

ApplianceWatch PRO® 2.0 for Microsoft System Center Operations Manager® **Installation and Administration Guide**

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Contents

Copyright information	5
Trademark information	7
About this guide	9
Audience	9
Terminology	9
Keyboard and formatting conventions	10
Special messages	11
How to send your comments	11
What ApplianceWatch is	13
ApplianceWatch object classes	13
What you can do with ApplianceWatch	15
ApplianceWatch limitations	17
Installing ApplianceWatch	19
Requirements for installing ApplianceWatch 2.0	19
Decisions to make before installing ApplianceWatch	20
Installing ApplianceWatch PRO 2.0	21
Configuring SNMP	22
Establishing and managing login credentials	22
Discovery	25
Expediting system discovery	25
Alert monitoring	27
Alerts view	27
Diagram view	27
State view	27
How to override monitoring rules	28
Performance monitoring	29
Types of metrics	29
CPU utilization	29
I/O operations	30
Protocols	30
Throughput	30
How to launch Health Explorer for a controller	31

Using ApplianceWatch PRO tips	33
Types of PRO Tips	33
Implementing PRO Tips automatically	34
Implementing PRO Tips manually	34
Launching FilerView from ApplianceWatch	37
Managing NetApp Operations Manager servers with	
ApplianceWatch	39
ApplianceWatch troubleshooting tips	41
Index	45

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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.

Next topics

[Audience](#) on page 9

[Terminology](#) on page 9

[Keyboard and formatting conventions](#) on page 10

[Special messages](#) on page 11

[How to send your comments](#) on page 11

Audience

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

This guide is for Microsoft System Center Operations Manager 2007 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)	Refers to a logical unit of storage identified by a number.
native disk	Refers to a disk that is sold as local storage for storage systems that run Data ONTAP software.
native disk shelf	Refers to a disk shelf that is sold as local storage for storage systems that run Data ONTAP software.
storage controller	Refers to 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	Refers to 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 <i>NetApp On the Web</i> at http://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 is

ApplianceWatch is a free management pack for Microsoft System Center Operations Manager (SCOM) 2007. You can use your existing storage management tools to monitor all of your Data ONTAP storage systems through one interface. ApplianceWatch allows you to view your hardware and storage layout as well as to monitor any issues.

With ApplianceWatch Performance and Resource Optimization (PRO), you can also monitor your virtualized environment and receive PRO Tips with automatic remediation support within the Microsoft System Center Virtual Machine Manager console.

ApplianceWatch object classes

ApplianceWatch can discover and monitor different object classes. The management packs define the hosting relationships that organize the classes into a hierarchy.

The following table displays the hierarchy of object classes in ApplianceWatch, as well as what they monitor and the tasks that you can perform.

Object	Monitors	Tasks
Management server	None	• Run Data ONTAP discovery • Manage Data ONTAP controller credentials • Manage NetApp Operations Manager servers
Storage controller group	None	• Manage Data ONTAP controller credentials • Manage NetApp Operations Manager servers

Object	Monitors	Tasks
Storage controller	- Global status - Cluster status - Processor utilization - Connection (protocols and valid credentials) - Emergency trap (manual reset) - Critical trap (disabled by default, timer reset) - Warning trap (disabled by default, timer reset) - Informational trap (disabled by default, timer reset)	- Manage Data ONTAP controller credentials - Launch FilerView - Manage NetApp Operations Manager servers
Aggregate	- State - Space utilization	None
Volume	- State - Space utilization - Inode utilization - Quota - SnapMirror relationships	None
Qtree	- Quota - SnapMirror relationships	None
LUN	State	None
Enclosure	State	None
Disk	State	None
Power Supply	State	None
Fan	State	None

What you can do with ApplianceWatch

ApplianceWatch allows you to use the tools that you have to monitor your NetApp storage.

You can do the following with ApplianceWatch PRO 2.0:

- Use your existing storage management tools
- Use one interface to monitor all of your NetApp storage systems
- Simplify data management through integration with Microsoft System Center Operations Manager 2007
- View hardware and storage layout of all of your NetApp storage systems
- Isolate problems using alerts and Microsoft Health Explorer
- Monitor the performance of your NetApp storage controllers using different performance metrics
- Configure deduplication and autosize settings on NetApp flexible volumes
- Launch FilerView from the ApplianceWatch interface
- Connect to Data ONTAP 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

ApplianceWatch limitations

Some features are not supported in ApplianceWatch 2.0.

- Traditional volumes are not supported.
- Data ONTAP GX and Data ONTAP 8.0 Cluster-Mode are not supported.

Installing ApplianceWatch

Although ApplianceWatch is free to download and install, you should first make sure that your environment meets certain Microsoft Systems Center Operations Manager, Microsoft System Center Virtual Machine Manager 2008, and Data ONTAP requirements.

Next topics

Requirements for installing ApplianceWatch 2.0 on page 19

Decisions to make before installing ApplianceWatch on page 20

Installing ApplianceWatch PRO 2.0 on page 21

Configuring SNMP on page 22

Establishing and managing login credentials on page 22

Requirements for installing ApplianceWatch 2.0

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

Hardware requirements	Microsoft System Center Operations Manager 2007 determines the hardware requirements. For more information on Operations Manager 2007, see the Microsoft TechNet site.
Software requirements	Microsoft System Center Operations Manager 2007 and Virtual Machine Manager 2008 determine the software requirements. For more information, see the Microsoft TechNet site.
Data ONTAP requirements	ApplianceWatch 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 • 8.0 (7 mode) in the Data ONTAP 8.0 product family
Microsoft licenses	ApplianceWatch requires the following Microsoft licenses: • Windows Server 2003 or 2008 (32-bit or 64-bit) • Microsoft System Center Operations Manager 2007 (SP1 or R2) • Microsoft System Center Virtual Machine Manager 2008 R2 (only necessary for ApplianceWatch PRO)

Related information

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

Decisions to make before installing ApplianceWatch

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

Discovery of Data ONTAP storage controllers

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

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

ApplianceWatch download

Have you downloaded the ApplianceWatch software from the NOW site?

Storage system requirements

Does the storage system run the appropriate version of the Data ONTAP software?

Data ONTAP versions 7.2.6 or later, 7.3 or later, and 8.0 7-Mode only are supported.

Licenses

Do you have the appropriate licenses to run ApplianceWatch?

Certain Microsoft licenses are required. However, ApplianceWatch PRO 2.0 is a free product and does not require a license.

Credentials

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

For more information on how to import a management pack into Microsoft Operations Manager, see "How to Import a Management Pack in Operations Manager 2007" on the Microsoft TechNet site.

Related tasks

[Installing ApplianceWatch PRO 2.0](#) on page 21

Related information

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

Installing ApplianceWatch PRO 2.0

You can install the ApplianceWatch PRO software so that you can monitor your NetApp storage systems and Microsoft Hyper-V hosts.

Before you begin

Before installing the ApplianceWatch software, you should be aware of all of the requirements to run ApplianceWatch.

Steps

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

Note: You must install ApplianceWatch on any storage system on which the Microsoft Operations Manager 2007 operations console is used, as well as on all Hyper-V hosts.

4. From the **Microsoft Operations Manager > Administration** pane, import the DataONTAP .mp and DataONTAP .PRO .mp files.

After you finish

You must enable the **DataONTAP discovery** and **DataONTAP PRO discovery** rules, targeted at the Management Server class, on the management server that will run the management pack rules. This might or might not be the root management server.

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

Related concepts

[Decisions to make before installing ApplianceWatch](#) on page 20

Related tasks

[Establishing and managing login credentials](#) on page 22

Related information

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

Configuring SNMP

If you want to receive SNMP traps using ApplianceWatch, you must first configure it.

Before you begin

- If you use Windows 2008, you must install SNMP Service and SNMP WMI Provider.
- If you use Windows 2008 SP1, you must install Microsoft hotfixes 958936 and 967718.
- If you use Microsoft Operations Manager 2007 SP1, you must install 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.

Establishing and managing login credentials

You can set credentials for all of the NetApp storage controllers you want to monitor from either **Diagram View** or **State 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 > DataONTAP:Manage Controller Credentials**.
3. Enter credentials for each storage controller that you want ApplianceWatch to monitor.
4. Click **Apply** and **OK**.

Discovery

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 (**DataONTAP.Discovery.Rule**) is disabled by default. After importing the management pack, you can enable this rule on a Microsoft Systems Center Operations Manager management server by overriding the setting.

ApplianceWatch PRO also discovers virtual machines and their relationships to Data ONTAP storage.

ApplianceWatch ignores traditional volumes during the discovery process.

Expediting system discovery

If you choose not to wait for the automated discovery process, which runs once in a 24-hour period, to begin or you have modified storage systems being monitored, you can expedite the process by manually running the system discovery.

Before you begin

The ApplianceWatch management pack must already be installed before performing the discovery process.

Steps

1. Navigate to the Microsoft System Center Operations Manager **Monitoring** pane.
2. Select **Discovered Inventory**.
3. Select the management server on which discovery is enabled.
4. In the **Actions > Health Services Tasks** pane, select **DataONTAP: Run Discovery Task**.

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 DataONTAP Controller class.

All other periodic monitoring rules are targeted at the DataONTAP 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 **State View** windows.

Next topics

[Alerts view](#) on page 27

[Diagram view](#) on page 27

[State view](#) on page 27

[How to override monitoring rules](#) on page 28

Alerts view

You can view a list of every active alert found by ApplianceWatch. When you select an alert, you can view information about it in the **Alert Details** pane. You can launch Health Explorer in Microsoft Operations Manager to find the root of the issue.

Diagram view

You can view a pictorial representation of all of the storage and hardware currently being monitored by ApplianceWatch. You can expand the view from a storage controller to include its associated objects, allowing you to locate any issues. When you select a controller or associated object, you can view information about it in the **Detail View** window.

State 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 **State 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.

How to override monitoring rules

You can use the **Authoring** window in Microsoft Operations Manager to find and override rules as necessary. As you scale your storage configuration, you might want to adjust the frequency and timeout values of the monitoring rules.

You can view rule properties by clicking **View Knowledge** in the **Rule Details** pane. Different tabs provide information about the rule. You can override the rule by clicking the **Override** tab in the rule and following the directions in the tab window.

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 them less often, you place less burden on the Microsoft Operations Manager infrastructure, but you receive less timely alert information.

Next topics

[Types of metrics](#) on page 29

[How to launch Health Explorer for a controller](#) on page 31

Types of metrics

ApplianceWatch monitors several controller-level 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, protocols, and throughput.

Next topics

[CPU utilization](#) on page 29

[I/O operations](#) on page 30

[Protocols](#) on page 30

[Throughput](#) on page 30

CPU utilization

ApplianceWatch monitors the CPU utilization of 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

ApplianceWatch monitors the I/O operations on your storage controllers.

The I/O operations graphs display the following information:

Read latency	Displays the average read latency, in milliseconds, at specified time intervals.
Reads	Displays the read operations per second at specified time intervals.
Total latency	Displays the average total latency, in milliseconds, at specified time intervals.
Total reads/writes	Displays the total operations per second at specified time intervals.
Write latency	Displays the average write latency, in milliseconds, at specified time intervals.
Writes	Displays the write operations per second at specified time intervals.

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

Protocols

ApplianceWatch monitors the operations performed by storage controllers using different transport 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**.

Throughput

ApplianceWatch monitors the throughput of your storage controllers.

The 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**.

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 NetApp 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 the 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.

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 33

[*Implementing PRO Tips automatically*](#) on page 34

[*Implementing PRO Tips manually*](#) on page 34

Types of PRO Tips

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

The five PRO Tips and their descriptions are as follows:

Volume deduplication not enabled	This Tip is generated for a virtual machine when you have deduplication licensed but not enabled on a storage controller that hosts storage system volumes serving several virtual machines. This Tip offers automatic remediation to enable deduplication on the affected volumes.
Volume deduplication not licensed	This Tip is generated for a virtual machine when deduplication is not licensed on a storage controller that hosts storage system volumes that serve several 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.
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.

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 are 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 suggests that the virtual machine be paused by the SCVMM administrator to avoid running out of space.

Implementing PRO Tips automatically

You can configure PRO Tips to automatically implement solutions for storage-related problems in your virtual environment.

Before you begin

Before you can implement PRO Tips, you must have ApplianceWatch PRO management pack installed and the Data ONTAP 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, choose either Critical Only or Warning and Critical.
4. Click **OK**.

Implementing PRO Tips manually

You can implement PRO Tips manually to resolve one or more storage-related problem.

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 **Implement**.

Launching FilerView from ApplianceWatch

You can select storage controllers monitored by ApplianceWatch and launch FilerView so that you can change controller configuration information using the command-line 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 > DataONTAP Controller Tasks** pane, select **Launch FilerView**.

Managing NetApp Operations Manager servers with ApplianceWatch

You can monitor the state of NetApp Operations Manager servers using ApplianceWatch.

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 > DataONTAP Controller Tasks** pane, select **Manage DataONTAP DFM Servers**.
4. Add the NetApp Operations Manager server and click **Apply** and **OK**.

ApplianceWatch troubleshooting tips

You can troubleshoot common issues in ApplianceWatch and ApplianceWatch PRO.

ApplianceWatch common issues

If...	Then...
You do not see what you expect to see in the Operations Console	Perform a manual refresh.
ApplianceWatch is not acting as you expect	Look in the Microsoft Operations Manager and ApplianceWatch logs.
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.
NetApp storage systems do not appear in the Microsoft Operations Manager Network Device pane	Use the Discovery wizard in Microsoft Operations Manager to discover them.
NetApp storage systems are not found using the Discovery wizard	Ensure that SNMP is enabled on the storage controllers and that the SNMP community string in the wizard matches the one 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 DataONTAP.Discovery.Rule for the Microsoft Operations Manager management server and set the credentials for that server.
The Data ONTAP credentials tool, or other console tasks, do not start	Run the Appliancewatch MSI installer file on each computer that runs on the Microsoft Operations Manager console.
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 credentials tool. This identifies any devices that ApplianceWatch does not support.
You made changes to your storage configuration and they are not reflected in Microsoft Operations Manager	Run the Discovery rule again or wait for it to run automatically. By default, this rule runs once in a 24-hour period.

If...	Then...
A problem reoccurs, but the alert does not reappear	Open Health Explorer and select Reset Health . As a Microsoft Operations Manager best practice, do not dismiss an alert without resetting its underlying monitor.
Console tasks fail consistently	Ensure that you have the necessary credentials. Provide alternate credentials when prompted by the console task.
SNMP traps are not appearing in Microsoft Operations Manager	The non-emergency trap monitors are disabled by default. Enable them globally or by each controller.

ApplianceWatch PRO common issues

If...	Then...
PRO Tips do not appear	• Ensure that you imported the Data ONTAP PRO management pack. • Ensure that you installed the ApplianceWatch MSI installer file on every Microsoft Hyper-V host you want to monitor. • Enable the DataONTAP.PRO.Discovery.Rule for the Microsoft Operations Manager management server and set the credentials for that server.
DataONTAP.PRO.HyperV.Host objects are not present	• Ensure that you configured each Microsoft Hyper-V host in the correct Microsoft Operations Manager management group. • Ensure that you imported the Data ONTAP PRO management pack. • Ensure that you installed the ApplianceWatch MSI installer file on every Microsoft Hyper-V host you want to monitor.

If...	Then...
DataONTAP.PRO.HyperV.VirtualMachine or DataONTAP.PRO.HyperV.VirtualMachine.Storage objects are not present	• Ensure that your virtual machines use NetApp LUNs, mounted as VHD files or pass-through disks. • Ensure that your virtual machines are on and appear in Microsoft System Center Virtual Machine Manager.
DataONTAP.PRO.ManagementServer or DataONTAP.PRO.VirtualMachine.Public objects are not present	Enable the DataONTAP.PRO.Discovery.Rule for the Microsoft Operations Manager management server and set the credentials for that server.
PRO Tip implementation fails	Ensure that you have the necessary credentials.

Index

A

- alerts
 - monitoring 27
- Alerts view 27
- ApplianceWatch
 - installing 21
 - limitations 17
 - object classes 13
 - troubleshooting 41, 42
 - what it is 13
 - what you can do 15
- automatic implementation, PRO Tips 34

C

- configuring
 - SMNP 22
- CPU utilization 29

D

- decisions to make
 - installing 20
- Diagram view 27
- discovery
 - expediting 25
 - what is 25

E

- expediting
 - system discovery 25

F

- FilerView
 - launching 37

H

- Health Explorer
 - launching 31

I

- I/O operations 30

- implementing PRO Tips
 - automatically 34
 - manually 34
- installing
 - ApplianceWatch 21
 - decisions to make 20
 - requirements 19

L

- launching
 - FilerView 37
 - Health Explorer 31
- limitations
 - ApplianceWatch 17
- login credentials
 - setting 22

M

- managing
 - Operations Manager servers 39
- manual implementation, PRO Tips 34
- monitoring
 - alerts 27
 - performance 29

O

- object classes 13
- Operations Manager servers
 - managing 39
- overriding
 - rules 28

P

- performance
 - monitoring 29
- performance metrics
 - CPU utilization 29
 - I/O operations 30
 - protocols 30
 - throughput 30
- protocols 30

R

requirements

- Data ONTAP 19
- hardware 19
- installing 19
- Microsoft licenses 19
- software 19

rules

- overriding 28

S

setting

- login credentials 22

SNMP

- configuring 22

State view 27

storage systems

- Alerts view 27
- Diagram view 27

State view 27

system discovery

expediting 25

T

throughput 30

Tips, ApplianceWatch PRO

implementing automatically 34

implementing manually 34

types of 33

using 33

troubleshooting 41, 42

V

views

Alerts 27

Diagram 27

State 27