and resize the LUN. |

An Unexpected Error occurred while adding disk to the Cluster

| | |
|--------------------------|---|
| Description | The <code>New-OCStorage</code> cmdlet fails with an unspecific error when you try to use an existing <code>ResourceName</code> value. |
| Corrective action | Create a new <code>ResourceName</code> 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 due to conflicting virtual machine names

| | |
|--------------------------|---|
| Issue | Cloning might fail for CSV virtual machines if all the virtual machines in the CSV are not on the node where the plug-in cmdlet is executed. |
| Cause | The failure to create highly available virtual machines is caused by conflicting virtual machine names, when there are multiple virtual machines on the same node with the same name. A virtual machine that was created first with a particular name is highly available; a virtual machine that was created with a name already in use 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 | When you attempt to create a clone, you receive the following error message: ValidateCreateCloneRequest: Invalid mount point for create clone request. |
| Description | 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 <code>Windows_2008</code> and <code>Hyper_V</code> . |
| Corrective action | Create a new LUN with the proper OS type and create a source virtual machine or template on it. |

Misaligned VHD path

| | |
|--------------------------|---|
| Issue | You receive the following error message: "VHDPath" is not aligned to 4K boundary. |
| Cause | The partition inside one of the VHDs of the source virtual machine or template is not aligned to a 4K boundary. |
| Corrective action | Create the VHD with partitions that are 4k aligned. If the VHD has MBR partitions, run the MBRAAlign tool. |

VMM is unable to complete the request

| | |
|--------------------------|---|
| Message | When you attempt to create a clone from a template, you receive the following error message: VMM is unable to complete the request. The connection to the agent on machine has been lost. |
| Description | This message occurs when 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, but 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 when you try to clone one virtual machine into one each new LUN for a total of more than 255 virtual machine clones.
- Cause** When you try to clone more than 255 virtual machines into one single LUN, the clone operation is successful. But when you try to clone one virtual machine each into one single new LUN for a total of 255 new virtual machines, the cmdlet fails because of a limitation on the number of LUNs that can be cloned. The limitation states that for each target, Windows supports 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 do not update consistently.
- Cause** The multilingual user interface (MUI) settings on an internationalized version of Microsoft Windows 2008 R2 were changed.
- Corrective action** On non-English versions of Microsoft Windows 2008 R2, you should not use the MUI settings to change the display languages, current culture settings, or locale from those of the native operating system.

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.

What to do with the event matrix

Some OCPM cmdlets generate error events in various Windows logs. This behavior is not expected by Windows and occurs because of the order in which operations are performed. 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. You can use the event matrix as a guide to error events that you do not need to troubleshoot.

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 the erroneous event log messages. Errors might occur for each virtual machine that is restored or removed.

The following matrix lists all possible events by ID names their sources, and describes them. You can refer to this matrix to determine which events do not need to be addressed.

| 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. |
| 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 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 <code>Remove-OCVM</code> nor the <code>Reset-OCDRSite</code> cmdlets remove the virtual machine record from the SCVMM 2012 VMs and Services view. You must manually delete the record. |
| Corrective action | To manually delete the record, perform the following steps: <ol style="list-style-type: none"> 1. Go to the VMs and Services view in System Center Virtual Machine Manager (SCVMM). 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 | When you run the <code>Reset-OCDRsite</code> cmdlet with the <code>-Force</code> and <code>-Full</code> parameters, it should remove all virtual machines and LUNs that are in the disaster recovery plan from the secondary site. But 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 <code>Reset-OCDRsite</code> cmdlet with the <code>Force</code> and <code>Full</code> parameters, perform the following steps: <ol style="list-style-type: none"> 1. Go to Failover Cluster Manager. 2. Perform one of the following steps, based on your operating system: <ul style="list-style-type: none"> • If you are using Windows 2008 R2, in 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. <p>This removes both the virtual machine cluster resource and the virtual machine configuration file.</p> |

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.

Known issues

You should be familiar with certain known issues in OnCommand Plug-in for Microsoft.

System Center Operations Manager issues

You should be aware of certain issues related to the System Center Operations Manager (SCOM).

SCOM Tasks view reports success when controllers are not added

| | |
|--------------------------|---|
| Description | When you try to add a controller using Data ONTAP: Add Controller System Center Operations Manager (SCOM) task, the plug-in tries to contact the controller using SNMP first. If SNMP is successful, the plug-in then attempts to contact the controller using HTTP or HTTPS. The plug-in returns an error message but the System Center Operations Manager (SCOM) Tasks view shows that the operation was successful. |
| Cause | When a controller can be reached by SNMP, the task appears as a Reserved task in the System Center Operations Manager (SCOM) Tasks view. When the controller cannot be reached by HTTP or HTTPS, OCPM returns an error message. |
| Corrective action | There is no corrective action. |

Microsoft VBScript runtime error: ActiveX component cannot create object

Message Microsoft VBScript runtime error: ActiveX component can't create object: 'IBM.OM.Server.Discovery.StorageDiscovery'

Description When you try to run the discovery task on a server that does not have the plug-in installed, the plug-in returns a standard error (StdErr).

Cmdlets disabled from the installer for operating systems prior to Windows 2008 R2

Description The cmdlets feature is available only in the Windows 2008 R2 and later operating systems. It is disabled by default in other operating systems.

Show the Windows Installer log check box is not visible

If you use a Microsoft Windows Installer (MSI) version earlier than 4.0, you do not see the **Show the Windows Installer log** check box at the end of the installation.

If you download MSI version 4.0 or later, you can select the **Show the Windows Installer log** check box during installation to display the logs.

For more information, see the Microsoft TechNet website.

Related information

[Microsoft TechNet website](#)

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 view the PRO script.

OC.SCOM.log rolls over into multiple logs

OC.SCOM.log is normally created when it has logged processes that total 10 MB in size. When a log reaches 10 MB, another log file is created to collect the next 10 MB of events: for example OC.SCOM.log.1, OC.SCOM.log.2, and so on. The log file often does not reach 10 MB in size when multiple processes are sending events to the OC.SCOM.log file at the same time. Instead, the log file might roll over multiple times and create a new log file that is very small.

Calculation for projected savings can actually be less than the current savings

In certain cases, the calculation for projected savings can actually be less than the current savings.

For clarification, the three savings metrics are defined as follows:

- | | |
|---------------------------|--|
| Current Savings | An estimate of how much space is being saved due to deduplication and cloning. |
| Projected Savings | An estimate of how much space will be saved in the future due to deduplication, while taking into account overhead for space reserves. Note that this can be less than your current savings in some cases. |
| Storage Efficiency | An estimate of how efficiently space is saved, based on your current and projected savings. |

vFiler unit credentials are not removed if the physical storage system is removed

vFiler unit credentials are encrypted and saved in the System Center Operations Manager (SCOM) database. If the parent controller is removed from SCOM and then added back into SCOM, the vFiler unit credentials that were entered previously remain in the SCOM database and are used again to monitor the storage system.

If the storage system is automatically authenticated it causes a security issue.

After XenDesktop import failure, host names of virtual machines are not changed

Clones must have unique names in the Hyper-V Manager. If the host name of a newly cloned server is the same as the name of the source virtual machine, the server name is not changed and therefore not unique, which causes the XenDesktop import to fail.

You can use the tool that is appropriate for your operating system to change the host name of the newly cloned server:

- For Windows 2003, Windows XP, and earlier operating systems, you can use `sysprep.exe` to run the Sysprep (Microsoft System Preparation) tool on your VHDs.
- For Windows Vista and later operating systems, you can use Windows Automated Installation Kit (WAIK) to create an answer file and then run the Sysprep tool on your VHDs.

The source VHD and source virtual machine configuration must be on a LUN from Data ONTAP storage.

You should run Sysprep on the VHD that is attached to the virtual machine. The virtual machine is in an off state after you attach the VHDs on which Sysprep has been run.

For detailed information about how to run Sysprep, see the Microsoft TechNet website.

Related information

[Microsoft TechNet website](#)

You must add a string of MSvSCVMM as a connection name when you add an SCVMM host to Citrix Desktop Studio

When you use the Add Host Wizard during the initial configuration of Citrix Desktop Studio to add the SCVMM host, a connection name is requested. You must enter `MSvSCVMM` in this field for the import operation to succeed.

Orchestrator issues

You should be aware of certain issues related to the use of Orchestrator.

Orchestrator activities show success even when the operation fails

- Description** Some Orchestrator activities, such as **List LUN Info**, **List Aggregate Info**, and **List Volume Info**, can return more than one output value, which can cause a mixed-result state (for example, error, success, success).
- Cause** There are situations when you input more than one object name, for example vol1, vol2, vol3, which could have a mixed result state, for example error, success, success. Since you want to be aware of both the successful published data and any erroneous data, the plug-in returns the successful published data and the errors are exposed in the Result status and Result message fields.

Provisioning issues

You should be aware of certain issues related to provisioning.

Delete virtual machine object cleanup is incomplete

- Issue** If you have data for multiple virtual machine configurations in one common virtual machine folder, the `Remove-OCVM` cmdlet and the `Delete VM from Host` Orchestrator activity do not remove the virtual machine folder; they remove only the associated virtual machine configuration files and VHD.
- Cause** This is Microsoft default behavior.
- Corrective action** This issue is caused by the Microsoft WMI API. You can use Windows Explorer to delete the empty folders.

Related information

[Microsoft TechNet website](#)

Map LUNs to igroups with type `Hyper_V` only

If you use the `New-OCStorage`, `Connect-OCStorage`, or `New-OCClone` cmdlets to map LUNs to igroups that contain host initiators with a type other than `Hyper_V`, an error is returned.

To successfully run a LUN to the host initiator task, you must change the igroup type to `Hyper_V`.

If you have mapped any other LUNs to igroups with a type other than `Hyper_V`, you must first delete the mappings and then change the type to `Hyper_V`.

If you have not mapped any LUNs to igroups with a type other than `Hyper_V`, you can delete the igroup and try the operation again.

A PowerShell execution policy set to Allsigned causes the New-OCClone cmdlet to fail

If you use the PowerShell Allsigned execution policy with the `New-OCClone` cmdlet, the operation fails. You can import the Microsoft System Center Virtual Machine Manager (SCVMM) certificate as a Trusted Publisher to avoid this error.

For more information about importing a certificate, see the Microsoft TechNet website.

Related information

[Microsoft TechNet website](#)

Virtual machine cloning into an existing CSV with the same base name fails

The path for a cloned VHD is generated by using the name of the source VHD and appending `_clone_BaseVMName` to it. If the `New-OCClone` cmdlet fails because the VHD path information already exists, the system returns the following error:

```
Failed to create file <VHD File Path>. The file exists.
```

Workaround:

To ensure a unique new path that does not conflict with any existing VHD path, change the `-BaseVMName` parameter and then retry the command.

If the system clock is out of sync, the node loses connectivity

If the system clock on any node is more than five minutes out of sync with the clock on the storage controller, the node loses connectivity to the storage controller. You should also ensure that the time difference is less than five minutes between the host machine and the domain controller time clocks and the storage system.

If the clock is out of sync on one of the nodes in a cluster and you run the `New-OCStorage` cmdlet with the `-CSV` parameter, it should create a LUN that is connected to all the nodes of the cluster. But it actually results in creating a dedicated LUN that is connected to only one host.

Resizing dedicated disks could take longer than expected

The time that is required to expand or shrink a shared LUN varies based on the size of the LUN and could take longer than expected. For example, to resize a shared LUN that is 100 GB in size can take as long as six minutes to complete.

The storage path of FC connected disks owned by adjacent nodes in a cluster cannot be discovered

The storage path of FC connected disks owned by adjacent nodes in a cluster cannot be discovered. Therefore, when you run cmdlets remotely on adjacent nodes of a cluster, the `Set-OCStorageSize`, `Remove-OCStorage`, and `Disconnect-OCStorage` cmdlets might fail.

Workaround:

Ensure that you have the discovery agent installed in order to discovery FC LUNs. You do not need to do anything further to discover ISCSI LUNs.

SCVMM crashes as a result of an attempt to remove a virtual machine

| | |
|--------------------------|---|
| Issue | The crash occurs when System Center Virtual Machine Manager (SCVMM) encounters incorrect or incomplete highly available virtual machine configurations. |
| Cause | When you use the <code>Remove-OCVM</code> cmdlet to try to delete a virtual machine on an HA virtual machine, the resource group of the highly available virtual machine is deleted along with any virtual machines that reside on CSV LUNs. For the virtual machines that reside on shared LUNs, only the virtual machine is deleted and not the virtual machine resource group. |
| Corrective action | <ol style="list-style-type: none"> 1. Use the SCVMM <code>Remove-VM</code> cmdlet to remove the virtual machines on the host or cluster that do not have the complete virtual machine configuration. 2. Restart the service. <p>If you use the <code>Remove-OCVM</code> cmdlet, you should delete the resource group that was left behind in the WFC.</p> |

Cloning issues

This section contains issues related to cloning.

TemplateCloneEngine::Clone: ValidateVHDDiskPaths failed

| | |
|--------------------|---|
| Message | <code>TemplateCloneEngine::Clone: ValidateVHDDiskPaths failed reason Validate VHD path found that following VHD paths are not on IBM N Series LUN</code> |
| Description | When a System Center Virtual Machine Manager (SCVMM) template is on a library share residing in a pass-through LUN that is connected to a virtual machine, the <code>New-OCClone</code> cmdlet fails with a <code>TemplateCloneEngine</code> error. |

New-OCClone cmdlet fails because VHD path information already exists

If the `New-OCClone` cmdlet is run with the `JustCloneVHD` parameter and then run again using the same base name but without the `JustCloneVHD` parameter, the second `New-OCClone` cmdlet fails because the VHD path information already exists.

The system returns the following error:

```
Failed to create file <VHD File Path>. The file exists.
```

The path for a cloned VHD is generated by using the name of the source VHD and appending `_clone_BaseVMName` to it. Changing the `-BaseVMName` parameter creates a new, unique path that does not conflict with any existing VHD path.

Workaround:

To ensure a unique new path is created that does not conflict with any existing VHD path, change the `-BaseVMName` parameter and then retry the command.

The New-OCClone cmdlet fails on vFiler units that use Data ONTAP versions earlier than 7.3.3

The use of vFiler units is only supported when you use Data ONTAP version 7.3.3 and later.

Cloning into an existing LUN on a remote system is not supported

Issue

Cloning into an existing LUN on a remote system is not supported.

Description

The clone target is a remote system or cluster and the mountpoint is in use by a mounted NTFS.

Corrective action

Use a mountpoint that is not used by a mounted NTFS so that a new LUN is created with the cloned data and mounted at the specified mountpoint.

Cannot clone a virtual machine from a SCVMM template into a new CSV

Cloning virtual machines from a System Center Virtual Machine Manager (SCVMM) template to put each virtual machine into a newly created cluster shared volume (CSV) is not supported due to SCVMM limitations. If you want to clone a virtual machine into a CSV, you must perform the following steps.

Steps

1. Use the `New-OCStorage` cmdlet to create a CSV large enough to hold the specified number of virtual machines that you want to create:

```
New-OCStorage -StoragePath lun_path_on_storage -s clustername -csv -size required_size_gb/mb
```

2. Use the `Refresh-VMHostCluster` cmdlet or use the SCVMM GUI to refresh an SCVMM host or cluster:

```
Refresh-VMHostCluster -VMHostCluster VMHostCluster
```

3. Use the `New-OCClone` cmdlet to clone virtual machines into the existing CSV:

```
New-OCClone -vmms SCVMM server-template Template_Name -s cluster_name-mp  
existing_csv_reparsepoint
```

Neither source VHD nor clone destination is on an ONTAP LUN

Issue

Neither the mounted NTFS that contains the source VHD nor the specified mount point of an existing NTFS to be used as the clone destination is on a LUN.

Corrective action

The source VHDs must be mounted on a LUN and the clone destination must be a LUN.

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.

The Clone NTFS File activity changes the ownership of the available storage to the VIM web service server

- Issue** When the Virtualized Infrastructure Management (VIM) web service server does not own the available storage, the **Clone NTFS File** activity changes the ownership of the available storage to the VIM web service server.
- Cause** When the ownership of the available storage changes to the VIM web service server, the non-HA virtual machines that are on the cluster disks under the available storage go into critical state.
- Corrective action** Move the following two cluster groups back to the owner of the source virtual machine after the **Clone NTFS File** operation finishes:
- ```
Move-ClusterGroup -Name "Available Storage" -Node
<Owner_Source_VM>
```
- ```
Move-ClusterGroup -Name "Cluster Group" -Node  
<Owner_Source_VM>
```

Error: For template cloning in cluster environment, clones can only be created on an existing CSV

Message Error: For template cloning in cluster environment, clones can only be created on an existing CSV or into a new shared disk for each clone.

Description This incorrect error message occurs when you attempt to create a new clone with the `New-OCClone` cmdlet and you provide a non-existent drive letter as the mount point, no server name is given, and the available storage is not owned by the node executing the cmdlet.

The error message should read, Reason: Cannot provision cluster storage on a node that does not have ownership of the available storage resource group. OCPM161-70 is the current owner for the available storage group.

Disaster recovery issues

This section contains issues related to disaster recovery.

The restored virtual machine fails to start

| | |
|--------------------------|---|
| Issue | After a successful disaster recovery failover and failback operation, the restored virtual machine fails to start. |
| Cause | After a virtual machine is restored, it incorrectly enters the <code>Saved</code> state and then fails to start. |
| Corrective action | You must delete the saved state file from the virtual machine and then start the virtual machine. In the Hyper-V Manager interface, right-click the restored virtual machine and select Delete Saved State . |

An error occurred while retrieving the GetHostData data.

| | |
|--------------------------|--|
| Cause | The failure occurs when you try to create a disaster recovery plan across domains. |
| Corrective action | If the two domains are from two different forests, you must ensure the following: <ul style="list-style-type: none"> • The domain trusts are working in both directions. • The correct user access rights are enabled. |

The disaster recovery `Invoke-OCDRMirrorReverseResync` cmdlet fails because of an incorrect storage system name

Storage system names are case sensitive. The disaster recovery `Invoke-OCDRMirrorReverseResync` cmdlet fails if the storage system name does not match exactly the name as listed in the disaster recovery plan.

If the cmdlet fails due to a storage system name mismatch, remove the `SnapMirror` relationships that are involved, reestablish the relationships with the proper short names, and try the cmdlet again.

During failover, two highly available virtual machines with the same name cause a failure

| | |
|--------------------------|---|
| Issue | When there is an existing highly available virtual machine on the secondary site that has the same name as a highly available virtual machine (with a different GUID) on the primary site, the disaster recovery failover fails if you do not specify the <code>Force</code> property. |
| Cause | Then the disaster recovery failover creates the same cluster resource group and the highly available virtual machine. After the disaster recovery failover operation completes, there are two virtual machines with the same name in the Hyper-V Manager. The disaster recovery failover does not remove the virtual machine with same name in the Hyper-V Manager because these virtual machines have different GUIDs. |
| Corrective action | <p>There are two resolutions:</p> <ol style="list-style-type: none"> 1. If you want to recover this original virtual machine, you can run it as a virtual machine that is not in the high-availability configuration or go back to the cluster and return this virtual machine to the high-availability configuration. In this case, the new virtual machine resource group has the same name as the one created by the disaster recovery failover. 2. If you do not need to recover the original virtual machine, manually delete the duplicate name from the Hyper-V Manager. |

To avoid this issue in the future, you should specify the `Force` property with the failover operation. After you issue a disaster recovery failover with the `Force` property, the disaster recovery failover removes the existing cluster resource with the same name from the secondary site, moves the resource disk to the available storage group, and leaves the existing virtual machine configuration unchanged.

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Index

-Force parameter
purpose in failover operations [100](#)

A

activities

- automated [90](#)
- Clone NTFS File [82](#)
- Clone VM [83](#), [84](#)
- Connect Storage [80](#)
- create clone [109](#)
- Create Clone [111](#)
- creating clones [82](#)
- Data ONTAP Toolkit [77](#)
- Delete VM [109](#)
- disaster recovery [86](#), [87](#)
- mount point
 - invalid [111](#)
- Provision Storage [80](#)
- specifying VIM web service configurations for [72](#)
- Start DR Simulate Failover [98](#)
- Start Test DR Failover [99](#)
- storage system credential [78](#)

Add Controller

troubleshooting [117](#)

Add Host Wizard

use during initial configuration of Citrix Desktop Studio [119](#)

add-ins

- Clone a Virtual Machine [63](#)
- clone virtual machine from a template [63](#)
- Clone Virtual Machine from a Template [64](#)
- importing [61](#)
- Manage Controllers [64](#)
- Manage OCPM Hosts [67](#)
- Manage OCPM Hosts for the SCVMM Console [66](#)
- removing from the SCVMM Console [62](#)
- SCVMM Console [61](#)

AddLocal [25](#)

administration profiles

Windows [74](#)

Administrators group user

running cmdlets as [26](#)

aggregate committed space [48](#)

aggregate storage space

monitoring [48](#)

aggregates

removing [39](#)

Aggregates view [45](#)

Alert Details pane [42](#)

alerts

monitoring [41](#)

PRO Tips [51](#)

alerts and events

list of monitors [40](#)

Alerts view [42](#)

alignment

checking [60](#)

alignment checking

issues [105](#)

on a regular schedule [59](#)

on demand [59](#)

alignment of VHDs

troubleshooting [112](#)

AllinSingleLUN property

using to clone and store VMs in the same LUN [84](#)

AllinSourceLUN

using to clone and store VMs in the same LUN [84](#)

Allsigned execution policy

purpose [121](#)

attributes

viewing [46](#)

automated workflow [97](#)

automated workflow activities

Start Test DR Failover [99](#)

automatic failover [95](#)

automatic recovery [95](#)

availability events [56](#)

B

background installation [23](#)

background uninstallation [28](#)

C

Check VHD Alignment Status

issues when using [105](#)

checklist

installing SCOM and the plug-in [17](#)

child features

- role in custom installation [25](#)
 - silent installation [25](#)
- Citrix Desktop Studio
 - initial configuration using the Add Host Wizard [119](#)
- cleanup
 - troubleshooting incomplete [120](#)
- clone
 - operation failed [106](#)
- Clone NTFS File activity [82](#)
- Clone VM activity
 - purpose [83](#), [84](#)
 - when to use [83](#)
- Clone VM from SCVMM activity [82](#)
- clones
 - creating [82](#)
 - creating using a template [64](#)
 - creating with the Clone a Virtual Machine add-in [63](#)
 - duplicating without copying [81](#)
 - sub-LUN [81](#)
 - virtual machines [83](#)
- cloning
 - and storing VMs into the same LUN [84](#)
 - file [82](#)
 - into an existing CSV [84](#)
 - requirements [81](#)
- cloning configurations
 - creating [71](#)
 - editing [72](#)
 - removing [73](#)
 - specifying [72](#)
- cloning operation fails [112](#)
- cloning requirements for installation [20](#)
- cloning virtual machines
 - into a new LUN [83](#)
- cluster resources
 - removing [100](#)
- clusters
 - configuring [67](#)
- cmdlet
 - New-OCClone [121](#)
- cmdlet requirements
 - cloning [81](#)
- cmdlets
 - common parameters [75](#)
 - Debug-OCHost [104](#)
 - disaster recovery [86](#)
 - DR Failover [95](#)
 - Enable-PSRemoting [59](#)
 - for failover [91](#)
 - Invoke-OCDFailover [95](#)
 - New-OCClone [85](#)
 - New-OCCloneFile [82](#)
 - provisioning [79](#)
 - running as an Administrators group user [26](#)
 - Start-OCDRSimulateFailover [98](#), [99](#)
 - storage system credential [78](#)
- cmdlets and the plug-in [74](#)
- command-line shell [74](#)
- component descriptions [14](#)
- composite cmdlets
 - Invoke-OCDFailover [95](#)
- configuration
 - remote [67](#)
 - removing with Manage Hosts add-in for the SCVMM Console [68](#)
- configuration events [57](#)
- configurations
 - monitoring performance [43](#)
- Connect Storage activity
 - differences from Provision Storage activity [80](#)
- connection name
 - used to add the SCVMM host during Citrix Desktop Studio configuration [119](#)
- consecutive failover
 - preparation [97](#)
 - workflow [96](#)
- consecutive failover workflow [97](#)
- console add-ins
 - importing [61](#)
 - removing from the SCVMM Console [62](#)
- console issues, troubleshooting [102](#)
- console tasks
 - performing remotely [39](#)
- controller attributes
 - viewing [45](#)
- controller committed space [48](#)
- controller configuration information
 - modifying with System Manager [38](#)
- controller configurations [32](#)
- controller credentials
 - checking through the SCVMM Console [64](#)
 - created using the Manage Controllers add-in for the SCVMM Console [66](#)
 - managing [30](#)
 - modifying with the Manage Controllers add-in [65](#)
 - removing through a GUI instead of a CLI [65](#)
 - removing using the Manage Controllers add-in for the SCVMM Console [65](#)
- controller health
 - monitoring [45](#)

- controller storage space
 - monitoring [48](#)
 - controllers
 - adding [30](#)
 - adding using the Manage Controllers add-in for the SCVMM Console [66](#)
 - credentials [66](#)
 - managing through SCVMM Console add-in [64](#)
 - monitoring performance [43](#)
 - removing credentials using Manage Controllers add-in [65](#)
 - Controllers view
 - purpose of [45](#)
 - CPU utilization [43](#)
 - crash-consistent disaster recovery
 - described [86](#)
 - requirements [86](#)
 - SnapMirror requirements [87](#)
 - Create Clone activity [109](#), [111](#)
 - credentials
 - changing [38](#)
 - checking [30](#)
 - encrypting and saving [119](#)
 - refreshing [68](#)
 - storage system [78](#)
 - verifying using the Manage Controllers add-in [64](#)
 - critical state [43](#)
 - custom installation
 - feature choices [25](#)
 - custom reports [59](#)
- ## D
- Dashboard view [46](#)
 - data
 - published [108](#)
 - Data ONTAP
 - discovery rule [55](#)
 - Discovery Rule [32](#)
 - management pack rules [34](#), [35](#)
 - missing virtualization or PRO objects [107](#)
 - objects [32](#)
 - reports [57](#)
 - Reports Management Pack [58](#)
 - Run Discovery Task [33](#)
 - troubleshooting Add Controller [117](#)
 - Data ONTAP configurations
 - editing [72](#)
 - removing [73](#)
 - specifying [72](#)
 - Data ONTAP integration pack configurations
 - creating [71](#)
 - Data ONTAP requirements
 - for plug-in installation [18](#)
 - Data ONTAP Toolkit
 - activities [77](#)
 - Data ONTAP Virtualization: Discovery Rule
 - purpose [34](#)
 - data security [30](#)
 - DataFabric Manager [39](#)
 - Debug-OCHost cmdlet [104](#)
 - Delete VM activity [109](#)
 - deploying OIPs [70](#)
 - diagnostics [104](#)
 - Diagram view [42](#)
 - disaster recovery
 - activities [86](#)
 - cmdlets [86](#)
 - failback workflow [95](#)
 - failover operations using -Force [100](#)
 - failover workflow [95](#)
 - live [90](#)
 - online [90](#)
 - overview [86](#)
 - planning [88](#)
 - requirements [86](#)
 - SnapMirror requirements [87](#)
 - troubleshooting [113](#)
 - disaster recovery plan
 - activities [89](#)
 - cmdlets [89](#)
 - error when planning across domains [125](#)
 - guidelines [88](#)
 - location [88](#)
 - purpose [88](#)
 - discovery
 - adding controllers [30](#)
 - enabling [32](#)
 - expediting [33](#), [34](#)
 - rules [31](#), [33](#)
 - running manually [33](#)
 - running to detect storage resources [33](#)
 - types [32](#)
 - what is [31](#)
 - disk enumeration
 - troubleshooting [104](#)
 - DR Failback activity [95](#)
 - DR Failover
 - Orchestrator activity [95](#)
 - DR Failover activity [97](#)

DRPlan

- activities used with [89](#)
- cmdlets used with [89](#)
- naming convention [88](#)
- See also* disaster recovery plan

E

empty folders

- deleting after cleanup [120](#)

Enable-PSRemoting cmdlet [59](#)

End Test DR Failover activity

- purpose [99](#)

error events

- described [114](#)
- matrix of [114](#)

errors

- %OCSCOMPATHEX%\executable.exe not found [105](#)

event logs [80](#)event matrix [114](#)

events

- availability [56](#)
- configuration [57](#)
- matrix of [114](#)
- viewing information about [56](#)

events and alerts

- list of monitors [40](#)

Events window [56](#)

executable file path

- error caused when missing [105](#)

execution policies

- Windows [74](#)

expedited discovery

- what it is [33](#)

F

failback

- requirements [90](#)
- workflow [95](#)

failover

- consecutive [91](#)
- preparation [91](#)
- requirements [90](#)
- simulation [98, 99](#)
- simulation preparation [98](#)
- workflow [95](#)
- workflow steps [91](#)

failover operations

- failure caused by naming conflict [126](#)

- using the - Force parameter [100](#)

failover simulation

- preparing to repeat [99](#)
- purpose [98](#)

feature selection

- for a custom installation [25](#)
- silent installation [25](#)

file cloning

- activity [82](#)
- cmdlet [82](#)
- requirements [82](#)

flatten check box [108](#)

folders

- deleting empty after cleanup [120](#)

frequency

- of monitoring rules [41](#)

G

GetHostData

- error retrieving [125](#)

granular cmdlets [90](#)

guidelines

- disaster recovery plan [88](#)
- installing the plug-in [21](#)

H

HA virtual machine configurations

- incorrect or incomplete [122](#)

hardware

- installation requirements [18](#)

hardware monitoring

- illustrated in Diagram view [42](#)

health

- monitoring [46](#)

Health Explorer [42, 43](#)

host configuration

- remote [67](#)
- removing with Manage Hosts add-in the SCVMM Console [68](#)

host names

- failure to change for cloned virtual machines [119](#)

hosts

- remote [109](#)

Hyper-V hosts view [49](#)

Hyper-V LUN alignment

- checking [60](#)

Hyper-V LUNs view [49](#)Hyper-V VHDs view [50](#)

Hyper-V VMs view [50](#)

I

I/O

operations [44](#)

implementing PRO Tips [54](#)

importing SCVMM Console add-ins [61](#)

incorrect HA virtual machine configurations [122](#)

installation

checklist for SCOM and the plug-in [17](#)

guidelines [21](#)

in silent mode [17](#)

information needed to perform [17](#)

Microsoft licenses required [18](#)

silent [23](#)

using a wizard [17](#)

installation checklist

for SCOM and the plug-in [17](#)

installation requirements

cloning [20](#)

Data ONTAP [18](#)

hardware [18](#)

OnCommand Discovery Agent [18](#)

OnCommand plug-in for Microsoft [17](#)

Orchestrator integration packs [20](#)

SCOM [19](#)

SCOM library [19](#)

SCVMM add-ins [20](#)

software [18](#)

web services [21](#)

installation wizard

using to install management packs [22](#)

using to install SCVMM add-ins [22](#)

using to install the Orchestrator integration pack [22](#)

using to install the plug-in [22](#)

using to install web services [22](#)

integration packs

registering [69](#)

invalid entries

Data ONTAP: Add Controller [117](#)

Invoke-OCDRFailback composite cmdlet [95](#)

Invoke-OCDRFailover

cmdlet [95](#)

Invoke-OCDRFailover cmdlet [97](#)

issues with cloning

troubleshooting [110](#)

J

job status

viewing [62](#)

Jobs view

for SCVMM [62](#)

L

latency [44](#)

legend [48](#)

license requirements

Microsoft [18](#)

list of plug-in monitors [40](#)

live virtual machine disaster recovery

purpose [90](#)

login credentials

setting [38](#)

LUN attributes

viewing [46](#)

LUN latency [41](#)

LUN latency rule [41](#)

LUNs

creating [111](#)

diagnosing issues [46](#)

monitoring health [46](#)

monitoring using Data ONTAP PRO monitors [41](#)

removing [39](#)

view [46](#)

LUNs view

purpose [46](#)

M

Manage Controller add-in for the SCVMM Console

adding controllers using [66](#)

Manage Controllers add-in

for the SCVMM Console

purpose [65](#)

removing controller credentials using [65](#)

purpose [64, 65](#)

removing controller credentials using [65](#)

using to check controller credentials [64](#)

using to modify controller credentials through a GUI

rather than a CLI [65](#)

Manage Controllers add-in for the SCVMM Console

purpose [65](#)

removing controller credentials using [65](#)

using to refresh the Manage Hosts view [68](#)

Manage Hosts add-in for SCVMM Console

- purpose [61](#)
- Manage Hosts add-in for the SCVMM Console [67](#)
- Manage Hosts add-in the SCVMM Console
 - using to remove the plug-in and host configuration [68](#)
- Manage OCPM Hosts add-in for the SCVMM Console
 - configuring hosts [67](#)
 - tasks performed using [66](#)
- management of storage controllers [37](#)
- management pack
 - rules [35](#)
- management packs
 - descriptions [14](#)
 - rules [34](#)
 - uninstalling [28](#)
- management server
 - performing tasks remotely [39](#)
- management server object [31](#)
- Management Server view [46](#)
- management servers
 - multiple [31](#)
- metrics
 - using to monitor performance [43](#)
- Microsoft licenses
 - required for installation [18](#)
- Microsoft PRO module
 - required for View PRO Script visibility [108](#), [118](#)
- Microsoft System Center Orchestrator
 - integration packs [69](#)
- missing Data ONTAP objects [107](#)
- monitoring
 - alerts [41](#)
 - Operations Manager servers [39](#)
 - performance [43](#)
- monitoring rules
 - overriding [41](#)
- monitors
 - Data ONTAP PRO, list of [41](#)
 - plug-in [40](#)
- mount points
 - invalid [111](#)
- multiple management server environment
 - deploying the plug-in in [31](#)

N

- network devices
 - list [39](#)
- New-OCClone cmdlet
 - purpose [121](#)

- New-OCCloneFile cmdlet [82](#)
- NewOCClone cmdlet [82](#)
- NewOCCloneFile cmdlet [82](#)
- nodes of a cluster
 - configuring [67](#)

O

- object cleanup
 - troubleshooting incomplete [120](#)
- objects
 - missing Data ONTAP virtualization or PRO [107](#)
- OIPs
 - Data ONTAP Toolkit [77](#)
 - deploying [69](#), [70](#)
 - registering [69](#)
 - unregistering [71](#)
 - See also* Orchestrator integration packs
- OnCommand Discovery Agent
 - when required for virtualization discovery [34](#)
- OnCommand Discovery Agent requirements
 - installation [18](#)
- online virtual machine disaster recovery
 - purpose [90](#)
- operation status
 - viewing in the Jobs view [62](#)
- Operations Manager servers
 - monitoring [39](#)
- Orchestration integration packs requirements
 - installation [20](#)
- Orchestrator
 - published data [108](#)
- Orchestrator activity
 - DR Failover [95](#)
- Orchestrator integration pack
 - descriptions [14](#)
- Orchestrator integration packs
 - described [69](#)
 - See also* OIPs
- OS types
 - supported [111](#)

P

- parameters
 - common to cmdlets [75](#)
- parent features
 - role in custom installation [25](#)
 - silent installation [25](#)
- partial failover or fallback operation [100](#)

- partition alignment boundaries
 - compliance with [112](#)
 - performance
 - monitoring [43](#)
 - performance improvement
 - checking VHD alignment [59](#)
 - VHD alignment [59](#)
 - performance metrics
 - CPU utilization [43](#)
 - I/O operations [44](#)
 - I/O throughput [44](#)
 - latency [44](#)
 - performance monitoring [43](#)
 - performance monitoring views [45](#)
 - pictorial representation of storage system [42](#)
 - plan
 - disaster recovery [88](#)
 - plug-in
 - features [14](#)
 - installation checklist [17](#)
 - installing [22](#)
 - installing with the SCVMM Manage Hosts add-in [61](#)
 - monitors [40](#)
 - purpose [30](#)
 - relationship with SCOM [30](#)
 - troubleshooting [107](#)
 - uninstalling [28](#)
 - upgrading [22](#)
 - plug-in configuration
 - with multiple management servers [31](#)
 - plug-in installation
 - in silent mode [17](#)
 - information needed to perform [17](#)
 - using a wizard [17](#)
 - plug-in installation requirements
 - Data ONTAP [18](#)
 - PowerShell execution policies
 - purpose of Allsigned [121](#)
 - PowerShell interface [74](#)
 - preparation
 - for consecutive failover [97](#)
 - to simulate failover [98](#)
 - preparation for failover [91](#)
 - prerequisites
 - disaster recovery [86](#)
 - prerequisites for disaster recovery
 - SnapMirror [87](#)
 - PRO discovery
 - running to detect storage resources [33](#)
 - PRO monitors
 - list of [41](#)
 - PRO rules [51](#)
 - PRO Tip issues, troubleshooting [107](#)
 - PRO Tips
 - defined [51](#)
 - enabling [54](#)
 - implementing [54](#)
 - implementing manually [55](#)
 - required for View PRO Script visibility [108](#), [118](#)
 - troubleshooting [107](#), [108](#), [118](#)
 - types [51](#)
 - using [51](#)
 - progress of operation
 - viewing in the Jobs view [62](#)
 - Provision Storage activity
 - differences from Connect Storage activity [80](#)
 - provisioning
 - requirements [79](#)
 - troubleshooting [109](#)
 - provisioning cmdlets
 - using to improve storage [79](#)
 - provisioning configurations
 - creating [71](#)
 - editing [72](#)
 - removing [73](#)
 - specifying [72](#)
 - published data
 - subscribing [108](#)
- ## Q
- Qtrees view [47](#)
- ## R
- remote
 - hosts [109](#)
 - remote configuration
 - of hosts [67](#)
 - remote console
 - performing tasks using [39](#)
 - removing SCVMM Console add-ins
 - steps [62](#)
 - reports
 - custom [59](#)
 - list of [57](#)
 - viewing from the Reports tab [58](#)
 - Reports tab
 - using to view plug-in-generated reports [58](#)
 - requirements

- cloning [81](#)
- disaster recovery [86](#)
- for failover and failback [90](#)
- for installing SCVMM add-ins [20](#)
- hardware [17](#)
- installing OnCommand plug-in for Microsoft [17](#)
- licensing [17](#)
- minimum configurations
 - requirements [17](#)
- minimum OS
 - requirements [17](#)
- PowerShell
 - requirements [17](#)
- provisioning [79](#)
- service packs
 - requirements [17](#)
- software [17](#)
- requirements for disaster recovery
 - SnapMirror [87](#)
- requirements for installation
 - cloning [20](#)
 - hardware [18](#)
 - OnCommand Discovery Agent [18](#)
 - Orchestrator integration packs [20](#)
 - SCOM [19](#)
 - SCOM library [19](#)
 - software [18](#)
 - web services [21](#)
- requirements for plug-in installation
 - Data ONTAP [18](#)
- reset secondary site
 - using the End Test DR Failover activity [99](#)
 - using the Stop-OCDRSimulatFailover cmdlet [99](#)
- restore operations for virtual machines
 - troubleshooting partial failover and failback [100](#)
- restored virtual machines
 - failure to start [125](#)
- resynchronization
 - as part of simulated failover repetition [99](#)
- rules
 - availability events [56](#)
 - Data ONTAP management pack [35](#)
 - locating [34](#)
 - monitoring [41](#)
 - overriding [34](#)
 - overriding monitoring [41](#)
 - volume latency [41](#)
- Runbook Designer
 - purpose [69](#)
- Runbook Designer and server [70](#)

- runbook server
 - unregistering OIPs [71](#)

S

- saved state file
 - deleting to enable VM start [125](#)
- scheduled discovery [30](#)
- SCO
 - See* Microsoft System Center Orchestrator
- SCOM
 - database [119](#)
 - installation checklist [17](#)
 - relationship with plug-in [30](#)
 - remote console [39](#)
 - requirements for installation [19](#)
 - troubleshooting [104](#)
- SCOM discovery wizard [33](#)
- SCOM library requirements
 - installation [19](#)
- SCVMM
 - administrator console [109](#)
 - alerts [51](#)
 - connection problem [112](#)
 - discovery of storage resources [33](#)
 - See also* System Center Virtual Machine Manager
- SCVMM add-ins
 - installation requirements [20](#)
 - Manage Controllers [64](#)
- SCVMM certificate
 - purpose when used as Trusted Publisher [121](#)
- SCVMM Console
 - Manage OCPM Hosts add-in [67](#)
- SCVMM Console add-in Clone Virtual Machine from a Template
 - purpose [64](#)
- SCVMM Console add-ins
 - clone virtual machine [62](#)
 - Clone Virtual Machine from a Template [64](#)
 - described [61](#)
 - importing [61](#)
 - Manage Hosts [68](#)
 - Manage OCPM Hosts [66](#)
 - removing [62](#)
 - SCVMM Clone VM from a Template add-in [63](#)
- SCVMM Console Clone a Virtual Machine add-in
 - purpose [63](#)
- SCVMM Console Manage Controllers add-in
 - purpose

- using to modify controller credentials through a GUI rather than a CLI [65](#)
- using to check controller credentials [64](#)
- SCVMM Console Manage Hosts add-in
 - purpose [61](#)
- SCVMM host
 - adding to Citrix Desktop Studio [119](#)
- SCVMM Jobs view
 - purpose [62](#)
- SCVMM PRO integration [54](#)
- SCVMM server
 - configuring with the SCVMM Console Manage OCPM Hosts add-in [61](#)
- silent installation
 - feature names [25](#)
- silent mode
 - information needed to install the plug-in using [17](#)
 - uninstallation [28](#)
- simulate failover workflow [98](#)
- simulation
 - failover [99](#)
 - failover, preparing to repeat [99](#)
- simulations
 - failover workflow [98](#)
- site clean-up
 - using -Force parameter [100](#)
- SnapMirror
 - disaster recover requirements [86, 87](#)
 - restoring relationships [96](#)
 - viewing monitored relationship status [47](#)
- SnapMirror relationships
 - viewing status [47](#)
- SNMP communities [37](#)
- SNMP traps
 - configuring [37](#)
- software requirements
 - installation [18](#)
- Start DR Simulate Failover activity
 - purpose [98](#)
- Start Test DR Failover activity
 - purpose [99](#)
- Start-OCDRSimulateFailover cmdlet
 - purpose [98](#)
- status of jobs
 - viewing [62](#)
- steps to failover [91](#)
- Stop-OCDRSimulateFailover cmdlet
 - purpose [99](#)
- storage
 - cloning [81](#)
 - creating and connecting [80](#)
 - discovery [33](#)
 - monitoring [48](#)
 - problems indicated by PRO Tips [51](#)
 - provisioning using cmdlets [79](#)
 - replicating [82](#)
 - used [48](#)
- storage controllers
 - adding [30](#)
 - credentials [38](#)
 - managing [37](#)
 - monitoring health [45](#)
 - removing [39](#)
 - troubleshooting issues [103](#)
 - viewing attributes [45](#)
- storage discovery [32, 33](#)
- storage hierarchy
 - display [42](#)
- storage monitoring
 - illustrated in Diagram view [42](#)
- storage problems
 - resolving [55](#)
- storage resources
 - monitoring [45, 56](#)
- storage system
 - requirements for installing SCVMM add-ins [20](#)
- storage system credential cmdlets
 - purpose [78](#)
- storage systems
 - Alerts view [42](#)
 - Controllers view [43](#)
 - Diagram view [42](#)
 - Storage Utilization view [48](#)
- sub-LUN clones
 - definition and purpose [81](#)
- subcomponent descriptions [14](#)
- Sysprep tool
 - used to change host names of cloned servers [119](#)
- System Center 2012 Orchestrator
 - interoperability with the plug-in [69](#)
 - purpose [69](#)
- System Center Operations Manager
 - See SCOM
- System Center Virtual Machine Manager
 - See SCVMM
- system diagnostics [104](#)
- system discovery
 - expediting [33](#)
- system failure
 - possible cause [105](#)

- workaround [105](#)
- System Manager
 - modifying storage controller information [38](#)
- system status
 - monitoring using custom reports [59](#)

T

- tasks
 - performing remotely [39](#)
- template
 - cloning [82](#), [112](#)
- templates
 - cloning a virtual machine [63](#)
- throughput [44](#)
- timeout values
 - of monitoring rules [41](#)
- tips
 - console issues [102](#)
 - storage controller troubleshooting [103](#)
- troubleshooting
 - %OCSCOMPATHEX%\executable.exe not found error [105](#)
 - cloning [110](#)
 - cloning from template failure [112](#)
 - consoles [102](#)
 - creating virtual machines [111](#)
 - Data ONTAP: Add Controller [117](#)
 - disaster recovery [113](#)
 - disk enumeration [104](#)
 - failover [126](#)
 - incomplete virtual machine object cleanup [120](#)
 - list of monitors to use for [40](#)
 - LUN create failure [111](#)
 - LUN OS type validation failure [111](#)
 - misaligned VHD path [112](#)
 - PRO Tip issues [107](#)
 - PRO Tips [108](#), [118](#)
 - problems [32](#)
 - provisioning [109](#)
 - Show the Windows Installer log check box not displayed [118](#)
 - storage controllers [103](#)
 - using Diagram view [42](#)
 - using the event matrix [114](#)
 - VHDs alignment checking issues [105](#)
 - View PRO script [108](#), [118](#)
 - VIM web service restart failure [108](#)

U

- uninstall wizard [28](#)
- uninstalling
 - the plug-in [28](#)
- uninstalling the plug-in
 - in the background [28](#)
 - using silent mode [28](#)
- upgrade
 - silent [23](#)
- usage patterns
 - identifying [43](#), [45](#)
- user credentials
 - storage system [78](#)
- using SCOM information [104](#)

V

- vFiler unit credentials
 - persistence [119](#)
- vFilers view
 - attributes displayed in [48](#)
- VHD alignment
 - checking on a regular schedule [59](#)
 - checking on demand [59](#)
 - on demand [59](#)
 - scheduled [59](#)
- VHD paths
 - misaligned [112](#)
- VHDs
 - alignment checking issues [105](#)
- View PRO Script
 - visibility [108](#), [118](#)
- views
 - Aggregates [45](#)
 - Alerts [42](#)
 - Controllers [43](#), [45](#)
 - Dashboard [46](#)
 - Diagram [42](#)
 - Hyper-V hosts [49](#)
 - Hyper-V LUNs [49](#)
 - Hyper-V VHDs [50](#)
 - Hyper-V VMs [50](#)
 - LUNs [46](#)
 - Management Server [46](#)
 - performance monitoring [45](#)
 - Qtrees [47](#)
 - SnapMirror status [47](#)
 - Storage Utilization [48](#)
 - vFilers [48](#)

- Volumes [49](#)
- VIM web service
 - <how is this related to this container text?> [69](#)
 - configurations [71](#), [72](#)
 - configurations for activities [72](#)
 - does not restart [108](#)
 - removing configurations [73](#)
- VIM web service configurations
 - specifying for activities [72](#)
- Virtual Infrastructure Management web service
 - See VIM web service
- Virtual Infrastructure Management web services
 - See VIM web service
- virtual machine clones
 - creating [83](#)
 - creating using a template [64](#)
 - creating with the Clone a Virtual Machine add-in [63](#)
- virtual machine host names
 - failure to change after XenDesktop import failure [119](#)
- Virtual Machine Manager
 - error [122](#)
- virtual machine names
 - conflicting [111](#)
- virtual machines
 - cloning [82](#), [83](#)
 - cloning failure [111](#)
 - cloning from a template [63](#), [82](#)
 - cloning from one LUN to another [83](#)
 - cloning with the SCVMM Console add-in [62](#)
 - conflicting names [111](#)
 - failure to start [125](#)
 - live disaster recovery [90](#)
 - monitoring using Data ONTAP PRO monitors [41](#)
 - name conflict [126](#)
 - online disaster recovery [90](#)
 - partial restore [100](#)
- virtualization discovery
 - expediting [34](#)
 - running to detect storage resources [33](#)
- volume latency rule [41](#)
- volumes

- monitoring storage space [48](#)
- monitoring using Data ONTAP PRO monitors [41](#)
- removing [39](#)
- Volumes view [49](#)

W

- warning events
 - described [114](#)
 - matrix of [114](#)
- warning state [43](#)
- web service credentials
 - using to install and configure the plug-in [67](#)
- web services requirements for installation [21](#)
- web services server
 - configuring [66](#)
 - refreshing [68](#)
- Windows 2012
 - disaster recovery [90](#)
- Windows Installer
 - show log check box not displayed [118](#)
- Windows PowerShell
 - administration profiles [74](#)
 - execution policies [74](#)
- WMI warnings [80](#)
- workflow
 - breakdown [91](#)
- workflows
 - automated [90](#)
 - consecutive failover [96](#)
 - disaster recovery fallback [95](#)
 - failover simulation [98](#)
 - granular and composite [90](#)

X

- XenDesktop
 - import failure [119](#)



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