

ApplianceWatch PRO™ 2.1 for Microsoft® System Center Operations Manager **Installation and Administration Guide**

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About this guide

You can use your product more effectively when you understand this document's intended audience and the conventions that this document uses to present information.

This guide describes how to install and use ApplianceWatch PRO.

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Audience

This document is written with certain assumptions about your technical knowledge and experience.

This guide is for Microsoft System Center Operations Manager 2007 R2 administrators and application owners.

Terminology

To understand the concepts in this document, you might need to know how certain terms are used.

LUN (logical unit number)	A logical unit of storage identified by a number.
native disk	A disk that is sold as local storage for storage systems that run Data ONTAP software.
native disk shelf	A disk shelf that is sold as local storage for storage systems that run Data ONTAP software.
storage controller	The component of a storage system that runs the Data ONTAP operating system and controls its disk subsystem. Storage controllers are also sometimes called <i>controllers</i> , <i>storage appliances</i> , <i>appliances</i> , <i>storage engines</i> , <i>heads</i> , <i>CPU modules</i> , or <i>controller modules</i> .
storage system	The hardware device running Data ONTAP that receives data from and sends data to native disk shelves, third-party storage, or both. Storage systems that

run Data ONTAP are sometimes referred to as *filers*, *appliances*, *storage appliances*, *V-Series systems*, or *systems*.

Keyboard and formatting conventions

You can use your product more effectively when you understand how this document uses keyboard and formatting conventions to present information.

Keyboard conventions

Convention	What it means
The NOW site	Refers to the NetApp Support site at now.netapp.com/ .
<i>Enter</i> , <i>enter</i>	- Used to refer to the key that generates a carriage return; the key is named Return on some keyboards. - Used to mean pressing one or more keys on the keyboard and then pressing the Enter key, or clicking in a field in a graphical interface and then typing information into the field.
hyphen (-)	Used to separate individual keys. For example, Ctrl-D means holding down the Ctrl key while pressing the D key.
type	Used to mean pressing one or more keys on the keyboard.

Formatting conventions

Convention	What it means
<i>Italic font</i>	- Words or characters that require special attention. - Placeholders for information that you must supply. For example, if the guide says to enter the <code>arp -d <i>hostname</i></code> command, you enter the characters "arp -d" followed by the actual name of the host. - Book titles in cross-references.
Monospaced font	- Command names, option names, keywords, and daemon names. - Information displayed on the system console or other computer monitors. - Contents of files. - File, path, and directory names.

Convention	What it means
Bold monospaced font	Words or characters you type. What you type is always shown in lowercase letters, unless your program is case-sensitive and uppercase letters are necessary for it to work properly.

Special messages

This document might contain the following types of messages to alert you to conditions that you need to be aware of.

Note: A note contains important information that helps you install or operate the system efficiently.

Attention: An attention notice contains instructions that you must follow to avoid a system crash, loss of data, or damage to the equipment.

How to send your comments

You can help us to improve the quality of our documentation by sending us your feedback.

Your feedback is important in helping us to provide the most accurate and high-quality information. If you have suggestions for improving this document, send us your comments by e-mail to doccomments@netapp.com. To help us direct your comments to the correct division, include in the subject line the name of your product and the applicable operating system. For example, *FAS6070—Data ONTAP 7.3*, or *Host Utilities—Solaris*, or *Operations Manager 3.8—Windows*.

What ApplianceWatch PRO is

ApplianceWatch PRO is a free management pack for Microsoft System Center Operations Manager (SCOM) 2007 R2 that enables you to discover, monitor, and generate reports for your storage systems running Data ONTAP.

ApplianceWatch consists of the following components:

Data ONTAP management pack	Enables you to use your existing storage management tools to monitor all of your storage systems running Data ONTAP through one interface. ApplianceWatch enables you to view your hardware and storage layout, as well as to monitor any issues.
Data ONTAP PRO management pack	Enables you to monitor and report on your virtualized environment, and to receive PRO Tips with automatic remediation support within the Microsoft System Center Virtual Machine Manager console.
Data ONTAP Reports management pack	Enables you to generate reports for NetApp storage data points over a period of time.
MetroCluster management pack	Enables you to solve any controller disputes during MetroCluster installation and also provides instruction to assist you in reassembling a cluster after a cluster has failed over.
Provisioning and cloning commandlets	You can use rapid provisioning and cloning commandlets to utilize Microsoft System Center Virtual Machine Manager applications. For more information on the provisioning and cloning commandlets, see the <i>Rapid Provisioning and Cloning Command Reference Guide</i> .
WMI provider	You can use the Windows Management Instrumentation (WMI) provider with ApplianceWatch to assist you with provisioning and cloning commandlet functionality.

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New features in ApplianceWatch PRO 2.1

ApplianceWatch PRO offers several new features, as well as reporting and MetroCluster management packs to assist you in monitoring the health of your Data ONTAP storage.

The following new features have been added:

- Additional PRO Tips for managing virtual machines
- Improved health and monitoring diagnostics
- Reporting management pack so you can view reports on various aspects of your storage
- MetroCluster management pack for assistance during MetroCluster installation and help recovering from failover

What you can do with ApplianceWatch PRO

ApplianceWatch enables you to manage your NetApp storage using the tools you already have.

You can perform the following tasks with ApplianceWatch PRO 2.1:

- Manage storage using your existing tools
- Monitor all of your NetApp storage systems using one interface
- Simplify data management through integration with Microsoft System Center Operations Manager 2007 R2
- View the hardware and storage layout of all of your NetApp storage systems
- Isolate problems using alerts and Operations Manager Health Explorer
- Monitor the performance of your NetApp storage controllers using different performance metrics
- Configure deduplication and automatic size settings on NetApp flexible volumes
- Launch FilerView from the ApplianceWatch interface
- Connect to DataFabric Manager servers from the ApplianceWatch interface
- Monitor storage availability and capacity of virtual machines running on Microsoft Hyper-V hosts
- Receive Performance and Resource Optimization (PRO) Tips with automatic remediation support
- Generate reports about various aspects of storage performance

ApplianceWatch PRO 2.1 limitations

Some features are not supported in the 2.1 release of ApplianceWatch PRO.

The following features are not supported or have limited support in this release of ApplianceWatch PRO:

- Traditional volumes
- Data ONTAP GX and Data ONTAP 8.0 Cluster-Mode
- Pass-through disks
- Limited support for high availability
- vFilers cannot be added or monitored
- Clusters and cluster shared volumes (for commandlets only)
- Source and destination storage controllers need to be monitored to generate PRO Tips and to view SnapMirror status

ApplianceWatch PRO installation

Although you can download and install ApplianceWatch PRO and the rapid provisioning and cloning commandlets for free, you should first make sure that your environment meets certain Microsoft System Center Operations Manager 2007 R2, Microsoft System Center Virtual Machine Manager 2008, and Data ONTAP requirements.

Next topics

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Requirements for installing ApplianceWatch PRO 2.1 management packs

You must meet all hardware, software, Data ONTAP, and Microsoft licensing requirements before installing ApplianceWatch.

ApplianceWatch requirements

To correctly install ApplianceWatch PRO 2.1, you must first uninstall any earlier versions of ApplianceWatch. If you install ApplianceWatch PRO 2.1 on the same management server on which a previous version of ApplianceWatch is installed, you can experience problems.

ApplianceWatch PRO Agent requirements

The following requirements are necessary for installation of ApplianceWatch PRO Agent:

- System Center Operations Manager Agent
- Hyper-V server role enabled
- Windows Server 2008 R2

Data ONTAP requirements

ApplianceWatch PRO supports the following versions of Data ONTAP:

- 7.2.6 or later in the Data ONTAP 7.2 product family
- 7.3 or later in the Data ONTAP 7.3 product family
- 7.3.3 or later for vFiler support
- Data ONTAP 8.0 7-Mode in the Data ONTAP 8.0 product family

Hardware requirements	Microsoft System Center Operations Manager 2007 R2 determines the hardware requirements. For more information, see the Microsoft TechNet site.
Software requirements	Microsoft System Center Operations Manager 2007 R2 and Virtual Machine Manager 2008 R2 determine the software requirements. Microsoft .NET Framework 3.5 SP 1 is also required. For more information, see the Microsoft TechNet site.
System Center Operations Manager library requirements	The following System Center Operations Manager libraries are required for ApplianceWatch PRO functionality: • Microsoft.SystemCenter.Library • 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 The following System Center Operations Manager libraries are required for reporting functionality: • Microsoft.SystemCenter.DataWarehouse.Reports • Microsoft.SystemCenter.DataWarehouse.Report.Library • Microsoft ODR Report Library • Microsoft.SystemCenter.DataWarehouse.ServiceLevel.Report.Library
System Center Operations Manager reporting configuration requirements	You must configure System Center Operations Manager 2007 R2 for reporting so that the Data ONTAP Reports management pack appears with the other management packs. To do this, you must correctly configure the SQL server data warehouse. For more information, see the Microsoft TechNet site.
Microsoft licenses requirements	ApplianceWatch PRO requires the following Microsoft licenses: • Windows Server 2003, 2008 (32-bit or 64-bit), or 2008 R2 • Microsoft System Center Operations Manager 2007 R2 • Microsoft System Center Virtual Machine Manager 2008 R2 (only necessary to receive PRO Tips)

Related concepts

[Decisions to make before installing ApplianceWatch PRO](#) on page 21

Related tasks

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Importing ApplianceWatch PRO 2.1 on page 24

Related references

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Related information

Microsoft System Center - <http://technet.microsoft.com>

Decisions to make before installing ApplianceWatch PRO

Before you install ApplianceWatch PRO, it is useful to have all of the installation information available.

Management pack import

Have you imported the ApplianceWatch management packs into Microsoft Operations Manager?

For more information on how to import a management pack into Microsoft System Center Operations Manager, see the Microsoft TechNet site.

Data ONTAP storage controllers discovery

Have you discovered the Data ONTAP storage controllers as Microsoft Operations Manager network devices?

You can discover your storage controllers using the Microsoft System Center Operations Manager **Discovery** wizard.

ApplianceWatch download

Have you downloaded the ApplianceWatch software from the NOW site?

Requirements

Have you met the requirements for proper installation of ApplianceWatch?

Credentials

Do you have the appropriate credentials to install and run ApplianceWatch?

Installation components

Which components do you want to install?

You can customize your ApplianceWatch installation by choosing one or more of the following components:

Data ONTAP base management pack

Required for any use.

Data ONTAP PRO management pack

Required for use in a virtualized environment.

Data ONTAP reporting management pack	Required to receive or generate any reports.
Data ONTAP MetroCluster management pack	Required for any use with MetroClusters and includes MetroCluster TieBreaker Manager and MetroCluster Recovery Assistant.
Provisioning and cloning commandlets	Required to permit provisioning and cloning operations to occur from Microsoft System Center Virtual Machine Manager applications. The commandlets are separate from the rest of the management packs and are not dependant on them to function correctly. Rapid provisioning and cloning functionality requires the presence of WMI provider for Hyper-V hosts.
ApplianceWatch PRO Agent	Required for discovery of Hyper-V virtual machines and performance and resource optimization (PRO) functionality. ApplianceWatch PRO Agent is the WMI provider.

Related concepts

[Requirements for installing ApplianceWatch PRO 2.1 management packs](#) on page 19

Related tasks

[Installing ApplianceWatch PRO 2.1](#) on page 23

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Related information

[How to Import a Management Pack in Operations Manager 2007 - <http://technet.microsoft.com/en-us/library/default.aspx>](#)
<http://now.netapp.com/NOW/>

Installing ApplianceWatch PRO 2.1

You can install the ApplianceWatch PRO software so that you can import the management packs into System Center Operations Manager.

Before you begin

Before installing the ApplianceWatch PRO 2.1 software, you should have completed all of the necessary requirements.

Steps

1. Download ApplianceWatch PRO from the NOW site.
2. Launch the ApplianceWatch PRO executable file.
3. Complete the steps in the ApplianceWatch PRO setup wizard on your Microsoft Operations Manager 2007 R2 management server.

Note: You must install ApplianceWatch PRO and the MetroCluster management packs on any server on which the Microsoft Operations Manager 2007 R2 operations console is used. You must install ApplianceWatch PRO Agent on all Hyper-V hosts.

After you finish

You need to import the management packs into System Center Operations Manager.

Related concepts

[*Requirements for installing ApplianceWatch PRO 2.1 management packs*](#) on page 19

[*Decisions to make before installing ApplianceWatch PRO*](#) on page 21

Related tasks

[*Importing ApplianceWatch PRO 2.1*](#) on page 24

[*Managing storage controller credentials*](#) on page 39

Related information

[*http://now.netapp.com/NOW/*](http://now.netapp.com/NOW/)

Importing ApplianceWatch PRO 2.1

After installing ApplianceWatch PRO 2.1, you can import the management packs into System Center Operations Manager so that you can monitor your storage systems running Data ONTAP and Microsoft Hyper-V hosts.

Before you begin

You must have installed ApplianceWatch PRO 2.1 and the MetroCluster management packs on any server on which the Microsoft Operations Manager 2007 R2 operations console is used. You must install ApplianceWatch PRO Agent on all Hyper-V hosts.

Step

1. From the **Operations Manager > Administration > Action** pane, select **Import management pack** to import the management packs.

After you finish

To enable these rules, you must override the **Data ONTAP Discovery** and **Data ONTAP PRO Discovery** rules to a new management pack, targeted at the Management Server class, on the management server that will run the management pack rules.

You also must set login credentials for the storage controllers that you want ApplianceWatch PRO to monitor.

Related concepts

[Requirements for installing ApplianceWatch PRO 2.1 management packs](#) on page 19

[Decisions to make before installing ApplianceWatch PRO](#) on page 21

Related tasks

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[Managing storage controller credentials](#) on page 39

Uninstalling ApplianceWatch PRO 2.0

You can use Windows Control Panel to uninstall ApplianceWatch PRO 2.0 if you no longer need it or if you upgrade to a later version. You must uninstall ApplianceWatch PRO 2.0 before installing ApplianceWatch PRO 2.1.

Steps

1. Open Windows Control Panel on the appropriate management server.

- From Control Panel, run the Windows program management utility.

If...	Then...
You are using Windows 2003	Double-click Add or Remove Programs .
You are using Windows 2008	Double-click Programs and Features .

- Select ApplianceWatch PRO 2.0.

If...	Then...
You are using Windows 2003	Click Remove .
You are using Windows 2008	Click Uninstall .

Uninstalling ApplianceWatch PRO 2.1

You can uninstall ApplianceWatch PRO 2.1 when you no longer need it or upgrade to a later version.

Before you begin

You must have already installed the ApplianceWatch PRO 2.1 program.

Steps

- Open Windows Control Panel on the appropriate management server.
- From Control Panel, run the Windows program management utility.

If...	Then...
You are using Windows 2003	Double-click Add or Remove Programs .
You are using Windows 2008	Double-click Programs and Features .

- Select ApplianceWatch PRO 2.1.

If...	Then...
You are using Windows 2003	Click Remove .
You are using Windows 2008	Click Uninstall .

Rapid provisioning and cloning installation

Although you can download and install the rapid provisioning and cloning commandlets for free, you should first make sure that your environment meets certain Microsoft System Center Virtual Machine Manager 2008 and Data ONTAP requirements.

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[Uninstalling the rapid provisioning and cloning commandlets](#) on page 29

Requirements for installing rapid provisioning and cloning commandlets

You must meet all hardware, software, Data ONTAP, and Microsoft requirements before installing the rapid provisioning and cloning commandlets.

Data ONTAP requirements	Data ONTAP versions 7.3.1 P1 and later are supported.
Storage platform requirements (New-Clone commandlet only)	The following storage platforms are supported for the New-Clone command: • 20xx • 30xx • 31xx • 60xx • NearStore R200
Storage system license requirement	The FlexClone license is required on all storage systems using the commandlets.
Microsoft requirements	• .Net 3.5 SP 1 • WMI and VDS services enabled on host • Firewall ports for DCOM are opened for remote requests • New-Clone commandlet needs to be executed on host where the System Center Virtual Machine Manager library share exists
Microsoft licenses requirements	The commandlets require the following Microsoft licenses: • Windows Server 2008 R2 with Hyper-V enabled

- Microsoft System Center Virtual Machine Manager 2008 R2
- Microsoft SQL Server 2008
- Microsoft System Center Virtual Machine Manager Administrator Console (for New-Clone commandlet only)

Virtual machine requirements

All source VHDs for the System Center Virtual Machine Manager templates must reside on NetApp LUNs.

Note: Only fixed-size VHDs are supported.

PowerShell requirements

PowerShell version 2.0 or later is required. System Center Virtual Machine Manager administrative commandlets must also be imported in Windows PowerShell sessions and profiles.

Related concepts

[*Decisions to make before installing the rapid provisioning and cloning commandlets*](#) on page 28

Related tasks

[*Installing the rapid provisioning and cloning commandlets*](#) on page 29

Decisions to make before installing the rapid provisioning and cloning commandlets

Before you install the rapid provisioning and cloning commandlets, it is useful to have all of the installation information available.

ApplianceWatch download Have you downloaded the ApplianceWatch software from the NOW site?

Requirements Have you met the requirements for proper installation of the rapid provisioning and cloning commandlets?

Installation components You can choose to install only the rapid provisioning and cloning commandlets. The commandlets are not dependent on ApplianceWatch PRO for operation.

Related concepts

[*Requirements for installing rapid provisioning and cloning commandlets*](#) on page 27

Related tasks

[*Installing the rapid provisioning and cloning commandlets*](#) on page 29

Related information

<http://now.netapp.com/NOW/>

Installing the rapid provisioning and cloning commandlets

You can install the commandlets, using the ApplianceWatch PRO 2.1 installer, to permit provisioning and cloning operations to occur from Microsoft System Center Virtual Machine Manager applications.

Before you begin

Before installing the rapid provisioning and cloning commandlets, you should have completed all of the necessary requirements.

Steps

1. Download ApplianceWatch PRO from the NOW site.

Although the commandlets are a separate product from ApplianceWatch PRO, they share a common installer.

2. Launch the ApplianceWatch PRO executable file.
3. In the **ApplianceWatch PRO InstallShield Wizard**, select **Custom Setup**.
4. Select **Cmdlets** and complete the steps in the **ApplianceWatch PRO InstallShield Wizard**.

Related concepts

[*Decisions to make before installing the rapid provisioning and cloning commandlets*](#) on page 28

[*Requirements for installing rapid provisioning and cloning commandlets*](#) on page 27

Related information

<http://now.netapp.com/NOW/>

Uninstalling the rapid provisioning and cloning commandlets

You can uninstall the commandlets when you no longer need them or if you upgrade to a later version.

Before you begin

You must have already installed the rapid provisioning and cloning commandlets using the ApplianceWatch PRO 2.1 installer.

Steps

1. Open Windows Control Panel on the appropriate management server.
2. From Control Panel, run the Windows program management utility.

If...	Then...
You are using Windows 2003	Double-click Add or Remove Programs .
You are using Windows 2008	Double-click Programs and Features .

3. Select ApplianceWatch PRO 2.1.

If...	Then...
You are using Windows 2003	Click Remove .
You are using Windows 2008	Click Uninstall .

Data ONTAP management pack rules

ApplianceWatch PRO includes rules and monitors so you can more effectively manage your storage resources.

ApplianceWatch rules

The following list displays all of the ApplianceWatch base management pack rules:

- Data ONTAP: Discovery Rule
- Data ONTAP: Controller Network Data Sent Performance Rule
- Data ONTAP: Controller Average Latency Performance Rule
- Data ONTAP: Controller Write Operations Performance Rule
- Data ONTAP: Controller CIFS Operations Performance Rule
- Data ONTAP: Controller Network Data Received Performance Rule
- Data ONTAP: Controller Disk Data Written Performance Rule
- Data ONTAP: Controller Disk Data Read Performance Rule
- Data ONTAP: Controller Write Latency Performance Rule
- Data ONTAP: Controller CPU Resource Utilization Performance Rule
- Data ONTAP: Controller NFS Operations Performance Rule
- Data ONTAP: Controller iSCSI Operations Performance Rule
- Data ONTAP: Controller CPU Average Utilization Performance Rule
- Data ONTAP: Controller Read Operations Performance Rule
- Data ONTAP: Controller Total Operations Performance Rule
- Data ONTAP: Controller HTTP Operations Performance Rule
- Data ONTAP: Controller Read Latency Performance Rule
- Data ONTAP: Controller FCP Operations Performance Rule
- Data ONTAP: CPU Total Utilization Performance Rule
- Data ONTAP: Controller SNMP Trap Rule
- Data ONTAP: Trigger Controller Discovery
- Data ONTAP: Aggregate State Rule Data ONTAP: Aggregate Used Space Rule
- Data ONTAP: Volume State Rule
- Data ONTAP: Controller Rate of Change for Storage Utilization
- Data ONTAP: Collect SnapMirror Lag Time Counter
- Data ONTAP: Controller HA Status Rule
- Data ONTAP: Collect Events
- Data ONTAP: Enclosure State Rule
- Data ONTAP: Controller Connection Check Rule
- Data ONTAP: Disk State Rule
- Data ONTAP: SnapMirror Status Rule

- Data ONTAP: Discover Recent Network Devices
- Data ONTAP: LUN State Rule
- Data ONTAP: Volume Used Inodes Rule
- Data ONTAP: Volume Used Space Rule
- Data ONTAP: Quota Limits Rule
- Data ONTAP: Controller Global Status Rule
- Data ONTAP: Refresh Dashboard Rule

ApplianceWatch PRO rules

The following list displays all of the ApplianceWatch PRO management pack rules:

- Data ONTAP PRO: Discovery Rule
- Data ONTAP PRO: VM Replication PRO Tip Recovery Rule
- Data ONTAP PRO: Volume Snapshot Auto-Delete PRO Tip Recovery Rule
- Data ONTAP PRO: VM Thin Provisioning PRO Tip Recovery Rule
- Data ONTAP PRO: Volume Online PRO Tip Recovery Rule
- Data ONTAP PRO: Volume Deduplication Enable PRO Tip Recovery Rule
- Data ONTAP PRO: Volume Used Space 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 Enable PRO Tips Rule
- Data ONTAP PRO: Volume Snapshot Auto-Delete PRO Tip Rule
- Data ONTAP PRO: VM Space Utilization Rate PRO Tip Rule
- Data ONTAP PRO: LUN Online PRO Tip Rule
- Data ONTAP PRO: Thin Provisioning Volume Autogrow for Volumes Hosting Hyper-V VMs PRO Tip Rule
- Data ONTAP PRO: LUN Igroup Type Configuration PRO Tip Rule
- Data ONTAP PRO: VM Replication PRO Tip Rule
- Data ONTAP PRO: LUN Space Reservation PRO Tip Rule
- Data ONTAP PRO: Volume Online PRO Tip Rule
- Data ONTAP PRO: Volume Used Space Grow PRO Tip Rule
- Data ONTAP PRO: LUN Used Space PRO Tip Rule

MetroCluster rules

Data ONTAP: MetroCluster Discovery Rule

ApplianceWatch monitors

The following list displays all of the ApplianceWatch base management pack monitors:

- LUN State Monitor
- Aggregate Space Utilization Monitor

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

ApplianceWatch PRO monitors

The following list displays all of the ApplianceWatch PRO management pack monitors:

- Data ONTAP PRO: Hyper-V VM Replication Not Replicated Monitor
- Data ONTAP PRO: Hyper-V VM Replication Status Monitor
- Data ONTAP PRO: Hyper-V VM Thin Provisioning Configuration Monitor
- Data ONTAP PRO: Hyper-V VM 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

Finding Data ONTAP management pack rules

You can find the Data ONTAP management pack rules so that you can verify successful import into System Center Operations Manager, or to override the rules as necessary.

Before you begin

You must have correctly imported the appropriate ApplianceWatch management packs into System Center Operations Manager.

Steps

1. From the **Authoring** pane, select **Rules**.
2. In the **Name** column, go to **Type: Management Server** and search for **Data ONTAP**.

Related tasks

[*Overriding monitoring rules*](#) on page 48

What discovery is

ApplianceWatch utilizes rules that discover storage controllers, their associated objects, and their configurations so that you can monitor the state of each object and troubleshoot where necessary.

The main discovery rule (**Data ONTAP: Discovery Rule**) is disabled by default as recommended by Microsoft. After importing the management pack, you can enable this rule on a Microsoft System Center Operations Manager 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 and later, SNMP versions 1, 2C, and 3 are supported for use with ApplianceWatch discovery rules.

ApplianceWatch ignores traditional volumes during the discovery process.

Next topics

[Types of discovery](#) on page 35

[Expediting storage discovery](#) on page 36

Types of discovery

You can use storage discovery, PRO discovery, and MetroCluster discovery to discover storage controllers and their associated objects in each type.

ApplianceWatch provides the following discovery types:

Storage discovery	Storage discovery is accomplished when Data ONTAP storage devices are discovered as network devices by the built-in Microsoft System Center Operations Manager discovery wizard using SNMP. The controllers are recognized as Data ONTAP storage devices and, if valid credentials are set in the System Center Operations Manager database, the storage containers in these controllers are discovered.
Data ONTAP PRO discovery	Data ONTAP PRO discovery involves finding the mappings between Data ONTAP storage and Hyper-V virtual machines. Data ONTAP PRO discovery runs WMI queries locally on Hyper-V hosts to get all relevant disk information from those hosts to compare to the disk information for the controllers in System Center Operations Manager. By default, Data ONTAP PRO discovery might take up to two hours to initially discover virtual machine storage mappings.
MetroCluster discovery	The MetroCluster management pack is an optional pack with a separate discovery process. The MetroCluster discovery process uses controller objects that have already been discovered by the Data ONTAP management pack.

Related tasks

[*Expediting storage discovery*](#) on page 36

Expediting storage discovery

If you choose not to wait for the automated discovery process, which runs every four hours, or you have modified the storage systems being monitored, you can expedite the process by manually running storage discovery.

Before you begin

Before performing system discovery, the ApplianceWatch management pack must already be installed and you must have entered valid credentials for newly added storage systems.

Steps

1. Navigate to the Microsoft System Center Operations Manager **Monitoring** pane.
2. Select **Discovered Inventory**.
3. If **Management Server** is not the selected target type, in the **Actions > State Actions** pane, select **Change Target Type...**, and then select **Management Server** from the target list.
4. Select the management server on which discovery is enabled.
5. In the **Actions > Health Services Tasks** pane, select **Data ONTAP: Run Discovery Task**.

Adding a storage controller

You can add storage controllers so that ApplianceWatch can monitor their performance and health. Although new controllers are automatically added during scheduled discovery, you can add them manually at any time.

Steps

1. From the **Monitoring** pane, select **Diagram View**.
2. From the **Actions > Data ONTAP Controller Group Tasks** pane, select **Add Controller**.
3. From the drop-down menu, select the appropriate management server.
4. Specify the SNMP community string.
5. Specify the name or IP address of the storage controller you want to add and click **Add**.

After you finish

After adding a storage controller, you should set credentials using the **Data ONTAP:Manage Controller Credentials** action.

Related tasks

[Managing storage controller credentials](#) on page 39

[Removing a storage controller](#) on page 41

Managing storage controller credentials

You can set credentials for all of the NetApp storage controllers you want to monitor from either **Diagram View** or **Controllers View** in the **Monitoring** pane. You can change these credentials as necessary.

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 ApplianceWatch to monitor.

You can select multiple controllers at one time and set their passwords if they use the same credentials.

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

Note: HTTPS is the default protocol used to connect to the storage controller but you must have SSL set up and enabled to it. If SSL is not set up and enabled, the connection uses HTTP protocol.

4. Click **OK**.

Related tasks

[Adding a storage controller](#) on page 37

Removing a storage controller

You can remove storage controllers from ApplianceWatch PRO when you no longer need to monitor their health and performance.

About this task

Removing a storage controller also removes 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**.

Related tasks

[Adding a storage controller](#) on page 37

Configuring SNMP

If you want to receive SNMP traps using ApplianceWatch, 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.
- If you use Microsoft Operations Manager 2007 SP1, you must have installed Microsoft hotfixes 951526 and 961363.

Steps

1. In Windows 2008, navigate to **Server Manager > Configuration > Services > SNMP Service > Properties > Security** tab.
2. Ensure that **Accepted community names** contains the names of the SNMP communities 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 Microsoft Operations Manager root management server.
The SNMP monitors are targeted at the Data ONTAP Controller class.
7. Enable the non-emergency trap monitors using monitor overrides.

Modifying storage controller information using FilerView

You can select storage controllers monitored by ApplianceWatch and launch FilerView so that you can change controller configuration information using the FilerView interface.

Before you begin

You must have ApplianceWatch installed and configured.

Steps

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

Alert monitoring

You can monitor alerts to locate and isolate problems with your storage systems and storage objects.

ApplianceWatch includes numerous rules that monitor the health of various discovered Data ONTAP storage objects. If the parameters of a rule are broken, ApplianceWatch generates an alert and sends it to Microsoft Operations Manager. You can override these rules as necessary using the **Controller performance collection** rule, which is targeted at the Data ONTAP Controller class.

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 **Alert View**, **Diagram View**, or **Controllers View** windows.

Next topics

[Alerts View](#) on page 47

[Diagram View](#) on page 48

[Controllers View](#) on page 48

[Overriding monitoring rules](#) on page 48

Alerts View

You can view a list of every active alert found by ApplianceWatch; alternatively, you can limit the view to alerts specific to Data ONTAP storage. When you select an individual alert in one of these lists, you can view information about it in the **Alert Details** pane. You can launch Health Explorer in Microsoft Operations Manager to find the cause of the problem.

You can view active alerts by using any of the following options:

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.

Diagram View

You can view a pictorial representation of all of the storage and hardware currently being monitored by ApplianceWatch to enable you to isolate problems on a specific storage controller object.

You can expand the view for an individual storage controller to display its associated objects, allowing you to isolate problems to the exact component on which they occur. When you select a controller or associated object, you can view information about it in the **Detail View** window.

Controllers View

You can view a list of each storage controller currently monitored by ApplianceWatch, as well as its overall health. 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 Microsoft Operations Manager to find the root of the problem.

Overriding monitoring rules

You can adjust 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 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

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

Performance monitoring

ApplianceWatch 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 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.

Next topics

[Performance metrics](#) on page 49

[Views](#) on page 51

[How to launch Health Explorer for a controller](#) on page 55

Performance metrics

ApplianceWatch 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, I/O operations, I/O throughput, latency, and protocols.

Next topics

[CPU utilization](#) on page 49

[I/O operations](#) on page 50

[I/O throughput](#) on page 50

[Latency](#) on page 50

[Protocols](#) on page 51

CPU utilization

You can use the **CPU utilization** graph to determine how much space you have used, how you have utilized 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:

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.

Additional details are displayed in the **Legend**.

Protocols

You can use the **Protocols** graphs to determine how well the storage controllers perform based on its protocols.

The protocols graphs display the following information:

CIFS	Displays the number of CIFS operations per second at specified time intervals.
Fibre Channel	Displays the number of Fibre Channel operations per second at specified time intervals.
HTTP	Displays the number of HTTP operations per second at specified time intervals.
iSCSI	Displays the number of iSCSI operations per second at specified time intervals.
NFS	Displays the number of NFS operations per second at specified time intervals.

Additional details are displayed in the **Legend**.

Views

You can use different views in ApplianceWatch PRO to monitor the state of your storage resources, as well as to identify usage patterns.

Next topics

[Aggregates](#) on page 51

[Controllers](#) on page 52

[Dashboard](#) on page 52

[LUNs](#) on page 53

[Qtrees](#) on page 53

[SnapMirror status](#) on page 53

[Storage utilization](#) on page 54

[Volumes](#) on page 54

[Hyper-V VMs](#) on page 54

[Hyper-V VM-Storage Mapping](#) on page 55

Aggregates

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.
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Controller	Displays the fully qualified domain name of the controller to which the aggregate belongs.
Aggregate	Displays the aggregate name.
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

You can view different attributes of your storage controllers so that you can monitor their health and diagnose any issues at the controller level. ApplianceWatch displays only those storage controllers 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.
Model	Displays the model type of the storage system.
IP address	Displays the IP address of the storage system.
Fully qualified domain name (FQDN)	Displays the fully qualified domain name of the storage controller.
Version	Displays the version of Data ONTAP the storage system currently runs.

Dashboard

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.
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.
Controllers	Displays information about all storage controllers currently monitored by ApplianceWatch.

Total Storage Utilization across all controllers	Displays the percentage of storage that is currently being used by all storage controllers monitored by ApplianceWatch.
Alerts	Displays information about all active alerts.
Average latency across all controllers	Displays the average storage controller latency, in milliseconds, at specified time intervals.

LUNs

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	Displays the fully qualified domain name of the controller 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.

Qtrees

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 **Qtree** 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	Displays the fully qualified domain name of the controller, to which the qtree belongs.
Security style	Displays the security style of the qtree. Security styles include UNIX, NTFS, or mixed.

SnapMirror status

You can view the status of all SnapMirror relationships monitored by ApplianceWatch.

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. States include Uninitialized, SnapMirrored, Broken-Off, Quiesced, Source, and Unknown.
Lag	Displays the amount of time since the last SnapMirror transfer.

Storage utilization

You can use the **Storage Utilization** view to monitor how much space you have at the controller, aggregate, and volume levels. This tells you to how you have used the space on your storage and to make any necessary changes to utilize your space more effectively.

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

Controller used space	Displays the controller used-space percentage at specified time intervals.
Aggregate used space	Displays the aggregate used-space percentage at specified time intervals.
Volume used space	Displays the volume used-space percentage at specified time intervals.

Volumes

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	Displays the fully qualified domain name of the controller to which the volume belongs.
Total size	Displays the total size of the volume.

Hyper-V VMs

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:

State	Displays the state of the Hyper-V virtual machine, according to System Center Virtual Machine Manager. States include Healthy, Warning, and Critical.
Virtual Machine	Displays the name of the Hyper-V virtual machine.
FQDN of VM	Displays the fully qualified domain name of the virtual machine.
Host	Displays the name of the Hyper-V host, to which the virtual machine belongs.
VMM Server	Displays the Virtual Machine Manager server name.

Hyper-V VM-Storage Mapping

You can use the **Hyper-V VM-Storage Mapping** view to display how your virtual machines are mapped from Microsoft Virtual Machine Manager Hyper-V hosts to your monitored storage controllers.

The following attributes display in the **Hyper-V VM-Storage Mapping** view:

Virtual Machine	Displays the name of the Hyper-V virtual machine.
Host	Displays the name of the Hyper-V host, to which the virtual machine belongs.
Controller Name	Displays the fully qualified domain name of the controller that hosts the LUN.
Controller IP	Displays the IP address of the storage system.
Igroup	Displays the igroup mapping the LUN to the host.
LUN Path	Displays the full path of the controller-hosting LUN.

How to launch Health Explorer for a controller

You can launch Health Explorer in Microsoft System Center Operations Manager 2007 so that you can determine the root of any NetApp storage-related issues.

Microsoft Health Explorer enables you to find information about the health of any of your storage objects. By clicking **Health Explorer** in the **Alert Actions** pane, you can isolate issues involving storage objects.

Using ApplianceWatch PRO tips

You can use PRO Tips 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 SCVMM agent and the ApplianceWatch PRO Hyper-V agent installed on Hyper-V servers to receive virtual machine-related storage events and an event log subscription to the SCVMM event log to receive problems related to virtual machines. When ApplianceWatch PRO receives these events, PRO rules are triggered in the management pack to immediately generate PRO Tips.

PRO Tips are part of the ApplianceWatch PRO management pack. The **PRO Tips** button in the **SCVMM** toolbar displays the number of Tips currently available. Optionally, you can configure PRO Tips to display in a pop-up window whenever a new Tip is added.

Next topics

[Types of PRO Tips](#) on page 57

[Implementing PRO Tips automatically](#) on page 59

[Implementing PRO Tips manually](#) on page 60

Types of PRO Tips

ApplianceWatch has several types of PRO Tips to help you identify storage-related issues that occur between Data ONTAP LUNs and Hyper-V virtual machines. Some of the PRO Tips offer automatic remediation, enabling ApplianceWatch to fix the issue automatically if you choose.

The PRO Tips and their descriptions are as follows:

High LUN space utilization

This Tip is generated when space utilization on a LUN 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. 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 VM not replicated

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

Hyper-V VM space utilization rate

This Tip is generated when ApplianceWatch determines that storage space might soon be consumed on the volume on which a LUN resides.

The default threshold rate is 2 percent, approximating to storage being consumed within 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 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.

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 and non-Windows types.

If ApplianceWatch determines that the igroup type and LUN type are the incorrect Windows type, ApplianceWatch generates a warning Tip. If ApplianceWatch 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.

Thin provisioning LUN space reservation enabled

This Tip is generated when the LUN space reservation setting is enabled on LUNs hosting virtual machines. To provide thinly provisioned LUNs, LUN space reservation must be disabled.

This Tip offers automatic remediation to disable LUN space reservation.

Thin provisioning Snapshot auto delete disabled

This Tip is generated when automatic deletion of Snapshot copies is not set for volumes that contain LUNs hosting virtual machines.

This Tip offers automatic remediation to enable automatic Snapshot copy deletion on the volumes.

Thin provisioning volume autogrow for volumes hosting Hyper-V VMs

This Tip is generated when the volume autogrow option is not set for volumes that contain LUNs hosting virtual machines.

This Tip offers automatic remediation to enable volume autogrow.

Volume deduplication not enabled

This Tip is generated for a virtual machine when deduplication is licensed but not enabled on a storage controller that hosts storage system volumes serving two or more virtual machines.

	This Tip offers automatic remediation to enable deduplication on the affected volumes.
Volume deduplication not licensed	This Tip is generated for a virtual machine when deduplication is not licensed on a storage controller that hosts storage system volumes serving two or more virtual machines.
	This Tip does not provide automatic remediation, but it recommends installing a deduplication license in virtualized environments.
Volume offline	This Tip is generated for a virtual machine when one or more storage system volumes serving that virtual machine is offline.
	This Tip offers automatic remediation to bring the volumes back online.
Volume space utilization exceeded threshold	This Tip is generated for a virtual machine when one or more storage system volumes that serve that virtual machine is full.
	This Tip offers two configurable thresholds: a warning level that defaults to 95 percent, and a critical level that defaults to 99 percent.
	This Tip offers automatic remediation to increase the volume size so that space utilization is reduced to 85 percent. The Tip also recommends that the virtual machine be paused by the SCVMM administrator to avoid running out of space.

Related tasks

Implementing PRO Tips automatically on page 59

Implementing PRO Tips manually on page 60

Related references

Performance and resource optimization (PRO) issues on page 71

Implementing PRO Tips automatically

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

Before you begin

Before you can implement PRO Tips, you must have ApplianceWatch PRO management pack installed and the Data ONTAP PRO discovery rule enabled.

Steps

1. In the **Microsoft Operations Manager > Administration** pane, select **PRO Tips**.

2. In the **PRO Settings** window, select **Automatically Implement**.
3. To determine when PRO Tips are implemented, select either **Critical Only** or **Warning and Critical**.
4. Click **OK**.

Related concepts

[Types of PRO Tips](#) on page 57

Related tasks

[Implementing PRO Tips manually](#) on page 60

Related references

[Performance and resource optimization \(PRO\) issues](#) on page 71

Implementing PRO Tips manually

You can implement PRO Tips manually to resolve one or more storage-related problems. Use this option when you want to control when a solution is implemented.

Before you begin

Before you can use PRO Tips, the following requirements must be met:

- ApplianceWatch PRO management pack must be installed.
- Data ONTAP discovery rule must be enabled.
- PRO Tips must be enabled.

Steps

1. From the SCVMM tool bar, 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 57

Related tasks

[Implementing PRO Tips automatically](#) on page 59

Related references

[Performance and resource optimization \(PRO\) issues](#) on page 71

Events

You can use the **Events** window to view information about the events that ApplianceWatch has logged. ApplianceWatch monitors rules and logs events based on how you have configured the rules.

Each event displays the following information:

Level	The event level is 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.

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

Next topics

[Availability events](#) on page 61

[Configuration events](#) on page 62

Availability events

You can view availability events that are triggered by rules 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 information for 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

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

The **Configuration Events** view displays information for the following rules:

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

MetroCluster monitoring

ApplianceWatch PRO includes an optional MetroCluster management pack containing the MetroCluster TieBreaker Manager and the MetroCluster Recovery Assistant. These components monitor MetroCluster pairs and allow you to configure and manually initiate Cluster Failover on Disaster (CFOD) operations.

MetroCluster TieBreaker Manager	Runs as a Windows service and continually monitors all discovered MetroClusters.
MetroCluster Recovery Assistant	Assists in reassembling a cluster after a Cluster Failover on Disaster event.

Next topics

[Using the MetroCluster TieBreaker Manager](#) on page 63

[Reassembling a failed-over cluster](#) on page 64

Using the MetroCluster TieBreaker Manager

You can use MetroCluster TieBreaker Manager to choose which MetroCluster pairs the TieBreaker service monitors, and to configure the conditions under which the TieBreaker service initiates the Cluster Failover on Disaster operation.

Before you begin

You must have imported and installed the MetroCluster management pack.

About this task

You should install the TieBreaker Manager on a System Center Operations Manager server at a separate location from either MetroCluster site, so that it operates as an objective arbiter of MetroCluster availability.

Steps

1. From the **Monitoring** pane, select **MetroClusters > State View**.
2. From the **Actions > Data ONTAP MetroCluster Pair Tasks** pane, select **MetroCluster TieBreaker Manager**.

The **MetroCluster TieBreaker Settings** dialog box opens.

3. Enter the failover parameters in the dialog box.
4. Click **Apply** and then click **OK**.

Result

The parameters are saved into the Microsoft System Center Operations Manager database. The TieBreaker service reads the parameters every 15 minutes and updates operations as necessary.

Reassembling a failed-over cluster

You can use the MetroCluster Recovery Assistant to assist you in reassembling a cluster after it has failed over. You can also view the status of a MetroCluster and its mirrored aggregates or manually initiate a Cluster Failover on Disaster event.

Before you begin

You must have imported and installed the MetroCluster management pack.

Steps

1. From the **Monitoring** pane, select **MetroClusters > State View**.
2. Select the MetroCluster you want to recover.
3. From the **Actions > Data ONTAP MetroCluster Pair Tasks** pane, select **MetroCluster Recovery Assistant**.

The **MetroCluster Recovery Assistant** dialog box opens.

4. Click **Help** and follow the steps to restore the MetroCluster to normal operation.

Reports

Using ApplianceWatch, you can view reports about different aspects of your storage over a specific period of time.

You can view the following reports:

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. The default time period is from the first day of the month to the current day. This report assists you in determining whether or not you can load-balance more effectively.
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. The default time period is from the first day of the month to the current day.
Data ONTAP Controllers Availability Report	Displays the controller availability on one or more monitored storage controllers over a specific period of time. The default time period is from the first day of the month to the current day. The report selects all monitored storage controllers if none are selected.
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. The default time period is from the first day of the month to the current day.
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 time period is from the first day of the month to the current day, and the default number of volumes is 5.
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 time period is from the first day of the month to the current day, and the default number of aggregates is 5.
Data ONTAP Group Storage Utilization Report	Displays the storage utilization for all monitored storage controllers over a specific period of time. The default time period is from the first day of the month to the current day.
Data ONTAP Controller Rate Of Storage Utilization Report	Displays the rate at which storage controller utilization changes over a specific period of time. The default time period is from the first day of the month to the current day.

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 time is from the first day of the month to the current day, and the default number of alerts shown is 5.
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. The default time period is from the first day of the month to the current day.
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.

Viewing reports

You can view reports generated by ApplianceWatch by using the **Reports** tab of System Center Operations Manager.

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.

Related concepts

[Reports](#) on page 65

Using ApplianceWatch PRO to monitor NetApp Operations Manager servers

Using ApplianceWatch PRO, you can enable Microsoft System Center Operations Manager to monitor the state of NetApp Operations Manager servers.

Before you begin

You must have ApplianceWatch installed and configured.

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 NetApp Operations Manager server and click **Apply > OK**.

Troubleshooting

You can use tips to help solve common problems with consoles, storage controllers, and performance and resource optimization.

Next topics

[Tips for solving console issues](#) on page 69

[Tips for solving storage controller issues](#) on page 70

[Performance and resource optimization \(PRO\) issues](#) on page 71

[The Show Windows Installer Log check box is not visible](#) on page 72

Tips for solving console issues

If you experience an issue with ApplianceWatch PRO and the Microsoft System Center Operations Manager console, you can use tips to help find the source of the problem.

The following list provides common console issues and some tips you can use to solve them:

Console tasks do not start	Run the Appliancewatch PRO Agent installer file on each computer that runs on the Microsoft System Center Operations Manager console.
Console tasks fail consistently	Ensure that you have the necessary credentials. Provide alternate credentials when prompted by the console task.
The Data ONTAP Storage Systems pane does not appear in the Microsoft Operations Manager Monitoring window	Ensure that you imported the Data ONTAP management pack.
Changes made to storage configuration not reflected in the Microsoft System Center Operations Manager 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 not appearing in the Microsoft System Center Operations Manager 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 not discovered when discovery timeout increased

Ensure that you have done the following:

- Use the correct SNMP version
- Use the default timeout value of 2 minutes or a value less than 5 minutes
- Run the System Center Operations Manager **Discovery** wizard
- Contact Microsoft for further assistance

Related information

www.microsoft.com

Tips for solving storage controller issues

If you experience an issue with ApplianceWatch PRO and your storage controllers, you can use tips to help find the source of the problem.

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 ApplianceWatch does not support.

Storage controllers do not appear after running Data ONTAP discovery

When using the System Center Operations Manager **Discovery** wizard, ensure that you have selected **Network Devices**. Once discovery finishes and finds the unmanaged devices, the Data ONTAP storage controllers, select these network devices to be managed by host proxy agent. This allows ApplianceWatch PRO to discover your Data ONTAP storage controllers.

Storage controllers not found using 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.

Performance and resource optimization (PRO) issues

If you experience an issue with ApplianceWatch PRO, you can use tips to help find the source of the problem.

PRO Tips do not appear Ensure that you have done the following:

- Imported the Data ONTAP ApplianceWatch PRO management pack
- Installed the ApplianceWatch PRO Agent and the System Center Operations Manager Agent files on every Microsoft Hyper-V host you want to monitor
- Enabled the Data ONTAP PRO Discovery Rule for the Microsoft System Center Operations Manager management server and set the credentials for that server
- Ensured that Alerts appear in the Hyper-V VMs on 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 ApplianceWatch PRO.

Data ONTAP PRO: Hyper-V Host objects are not present

Ensure that you have done the following:

- Imported the Data ONTAP ApplianceWatch PRO management pack
- Installed the ApplianceWatch PRO Agent and the System Center Operations Manager Agent files on every Microsoft Hyper-V host you want to monitor

Data ONTAP PRO: Hyper-V Virtual Machine or Data ONTAP PRO: Hyper-V Virtual Machine Storage objects are not present

- Ensure that your virtual machine VHD files reside on NetApp LUNs
- Ensured that your virtual machines are on and appear in Microsoft System Center Virtual Machine Manager

PRO Tip implementation fails

Ensure that you have the necessary credentials.

PRO Tips do not generate

If you use Microsoft SQL Server 2008, ensure that you have installed the Microsoft SQL Server 2005 backward compatibility components, available in the Microsoft SQL Server 2008 Feature Pack. If you use Microsoft SQL Server 2005, installing the backward compatibility components is not necessary. For more information, see the Microsoft Web site.

Related information

www.microsoft.com

The Show Windows Installer Log check box is not visible

If you use a Microsoft Windows Installer (MSI) version earlier than 4.0, you will 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 check the **Show the Windows Installer log** box during installation to display logs.

For more information, see the Microsoft Web site.

Related concepts

[ApplianceWatch PRO installation](#) on page 19

Related information

www.microsoft.com

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