

Data ONTAP® DSM 3.0 for Windows® MPIO **Installation and Administration Guide**

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Preface

About this guide	This guide describes how to install and use the Data ONTAP® DSM for Windows® MPIO. It also explains how to troubleshoot common problems and understand log messages.
Audience	This guide is for administrators of Windows host computers and NetApp storage systems who are configuring multipath I/O (MPIO) connections.
Terminology	Storage systems that run Data ONTAP are sometimes also referred to as filers, appliances, storage appliances, or systems. The name of the graphical user interface for Data ONTAP (FilerView) reflects one of these common usages.
Command conventions	You can enter storage system commands on the system console or from any client that can obtain access to the storage system using a Telnet session.
Formatting conventions	The following table lists different character formats used in this guide to set off special information.

Formatting convention	Type of information
<i>Italic type</i>	◆ Words or characters that require special attention. ◆ Placeholders for information you must supply. For example, if the guide requires you to enter the <code>fcstest adaptername</code> command, you enter the characters “fcstest” followed by the actual name of the adapter. ◆ Book titles in cross-references.
Monospaced font	◆ Command and daemon names. ◆ Information displayed on the system console or other computer monitors. ◆ The contents of files.

Formatting convention	Type of information
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.

Keyboard conventions

This guide uses capitalization and some abbreviations to refer to the keys on the keyboard. The keys on your keyboard might not be labeled exactly as they are in this guide.

What is in this guide...	What it means...
hyphen (-)	Used to separate individual keys. For example, Ctrl-D means holding down the Ctrl key while pressing the D key.
<i>Enter</i>	Used to refer to the key that generates a carriage return; the key is named Return on some keyboards.
<i>type</i>	Used to mean pressing one or more keys on the keyboard.
<i>enter</i>	Used to mean pressing one or more keys and then pressing the Enter key.

Special messages

This guide contains special messages that are described as follows:

Note

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

Attention

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

MPIO concepts

Multipath I/O (MPIO) solutions use multiple physical paths between the storage system and the Windows host. If one or more of the components that make up a path fails, the MPIO system switches I/O to another path so that applications can still access their data.

If you have multiple paths between a storage system and a Windows host computer, you must have some type of MPIO software so that the Windows disk manager sees all of the paths as a single virtual disk. Without MPIO software, the disk manager treats each path as a separate disk, which can corrupt the data on the virtual disk.

Registry settings

The installation program for the Data ONTAP DSM for Windows MPIO sets a number of parameters to optimize performance and ensure correct failover and giveback behavior. The installation program asks for the cfmode of the storage system, and sets the parameters based on cfmode.

Standby cfmode: The Windows registry settings for storage systems with cfmode=standby include:

- ◆ HKLM\System\CurrentControlSet\Services\disk\TimeOutValue=120
- ◆ HKLM\System\CurrentControlSet\Services\mpio\Parameters\PathVerifyEnabled=1
- ◆ HKLM\System\CurrentControlSet\Services\mpio\Parameters\RetryCount=6
- ◆ HKLM\System\CurrentControlSet\Services\mpio\Parameters\PDORemovePeriod=130
- ◆ HKLM\System\CurrentControlSet\Services\mpio\Parameters\PathVerificationPeriod=30
- ◆ HKLM\System\CurrentControlSet\Services\mpio\Parameters\RetryInterval=10
- ◆ HKLM\System\CurrentControlSet\Services\ontapdsm\Parameters\LastPathRetryInterval=10
- ◆ HKLM\System\CurrentControlSet\Services\ontapdsm\Parameters\RebalanceGuardTime=180
- ◆ HKLM\System\CurrentControlSet\Services\ontapdsm\Parameters\ReservationRetryTimeout=60
- ◆ HKLM\System\CurrentControlSet\Services\ontapdsm\Parameters\ReservationTimeout=20
- ◆ HKLM\System\CurrentControlSet\Services\ontapdsm\Parameters\TestUnitReadyTimeOut=30

Other cfmodes: The Windows registry settings for storage systems with all other cfmodes values include:

- ◆ HKLM\System\CurrentControlSet\Services\disk\TimeOutValue=20
- ◆ HKLM\System\CurrentControlSet\Services\mpio\Parameters\PathVerifyEnabled=1
- ◆ HKLM\System\CurrentControlSet\Services\mpio\Parameters\RetryCount=8
- ◆ HKLM\System\CurrentControlSet\Services\mpio\Parameters\PDORemovePeriod=130
- ◆ HKLM\System\CurrentControlSet\Services\mpio\Parameters\PathVerificationPeriod=15
- ◆ HKLM\System\CurrentControlSet\Services\mpio\Parameters\RetryInterval=1

HBA settings

QLogic HBAs: For QLogic® HBAs, the DSM installation program sets the following HBA parameters:

- ◆ LinkDownTimeOut=5
- ◆ PortDownRetryCount=30

Emulex HBAs: For Emulex® HBAs, the DSM installation program sets the following HBA parameters:

- ◆ LinkTimeOut=5
- ◆ NodeTimeOut=30

DSM concepts

The Data ONTAP® DSM for Windows® MPIO is a device specific module (DSM) that works with the Microsoft Windows MPIO drivers (mpdev.sys, mpio.sys, and mpspltr.sys) to manage multiple paths between NetApp and IBM N series storage systems and Windows host computers. The DSM includes the storage-system-specific intelligence needed to correctly identify paths and to manage path failure and recovery.

IT and ITL nexus

An initiator-target (IT) nexus represents the path from the host's HBA (initiator) to the storage systems's HBA (target). An initiator-target-LUN (ITL) nexus represents one virtual disk (LUN) as seen by the DSM. The DSM groups all ITL nexuses to the same LUN together, and presents a single virtual disk to the Windows disk manager.

The ITL nexus is assigned an eight-character DSM identifier. The identifier is made up of four fields: port, bus, target, and LUN. For example, DSM ID 03000101 represents port 03, bus 00, target 01, and LUN 01. In the ONTAP DSM GUI, this value is displayed as VirtualDisk ID [3,0,1,1].

Each path (IT nexus) also has an eight-character identifier made up of four fields. The first three fields are the same as the DSM ID: port, bus, and target. The fourth field indicates the path type: 01 for non-proxy and 02 for proxy.

Failover and failback concepts

The DSM chooses the active ITL nexus between the LUN on the storage system and the Windows host based on the Load Balance Policy of the LUN, whether the path is local or proxy, the state of all possible paths, and the load on each path.

There are two load balance policies:

FailOver Only: The FailOver Only policy enables you to manually select a preferred ITL nexus. This ITL nexus will be used whenever it is available.

Auto Assigned: The Auto Assigned policy attempts to spread the load evenly across all available local paths. Whenever a path changes state, the DSM automatically rebalances the load.

The DSM differentiates between local (non-proxy) and proxy paths. Proxy paths use the cluster interconnect between controllers in an active/active configuration (storage system cluster) and are less efficient than local paths. Proxy paths are not used when local paths are available.

Windows clusters: The DSM applies special rules to Windows cluster (MSCS) configurations. After any path changes state (a new path becomes available or an existing path becomes unavailable), the DSM waits two minutes for I/O to stabilize before moving LUNs owned by a clustered Windows host to balance the load among paths.

Disabled paths: If you manually disable an ITL nexus, the DSM does not normally fail over to it. However, if the active ITL nexus fails, and there are no enabled ITL nexuses available, the DSM will try to fail over to a disabled ITL nexus. As soon as an enabled ITL nexus is available, the DSM will fail back to the enabled ITL nexus and return the ITL nexus to the disabled state.

FailOver Only example: A Windows host has four paths to a LUN, two paths to each node in an active/active storage system configuration. The load balance policy for the LUN is FailOver only. ITL_1 has been selected as the preferred ITL nexus by manually activating it.

Before path fail-over:

- ◆ ITL_1 Local - Active
- ◆ ITL_2 Proxy - Passive
- ◆ ITL_3 Proxy - Passive
- ◆ ITL_4 Local - Passive

After losing the active ITL nexus, the DSM selects the passive local ITL nexus:

- ◆ ITL_2 Proxy - Passive
- ◆ ITL_3 Proxy - Passive
- ◆ ITL_4 Local - Active

After losing both local ITL nexuses, the DSM selects the proxy ITL nexus with the lowest load:

- ◆ ITL_2 Proxy - Active
- ◆ ITL_3 Proxy - Passive

Whenever the preferred local ITL nexus becomes available again, the DSM activates that ITL nexus for I/O to the LUN.

Auto Assigned example: In this example, the Windows host again has four paths, but the load balance policy is Auto Assigned. The DSM activates the local ITL nexus that uses the path with the fewest active ITL nexuses. In this example, ITL_4 is selected. The administrator is not allowed to manually activate a path.

- ◆ ITL_1 Local - Passive
- ◆ ITL_2 Proxy - Passive
- ◆ ITL_3 Proxy - Passive
- ◆ ITL_4 Local - Active

The failover behavior is the same as for the FailOver Only example. The DSM will first select a local passive ITL nexus. If there are no local ITL nexuses, the DSM will select a proxy ITL nexus. Again, the particular ITL nexus selected depends on which available path has the lowest current load.

The AutoAssigned failback behavior is somewhat different from FailOver Only. If a proxy ITL nexus is in use, the DSM will activate the first available local ITL nexus.

If ITL_1 was the first local ITL nexus available, it would be activated:

- ◆ ITL_1 Local - Active
- ◆ ITL_2 Proxy - Passive
- ◆ ITL_3 Proxy - Passive

As additional local paths become available, the DSM rebalances paths so that active ITL nexuses are distributed evenly across paths. In this example, ITL_4 becomes available and uses a path with no active ITL nexus. ITL_1 uses a path that currently has two active ITL nexuses. The DSM activates ITL_4 so that each path has one active ITL nexus:

- ◆ ITL_1 Local - Passive
- ◆ ITL_2 Proxy - Passive
- ◆ ITL_3 Proxy - Passive
- ◆ ITL_4 Local - Active

If the paths are used by a clustered Windows host, the DSM waits two minutes after the path becomes available before balancing the load. This enables the I/O to stabilize and prevents the Windows cluster from failing over unnecessarily. Of course if a Windows cluster loses an active ITL nexus, a passive ITL nexus is activated immediately.

Topics in this chapter

Be sure to complete procedures in this chapter in the order shown. This chapter includes the following topics:

- ◆ “[Step 1: Install Windows hotfixes](#)” on page 9
- ◆ “[Step 2: Remove SnapDrive for Windows 4.1 or earlier](#)” on page 12
- ◆ “[Step 3: Install the FCP Host Utilities and HBA drivers](#)” on page 14
- ◆ “[Step 4: Obtain an MPIO license key](#)” on page 15
- ◆ “[Step 5: Run the installer program](#)” on page 16
- ◆ “[Step 6: Install SnapDrive for Windows 4.2](#)” on page 17
- ◆ “[Uninstalling the Data ONTAP DSM](#)” on page 18
- ◆ “[Using the Data ONTAP DSM repair option](#)” on page 20

Before you begin

Collect the cfmodes of your storage system. You can display the cfmodes by entering the `fcv show cfmodes` command on the storage system console.

Be sure that you have a supported combination of the following:

- ◆ Data ONTAP® software version on your storage system
- ◆ Windows® operating system version on your host computer
- ◆ SnapDrive® for Windows software version on your host computer
- ◆ FCP Host Utilities software versions on your host computer
- ◆ Fibre Channel host bus adapter model, driver, and firmware versions on your host computer
- ◆ Fibre Channel switch model and firmware version

See the FCP Host Compatibility Matrix and SnapDrive & SnapManager Compatibility Matrix at

http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/index.shtml.

Installation overview

To install the Data ONTAP DSM for Windows MPIO on a Windows host computer, you complete the following steps in the order shown. The rest of this chapter contains detailed procedures for each step.

1. Install required Windows hotfixes. This requires one or more reboots.
2. Remove SnapDrive for Windows version 4.1 or earlier if installed.

- 3.** Install the FCP Windows Host Utilities and required Fibre Channel HBA drivers.
- 4.** Obtain an MPIO license key if you do not already have one. If you have a license key for the MPIO component of SnapDrive for Windows 4.1 or earlier, you can use that key.
- 5.** Run the installer program for the Data ONTAP DSM for Windows MPIO.
- 6.** Optionally install SnapDrive for Windows version 4.2 or later.

Step 1: Install Windows hotfixes

Matrix lists hotfixes For the current list of hotfixes required for your version of Windows, see the FCP Host Compatibility Matrix at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/index.shtml.

As of the time of publication, the following hotfixes are required.

Windows 2000 SP4:

Q293778	Q325040
Q815198	Q815616
Q867818	Q885294

Windows 2003 SP1 x86:

Q833167	Q867818
Q886652	Q886800
Q887532	Q891957
Q898790	Q902837
Q908249	Q911030
Q912848	Q916048
Q922772	

Windows 2003 SP1 x64:

Q891957	Q898790
Q902837	Q908249
Q911030	Q912848
Q916048	Q922772

Windows 2003 SP1 Itanium:

Q833167	Q867818
Q886652	Q886800
Q887532	Q891957
Q898790	Q902837

Q908249	Q911030
Q912848	Q916048
Q922772	

Windows 2003 R2 x86:

Q833167	Q867818
Q886652	Q886800
Q887532	Q891957
Q898790	Q902837
Q908249	Q911030
Q916048	Q922772

Windows 2003 R2 x64:

Q891957	Q898790
Q902837	Q908249
Q911030	Q916048
Q922772	

Windows 2003 R2 Itanium:

Q833167	Q867818
Q886652	Q886800
Q887532	Q891957
Q898790	Q902837
Q908249	Q911030
Q916048	Q922772

Downloading fixes

Some of the required hotfixes can be directly downloaded from the Microsoft download site:

<http://www.microsoft.com/downloads/search.aspx?displaylang=en>

Enter the hotfix number in search box and select Go.

Note that some hotfixes must be requested from Microsoft support. They are not available for direct download.

Installing fixes

Follow the instructions provided by Microsoft to install the hotfixes. Some of the hotfixes require a reboot of your Windows host.

When you run the installer for the Data ONTAP DSM, it will list any missing hotfixes. You must add the required hotfixes before the installer will complete the installation process.

Step 2: Remove SnapDrive for Windows 4.1 or earlier

SnapDrive 4.2 required

The Data ONTAP DSM for Windows MPIO works with SnapDrive for Windows version 4.2 and later. If you have an earlier version of SnapDrive on your Windows host, you must remove it before the DSM can be installed.

There are two components of SnapDrive for Windows: MPIO and LUN management. You only need to remove the LUN management component. The installer for the Data ONTAP DSM will upgrade the MPIO component of SnapDrive.

Before removing SnapDrive

Be sure you have a record of the SnapDrive for Windows license keys before removing SnapDrive from your host. There are two license keys: one for the LUN management component and one for the MPIO component.

To view the license keys, complete the following steps:

Step	Action
1	Open the Microsoft Management Console (MMC).
2	Expand the Storage option in the left pane of the MMC window.
3	Select SnapDrive, then right-click SnapDrive and select SnapDrive Licenses.
4	Record the license values.

Removing SnapDrive

Use the SnapDrive installation program from the SnapDrive CD or from the local hard drive to remove SnapDrive components. Do not use the Windows Add or Remove Programs utility.

If you have the MPIO component installed, you must reboot your Windows host to complete the removal.

To remove SnapDrive for Windows, complete the following steps:

Step	Action
1	Navigate to the folder containing the SnapDrive installation package from which you did the installation, or insert the SnapDrive CD.
2	Launch the SnapDrive executable, which guides you through the uninstall procedure to remove the LUN management component. For more information, see the SnapDrive for Windows <i>Installation and Administration Guide</i> for your version of SnapDrive.

Step 3: Install the FCP Host Utilities and HBA drivers

FCP Host Utilities 3.0 or later required

Install the FCP Windows Host Utilities including the supported driver version for your FCP host bus adapters.

For the current Host Utilities version, see the FCP Host Compatibility Matrix at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/index.shtml.

If you have a version of the FCP Windows Host Attach Kit prior to 3.0, be sure to remove it before installing the Host Utilities. If you have the Host Attach Kit 3.0, the FCP Host Utilities installer can upgrade the Host Attach Kit software.

Step 4: Obtain an MPIO license key

Use key from SnapDrive MPIO

If you had a previous version of SnapDrive for Windows with an MPIO license, you can use that license key with the Data ONTAP DSM for Windows MPIO. You should have recorded the license key in “[Step 2: Remove SnapDrive for Windows 4.1 or earlier](#)” on page 12 before removing SnapDrive.

Get new key

To obtain a license key for a new copy of the Data ONTAP DSM for Windows MPIO, go to the NOW Protocol License page at <https://now.netapp.com/eservice/agree.do>.

In the Show me all field, select DSM-MPIO-WIN, enter your company name, and then click Go.

Record the appropriate license key displayed.

Step 5: Run the installer program

- Choose interactive or silent install

You can choose either an interactive installation or a silent (unattended) installation. This section describes the interactive installation. If you prefer the silent installation, see [Appendix B](#) on page 51.
- Before you begin

Verify that you have a license key and that you have completed the previous steps in this chapter. Verify that you know the cfmode setting of the storage system.

You should back up any critical data on your Windows host before installing.

A reboot of the Windows host is required to complete the installation.

Running the installer

Complete the following steps to install the Data ONTAP DSM for Windows MPIO:

Step	Action
1	Download or copy the appropriate installation file for your Windows host’s processor architecture.
2	Launch the installer program and follow the instructions on the screen.
3	Enter the MPIO license key when prompted.
4	Select the cfmode of the storage system when prompted.
5	If prompted, click Yes to reboot the Windows host and complete the installation.

Note

If the installer reports a problem, such as a required hotfix not found, correct the problem and run the installer again.

Step 6: Install SnapDrive for Windows 4.2

Version 4.2 or later required

After completing the installation of the Data ONTAP DSM for Windows MPIO, you can optionally install SnapDrive for Windows. SnapDrive version 4.2 or later is required on a Windows host with the Data ONTAP DSM installed.

For the current SnapDrive for Windows version, see the SnapDrive & SnapManager Compatibility Matrix at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/index.shtml.

Uninstalling the Data ONTAP DSM

Typical uninstall In most cases you can use the Add or Remove Programs applet. Select the Data ONTAP DSM for Windows MPIO and click Remove. You will have to reboot your Windows host computer after removing the DSM.

Force removal of MPIO To prevent accidentally removing the Windows MPIO components needed by another multipathing solution when removing the Data ONTAP DSM (the installer cannot reliably detect a DSM that is not currently active), the installer does not remove all Windows MPIO components. The Data ONTAP DSM for Windows MPIO uses Windows MPIO version 1.17. If you plan to install a program that needs an earlier version of the Windows MPIO code, such as SnapDrive for Windows 4.1 or earlier, you need to force the removal of the MPIO components when removing the Data ONTAP DSM.

Caution If you have other vendors' multipathing solutions installed, this procedure will prevent multipathing from working until the multipath software is reinstalled.

Never use multiple paths to storage unless you have multipathing software installed and running.

To remove the Data ONTAP DSM and force the removal of all Windows MPIO components, complete the following steps.

Step	Action
1	Quiesce host I/O and stop any applications accessing LUNs on the storage system.
2	Open a Windows command line and change to the directory where the Data ONTAP DSM setup program is located.
3	Enter the following command: <code>installer.exe /x /v"FORCE_REMOVE_MPIO=1"</code> <i>installer.exe</i> is the DSM installation program for your Windows host's processor architecture.

Step	Action
4	Reboot the Windows computer when prompted.
5	Reinstall any other multipathing software solutions.
6	Resume I/O to SAN storage.

Using the Data ONTAP DSM repair option

About the repair option

The installer for the Data ONTAP DSM for Windows MPIO includes a repair option. The repair option is available from the Windows Add or Remove Programs applet.

The repair option updates the Windows registry settings and puts new copies of the DSM and MPIO driver files into the Windows driver folder.

Use for changing storage system cfmode

The DSM uses different time out parameters depending on the cfmode setting of the storage system. If you change the cfmode setting, be sure to run the repair option and select the new cfmode setting.

Running the repair option

To run the DSM repair option, complete the following steps. A reboot is required.

Step	Action
1	Open the Windows Add or Remove Programs applet.
2	Select the Data ONTAP DSM for Windows MPIO, and click Change.
3	Select the Repair option.
4	Select the cfmode of the storage system.
5	Following the instructions on the screen and reboot the Windows host when prompted.

Managing the DSM using the GUI

Topics in this chapter

This chapter includes the following topics:

- ◆ “[Viewing LUNs and paths](#)” on page 22
- ◆ “[Changing load balance policies](#)” on page 24
- ◆ “[Changing the active path](#)” on page 25
- ◆ “[Enabling and disabling paths](#)” on page 26

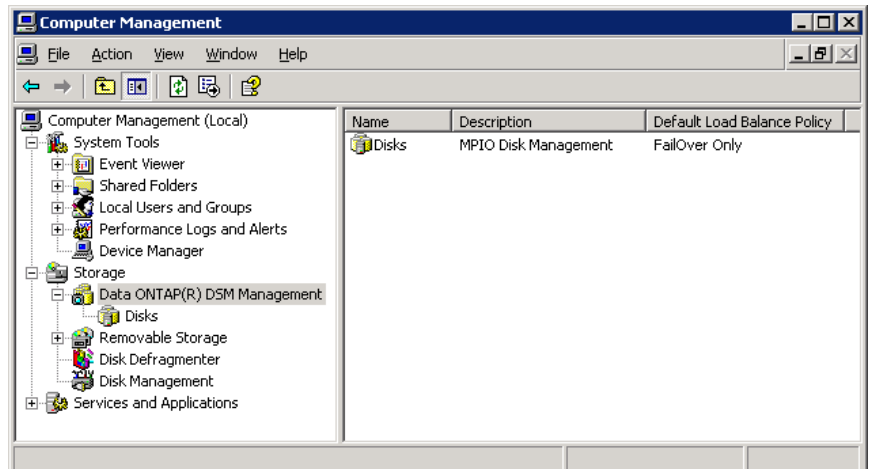
Management options

You can manage the Data ONTAP DSM for Windows MPIO using either a graphical user interface (GUI) or a command line interface (CLI). This chapter describes how to complete typical management tasks using the GUI. If you prefer to use a CLI, see [Chapter 4](#) on page 27.

Launching the GUI

Open the Windows Computer Management utility (Microsoft Management Console). Select Start > Administrative Tools > Computer Management.

Expand the Storage option in the left pane of the Microsoft Management Console (MMC), and then select Data Ontap DSM Management. The DSM GUI is displayed.



By default, the GUI manages the local Windows host. To manage the DSM on another Windows host on your network, select Action > Connect to another computer.

Viewing LUNs and paths

Viewing LUNs (virtual disks)

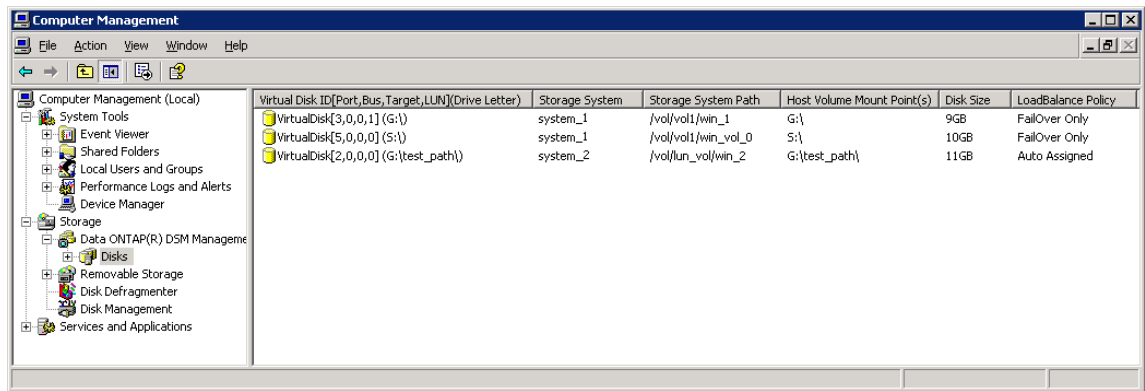
In the DSM GUI, expand Data ONTAP DSM Management, and then select Disks in the left pane.

If you add a new LUN on a storage system and it does not appear in the list, run Action > Rescan Disks in Windows Disk Management.

Each LUN is displayed as a virtual disk. Fields include:

- ◆ Name of the storage system
- ◆ Volume path to the LUN on the storage system
- ◆ Mount point or drive letter on the Windows host
- ◆ Virtual disk size
- ◆ Load balance policy

The following example shows three LUNs.



Virtual Disk ID[Port,Bus,Target,LUN](Drive Letter)	Storage System	Storage System Path	Host Volume Mount Point(s)	Disk Size	LoadBalance Policy
VirtualDisk{3,0,0,1} (G:\)	system_1	/vol/vol1/win_1	G:\	9GB	FailOver Only
VirtualDisk{5,0,0,0} (S:\)	system_1	/vol/vol1/win_vol_0	S:\	10GB	FailOver Only
VirtualDisk{2,0,0,0} (G:\test_path\)	system_2	/vol/lun_vol/win_2	G:\test_path\	11GB	Auto Assigned

Viewing paths

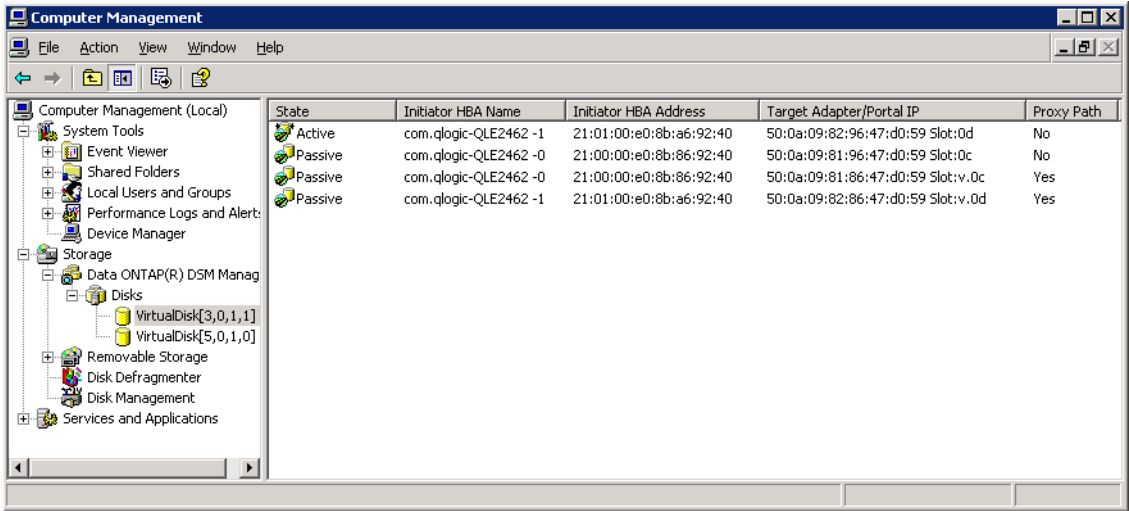
In the DSM GUI, expand Data ONTAP DSM Management, expand Disks, and then select an individual disk in the left pane.

All paths to the LUN are displayed. Fields include:

- ◆ State of the virtual disk, including Active, Pending Active, Passive, Pending Passive, Disabled, or Failed
- ◆ Initiator HBA name
- ◆ Initiator HBA address

- ◆ Target adapter port
- ◆ Whether the path is a proxy path

The following example shows an FCP virtual disk with four paths:



The screenshot shows the 'Computer Management' window with the 'Storage' section expanded. A table displays the configuration for four paths to a virtual disk. The table has columns for State, Initiator HBA Name, Initiator HBA Address, Target Adapter/Portal IP, and Proxy Path.

State	Initiator HBA Name	Initiator HBA Address	Target Adapter/Portal IP	Proxy Path
Active	com.qlogic-QLE2462 -1	21:01:00:e0:8b:a6:92:40	50:0a:09:82:96:47:d0:59 Slot:0d	No
Passive	com.qlogic-QLE2462 -0	21:00:00:e0:8b:86:92:40	50:0a:09:81:96:47:d0:59 Slot:0c	No
Passive	com.qlogic-QLE2462 -0	21:00:00:e0:8b:86:92:40	50:0a:09:81:86:47:d0:59 Slot:v.0c	Yes
Passive	com.qlogic-QLE2462 -1	21:01:00:e0:8b:a6:92:40	50:0a:09:82:86:47:d0:59 Slot:v.0d	Yes

Changing load balance policies

Changing the default

In the DSM GUI, select Data ONTAP DSM Management. From the Action menu, select “Set default Load Balance Policy to Auto Assigned” or select “Set default Load Balance Policy to Fail Over”.

The default load balance policy applies only to new virtual disks. To change the policy for an existing virtual disk, see the next section.

Changing the policy for a single LUN

In the DSM GUI, expand Data ONTAP DSM Management, and then select Disks in the left pane. Select a disk, and then from the Action menu select “Set Policy to Auto Assigned” or select “Set Policy to Failover.”

Changing the active path

Making a path active

In the DSM GUI, expand Data ONTAP DSM Management, expand Disks in the left pane, and then select a disk.

In the right pane, select a Passive path and then from the Action menu select Activate.

Note

You can make a Passive path Active only when the load balance policy is Fail Over. With policy Auto Assigned, you can disable the Active path, forcing a Passive path to become Active.

Enabling and disabling paths

Enabling a path

In the DSM GUI, expand Data ONTAP DSM Management, expand Disks in the left pane, and then select a disk.

In the right pane, select a Disabled path and then from the Action menu select Enable.

Disabling a path

In the DSM GUI, expand Data ONTAP DSM Management, expand Disks in the left pane, and then select a disk.

In the right pane, select a Passive path and then from the Action menu select Disable.

If there are multiple passive paths that use the same initiator or HBA port, you can disable all of them at once by selecting Disable all paths for this initiator.

Note

You cannot disable the active path. You must first activate another path so that the path you want to disable becomes a passive path.

Managing the DSM using the CLI

Topics in this chapter

This chapter includes the following topics:

- ◆ “[Using dsmcli dsm](#)” on page 28
- ◆ “[Using dsmcli lun](#)” on page 29
- ◆ “[Using dsmcli path](#)” on page 31

Management options

You can manage the Data ONTAP DSM for Windows MPIO using either a command line interface (CLI) or a graphical user interface (GUI). This chapter describes how to complete typical management tasks using the CLI. If you prefer to use a GUI, see [Chapter 3](#) on page 21.

Main commands

The CLI uses the `dsmcli` command. It has three main options:

- ◆ `dsmcli dsm` - displays information about installed device specific modules and displays or sets the default load balance policy.
- ◆ `dsmcli lun` - displays information about LUNs managed by the DSM and sets the load balance policy for individual LUNs.
- ◆ `dsmcli path` - lists the failover status of each LUN, enables and disables paths, and sets a passive path to active.

The following sections describe each of the `dsmcli` options.

Using dsmcli dsm

Getting DSM information

These commands list information about the DSM.

Syntax:

```
dsmcli dsm { list | version }
```

Examples:

```
C:\>dsmcli dsm list
```

```
Number of DSM registered with MPIO is 1
```

```
List of DSMs registered with MPIO:
```

```
    "Ontap Multi-Path Device Specific Module"
```

```
C:\>dsmcli dsm version
```

```
DSM MGMT Dll version 3.0.60917.2305 built on 09/17/2006 23:11:38
```

```
ONTAPDSM Driver    version 3.0.60917.2305 built on 09/17/2006
```

```
23:11:34
```

```
MSFT MPIO Driver version 1.17.3790.1759 built on 09/17/2006
```

```
23:11:34
```

Setting the default load balance policy

The default load balance policy applies only to newly created virtual disks.

Values are fail over (FO) or auto assign (AA). To change the policy for an existing virtual disk, use the `dsmcli lun setlbp` command.

Syntax:

```
dsmcli dsm getdefaultlbp
```

```
dsmcli dsm setdefaultlbp -l { FO | AA }
```

Examples:

```
C:\>dsmcli dsm getdefaultlbp
```

```
dsmcli:The default load balance policy for the dsm is AUTO ASSIGNED
```

```
C:\>dsmcli dsm setdefaultlbp -l FO
```

```
dsmcli:The default load balance policy for the dsm is set to  
FAILOVER.
```

Using dsmcli lun

Getting LUN information

These commands display information about the LUNs (virtual disks) mapped to the Windows host.

If you add a LUN on a storage system and it is not listed, rescan disks using the Windows disk manager and then run the `dsmcli` command again.

Syntax:

```
dsmcli lun { list | attributes }
```

Examples:

```
C:\>dsmcli lun list
Disks managed by  ONTAPDSM
C4e6hJ7LhYkD      Ontap Multi-Path Device Specific Module
C4e6SJ7LbmT1      Ontap Multi-Path Device Specific Module
C4e6SJ7KVZuS      Ontap Multi-Path Device Specific Module
C4e6hJ7S5KLg      Ontap Multi-Path Device Specific Module

C:\>dsmcli lun attributes
Disks managed by  ONTAPDSM
SerialNumber      Storage System  Storage System Path  MountPath
*****           *****
C4e6hJ7LhYkD      system_1        /vol/lun_vol/win_2    G:\test_path\
C4e6SJ7LbmT1      system_2        /vol/vol1/win_1       G:\
C4e6SJ7KVZuS      system_2        /vol/vol1/win_vol_0   S:\
C4e6hJ7S5KLg      system_1        /vol/lun_vol/win_1    M:\
```

Changing the load balance policy

This command changes the load balance policy for a single LUN (virtual disk). Values are fail over (FO) or auto assign (AA). The serial number can be displayed using the commands above.

Syntax:

```
dsmcli lun setlbp -l { FO | AA }
                    {-s serial_number | - d drive_letter}
```

Note

Note that the drive letter must *not* include a colon (:).

Examples:

```
C:\>dsmcli lun setlbp -l FO -s C4e6hJ57MGSS  
dsmcli:The load balance policy for the lun is set to  FAILOVER
```

```
C:\>dsmcli lun setlbp -l AA -d L  
dsmcli:The load balance policy for the lun is set to  AUTO ASSIGNED
```

Using dsmcli path

Displaying path information

This command displays all of the paths for all LUNs (virtual disks) mapped to the Windows host.

Syntax:

```
dsmcli path list
```

Example: (Output for a single LUN shown)

```
C:\>dsmcli path list
dsmcli:Paths managed by ONTAPDSM are listed below
Serial Number: C4e6hJ57MGSS
MPIO Paths: 2
Load Balance Policy:  AUTO ASSIGNED
```

```
Dsm Id:          0x3000100
SCSI Address:
  Scsiport : 3
  HostPathId : 0
  Targetid : 1
  lun : 0
Path State:      PASSIVE
```

```
Dsm Id:          0x3000000
SCSI Address:
  Scsiport : 3
  HostPathId : 0
  Targetid : 0
  lun : 0
Path State:      ACTIVE
```

Changing path status

These commands change the status of the specified path.

Note

You can make a Passive path Active only when the load balance policy is Fail Over. With policy Auto Assigned, you can disable the Active path, forcing a Passive path to become Active. You cannot disable a path if no other path is available to take over; there must always be an active path.

Syntax:

```
dsmcli path { enable | disable | active } -p Dsm_Id
```

Examples:

```
C:\>dsmcli path active -p 0x3000002  
dsmcli:Path 0x03000002 is set to ACTIVE state
```

```
C:\>dsmcli path disable -p 0x3000002  
dsmcli:Path 0x03000002 is DISABLED
```

```
C:\>dsmcli path enable -p 0x3000002  
dsmcli:Path 0x03000002 is ENABLED
```

Contents of appendix

This appendix contains troubleshooting information to help you resolve typical problems with installation and operation of the Data ONTAP DSM for Windows MPIO. This appendix includes the following topics:

- ◆ “[Windows event log entries](#)” on page 34
- ◆ “[Troubleshooting installation problems](#)” on page 47
- ◆ “[Troubleshooting GUI and CLI problems](#)” on page 48
- ◆ “[Troubleshooting failover problems](#)” on page 49

Windows event log entries

About event log entries

The DSM writes event log entries to the standard Windows event logs. Because of the limitations on the data that can be written to the event log, the details of some events are written in a raw format. The following section explains how to interpret the data in these events.

Most event messages are in text format and do not require special interpretation.

Event data section encoding

Some events include raw data in their data sections. This enables the event to include more information than would be possible using text data. These events have the following data fields at the offsets shown:

Byte Offset (Hex)	Data
0x28 - 0x2B	DsmID
0x2C - 0x2F	PathID
0x30 – 0x33	NT Status Code
0x34 – 0x37	SrbFlags
0x38 – 0x39	Function
0x3A	SRB Status
0x3B	SCSI Status
0x3C	SenseKey
0x3D	ASC
0x3E	Reserved
0x40-0x4F	CDB

ONTAPDSM log messages

The following messages can be written to the Windows system event log. The source of these messages is ontapdsm. The severity (Sev) values are listed as **I** for informational, **W** for warning, or **E** for error.

ID	Sev	Explanation
61002	I	The DSM successfully initialized. Issued once each time the driver starts.
61003	E	Reported when MPIO components cannot be located. Reinstall the DSM.
61004	W	The query did not return a serial number for a LUN. The DSM cannot manage the LUN.
61005	E	The DSM could not obtain required information about the specified LUN, such as the storage system name and LUN path. The DSM cannot manage the LUN.
61006	I	The specified LUN uses an unsupported protocol. The DSM cannot manage the LUN.
61007	I	Issued once each time the DSM is unloaded.
61018	I	The specified DSM ID (ITL nexus) is now active.
61019	I	The administrative request to make specified DSM ID (ITL nexus) active failed.
61023	I	The default load balance policy for new virtual disks changed to the specified value.
61026	E	The storage system is running a version of Data ONTAP software that is not compatible with the DSM version.
61034	W	The specified LUN on the specified storage system disconnected. All paths to the LUN have been removed.
61035	I	The DSM discovered the first path to a new LUN. The LUN, storage system, and DSM ID (ITL nexus) are listed.
61040	E	An earlier revision of the Windows MPIO drivers were found on the Windows system than is required by the DSM. Reinstall the DSM.
61041	I	The DSM discovered a new initiator-target-LUN (ITL) nexus and assigned it the specified DSM identifier. The WWPN of the target port is at byte offset 0x28 in the event text data.
61045	I	This information is used for diagnosing problems with host bus adapters.

ID	Sev	Explanation
61048	I	The specified DSM ID (ITL nexus) has been associated with the specified initiator-target nexus (path).
61049	W	There are no paths available to the specified LUN. The DSM requests path verification from the MPIO driver.
61051	W	The target cannot be reached on the specified DSM ID (ITL nexus).
61052	I	The specified DSM ID (ITL nexus) to the target is now working.
61053	E	The specified nexus failed. This was the last remaining path to a target. The DSM requests path verification from the MPIO driver. This event is reported during failover processing.
61054	W	All DSM IDs (ITL nexuses) in the specified nexus are marked as failed because the target is not responding. None of the member DSM IDs will be considered for I/O until at least one DSM ID passes path verification. Verification is started for all DSM IDs in the nexus.
61055	I	The specified DSM ID (ITL nexus) was enabled. It must still be activated before it is used for I/O.
61056	I	The specified DSM ID (ITL nexus) has been disabled and will not be selected for I/O.
61057	E	The administrative request to enable the specified DSM ID (ITL nexus) failed.
61058	E	The administrative request to disable the specified DSM ID (ITL nexus) failed. The last available ITL nexus cannot be disabled.
61059	I	The DSM requested that the MPIO driver stop using this DSM ID (ITL nexus) and drain its queue. Similar to disabling the DSM ID, but not persistent across host reboot.
61060	I	The MPIO driver did not allow throttling of I/O on the specified DSM ID (ITL nexus).
61061	I	The throttling of I/O on the specified DSM ID (ITL nexus) was removed. I/O resumes on the DSM ID.

ID	Sev	Explanation
61062	I	Unable to remove the throttle on the specified DSM ID (ITL nexus).
61063	I	The specified protocol was enabled for the DSM.
61064	I	The specified protocol was disabled for the DSM.
61068	E	The attempt to change the load balance policy for the specified LUNs failed.
61070	I	The path to a target has been removed for the specified IT nexus. There are no other DSM IDs (ITL nexuses) to the target port of the nexus, so the nexus is removed.
61071	I	The specified DSM ID (ITL nexus) has been activated and will be used for I/O.
61072	I	The specified DSM ID (ITL nexus) is no longer active. It remains a passive ITL nexus that can be used if the active ITL nexus fails.
61073	I	The specified DSM ID (ITL nexus) failed to transition to the active state as requested by the administrator.
61074	I	The specified DSM ID (ITL nexus) failed to transition to the passive state. To make the active DSM ID passive, activate a passive DSM ID.
61075	W	The specified active DSM ID (ITL nexus) was replaced by the new active DSM ID.
61076	E	The specified DSM ID (ITL nexus) reported an I/O error. The I/O will be retried. For information on decoding the data section of the event, see “ Event data section encoding ” on page 34.
61077	W	The specified DSM ID (ITL nexus) failed. The DSM requests path verification from the MPIO driver. The DSM activates a new ITL nexus.
61078	I	The specified LUN has failed over to the new DSM ID (ITL nexus) specified.

ID	Sev	Explanation
61079	W	The specified IT nexus was reported as failed, but it recovered before failover processing could complete. The original nexus will continue to be used.
61080	W	The storage system reported a queue full error for the specified DSM ID (ITL nexus). The target port has reached its limit for outstanding requests. The I/O will be retried. For information on decoding the data section of the event, see “Event data section encoding” on page 34.
61081	E	The storage system reported a write error for I/O on the specified DSM ID (ITL nexus). The I/O will be retried. For information on decoding the data section of the event, see “Event data section encoding” on page 34.
61082	E	The storage system reported an invalid command for an I/O operation on the specified DSM ID (ITL nexus). The I/O is not retried. For information on decoding the data section of the event, see “Event data section encoding” on page 34.
61083	E	The storage system reported the logical block address for an I/O operation on the specified DSM ID (ITL nexus) is out of range. For information on decoding the data section of the event, see “Event data section encoding” on page 34. Contact NetApp customer support to report this error.
61084	E	The storage system reported an invalid field error for an I/O operation on the specified DSM ID (ITL nexus). The I/O is not retried. For information on decoding the data section of the event, see “Event data section encoding” on page 34.
61085	E	The storage system reported that the requested LUN does not exist. The LUN may have been deleted on the storage system by the administrator. This error can also occur during storage system giveback. Check the event data section for additional information.
61086	E	The storage system reported an invalid parameter list error for an I/O operation on the specified DSM ID (ITL nexus). The I/O is not retried. For information on decoding the data section of the event, see “Event data section encoding” on page 34.

ID	Sev	Explanation
61087	E	The DSM attempted to release a persistent reservation on the specified DSM ID (ITL nexus) for a LUN that it does not own. The I/O is not retried.
61088	E	The storage system reported an invalid parameter list length error for an I/O operation on the specified DSM ID (ITL nexus). The I/O is not retried. For information on decoding the data section of the event, see “ Event data section encoding ” on page 34.
61089	E	The storage system reported an invalid task attribute error for an I/O operation on the specified DSM ID (ITL nexus). For information on decoding the data section of the event, see “ Event data section encoding ” on page 34.
61090	E	The storage system reported a configuration problem with the LUN on the specified DSM ID (ITL nexus). The I/O is not retried. For information on decoding the data section of the event, see “ Event data section encoding ” on page 34.
61091	W	The LUN on the specified DSM ID (ITL nexus) could not be reached because of problems with the storage system interconnect. The I/O is retried on another DSM ID. For information on decoding the data section of the event, see “ Event data section encoding ” on page 34.
61092	W	The storage system reported that the LUN on the specified DSM ID (ITL nexus) was not ready. The I/O will be retried. Check the event data section for additional information.
61093	W	The LUN on the specified DSM ID (ITL nexus) is not currently available because it is being formatted. The I/O will be retried. For information on decoding the data section of the event, see “ Event data section encoding ” on page 34.
61094	E	The storage system reported that the LUN on the specified DSM ID (ITL nexus) is not available. The I/O will be retried on another DSM ID. Check the event data section for additional information.

ID	Sev	Explanation
61095	W	The LUN on the specified DSM ID (ITL nexus) is not ready, but is in the process of becoming ready. The I/O will be retried. For information on decoding the data section of the event, see “Event data section encoding” on page 34.
61096	E	The storage system reported that the LUN on the specified DSM ID (ITL nexus) is offline. The I/O will be retried. For information on decoding the data section of the event, see “Event data section encoding” on page 34. Check the LUN status on the storage system and bring online.
61097	I	The storage system reported that the LUN on the specified DSM ID (ITL nexus) was reset. The I/O will be retried immediately. For information on decoding the data section of the event, see “Event data section encoding” on page 34.
61098	I	The DSM lost its SCSI reservation to the LUN on the specified DSM ID (ITL nexus). For information on decoding the data section of the event, see “Event data section encoding” on page 34.
61099	I	The storage system reported that the SCSI reservations to the LUN on the specified DSM ID (ITL nexus) were released. For information on decoding the data section of the event, see “Event data section encoding” on page 34.
61100	I	The storage system reported that the registration of the specified DSM ID (ITL nexus) was cleared. For information on decoding the data section of the event, see “Event data section encoding” on page 34.
61102	I	The storage system reported that a volume was created on the LUN in the specified DSM ID (ITL nexus). For information on decoding the data section of the event, see “Event data section encoding” on page 34.
61103	I	The storage system reported that a change in the availability of the LUN in the specified DSM ID (ITL nexus). For information on decoding the data section of the event, see “Event data section encoding” on page 34.

ID	Sev	Explanation
61104	E	The storage system reported an attempt to write to the read-only LUN in the specified DSM ID (ITL nexus). For information on decoding the data section of the event, see “Event data section encoding” on page 34.
61105	E	The storage system reported a write error on the LUN in the specified DSM ID (ITL nexus). The I/O will be retried. For information on decoding the data section of the event, see “Event data section encoding” on page 34. Check the storage system log for disk errors.
61106	E	The storage system reported a write error on the LUN in the specified DSM ID (ITL nexus) and was unable to reallocate the bad blocks. The I/O will be retried. For information on decoding the data section of the event, see “Event data section encoding” on page 34. Check the storage system log for disk errors.
61107	E	The storage system reported that one of the disks used for the LUN in the specified DSM ID (ITL nexus) was not supported. The I/O is not retried. For information on decoding the data section of the event, see “Event data section encoding” on page 34. Check the storage system log for disk errors.
61108	E	The storage system reported a high error rate for the LUN in the specified DSM ID (ITL nexus). The I/O will be retried. For information on decoding the data section of the event, see “Event data section encoding” on page 34. Check the storage system log for disk errors.
61109	W	The storage system aborted a SCSI command on the specified DSM ID (ITL nexus). The I/O will be retried. For information on decoding the data section of the event, see “Event data section encoding” on page 34. This is a common event during storage system giveback.
61110	E	The DSM was unable to communicate with the LUN on the specified DSM ID (ITL nexus). The DSM will try another path to the LUN. The data section of the event contains the NTSTATUS code.

ID	Sev	Explanation
61111	I	The DSM detected a buffer error for the LUN on the specified DSM ID (ITL nexus). The I/O is not retried. The data section of the event contains the NTSTATUS code.
61112	W	The DSM detected that the specified DSM ID (ITL nexus) is pending deletion while processing an I/O operation. The DSM will try another path to the LUN.
61113	W	The DSM detected an invalid device request on the specified DSM ID (ITL nexus). The I/O is not retried. Check the event data section for additional information.
61114	I	The DSM found the queue for the specified DSM ID (ITL nexus) frozen. The queue is now unfrozen and the I/O will be retried.
61115	E	The DSM found the queue for the specified DSM ID (ITL nexus) frozen. The DSM is unable to unfreeze the queue. The I/O will be retried.
61116	E	The port servicing the specified DSM ID (ITL nexus) did not finish processing an I/O request.
61117	I	The port servicing the specified DSM ID (ITL nexus) cancelled an I/O operation successfully.
61118	W	The port servicing the specified DSM ID (ITL nexus) was unable to cancel an I/O operation because the I/O operation could not be located.
61119	W	The port servicing the specified DSM ID (ITL nexus) reported that it was too busy to accept an I/O request. The I/O request will be retried.
61120	W	The port servicing the specified DSM ID (ITL nexus) reported that an I/O operation request was not supported.
61121	E	The port servicing the specified DSM ID (ITL nexus) reported that the bus is no longer valid.
61122	E	The port servicing the specified DSM ID (ITL nexus) reported that the LUN is no longer present.
61123	E	The port servicing the specified DSM ID (ITL nexus) reported that an I/O operation timed out.

ID	Sev	Explanation
61124	E	The port servicing the specified DSM ID (ITL nexus) reported that the LUN did not respond to selection.
61125	E	The port servicing the specified DSM ID (ITL nexus) reported that an I/O command timed out.
61126	E	The port servicing the specified DSM ID (ITL nexus) reported that the storage system rejected a message. This response is normally returned only for SRB_FUNCTION_TERMINATE_IO requests.
61127	W	The port servicing the specified DSM ID (ITL nexus) reported a bus reset while processing an I/O request. The request will be retried.
61128	E	The port servicing the specified DSM ID (ITL nexus) reported a parity error. The request will be retried.
61129	E	The port servicing the specified DSM ID (ITL nexus) failed a request-sense command. The request will be retried.
61130	E	The port servicing the specified DSM ID (ITL nexus) did not respond to an I/O request.
61131	E	The port servicing the specified DSM ID (ITL nexus) disconnected unexpectedly.
61132	E	The port servicing the specified DSM ID (ITL nexus) reported an illegal phase sequence failure.
61133	E	The port servicing the specified DSM ID (ITL nexus) reported an improper SRB request.
61134	I	The port servicing the specified DSM ID (ITL nexus) reported that a request for status was stopped.
61135	W	The port servicing the specified DSM ID (ITL nexus) reported that the LUN is invalid.
61136	E	The port servicing the specified DSM ID (ITL nexus) reported that the storage system is no longer available.
61137	W	The port servicing the specified DSM ID (ITL nexus) reported a bad function request in an I/O request.

ID	Sev	Explanation
61138	W	The port servicing the specified DSM ID (ITL nexus) reported that an I/O request completed with an error and that the SCSI INITIATE RECOVERY message was received.
61139	E	The port servicing the specified DSM ID (ITL nexus) reported that the storage system is not powered.
61140	W	The storage system reported that the LUN on the specified DSM ID (ITL nexus) is busy. The request will be retried.
61141	W	The storage system reported that the queue for the LUN on the specified DSM ID (ITL nexus) is full. The request will be retried.
61142	E	The specified nexus (path) failed.
61143	I	The specified nexus (path) is working normally.
61144	W	The specified DSM ID (ITL nexus) was used for an I/O operation, because there we no paths without I/O errors.
61145	W	The specified nexus (path) is degraded. One or more DSM IDs (ITL nexuses) have lost connectivity with the storage system.
61146	I	The specified DSM ID (ITL nexus) is reserved by host clustering software.
61147	I	The reservation for the specified DSM ID (ITL nexus) was released.
61148	W	The DSM has chosen the specified DSM ID (ITL nexus) even though it is on a degraded IT nexus. All other IT nexuses are degraded or processing I/O failures.
61149	W	The DSM has chosen the specified DSM ID (ITL nexus) even though it is disabled. The DSM will switch from the disabled path as soon as an enabled DSM ID is available.
61150	E	The DSM has determined that no alternate paths exist for the specified LUN on the specified storage system. The LUN is in a severely degraded state and I/O may fail.

ID	Sev	Explanation
61151	W	The DSM is retrying I/O on the specified DSM ID (ITL nexus). The retry was requested to move a reservation so that outstanding I/O would not error.
61152	I	The specified DSM ID (ITL nexus) is recovering from an I/O error. This event is reported during the first phase of error recovery, when path verification is requested after a failover.
61153	I	The specified DSM ID (ITL nexus) has completed error recovery from an I/O error. This event is reported as part of the second phase of error recovery after an I/O error. This event indicates that the ITL nexus is now operational.
61154	I	The specified DSM ID (ITL nexus) has reestablished communication for its IT nexus (path). The specified path is now normal. An ITL on a nexus which previously had experienced a path verification failure has detected that the nexus is now working. All of the ITLs on this nexus are now available for path selection.
61155	W	The specified DSM ID (ITL nexus) failed to release a LUN.
61156	W	The specified DSM ID (ITL nexus) failed to reserve a LUN. See the data section of the event for more information.
61157	W	The DSM is using the specified DSM ID (ITL nexus) to force the release of any reservations on the specified LUN.
61158	E	The reservation for the specified LUN was lost.
61201	I	The specified DSM ID (ITL nexus) has transitioned to the active state.
61202	I	The specified DSM ID (ITL nexus) has transitioned to the passive state.
61203	E	The specified DSM ID (ITL nexus) has transitioned to the failed state.
61204	W	The specified DSM ID (ITL nexus) is in the process of being removed.
61205	W	The specified DSM ID (ITL nexus) was removed.

ID	Sev	Explanation
61206	W	The specified DSM ID (ITL nexus) has transitioned to the disabled state.
61207	I	The specified DSM ID (ITL nexus) has transitioned to the pending active state.
61208	I	The specified DSM ID (ITL nexus) has transitioned to the pending passive state.

Troubleshooting installation problems

Missing Windows hotfixes

The DSM installer checks for required Windows hotfixes. The specific hotfixes vary by Windows version and processor architecture.

If the installer cannot find a required hotfix, it displays an error message. Record the missing hotfix numbers from the message, install them, and restart the DSM installer.

SnapDrive 4.1 found

The installer checks for SnapDrive 4.1 for Windows or earlier. If it finds an unsupported version of SnapDrive it displays an error message. Remove the old SnapDrive version and then restart the DSM installer.

Microsoft iSCSI software initiator

The Microsoft iSCSI initiator version 2.02 can overwrite the Windows MPIO components used by the DSM with an earlier, incompatible version. Do not install the Microsoft iSCSI initiator version 2.02 on a system running the Data ONTAP DSM 3.0 for Windows MPIO.

Troubleshooting GUI and CLI problems

Cannot disable entry

The DSM graphical user interface (GUI) does not allow you to disable the active DSM ID (ITL nexus). You must first activate another DSM ID and then disable the passive DSM ID.

In general, the GUI does not allow you to disrupt the host's access to a virtual disk.

Cannot change paths

If your DSM license has expired, the DSM will not allow you to make any changes, such as changing paths. A license that you purchase does not expire, but free demo licenses do expire. If your demo license expires, contact your sales representative to purchase a DSM license.

Check the event log

The DSM writes events to the Windows event log. Check the system log for messages from ontapdsm. Many events contain a DSM ID value. This value can be used to identify the virtual disk displayed in the GUI.

The DSM identifier is made up of four fields: port, bus, target, and LUN. For example, DSM ID 03000101 represents port 03, bus 00, target 01, and LUN 01. In the GUI, this value is displayed as VirtualDisk ID [3,0,1,1].

Note that the VirtualDisk ID displayed in the GUI changes, depending on which underlying ITL nexus is active.

Refresh the display

The GUI does not automatically refresh for all events. To manually refresh the display, first select Disks or Data ONTAP DSM Management in the left pane. Then select Refresh from the Action menu. If refresh does not work, try closing the GUI and opening it again.

Troubleshooting failover problems

Storage system failover

If a LUN is lost when an active/active storage system configuration fails over, check the following items:

- ◆ Verify that the Windows host has a path to the LUN on each storage system node.
- ◆ Verify that the igroup for the LUN includes the world wide port name (WWPN) of each initiator (HBA on Windows host) that you want to access the LUN with.
- ◆ Verify the storage system is running a supported version of Data ONTAP and a supported cfmode.

About silent installation

The silent (unattended) installation option of the InstallShield installer enables you to install the Data ONTAP DSM for Windows MPIO on one or more computers without operator interaction. You can also perform a silent uninstall.

Because installing the DSM requires a reboot, the Windows host will automatically be rebooted at the end of the silent installation. There is no warning or prompt before reboot.

Note

Some of the command options are case sensitive. Be sure to enter the commands exactly as shown.

Note

The account doing the actual installation must be in the Administrators group. For example, when using rsh, programs are executed under the SYSTEM account by default. You must change the rsh options to use an administrative account.

Silent installation commands

Command line: To run a silent installation from a command line, enter the following commands on your Windows host. Replace *installer* with the name of the installation program for your Windows host's processor architecture.

```
installer.exe /s /v"/qn MPIO_LICENSECODE=value  
CFMODE={standby|partner|mixed|dual_fabric|single_image}"
```

value is the MPIO license code for the DSM. See “[Step 4: Obtain an MPIO license key](#)” on page 15.

CFMODE is the cluster failover setting of the storage system.

Scripting: To include the silent install command in a script, use `start /b /wait` before the `installer.exe` command:

```
start /b /wait installer.exe /s /v"/qn MPIO_LICENSECODE=value  
CFMODE={standby|partner|mixed|dual_fabric|single_image}"
```

The wait option is needed to get the correct installation return value. If you just run *installer.exe*, it returns success if the InstallShield installer is successfully launched. However, the installation itself may still fail. By using the wait option as shown above, the return code describes the success or failure of the actual installation.

Installation command options

You can add optional parameters to the silent installation command.

Getting help: To view help for the silent installation command, run the following command:

```
installer.exe /v"CUSTOMHELP=1"
```

Uninstalling: To silently uninstall the DSM, run the following command:

```
installer.exe /s /x /v"/qn [FORCE_REMOVE_MPIO=1]"
```

The `FORCE_REMOVE_MPIO=1` option removes the Windows MPIO components to enable reverting to an earlier version. Before using this option, see [“Uninstalling the Data ONTAP DSM”](#) on page 18.

Install path and logging: You can optionally specify a different installation path for the DSM files, and you can specify a file to save the Windows msi log file for the installation. To set one or both of these options, run the following command:

```
installer.exe /s /v"/qn MPIO_LICENSECODE=value  
CFMODE={standby|partner|mixed|dual_fabric|single_image}  
[INSTALLDIR=path] [/l*v filename]"
```

path is the installation path for the DSM. The default path is
C:\Program Files\NetApp\FCP Host Utilities.

filename is the fully-qualified log file name. Note the first character of the `l*v` command is a lower case L.

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