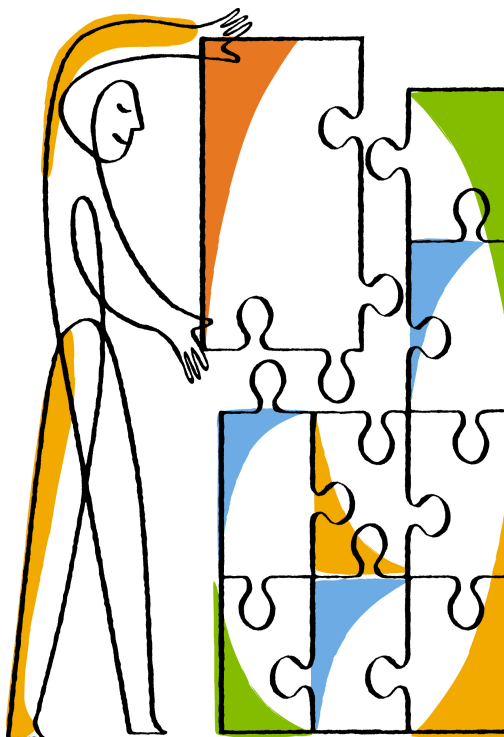




Windows Unified Host Utilities 7.0

Using Windows Hosts with FlashRay™ Systems

Mars™ OS Release 1.0.2



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Using Windows hosts with FlashRay

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Overview of supported Windows environments

Windows Unified Host Utilities 7.0 supports all NetApp platforms – FlashRay, FAS, and E-Series. Through the Host Utilities, FlashRay supports Windows Server 2008 R2 SP1, 2012, and 2012 R2.

The host utilities software ensures proper integration of NetApp storage systems with host hardware, operating systems, and I/O stack components. You can download the kit from the [Windows Unified Host Utilities download site](#), and the related documentation from the [Windows Host Utilities documentation site](#).

For support and the latest configuration information, consult the [NetApp Interoperability Matrix](#).

Setting up FlashRay for Windows hosts

Fibre Channel protocol (FCP) is the only protocol supported to transfer data between the FlashRay system and network hosts. The Windows Unified Host Utilities provide support for Fibre Channel (FC) connections to the FlashRay system using one of two variations of fabric-attached SANs:

- A single FC port can be connected from an HBA to the FlashRay controller through a single switch, which is connected by cable to redundant FC ports.
- A dual-port FC connection from the HBA to the FlashRay controller provides a redundant configuration, avoiding the single point of failure of single-switch configurations.

NOTE: Hosts for FlashRay systems should be configured using a dual fabric design to support redundancy and load balancing. Each host bus adapter (HBA) or initiator needs redundant paths to a single LUN to provide the required fault tolerance.

For details, consult the *FlashRay Installation and Setup Instructions* poster shipped with the FlashRay hardware. After the hardware setup is completed, you can set up LUNs on the FlashRay system that are to be accessed by the host.

Related topics

[How LUNs are accessed from a Windows host on page 6](#)

[Managing multipathing on LUNs on page 9](#)

Setting up LUNs

This chapter discusses the following topics:

- How LUNs are accessed from a Windows host 6
- Finding LUNs on Windows hosts 7
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How LUNs are accessed from a Windows host

HBA ports on Windows hosts are identified by worldwide port names (WWPNs) that work as unique addresses to identify host initiators to storage systems. LUNs are visible to the host only if the HBA's WWPN is known to that system.

Initiator groups (igroups), which are created by using the HBA's WWPNs, control access to the LUNs that are mapped to them. Through the igroups, the LUNs are recognizable as VHDs (virtual hard disks) to hosts.

NOTE: If there is more than a single path to a LUN, multipathing software must be used to ensure that each LUN is displayed as a single disk.

Creating LUNs on FlashRay

To prepare the Windows host to access LUNs, you must first create them on the FlashRay controller and map them to initiator groups. You can do this using FlashRay System Manager, or by entering commands in the Mars OS command line interface (CLI). Both procedures are described in detail in the *Mars OS System Administration Guide*.

NOTE: *NetApp SnapDrive for Windows*, an automatic provisioning system, is not yet available on FlashRay.

When complete, the LUNs will look and work like any other drive accessible from the Windows operating system. For example, you could initialize the disk on the Windows host and create a new partition, format it with NTFS, and assign a drive letter, just as you would for standard local disks.

Related topics

[Finding LUNs on Windows hosts on page 7](#)

[Managing multipathing on LUNs on page 9](#)

Finding LUNs on Windows hosts

After Windows Server and Windows Unified Host Utilities 7.0 are installed on your host, use the following procedure to access the LUNs you created on the FlashRay controller.

NOTE: Only Windows Server 2008 R2 SP1, Windows Server 2012, and Windows Server 2012 R2 are supported by FlashRay.

Steps

1. If you are using a Windows 2012 Server, select **Server Manager** from the Windows **Start** menu, then select **Computer Management** from the **Tools** menu. If you are using a Windows 2008 Server, select **Administrative Tools > Computer Management** from the **Start** menu.
2. In the navigation pane, select **Storage > Disk Management**.
3. Scan to locate the LUNs by selecting **Rescan Disk** from the **Action** menu, then scrolling down to view the LUNs.

The following table summarizes the paths to the LUNs for the supported Windows Server versions:

For	Click
Windows Server 2012, Windows Server 2012 R2	Server Manager > Dashboard > Tools > Computer Management > Disk Management > Storage > Action > Rescan Disks
Windows Server 2008 R2 SP1	Start > Administrative Tools > Disk Management > Storage > Action > Rescan Disks

4. Initialize the disks by selecting the appropriate partition type. Right-click each LUN and configure the volume, applying the settings appropriate for your application.
For a newly detected disk, right-click on the grey area where it says **Disk**, and select **Write signature** or **Initialize Disk**.
5. If you assigned drive letters to the LUNs, they are now also visible as new drives in Windows Explorer. From **Start**, select **Computer** to view them.

Related topics

[How LUNs are accessed from a Windows host on page 6](#)

[Managing multipathing on LUNs on page 9](#)

Setting up optimized paths with ALUA

Asymmetric Logical Unit Access (ALUA) is a method used to determine the optimized and non-optimized paths between the host and LUNs on the FlashRay system. This method defines a standard set of SCSI commands for discovering path priorities to LUNs on SANs.

Optimized paths are the most direct route from your host to the LUN. Non-optimized paths provide additional routes to the LUN if the optimized paths are not available. When you have the host and storage controller configured correctly, ALUA automatically determines which target ports provide optimized and unoptimized access to LUNs.

ALUA is enabled by default on FlashRay systems. The current FlashRay release supports only one node per cluster, so all paths to the cluster are optimized.

Related topics

[Overview of supported Windows environments on page 4](#)

[Managing multipathing on LUNs on page 9](#)

Managing multipathing on LUNs

The Windows Unified Host Utilities support multiple paths to FlashRay storage, which ensures fault tolerant connections between the Windows host and the FlashRay storage system. When multipathing software is implemented, the Windows host presents a single disk for all paths to a LUN.

During the Windows Unified Host Utilities installation, you can specify installation of Microsoft MPIO (Multipath I/O) software and the MS DSM (Microsoft device-specific module) to set values that support multipathing. Without these two components to support fault tolerance and load balancing, the Windows operating system might see each path to a LUN as a separate disk.

The software works by providing a logical framework for routing I/O over redundant hardware paths that are defined by the host bus adapters, switches, cabling, and storage controllers. Without this type of management, the data contained in the LUNs could become corrupted.

Related topics

[Finding LUNs on Windows hosts on page 7](#)

[Setting up optimized paths with ALUA on page 8](#)

SAN booting

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SAN booting Windows hosts

SAN booting allows you to boot a Windows host from a storage system LUN instead of an internal hard disk. This configuration can improve system availability, enable centralized administration, and eliminate the costs associated with maintaining and servicing hard drives.

In addition, when a diskless host's C:\ drive is located directly on the storage system, all of its reliability and backup features are available. This can simplify deployment of multiple Windows hosts and reduce the total storage needed.

Fibre Channel SAN booting

FlashRay supports only Fibre Channel connectivity, and on FC SANs, SCSI protocol is layered on top of the FC protocol. No support is required for special SCSI operations, so SAN booting is no different from any other SCSI disk operation.

The downside of SAN booting is that loss of connectivity between the host and storage system could prevent the host from booting. For that reason, be sure to use a reliable FC connection to the storage system.

Related topics

[Setting up SAN booting on page 12](#)

Setting up SAN booting

When SAN booting is set up, HBAs use code in the diskless system's BIOS to enable the host to boot from a LUN on the FlashRay system. That LUN is then installed with a Windows Server operating system.

For the data LUNs, one or more supported adapters should be used.

Before you begin

FlashRay systems support Windows Server 2008 R2 SP1, 2012, and 2012 R2 operating systems, but check the [NetApp Interoperability Matrix](#) for the latest requirements.

The Fibre Channel HBAs that FlashRay supports need to be tuned for specific queue depths to provide best results (254 for Emulex HBAs, or 256 for QLogic HBAs). To avoid host queuing, the host queue depths should not exceed the target queue depths on a per-target basis.

To set up SAN booting, use the following procedure:

Steps

1. Enable BootBIOS on the HBA.
BootBIOS firmware is installed on HBAs, but it is disabled by default. For information about how to enable it, see the vendor-specific documentation for your HBA.
2. To define the initiators that can access the boot LUN, add the HBA to an initiator group. The procedure for adding igroups is described in detail in the *Mars OS System Administration Guide*.
3. Restrict the HBA to a single path to the boot LUN. You can add additional paths after Windows is installed if you have a multipathing solution in place.
4. Create the LUN that you want to use as a boot device and map it to the igroup as LUN ID 0.
5. Reboot the host and enter the host BIOS utility.
Use the HBA vendor's BootBIOS utility to configure the LUN as a boot device.
6. In the host BIOS, make the boot LUN the first disk device in the boot order.
7. Get the HBA device drivers for your version of Windows and install them on the boot LUN.
Refer to your HBA vendor-specific documentation for instructions.
8. Install the selected Windows Server operating system on the boot LUN.
9. Install the Windows Unified Host Utilities on the boot LUN.
When the installer is run, it automatically configures the required HBA settings. If multipathing is selected during the installation process, the installer will also set up the Microsoft Device-Specific Module (MS DSM) to enable multipathing.

10. After rebooting, ensure that the LUNs are easily accessible and multipathing is working properly.

Related topics

[SAN booting Windows hosts on page 11](#)

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