SANtricity® Storage Manager 11.30

Installing and Configuring for Windows

Express Guide

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NetApp®

Contents

Deciding whether to use this Express Guide

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

Note: The configuration that the express method provides might not meet the needs of your production environment. For additional options for installing and configuring the storage system, see the SANtricity Power Guide for your operating system.

The express method includes the following steps:

1. Setting up one of the following communication environments:
   - Fibre Channel (FC)
   - iSCSI
   - SAS
2. Creating logical volumes on the storage array and assigning a logical unit number (LUN) to each volume.
3. Making the volume LUNs available to the data host.

This guide 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 any optional drive shelves and the controller shelf. • You have applied power to the storage array. • You have installed all other hardware (for example, host bus adapters and switches) and made the necessary connections.
Host	• You have made a connection between the storage array 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.

Component	Assumptions
Storage management station	• You are using a 1 Gb/s 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 array 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 obtained the MAC addresses for management port 1 on both storage array controllers.
Storage provisioning	• You will not use shared volumes. • You will create disk 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 versions listed in the *NetApp Interoperability Matrix Tool*.
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 versions listed in the NetApp Interoperability Matrix Tool.

If these assumptions are not correct for your installation, or if you want more conceptual background information, see the SANtricity Power Guide for your operating system.

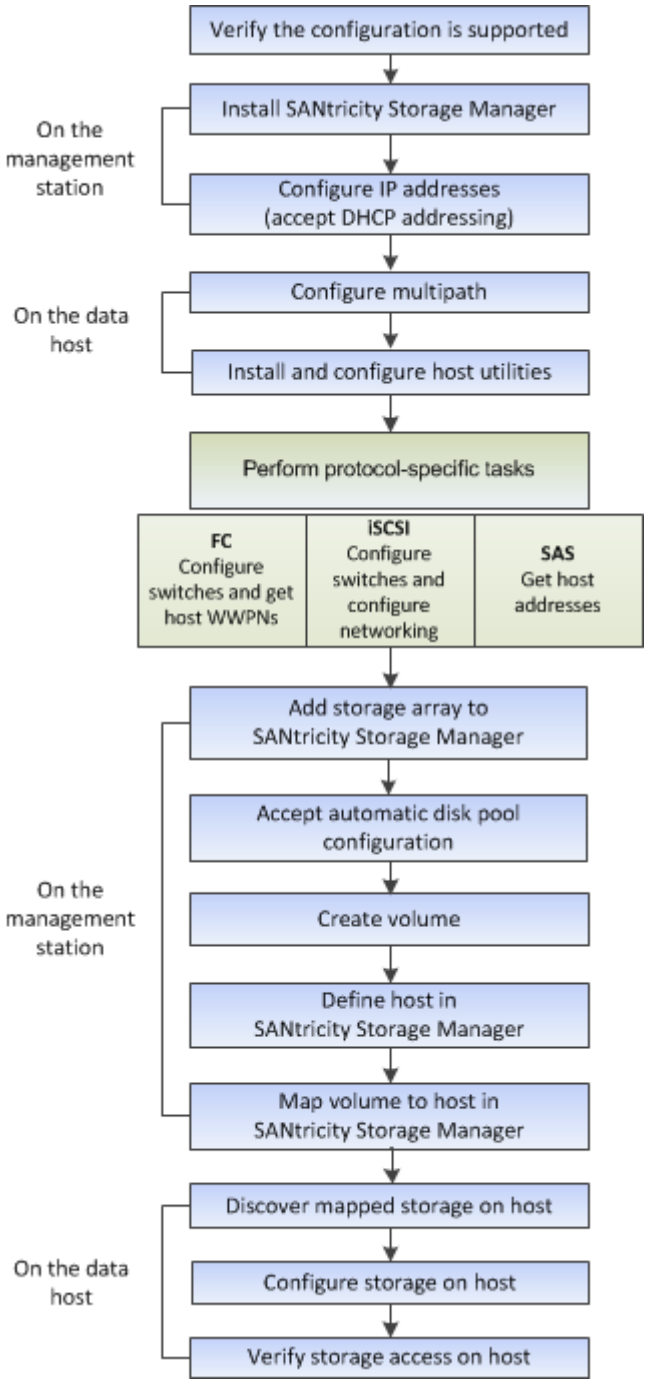
Related information

NetApp Interoperability Matrix Tool

SANtricity 11.30 Installing and Configuring for Windows Power Guide for Advanced Users

Understanding the workflow

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

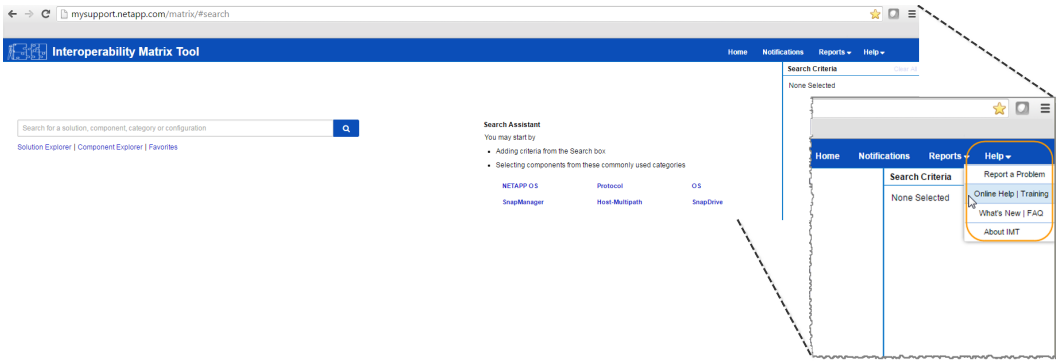


Verifying the configuration is supported

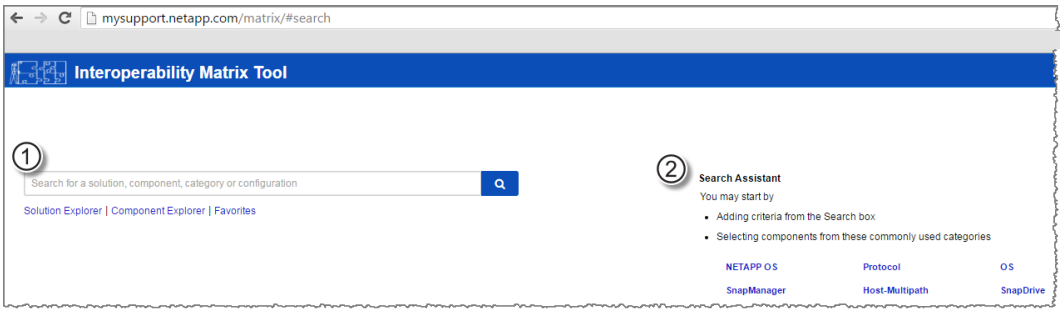
To ensure reliable operation, you create an implementation plan and then use the NetApp Interoperability Matrix Tool (IMT) to verify that the entire configuration is supported.

Steps

1. Go to the *NetApp Interoperability Matrix Tool*.
2. Go to **Help > Online Help | Training** or **Help > What's New | FAQ** for training or refresher tools.

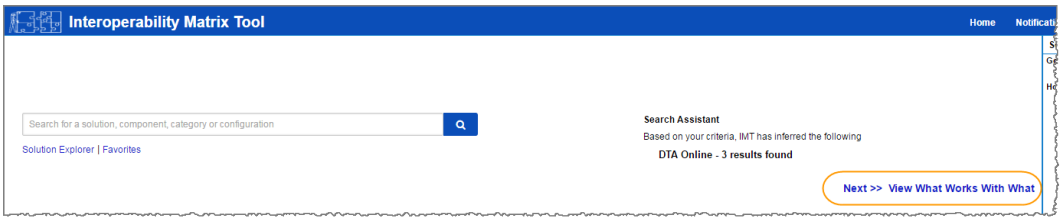


3. Use the search functions to enter the details of your configuration.

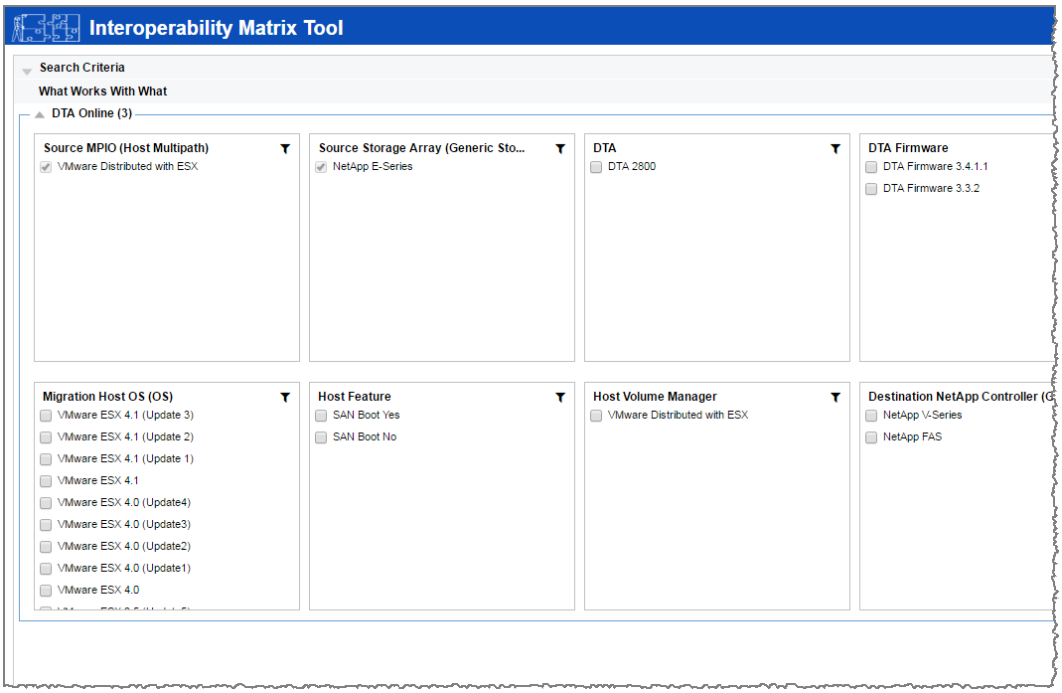


1	**Search box**: Enter a solution, component, category, or configuration for building initial criteria and inferring solutions.
2	**Search Assistant**: Use appropriate hints to infer solutions faster.

4. Click **View What Works With What** to select from a detailed matrix of components.



Example



5. Review the information in the following tabs in the **Configuration Details** window:
   - **Notes**: Lists important information specific to your configuration. Review the alerts to identify the hot fixes that are required for your operating system.
   - **Policies & Guidelines**: Provides general guidelines for all SAN configurations.
6. 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

Related information

NetApp Interoperability Matrix Tool

Installing SANtricity Storage Manager

When you install the SANtricity Storage Manager software on your management station, a graphical user interface (GUI) and a command line interface (CLI) are installed by default. These instructions assume that you will install the SANtricity Storage Manager GUI on a management station and *not* on the I/O host.

Before you begin

- You must have the correct administrator or superuser privileges.
- You must have ensured that the system that will contain the SANtricity Storage Manager client has the following minimum requirements:
  - **RAM**: 2 GB for Java Runtime Engine
  - **Disk space**: 5 GB
  - **OS/Architecture**: Refer to *NetApp Support* **Downloads > Software > E-Series/EF-Series SANtricity Storage Manager** for guidance on determining the supported operating system versions and architectures.

About this task

You will install the SANtricity Storage Manager software on the management station.

For more information about installation methods and customizations, see *SANtricity 11.30 Installing and Configuring for Windows Power Guide for Advanced Users*.

Steps

1. Download the SANtricity software release from *NetApp Support* **Downloads > Software > E-Series/EF-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.

Configuring IP addresses using DHCP

In this express method for configuring communications between the management station and the storage array, you use Dynamic Host Configuration Protocol (DHCP) to provide IP addresses. 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.

Before you begin

You have installed and configured a DHCP server on the same subnet as the storage management ports.

About this task

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.

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

   Important: 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: 192.168.128.101
   - Controller B, port 1: 192.168.128.102
   - Subnet mask: 255.255.255.0

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 when you add the storage array to SANtricity Storage Manager.

Configuring the multipath software

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 SANtricity Storage Manager. This software contains the multipath package for Windows.

About this task

If you have not installed SANtricity Storage Manager, go to *Installing SANtricity Storage Manager* on page 9.

Windows installations use the native MPIO Device Specific Module (DSM) driver for failover. When you install SANtricity Storage Manager, the DSM driver is installed and enabled. You do not need to take further action to use multipath.

Performing FC-specific tasks

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

Determining host WWPNs and making the recommended settings—FC

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

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
- Record the WWPNs on the *FC worksheet* on page 37.
- 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. Record the host identifiers on the *FC worksheet* on page 37.
4. Select the appropriate settings in the HBA utility.

   Appropriate settings for your configuration are listed in the Notes column of the IMT.

Related concepts

FC worksheet on page 37

Related information

NetApp Interoperability Matrix Tool
SANtricity 11.30 Installing and Configuring for Windows Power Guide for Advanced Users

Configuring the switches—FC

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.

Before you begin

- You must have administrator credentials for the switches.

- You must have used your HBA utility to discover the WWPN of each host initiator port and of each controller target port connected to the switch.

  Note: It is helpful to record the WWPNs on the *FC worksheet* on page 37.

About this task

For details about zoning your switches, see the switch vendor's documentation.

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.

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.

Performing iSCSI-specific tasks

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

Configuring the switches—iSCSI

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

You must ensure the following:

- You have 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.
- You have enabled send and receive hardware flow control **end to end**.
- You have disabled priority flow control.
- If appropriate, you have enabled jumbo frames.

Note: Port channels/LACP is not supported on the controller's switch ports. Host-side LACP is not recommended; multipathing provides the same, and in some cases better, benefits.

Related concepts

iSCSI worksheet on page 39

Configuring networking—iSCSI

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.

You must enable send and receive hardware flow control **end to end**. You must disable priority flow control.

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 steps in *Configuring array-side networking—iSCSI*.

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

Related tasks

Configuring array-side networking—iSCSI on page 15

Configuring array-side networking—iSCSI

You use the Array Management Window (AMW) of SANtricity Storage Manager to configure iSCSI networking on the array side.

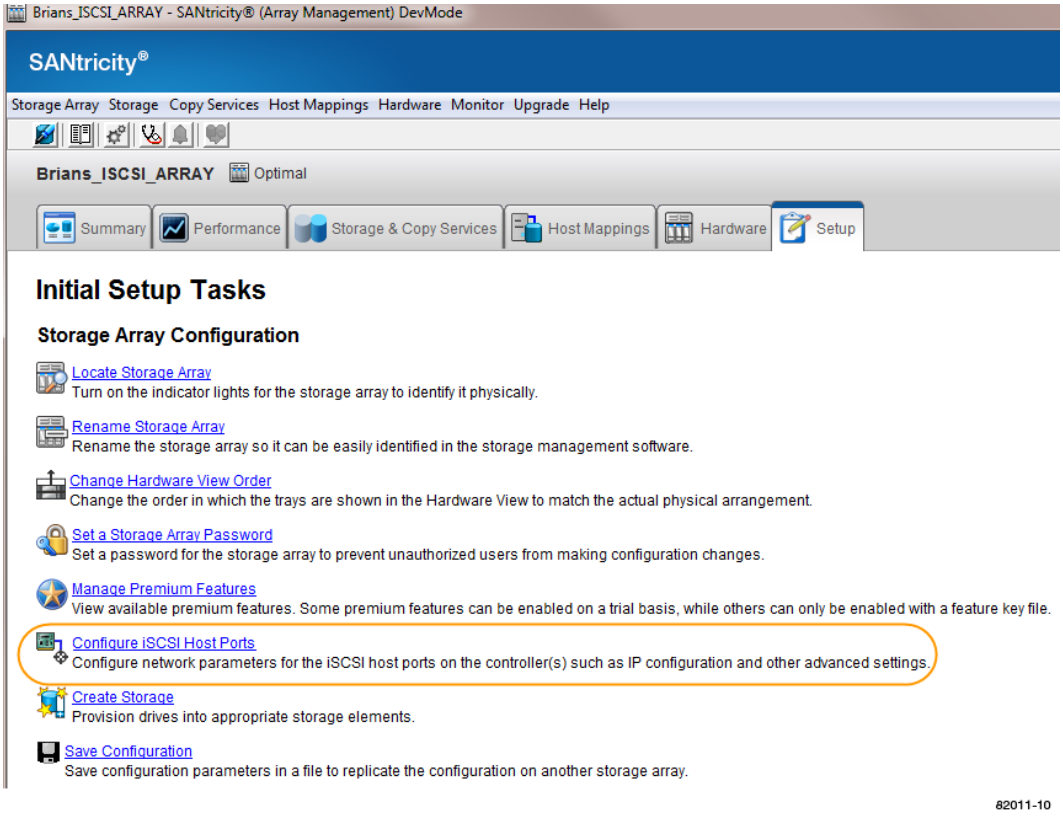
About this task

To configure E-Series iSCSI ports for both controllers, complete the following steps:

Steps

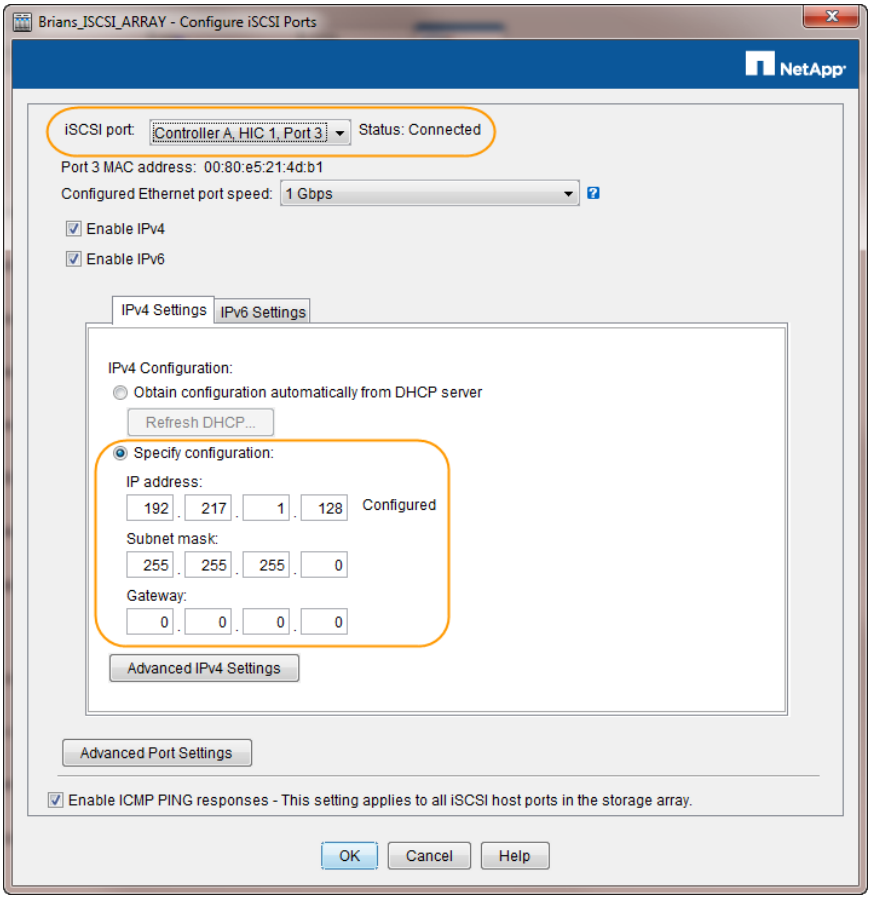
1. Open the **SANtricity Storage Manager Enterprise Management Window (EMW)**.
2. Click the **Devices** tab, and then double-click the name of the storage array in the left pane.

   The **Array Management Window (AMW)** opens.
3. From the **AMW**, select the **Setup** tab.
4. Select **Configure iSCSI Host Ports**.



5. Select the iSCSI host port to be configured and configure the IP address information as needed. Add the IP address to the worksheet for use when you configure iSCSI networking on the host side.

   Note: The **Enable ICMP PING Responses** check box is checked by default and should remain selected.



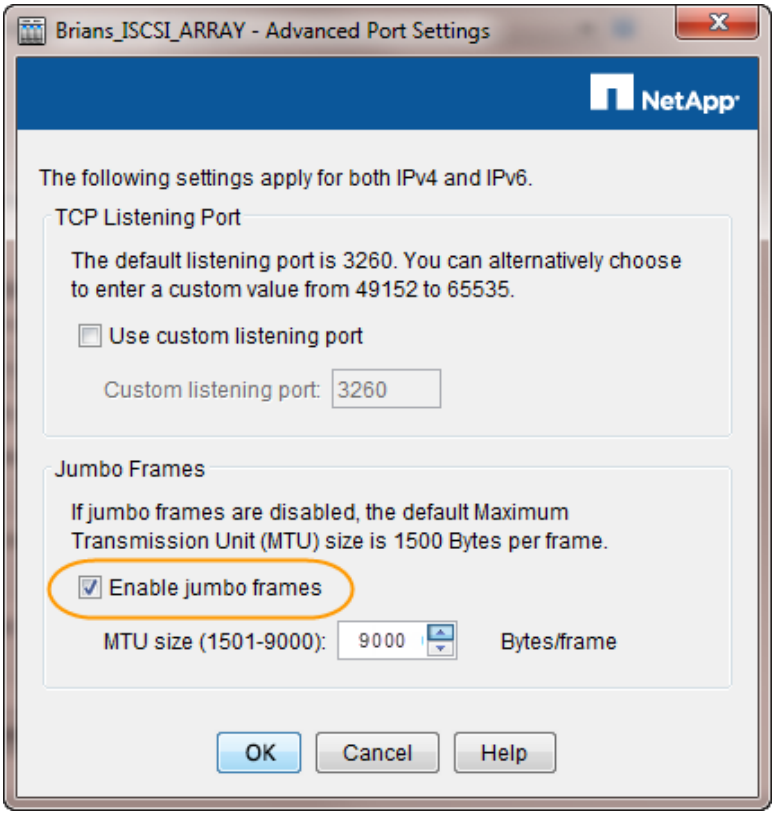
6. Reconfigure the E-Series iSCSI host ports to use the same maximum transmission unit (MTU) size as the host and switch.

   a. From the iSCSI Host Ports dialog box, select **Advanced Host Port Settings**.

   b. Select the **Enable jumbo frames** checkbox, if appropriate.

   c. Change the MTU size to the desired number of bytes per frame, and then select **OK**.

   d. Select **OK** on the remaining windows as necessary to complete this procedure.



7. Repeat steps above to configure additional iSCSI ports on the E-Series controllers.

Configuring 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.

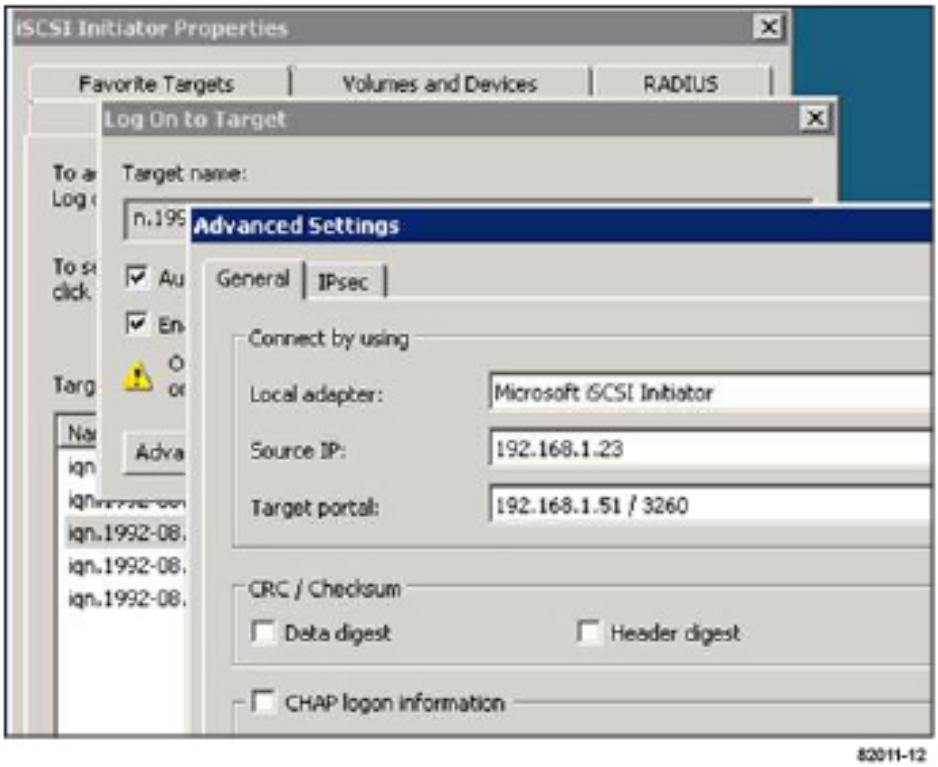
Before you begin

- Fully configure the switches that will be used to carry iSCSI storage traffic.
- You must have enabled send and receive hardware flow control **end to end** and disabled priority flow control.
- Complete the array side iSCSI configuration.
- These instructions assume that two NIC ports will be used for iSCSI traffic.
- You must know the IP address of each port on the controller.

Steps

1. Optimal NIC configuration includes disabling 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.



Verifying IP network connections—iSCSI

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

Steps

1. Select **Start > All Programs > Accessories > Command Prompt** and 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.

   Note: 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.

Performing SAS-specific tasks

For the SAS protocol, you determine host port addresses and make the settings recommended in the Notes column of the *NetApp Interoperability Matrix Tool (IMT)*.

About this task

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.
- It is helpful to record the SAS addresses on the *SAS worksheet* on page 40.
- 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. Record the host identifiers (SAS addresses) on the *SAS worksheet* on page 40.
4. Use the HBA BIOS to select the appropriate settings for your configuration.

   See the Notes column of the *NetApp Interoperability Matrix Tool* for recommendations.

Related concepts

SAS worksheet on page 40

Related information

NetApp Interoperability Matrix Tool

Installing and configuring Windows Unified Host Utilities 7.0

Windows Unified Host Utilities 7.0 includes tools to enable 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.

About this task

See the *Windows Host Utilities 7.0 Installation Guide,* found on the Documentation tab of *NetApp Support*.

Note: This utilities package is not installed using the SANtricity Storage Manager installer.

Steps

1. Use the *NetApp Interoperability Matrix Tool* to determine the appropriate version of Unified Host Utilities 7.0 to install.

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

2. Download the Unified Host Utilities 7.0 from *NetApp Support*.

Adding a storage array to SANtricity Storage Manager

After you have configured the network between the management station and the array controllers, you add the controller to SANtricity Storage Manager using the Enterprise Management Window (EMW).

Steps

1. Open SANtricity Storage Manager from the Windows **Start** menu.

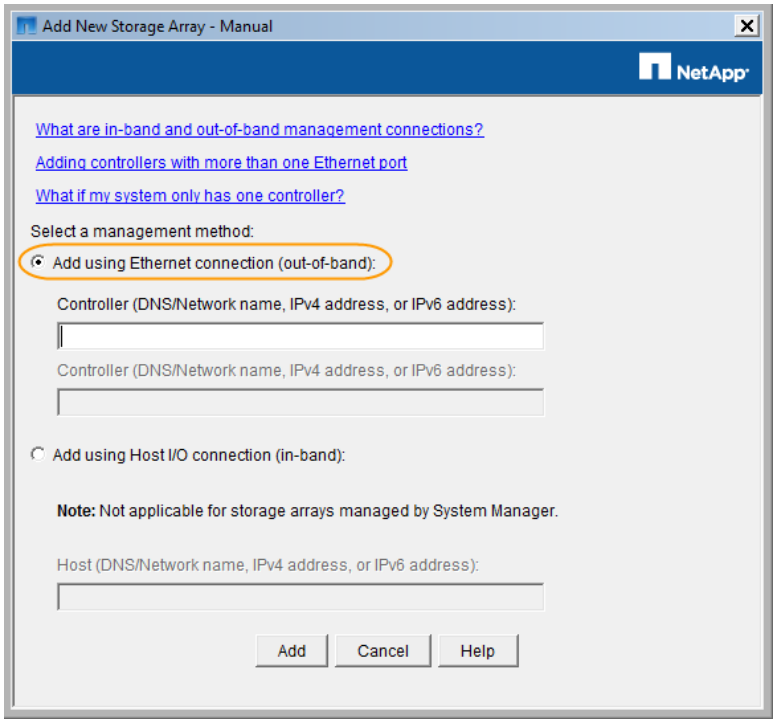
   The EMW is displayed.

2. On the **Select Addition Method** screen, select the **Manual** radio button, and then select **OK**.

   Note: When you open SANtricity Storage Manager for the first time, the **Select Addition Method** screen prompts you to select the **Automatic** or **Manual** method to add a new storage array.

3. To add one or more new storage arrays, complete the following steps:

   a. On the **Add New Storage Array – Manual** screen, make sure that the default **Add using Ethernet connection (out-of-band)** radio button is selected. Enter the IP address (as determined by DHCP) of port 1 for each controller (controller A and B) in the fields provided.



   b. Select **Add**.

      The Storage Array Added screen is displayed.

   c. To add another storage array, select **Yes** on the **Storage Array Added** screen and repeat the steps above.

      Otherwise, select **No**.

4. Name the storage array so you can find it more easily in the EMW after you change the IP addresses:
   a. In the **Setup** tab, select **Name/Rename Storage Arrays**.
   b. In the **Select storage array:** list, confirm that the storage array you added is selected.
   c. In the **Storage array name** field, type a name for the storage array.
   d. Select **OK**.
   e. On the **Name/Rename Storage Arrays** warning dialog, select **Yes** to dismiss the warning and continue.
5. Configure the network configuration information of the controllers, using information you obtain from your network administrator.
   a. Click the **Devices** tab, and then double-click on the name of the storage array.

      The Array Management Window (AMW) opens.
   b. Select the **Hardware** tab in the Array Management Window (AMW).
   c. Select the visual representation of one of the controllers in the **Hardware** tab.
   d. Right-click, and then select **Configure > Management Ports**.
   e. On the **Change Network Configuration** dialog box, select **Controller A, Port 1** in the **Ethernet port** drop-down list.
   f. From the **Speed and duplex mode** drop-down list, select **Auto-negotiate**.
   g. Depending on the format of your network configuration information, select the **Enable IPv4** check box, the **Enable IPv6** check box, or both check boxes.
   h. Depending on the format you have selected, enter the network configuration information in the **IPv4 Settings** tab or the **IPv6 Settings** tab.

      Note: You must obtain the network configuration information from your network administrator.

   i. Select **Controller B, Port 1** in the **Ethernet Port** drop-down list, and repeat the steps you followed for controller A.
   j. Select **OK**.
6. Find the identifiers of the controller's host ports by opening the AMW for the storage array and then following the appropriate steps for your protocol.

   Fibre Channel

   a. From the **Monitor** menu, select **Reports > Storage Array Profile**.
   b. Select the **Hardware** tab, then select the **Controllers** tab.
   c. Scroll through the information to find the WWPNs.
   d. Record the WWPNs in the worksheet.

   iSCSI

   a. Click the **Setup** tab.
   b. Click the link for **Manage iSCSI Settings**. Scroll through the information to find the identifiers.

c. Record the identifiers in the worksheet.

Accepting automatic disk pool configuration

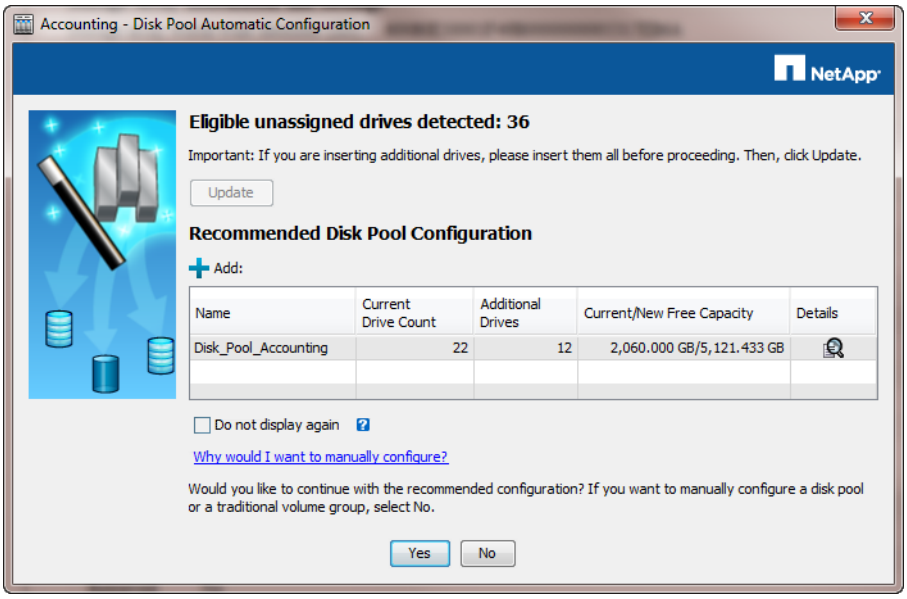
When there are unassigned drives available to create new disk pools, the Disk Pool Automatic Configuration wizard is displayed when you open the Array Management Window (AMW) for your storage array. You are prompted to select the recommended disk pool configuration.

Steps

1. In the **Enterprise Management Window (EMW)**, click **Devices**, and then double-click the storage array to open the Array Management Window (AMW).

   Note: When you open the AMW for a storage array for the first time, the Disk Pool Automatic Configuration wizard is displayed.

2. Accept the recommended disk pool configuration by clicking **Yes** in the **Disk Pool Automatic Configuration** dialog box.



Creating a volume

Using SANtricity Storage Manager, you create a volume—a single accessible storage area—on a storage array for the attached host to access. You create a volume from the free capacity of a disk pool.

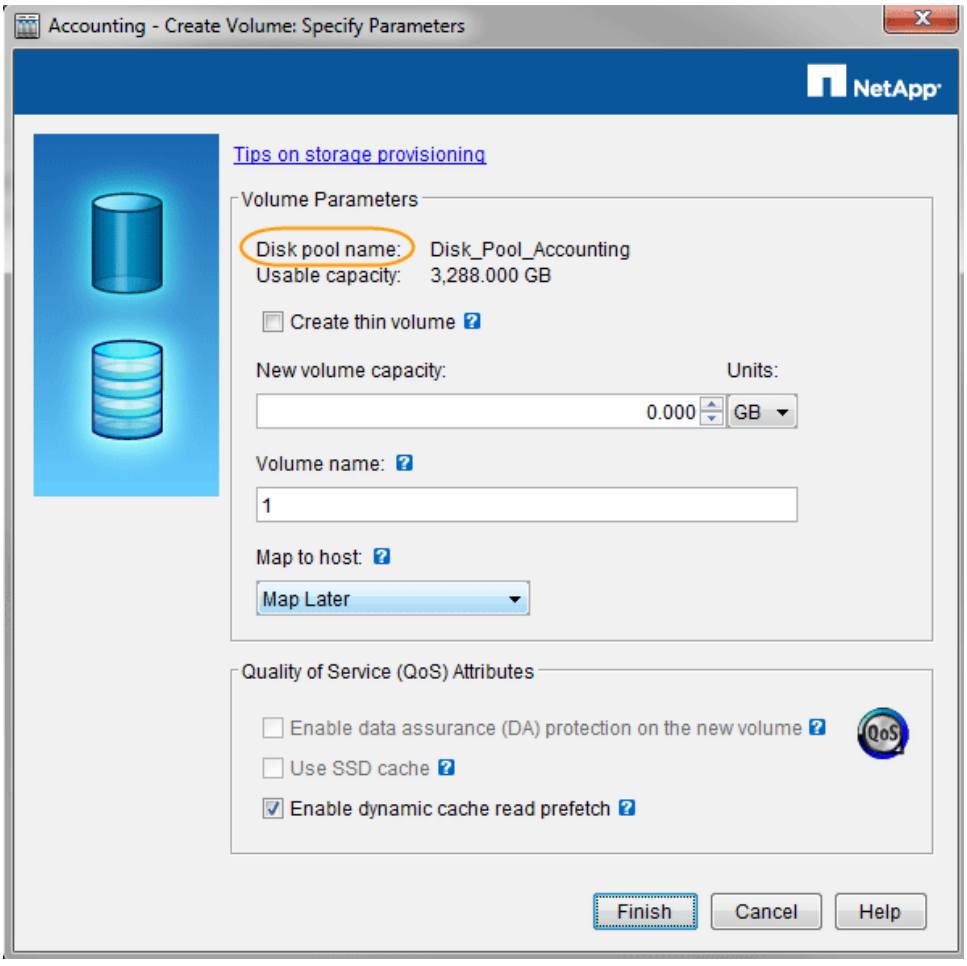
Before you begin

You must have determined the expected capacity, usage, data protection, and performance requirements for the volume.

Steps

1. From the **Array Management Window (AMW) Storage & Copy Services** tab, expand the disk pool on the array where you want to create the new volume.
2. Right-click **Free Capacity > Create Volume**.

   The following dialog box appears.



3. Configure the volume parameters.

   Onscreen flyovers provide more information about particular options.

   a. If you want to create a thin volume, select the **Create thin volume** check box.

b. From the **Units** drop-down list, select the appropriate unit for the new volume capacity.

c. Specify the volume capacity to be taken from the free capacity that is listed.

d. Enter the volume name.

e. From the **Map to host** drop-down list, select the **Map later** option.

4. Specify the Quality of Service attributes. Use the onscreen flyovers and the SANtricity Online Help to get more information about particular attributes.

Note: The **Use SSD cache** check box is not available in the Quality of Service section because you have chosen to map the volume to a host later. See the Array Management Window Online Help topic "Learn about SSD Cache" to decide if it is appropriate to enable SSD cache later. To enable it, from the **AMW Storage & Copy Services** tab, right-click the volume, and then select **SSD Cache > Enable**.

a. To enable DA protection, select the **Enable data assurance (DA) protection on the new volume** check box.

This check box appears only if the drives, the controller, and the host bus adapter are all DA-capable.

b. Finish selecting the Quality of Service Attributes and create the volume.

5. If you want to enable dynamic cache read prefetch, select the **Enable dynamic cache read prefetch** check box to enable it.

Note: Dynamic cache read prefetch is not available for thin volumes.

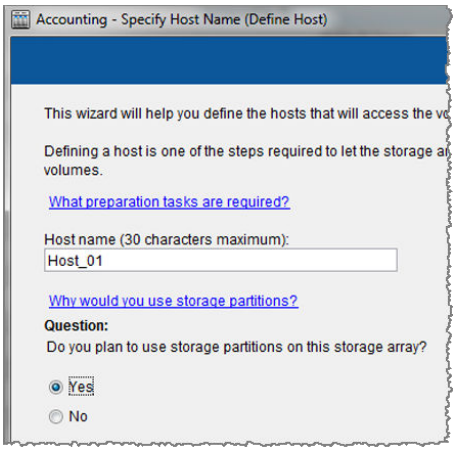
6. Select **Finish**.

Defining a host in SANtricity Storage Manager

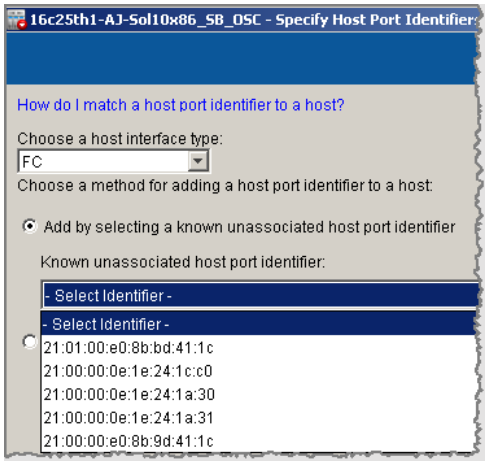
You define a new logical host on the storage array so that volumes can be shared with the host.

Steps

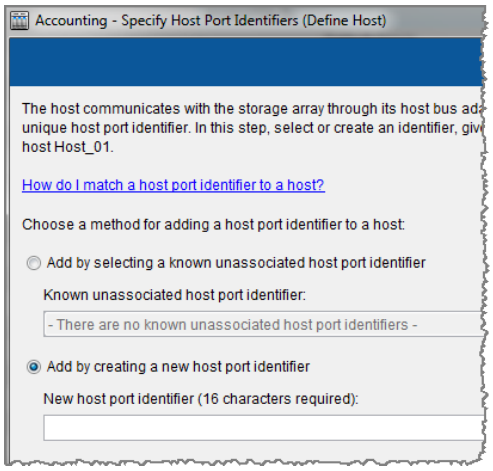
1. From the **Array Management Window (AMW)**, select the **Host Mappings** tab.
2. In the left pane, expand the storage array tree.
3. Right-click **Default Group** and select **Define > Host** to start the **Define Host** wizard.
   a. Enter a descriptive name for the host to make it easier for administrators to manage the environment over time.
   b. In the **Question** area of the dialog box, keep the **Yes** selected.



4. Select **Next**.
5. If the controller supports multiple host interface types, select one type from the **Choose a host interface type** drop-down list.
6. Choose a method for adding a host port identifier to the host.
   - You can add known unassociated host port identifiers by selecting the option **Add by selecting a known unassociated host port identifier**. From the drop-down list, select the identifier for the first port on the host.
     In this example, a Fibre Channel host interface type is shown.



- If no identifiers are displayed, there is an issue with the path to the host, and the storage cannot be discovered. Resolve the host issue, then change the host port identifier that was not discovered by selecting the option **Add by creating a new host port identifier**. Enter the new host port identifier.



Note: The host port identifier is called a different name depending on the protocol:

- Fibre Channel and SAS: World Wide Identifier (WWID)
- InfiniBand and iSCSI: iSCSI Qualified Name (IQN)

When the identifier is displayed in the selection list, the storage array can automatically detect the path to the host.

7. Enter a descriptive alias name for the host port identifier.
8. Select **Add** to add the host port identifier to the host.
9. Repeat Step *6* on page 28 through Step *8* on page 29 for each link between the host and the storage array. You can connect and provision two to four paths between any one host and the E-Series storage array.

   Note: For InfiniBand and iSCSI, additional links between host and storage will not show up as different identifiers; they will all exist behind the same IQN.

10. Select **Next**.

11. From the **Host type (operating system)** drop-down list, select host type **Windows**.
12. Select **Next**.
13. Select **No – this host will NOT share access to the same volumes with other hosts**, and then select **Next**.

    Note: These instructions assume a non-clustered configuration.

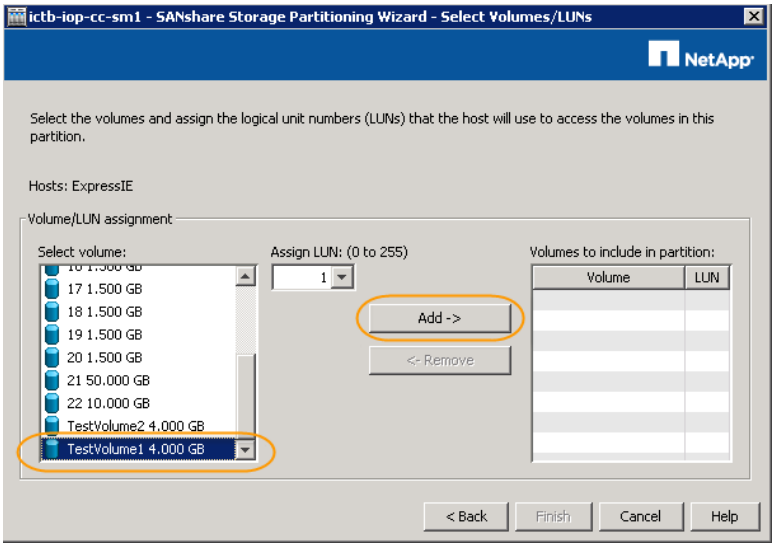
14. Review the host definition information and confirm that the host name, the host type, and the host port identifiers are correct.
15. Select **Finish** to create the host.
16. Repeat Step *3* on page 28 through Step *15* on page 30 to create additional hosts as required.
17. From the **Host Mappings** tab, review the storage array tree to verify that the hosts were created.

Mapping a volume to a host

Using SANtricity Storage Manager to create storage partitions, you assign a logical unit number (LUN) to a volume and map the LUN to the host.

Steps

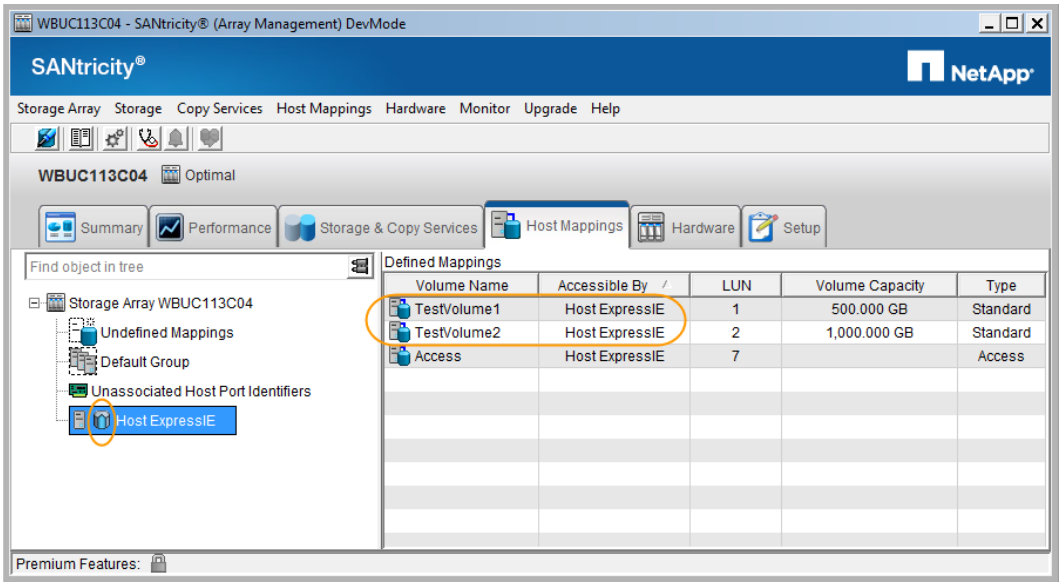
1. From the **Array Management Window (AMW)**, select the **Host Mappings** tab.
2. Select the storage array tree, right-click the desired host, and then select **Define Storage Partition** to start the **SANshare Storage Partitioning** wizard.
3. On the **Welcome** page of the wizard, select **Next**.
4. Select **Host** to create a dedicated mapping, and then select the host name to be added to the partition.
5. Select **Next**.
6. Select an individual volume, assign a LUN to the volume, and then select **Add** to associate the volume (LUN) with the partition.



7. Repeat Step *6* until all desired volumes are added to the partition.
8. Select **Finish** to create the partition.
9. Review the storage array tree on the **Host Mappings** tab to confirm that the partition was successfully created.

Example

Note: In this example, the volumes `TestVolume1` and `TestVolume2` are mapped to the host `ExpressIE`. Only this host has access to `TestVolume1` and `TestVolume2`. In the left pane of the screen, the storage partition on the host is indicated by the blue slice on the storage cylinder icon.


WBUC113C04 - SANtricity® (Array Management) DevMode
SANtricity®
NetApp
Storage Array Storage Copy Services Host Mappings Hardware Monitor Upgrade Help
WBUC113C04 Optimal
Summary Performance Storage & Copy Services Host Mappings Hardware Setup
Find object in tree
Storage Array WBUC113C04
Undefined Mappings
Default Group
Unassociated Host Port Identifiers
Host ExpressIE
Defined Mappings
Volume Name Accessible By LUN Volume Capacity Type
TestVolume1 Host ExpressIE 1 500.000 GB Standard
TestVolume2 Host ExpressIE 2 1,000.000 GB Standard
Access Host ExpressIE 7 Access
Premium Features:

Discovering storage on the host

LUNs on your storage system appear as disks to the Windows host. When you add new LUNs, you must manually rescan the associated disks to discover them. The host does not automatically discover new LUNs.

Before you begin

You must be logged on as an administrator.

Steps

1. To discover the storage, run the following command from a Windows command prompt.

   ```
   # echo rescan | diskpart
   ```

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

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

Configuring storage on the host

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. Optionally, you can format the LUN with a file system.

Before you begin

The host must have discovered the LUN.

About this task

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).

Steps

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

   Example

   ```
   > diskpart
   ```

2. View the list of available disks.

   Example

   ```
   > list disk
   ```

3. Select the disk to bring online.

   Example

   ```
   > select disk 1
   ```

4. Bring the disk online.

   Example

   ```
   > online disk
   ```

5. Create a partition.

   Example

   ```
   > create partition primary
   ```

   Note: 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.

Example

```
> assign letter=f
```

7. Format the disk.

Example

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

8. Exit the `diskpart` context.

Example

```
> exit
```

Verifying storage access on the host

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

Before you begin

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.

   Example

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

2. Read the file and verify data was written.

   Example

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

3. To verify that multipath is working, change the volume ownership.

   a. From the SANtricity Storage Manager Array Management Window (AMW), expand the storage array tree, select the volume, right-click, select **Change** > **Ownership/Preferred Path**, and then select the other controller.

   b. Verify that you can still access the files on the LUN.

      Example

      ```
      > dir f:\
      ```

4. Find the target ID.

   Note: The `dsmUtil` utility is case sensitive.

   Example

   ```
   > 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.

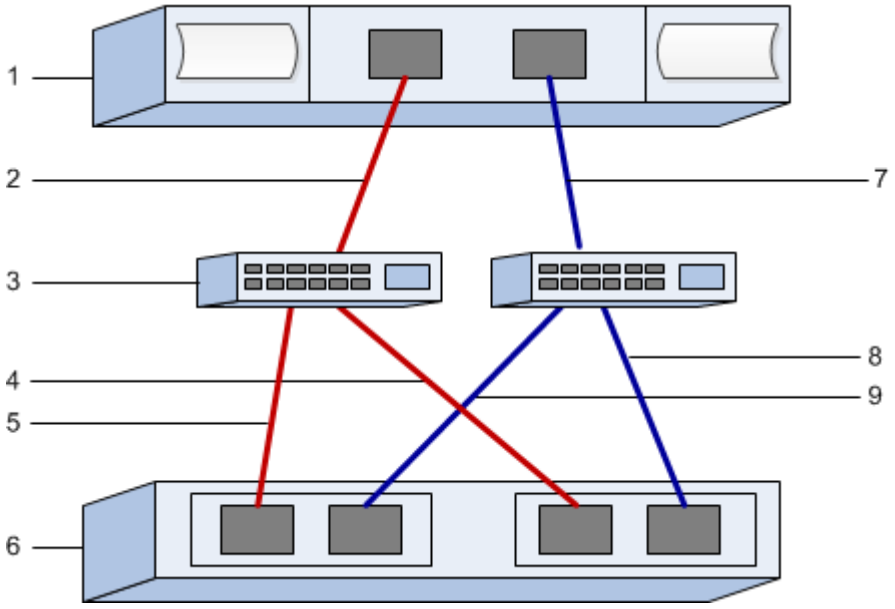
   Example

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

FC worksheet

You can use this 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

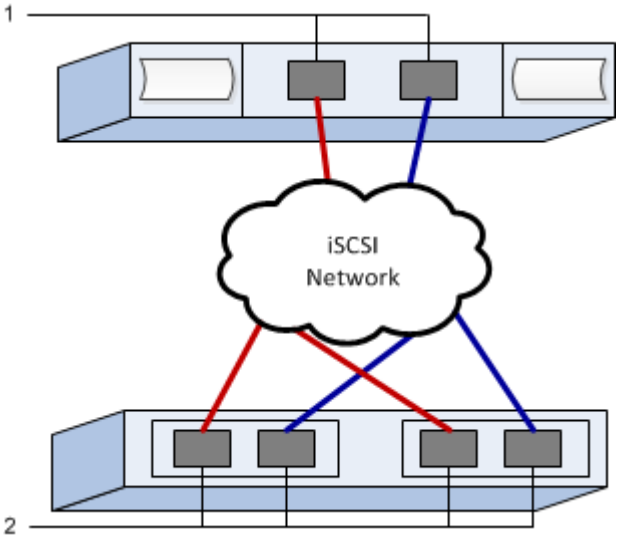
Mapping host name	
Host OS type	

iSCSI worksheet

You can use this 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	

Mappings host name

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

SAS worksheet

You can use this worksheet to record SAS storage configuration information. You need this information to perform provisioning tasks.

Host Identifiers

Host (initiator) port connections	SAS address
Host (initiator) port connected to Controller A	
Host (initiator) port connected to Controller B	

Target Identifiers

Recommended configurations consist of two target ports.

Mappings Host

Mappings Host Name	
Host OS Type	

Where to find additional information

Use the resources listed here if you need additional information. You can also use the online help systems for the Enterprise Management Window (EMW) and the Array Management Window (AMW) of SANtricity Storage Manager.

- *SANtricity 11.30 Installing and Configuring for Windows Power Guide for Advanced Users* describes:
  - Software installation options
  - Configuration options
  - Multipath options
  - Installation on a boot device
  - Installation on Windows Server Core
- *Windows Unified Host Utilities 7.0 Installation Guide* (https://library.netapp.com/ecm/ecm_get_file/ECMP1656700) describes how to install and use the Windows Unified Host Utilities 7.0.
- Online help describes how to use SANtricity Storage Manager to complete configuration and storage management tasks. It is available within the product and as a PDF download.
- *NetApp Knowledgebase* (a database of articles) provides troubleshooting information, FAQs, and instructions for a wide range of NetApp products and technologies.
- For additional documentation and instructions for E-Series products, including SANtricity software, go to the *NetApp E-Series and EF-Series Systems Documentation Center*.

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