Windows express configuration

E-Series Systems

NetApp
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Table of Contents

Windows express configuration

Windows express configuration overview

The Windows express method for installing your storage array and accessing SANtricity System Manager is appropriate for setting up a standalone Windows host to an E-Series system. It is designed to get the storage system up and running as quickly as possible with minimal decision points.

Procedure overview

The express method includes the following steps, which are also outlined in the Windows workflow.

1. Set up one of the following communication environments:
   - Fibre Channel (FC)
   - iSCSI
   - SAS
2. Create logical volumes on the storage array.
3. Make the volumes available to the data host.

Find more information

- Online help — Describes how to use SANtricity System Manager to complete configuration and storage management tasks. It is available within the product.
- NetApp Knowledgebase (a database of articles) — Provides troubleshooting information, FAQs, and instructions for a wide range of NetApp products and technologies.
- NetApp Interoperability Matrix Tool — Enables you to search for configurations of NetApp products and components that meet the standards and requirements specified by NetApp.
- NetApp Documentation: Host Utilities — Provides documentation for the current Windows Unified Host Utilities version.

Assumptions

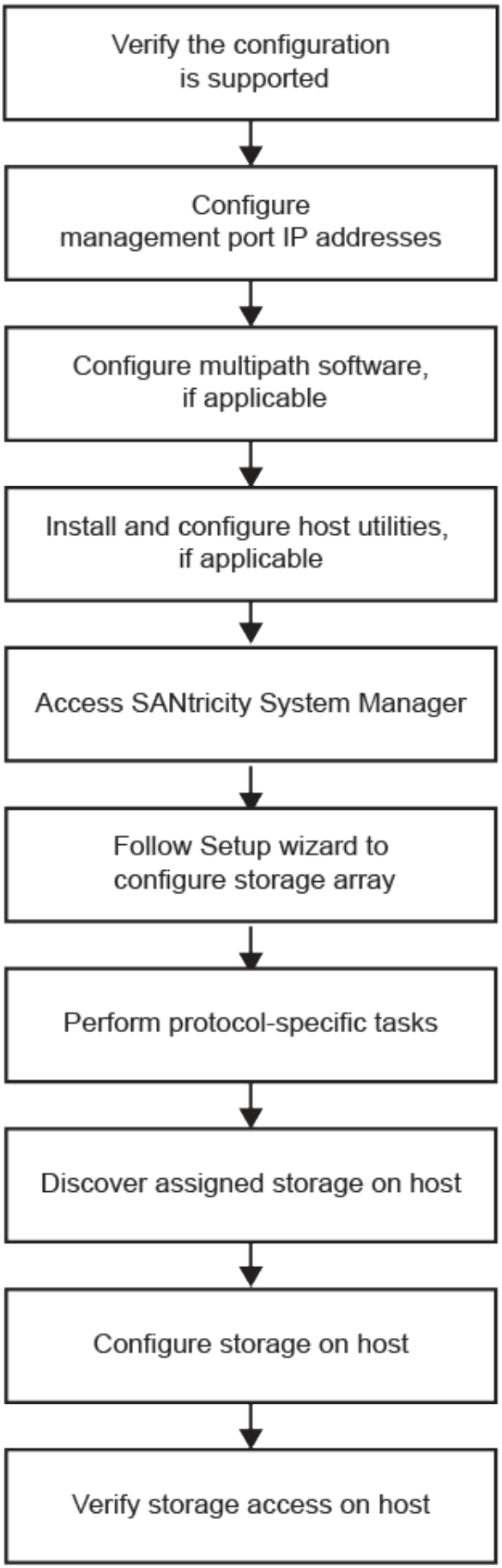
The Windows express method is based on the following assumptions:

Component	Assumptions
Hardware	• You have used the Installation and Setup Instructions included with the controller shelves to install the hardware. • You have connected cables between the optional drive shelves and the controllers. • You have applied power to the storage system. • You have installed all other hardware (for example, management station, switches) and made the necessary connections.
Host	• You have made a connection between the storage system and the data host. • You have installed the host operating system. • You are not using Windows as a virtualized guest. • You are not configuring the data (I/O attached) host to boot from SAN.
Storage management station	• You are using a 1 Gbps or faster management network. • You are using a separate station for management rather than the data (I/O attached) host. • You are using out-of-band management, in which a storage management station sends commands to the storage system through the Ethernet connections to the controller. • You have attached the management station to the same subnet as the storage management ports.
IP addressing	• You have installed and configured a DHCP server. • You have **not** yet made an Ethernet connection between the management station and the storage system.
Storage provisioning	• You will not use shared volumes. • You will create pools rather than volume groups.
Protocol: FC	• You have made all host-side FC connections and activated switch zoning. • You are using NetApp-supported FC HBAs and switches. • You are using FC HBA driver and firmware versions as listed in the NetApp Interoperability Matrix Tool.

Component	Assumptions
Protocol: iSCSI	• You are using Ethernet switches capable of transporting iSCSI traffic. • You have configured the Ethernet switches according to the vendor's recommendation for iSCSI.
Protocol: SAS	• You are using NetApp-supported SAS HBAs. • You are using SAS HBA driver and firmware versions as listed in the NetApp Interoperability Matrix Tool.

Understand the Windows workflow

This workflow guides you through the express method for configuring your storage array and SANtricity System Manager to make storage available to a Windows host.


Verify the configuration is supported
Configure management port IP addresses
Configure multipath software, if applicable
Install and configure host utilities, if applicable
Access SANtricity System Manager
Follow Setup wizard to configure storage array
Perform protocol-specific tasks
Discover assigned storage on host
Configure storage on host
Verify storage access on host

Verify the Windows configuration is supported

To ensure reliable operation, create an implementation plan and then use the NetApp Interoperability Matrix Tool (IMT) to verify that the entire configuration is supported.

Steps

1. Go to the NetApp Interoperability Matrix Tool.
2. Click on the **Storage Solution Search** tile.
3. In the **Protocols › SAN Host** area, click the **Add** button next to **E-Series SAN Host**.
4. Click **View Refine Search Criteria**.

   The Refine Search Criteria section is displayed. In this section you may select the protocol that applies, as well as other criteria for the configuration such as Operating System, NetApp OS, and Host Multipath driver. Select the criteria you know you want for your configuration, and then see what compatible configuration elements apply. As necessary, make the updates for your operating system and protocol that are prescribed in the tool. Detailed information for your chosen configuration is accessible on the View Supported Configurations page by clicking the right page arrow.

5. As necessary, make the updates for your operating system and protocol as listed in the table.

Operating system updates	Protocol	Protocol-related updates
You might need to install out-of-box drivers to ensure proper functionality and supportability. Each HBA vendor has specific methods for updating boot code and firmware. Refer to the support section of the vendor's website to obtain the instructions and software necessary to update the HBA boot code and firmware.	FC	Host bus adapter (HBA) driver, firmware, and bootcode
	iSCSI	Network interface card (NIC) driver, firmware and bootcode.
	SAS	Host bus adapter (HBA) driver, firmware, and bootcode

Configure IP addresses using DHCP

To configure communications between the management station and the storage array, use Dynamic Host Configuration Protocol (DHCP) to provide IP addresses.

What you'll need

A DHCP server installed and configured on the same subnet as the storage management ports.

About this task

Each storage array has either one controller (simplex) or two controllers (duplex), and each controller has two storage management ports. Each management port will be assigned an IP address.

The following instructions refer to a storage array with two controllers (a duplex configuration).

Steps

1. If you have not already done so, connect an Ethernet cable to the management station and to management port 1 on each controller (A and B).

   The DHCP server assigns an IP address to port 1 of each controller.

   > Do not use management port 2 on either controller. Port 2 is reserved for use by NetApp technical personnel.

   > If you disconnect and reconnect the Ethernet cable, or if the storage array is power-cycled, DHCP assigns IP addresses again. This process occurs until static IP addresses are configured. It is recommended that you avoid disconnecting the cable or power-cycling the array.

   If the storage array cannot get DHCP-assigned IP addresses within 30 seconds, the following default IP addresses are set:

   - Controller A, port 1: 169.254.128.101
   - Controller B, port 1: 169.254.128.102
   - Subnet mask: 255.255.0.0

2. Locate the MAC address label on the back of each controller, and then provide your network administrator with the MAC address for port 1 of each controller.

   Your network administrator needs the MAC addresses to determine the IP address for each controller. You will need the IP addresses to connect to your storage system through your browser.

Configure the multipath software

To provide a redundant path to the storage array, you can install the SANtricity Windows DSM package and use the multipath package for Windows.

What you'll need

The correct administrator or superuser privileges.

About this task

Multipath software provides a redundant path to the storage array in case one of the physical paths is disrupted. Before you can use multipathing, you need to install the SANtricity Windows DSM package. This package contains the multipath software for Windows.

Windows installations use the native MPIO Device Specific Module (DSM) driver for failover. When you install and enable the SANtricity Windows DSM package, you do not need to take further action to use multipath.

Steps

1. Download the **SANtricity Windows DSM** package from the SANtricity OS software page. Select your software version, accept the license agreement, and select **SANtricity Windows DSM** under Additional Downloads.
2. Run the **SANtricity Windows DSM** installer. Double-click the install package to execute.
3. Use the installation wizard to install the package on the management station.

Install and configure Windows Unified Host Utilities

The Windows Unified Host Utilities tools help you to connect host computers to NetApp storage systems and set required parameters on host computers. You can also set appropriate disk timeouts for best read/write performance with NetApp storage.

For more information, see the *Windows Host Utilities Installation Guide,* found under NetApp Documentation: Host Utilities.

Steps

1. Use the NetApp Interoperability Matrix Tool to determine the appropriate version of Unified Host Utilities to install.

   The versions are listed in a column within each supported configuration.

2. Download the Unified Host Utilities from NetApp Support.

   This utilities package cannot be installed using the SANtricity Storage Manager installer.

   Alternatively, you can use the SANtricity SMdevices utility to perform the same functions as the Unified Host Utility tool. The SMdevices utility is included as part of the SMutils package. The SMutils package is a collection of utilities to verify what the host sees from the storage array. It is included as part of the SANtricity software installation.

Install SANtricity Storage Manager for SMcli and Host Context Agent (HCA)

If you are using SANtricity software 11.53 or earlier, you can install the SANtricity Storage Manager software on your management station to help manage the array.

SANtricity Storage Manager includes the command line interface (CLI) for additional management tasks, and also the Host Context Agent for pushing host configuration information to the storage array controllers through the I/O path.

If you are using SANtricity software 11.60 and newer, you do not need to follow these steps. The SANtricity Secure CLI (SMcli) is included in the SANtricity OS and downloadable through the SANtricity System Manager. For more information on how to download the SMcli through the SANtricity System Manager, refer to the *Download command line interface (CLI)* topic under the SANtricity System Manager Online Help.

What you'll need

- SANtricity software 11.53 or earlier.
- The correct administrator or superuser privileges.
- A system for the SANtricity Storage Manager client that has the following minimum requirements:
  - **RAM**: 2 GB for Java Runtime Engine
  - **Disk space**: 5 GB

- **OS/Architecture**: For guidance on determining the supported operating system versions and architectures, go to NetApp Support. From the **Downloads** tab, go to **Downloads › E-Series SANtricity Storage Manager**.

Steps

1. Download the SANtricity software release at NetApp Support. From the **Downloads** tab, **Downloads › E-Series SANtricity Storage Manager**.
2. Run the SANtricity installer. Double-click the SMIA*.exe install package to execute.
3. Use the installation wizard to install the software on the management station.

Access SANtricity System Manager and use the Setup wizard

To configure your storage array, you can use the Setup wizard in SANtricity System Manager.

SANtricity System Manager is a web-based interface embedded on each controller. To access the user interface, you point a browser to the controller's IP address. A setup wizard helps you get started with system configuration.

What you'll need

- Out-of-band management.
- A management station for accessing SANtricity System Manager that includes one of the following browsers:

Browser	Minimum version
Google Chrome	79
Microsoft Internet Explorer (MSE)	11
Microsoft Edge	79
Mozilla Firefox	70
Safari	12

About this task

If you are an iSCSI user, make sure you have closed the Setup wizard while configuring iSCSI.

The wizard automatically relaunches when you open System Manager or refresh your browser and *at least one* of the following conditions is met:

- No pools or volume groups are detected.
- No workloads are detected.
- No notifications are configured.

If the Setup wizard does not automatically appear, contact technical support.

Steps

1. From your browser, enter the following URL: `https://<DomainNameOrIPAddress>`

   `IPAddress` is the address for one of the storage array controllers.

   The first time SANtricity System Manager is opened on an array that has not been configured, the Set Administrator Password prompt appears. Role-based access management configures four local roles: admin, support, security, and monitor. The latter three roles have random passwords that cannot be guessed. After you set a password for the admin role, you can change all of the passwords using the admin credentials. For more information about the four local user roles, see the online help available in the SANtricity System Manager user interface.

2. Enter the System Manager password for the admin role in the Set Administrator Password and Confirm Password fields, and then click **Set Password**.

   The Setup wizard launches if there are no pools, volumes groups, workloads, or notifications configured.

3. Use the Setup wizard to perform the following tasks:
   - **Verify hardware (controllers and drives)** — Verify the number of controllers and drives in the storage array. Assign a name to the array.
   - **Verify hosts and operating systems** — Verify the host and operating system types that the storage array can access.
   - **Accept pools** — Accept the recommended pool configuration for the express installation method. A pool is a logical group of drives.
   - **Configure alerts** — Allow System Manager to receive automatic notifications when a problem occurs with the storage array.
   - **Enable AutoSupport** — Automatically monitor the health of your storage array and have dispatches sent to technical support.
4. If you have not already created a volume, create one by going to **Storage › Volumes › Create › Volume**.

   For more information, see the online help for SANtricity System Manager.

Perform FC-specific tasks

For the Fibre Channel protocol, you configure the switches and determine the host port identifiers.

Step 1: Configure the FC switches—Windows

Configuring (zoning) the Fibre Channel (FC) switches enables the hosts to connect to the storage array and limits the number of paths. You zone the switches using the management interface for the switches.

What you'll need

- Administrator credentials for the switches.
- The WWPN of each host initiator port and of each controller target port connected to the switch. (Use your HBA utility for discovery.)

About this task

You must zone by WWPN, not by physical port. Each initiator port must be in a separate zone with all of its corresponding target ports. For details about zoning your switches, see the switch vendor's documentation.

Steps

1. Log in to the FC switch administration program, and then select the zoning configuration option.
2. Create a new zone that includes the first host initiator port and that also includes all of the target ports that connect to the same FC switch as the initiator.
3. Create additional zones for each FC host initiator port in the switch.
4. Save the zones, and then activate the new zoning configuration.

Step 2: Determine host WWPNs and make recommended settings—FC, Windows

You install an FC HBA utility so you can view the worldwide port name (WWPN) of each host port. Additionally, you can use the HBA utility to change any settings recommended in the Notes column of the NetApp Interoperability Matrix Tool for the supported configuration.

About this task

Review these guidelines for HBA utilities:

- Most HBA vendors offer an HBA utility. You will need the correct version of HBA for your host operating system and CPU. Examples of FC HBA utilities include:
  - Emulex OneCommand Manager for Emulex HBAs
  - QLogic QConverge Console for QLogic HBAs
- Host I/O ports might automatically register if the host context agent is installed.

Steps

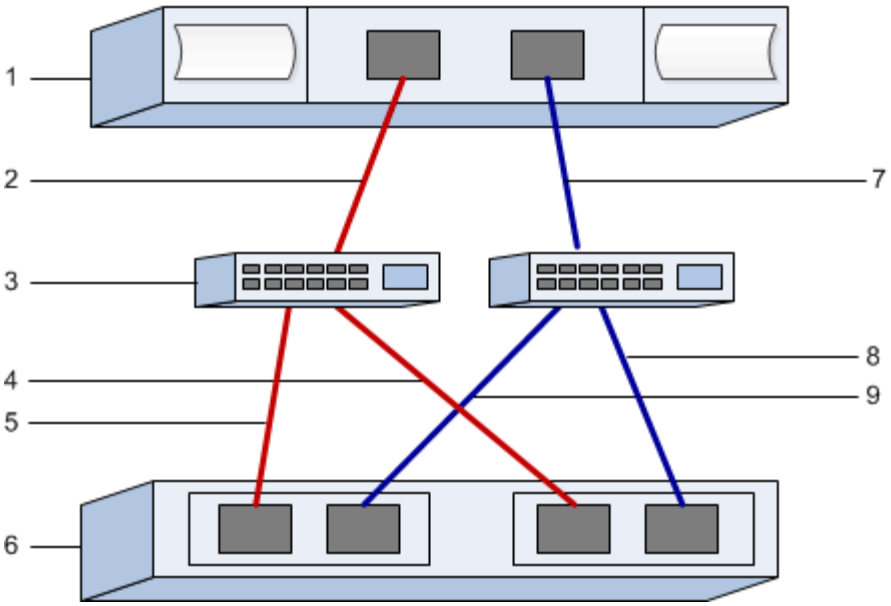
1. Download the appropriate utility from your HBA vendor's web site.
2. Install the utility.
3. Select the appropriate settings in the HBA utility.

   Appropriate settings for your configuration are listed in the Notes column of the NetApp Interoperability Matrix Tool.

Step 3: Record your configuration

You can generate and print a PDF of this page, and then use the following worksheet to record FC storage configuration information. You need this information to perform provisioning tasks.

The illustration shows a host connected to an E-Series storage array in two zones. One zone is indicated by the blue line; the other zone is indicated by the red line. Any single port has two paths to the storage (one to each controller).



Host identifiers

Callout No.	Host (initiator) port connections	WWPN
1	Host	*not applicable*
2	Host port 0 to FC switch zone 0	
7	Host port 1 to FC switch zone 1	

Target identifiers

Callout No.	Array controller (target) port connections	WWPN
3	Switch	*not applicable*
6	Array controller (target)	*not applicable*
5	Controller A, port 1 to FC switch 1	
9	Controller A, port 2 to FC switch 2	
4	Controller B, port 1 to FC switch 1	
8	Controller B, port 2 to FC switch 2	

Mapping host name

Mapping host name	

Host OS type	

Perform iSCSI-specific tasks

For the iSCSI protocol, you configure the switches, configure networking on the array side and host side, and then verify the IP network connections.

Step 1: Configure the switches—iSCSI, Windows

You configure the switches according to the vendor's recommendations for iSCSI. These recommendations might include both configuration directives as well as code updates.

What you'll need

- Two separate networks for high availability. Make sure that you isolate your iSCSI traffic to separate network segments by using VLANs or two separate networks.
- Enabled send and receive hardware flow control **end to end**.
- Disabled priority flow control.
- If appropriate, enabled jumbo frames.

> Port channels/LACP is not supported on the controller's switch ports. Host-side LACP is not recommended; multipathing provides the same benefits or better.

Steps

Consult your switch vendor's documentation.

Step 2: Configure networking—iSCSI Windows

You can set up your iSCSI network in many ways, depending on your data storage requirements. Consult your network administrator for tips on selecting the best configuration for your environment.

An effective strategy for configuring the iSCSI network with basic redundancy is to connect each host port and one port from each controller to separate switches and partition each set of host and controller ports on separate network segments using VLANs.

What you'll need

- Enabled send and receive hardware flow control **end to end**.
- Disabled priority flow control.
- If appropriate, enabled jumbo frames.

  If you are using jumbo frames within the IP SAN for performance reasons, make sure to configure the array, switches, and hosts to use jumbo frames. Consult your operating system and switch documentation for information on how to enable jumbo frames on the hosts and on the switches. To enable jumbo frames on the array, complete the procedure in Step 3.

Steps

Consult your switch vendor's documentation.

Many network switches have to be configured above 9,000 bytes for IP overhead. Consult your switch documentation for more information.

Step 3: Configure array-side networking—iSCSI, Windows

You use the SANtricity System Manager GUI to configure iSCSI networking on the array side.

What you'll need

- The IP address or domain name for one of the storage array controllers.
- A password for the System Manager GUI, or Role-Based Access Control (RBAC) or LDAP and a directory service configured for the appropriate security access to the storage array. See the SANtricity System Manager online help for more information about Access Management.

About this task

This task describes how to access the iSCSI port configuration from the Hardware page. You can also access the configuration from **System › Settings › Configure iSCSI ports**.

Steps

1. From your browser, enter the following URL: `https://<DomainNameOrIPAddress>`

   `IPAddress` is the address for one of the storage array controllers.

   The first time SANtricity System Manager is opened on an array that has not been configured, the Set Administrator Password prompt appears. Role-based access management configures four local roles: admin, support, security, and monitor. The latter three roles have random passwords that cannot be guessed. After you set a password for the admin role, you can change all of the passwords using the admin credentials. See the SANtricity System Manager online help for more information on the four local user roles.

2. Enter the System Manager password for the admin role in the Set Administrator Password and Confirm Password fields, and then select the **Set Password** button.

   When you open System Manager and no pools, volumes groups, workloads, or notifications have been configured, the Setup wizard launches.

3. Close the Setup wizard.

   You will use the wizard later to complete additional setup tasks.

4. Select **Hardware**.
5. If the graphic shows the drives, click **Show back of shelf**.

   The graphic changes to show the controllers instead of the drives.

6. Click the controller with the iSCSI ports you want to configure.

   The controller's context menu appears.

7. Select **Configure iSCSI ports**.

   The Configure iSCSI Ports dialog box opens.

8. In the drop-down list, select the port you want to configure, and then click **Next**.
9. Select the configuration port settings, and then click **Next**.

   To see all port settings, click the **Show more port settings** link on the right of the dialog box.

Port Setting	Description
Configured ethernet port speed	Select the desired speed. The options that appear in the drop-down list depend on the maximum speed that your network can support (for example, 10 Gbps). The optional iSCSI host interface cards in the E5700 and EF570 controllers do not auto-negotiate speeds. You must set the speed for each port to either 10 Gb or 25 Gb. All ports must be set to the same speed.
Enable IPv4 / Enable IPv6	Select one or both options to enable support for IPv4 and IPv6 networks.
TCP listening port (Available by clicking **Show more port settings**.)	If necessary, enter a new port number. The listening port is the TCP port number that the controller uses to listen for iSCSI logins from host iSCSI initiators. The default listening port is 3260. You must enter 3260 or a value between 49152 and 65535.
MTU size (Available by clicking **Show more port settings**.)	If necessary, enter a new size in bytes for the Maximum Transmission Unit (MTU). The default Maximum Transmission Unit (MTU) size is 1500 bytes per frame. You must enter a value between 1500 and 9000.
Enable ICMP PING responses	Select this option to enable the Internet Control Message Protocol (ICMP). The operating systems of networked computers use this protocol to send messages. These ICMP messages determine whether a host is reachable and how long it takes to get packets to and from that host.

   If you selected **Enable IPv4**, a dialog box opens for selecting IPv4 settings after you click **Next**. If you selected **Enable IPv6**, a dialog box opens for selecting IPv6 settings after you click **Next**. If you selected both options, the dialog box for IPv4 settings opens first, and then after you click **Next**, the dialog box for IPv6 settings opens.

10. Configure the IPv4 and/or IPv6 settings, either automatically or manually. To see all port settings, click the **Show more settings** link on the right of the dialog box.

Port setting	Description
Automatically obtain configuration	Select this option to obtain the configuration automatically.
Manually specify static configuration	Select this option, and then enter a static address in the fields. For IPv4, include the network subnet mask and gateway. For IPv6, include the routable IP address and router IP address.
Enable VLAN support (Available by clicking **Show more settings**.)	This option is only available in an iSCSI environment. It is not available in an NVMe over RoCE environment. Select this option to enable a VLAN and enter its ID. A VLAN is a logical network that behaves like it is physically separate from other physical and virtual local area networks (LANs) supported by the same switches, the same routers, or both.
Enable ethernet priority (Available by clicking **Show more settings**.)	This option is only available in an iSCSI environment. It is not available in an NVMe over RoCE environment. Select this option to enable the parameter that determines the priority of accessing the network. Use the slider to select a priority between 1 and 7. In a shared local area network (LAN) environment, such as Ethernet, many stations might contend for access to the network. Access is on a first-come, first-served basis. Two stations might try to access the network at the same time, which causes both stations to back off and wait before trying again. This process is minimized for switched Ethernet, where only one station is connected to a switch port.

11. Click **Finish**.
12. Close System Manager.

Step 4: Configure host-side networking—iSCSI

You must configure iSCSI networking on the host side so that the Microsoft iSCSI Initiator can establish sessions with the array.

What you'll need

- Fully configured switches that will be used to carry iSCSI storage traffic.
- Enabled send and receive hardware flow control **end to end**
- Disabled priority flow control.

- Array side iSCSI configuration completed.
- The IP address of each port on the controller.

About this task

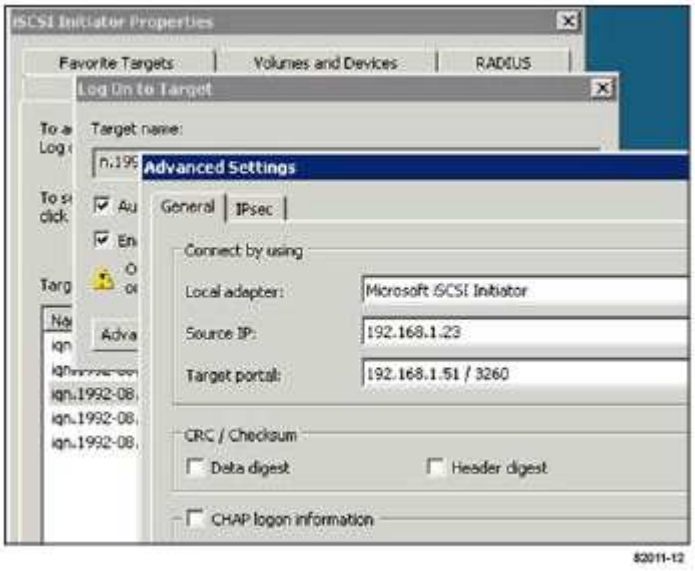
These instructions assume that two NIC ports will be used for iSCSI traffic.

Steps

1. Disable unused network adapter protocols.

   These protocols include, but are not limited to, QoS, File and Print Sharing, and NetBIOS.

2. Execute `> iscsicpl.exe` from a terminal window on the host to open the **iSCSI Initiator Properties** dialog box.
3. On the **Discovery** tab, select **Discover Portal**, and then enter the IP address of one of the iSCSI target ports.
4. On the **Targets** tab, select the first target portal you discovered and then select **Connect**.
5. Select **Enable multi-path**, select **Add this connection to the list of Favorite Targets**, and then select **Advanced**.
6. For **Local adapter**, select **Microsoft iSCSI Initiator**.
7. For **Initiator IP**, select the IP address of a port on the same subnet or VLAN as one of the iSCSI targets.
8. For **Target IP**, select the IP address of a port on the same subnet as the **Initiator IP** selected in the step above.
9. Retain the default values for the remaining check boxes, and then select **OK**.
10. Select **OK** again as you return to the **Connect to Target** dialog box.
11. Repeat this procedure for each initiator port and session (logical path) to the storage array that you want to establish.



Step 5: Verify IP network connections—iSCSI, Windows

You verify Internet Protocol (IP) network connections by using ping tests to ensure the host and array are able to communicate.

1. Select **Start › All Programs › Accessories › Command Prompt**, and then use the Windows CLI to run one of the following commands, depending on whether jumbo frames are enabled:
   - If jumbo frames are not enabled, run this command:

     ```
     ping -s <hostIP\> <targetIP\>
     ```

   - If jumbo frames are enabled, run the ping command with a payload size of 8,972 bytes. The IP and ICMP combined headers are 28 bytes, which when added to the payload, equals 9,000 bytes. The -f switch sets the `don't fragment (DF)` bit. The -l switch allows you to set the size. These options allow jumbo frames of 9,000 bytes to be successfully transmitted between the iSCSI initiator and the target.

     ```
     ping -l 8972 -f <iSCSI_target_IP_address\>
     ```

     In this example, the iSCSI target IP address is `192.0.2.8`.

     ```
     C:\>ping -l 8972 -f 192.0.2.8
     Pinging 192.0.2.8 with 8972 bytes of data:
     Reply from 192.0.2.8: bytes=8972 time=2ms TTL=64
     Reply from 192.0.2.8: bytes=8972 time=2ms TTL=64
     Reply from 192.0.2.8: bytes=8972 time=2ms TTL=64
     Reply from 192.0.2.8: bytes=8972 time=2ms TTL=64
     Ping statistics for 192.0.2.8:
       Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
     Approximate round trip times in milli-seconds:
       Minimum = 2ms, Maximum = 2ms, Average = 2ms
     ```

2. Issue a `ping` command from each host's initiator address (the IP address of the host Ethernet port used for iSCSI) to each controller iSCSI port. Perform this action from each host server in the configuration, changing the IP addresses as necessary.

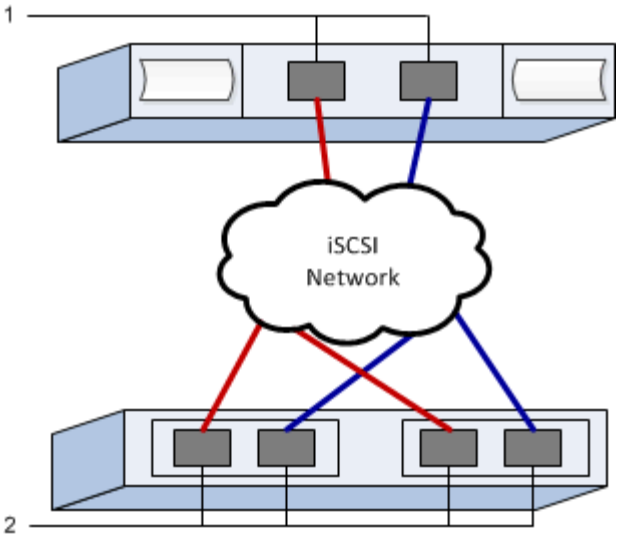
   If the command fails (for example, returns `Packet needs to be fragmented but DF set`), verify the MTU size (jumbo frame support) for the Ethernet interfaces on the host server, storage controller, and switch ports.

Step 6: Record your configuration

You can generate and print a PDF of this page, and then use the following worksheet to record iSCSI storage configuration information. You need this information to perform provisioning tasks.

Recommended configuration

Recommended configurations consist of two initiator ports and four target ports with one or more VLANs.



Target IQN

Callout No.	Target port connection	IQN
2	Target port	

Mapping host name

Callout No.	Host information	Name and type
1	Mapping host name	
	Host OS type	

Perform SAS-specific tasks

For the SAS protocol, you determine host port addresses and make the appropriate settings.

Step 1: Determine SAS host identifiers—Windows

Find the SAS addresses using the HBA utility, then use the HBA BIOS to make the appropriate configuration settings.

About this task

Review the guidelines for HBA utilities:

- Most HBA vendors offer an HBA utility. Depending on your host operating system and CPU, use either the LSI-sas2flash(6G) or sas3flash(12G) utility.
- Host I/O ports might automatically register if the host context agent is installed.

Steps

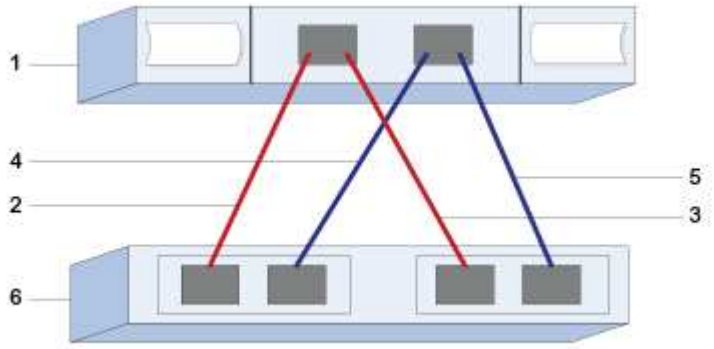
1. Download the LSI-sas2flash(6G) or sas3flash(12G) utility from your HBA vendor's web site.

2. Install the utility.
3. Use the HBA BIOS to select the appropriate settings for your configuration.

   For setting recommendations, see the Notes column of the NetApp Interoperability Matrix Tool.

Step 2: Record your configuration

You can generate and print a PDF of this page, and then use the following worksheet to record your protocol-specific storage configuration information. You need this information to perform provisioning tasks.



Host identifiers

Callout No.	Host (initiator) port connections	SAS address
1	Host	*not applicable*
2	Host (initiator) port 1 connected to Controller A, port 1	
3	Host (initiator) port 1 connected to Controller B, port 1	
4	Host (initiator) port 2 connected to Controller A, port 1	
5	Host (initiator) port 2 connected to Controller B, port 1	

Target identifiers

Recommended configurations consist of two target ports.

Mapping host name

Mapping host name	

Host OS type	

Discover storage on the host

When you add new LUNs, you must manually rescan the associated disks to discover them. The host does not automatically discover new LUNs.

LUNs on your storage system appear as disks to the Windows host.

Steps

1. Log on as an administrator.
2. To discover the storage, run the following command from a Windows command prompt.

```
# echo rescan | diskpart
```

3. To verify the addition of new storage, run the following command.

```
# echo list disk | diskpart
```

Configure storage on the host

Because a new LUN is offline and has no partition or file system when a Windows host first discovers it, you must bring the volume online and initialize it in Windows. Optionally, you can format the LUN with a file system.

You can initialize the disk as a basic disk with a GPT or MBR partition table. Typically, you format the LUN with a file system such as New Technology File System (NTFS).

What you'll need

A LUN discovered by the host.

Steps

1. From a Windows command prompt, enter the `diskpart` context.

```
> diskpart
```

2. View the list of available disks.

```
> list disk
```

3. Select the disk to bring online.

```
> select disk 1
```

4. Bring the disk online.

```
> online disk
```

5. Create a partition.

```
> create partition primary
```

> In Windows Server 2008 and later, you are prompted immediately after creating the partition to format the disk and give it a name. Select **Cancel** on the prompt to continue using these instructions for formatting and naming the partition.

6. Assign a drive letter.

```
> assign letter=f
```

7. Format the disk.

```
> format FS=NTFS LABEL="New Volume" QUICK
```

8. Exit the diskpart context.

```
> exit
```

Verify storage access on the host

Before using the volume, verify that the host can write data to the LUN and read it back.

What you'll need

You must have initialized the LUN and formatted it with a file system.

Steps

1. Create and write to a file on the new LUN.

```
> echo test file > f:\\test.txt
```

2. Read the file and verify data was written.

```
> type f:\\test.txt
```

3. To verify that multipath is working, change the volume ownership.
   a. From the SANtricity System Manager GUI, go to **Storage** > **Volumes**, and then select **More** > **Change ownership**.
   b. On the Change Volume Ownership dialog box, use the **Preferred Owner** pull-down to select the other controller for one of the volumes in the list, and then confirm the operation.
   c. Verify that you can still access the files on the LUN.

```
> dir f:\\
```

4. Find the target ID.

The dsmUtil utility is case sensitive.

```
> C:\\Program Files \(x86\)\\DSMDrivers\\mppdsm\\dsmUtil.exe -a
```

5. View the paths to the LUN and verify that you have the expected number of paths. In the `<target ID>` portion of the command, use the target ID that you found in the previous step.

```
> C:\\Program Files \(x86\)\\DSMDrivers\\mppdsm\\dsmUtil.exe -g <target
ID\>
```

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