

# Quantum®

## SANtricity® Storage Manager 11.4x Installing and Configuring for VMware® Express Guide

# StorNext QD7000

Firmware 8.40.xx.xx



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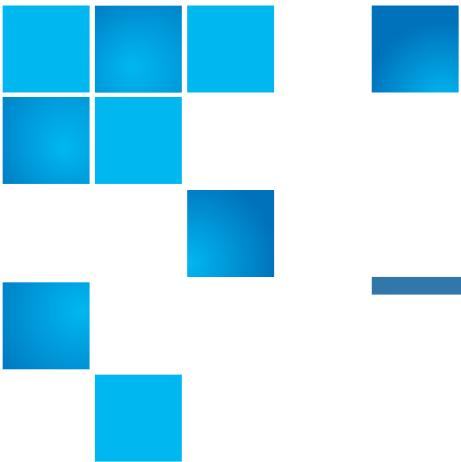
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# Preface

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**Note:** The 8.40.xx.xx firmware (Madrid) is used in the QD7000 (E5600, Titan RAID controller, only). Refer to the [NetApp to Quantum Naming Decoder](#) section for additional information.

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This section provides the following information:

- [Audience](#)
- [Prerequisites](#)
- [NetApp to Quantum Naming Decoder](#)
- [Product Safety Statements](#)
- [Contacts](#)
- [Comments](#)
- [Quantum Global Services](#)

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## Audience

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This manual is intended for storage customers and technicians.

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**Prerequisites**

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Prerequisites for installing and using this product include knowledge of:

- Servers and computer networks
- Network administration
- Storage system installation and configuration
- Storage area network (SAN) management and direct attach storage (DAS)
- Fibre Channel (FC) and Ethernet protocols

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**NetApp to Quantum Naming Decoder**

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Use [Table 1](#) to correlate the NetApp product nomenclature to the equivalent Quantum-storage naming conventions.

Table 1 Product Nomenclature

E-Series NetApp Product	Quantum-Storage	Description
Controller-Drive Tray	Base System	Quantum uses Base System when referring to a drive tray with the RAID controllers.
Drive Tray	Expansion Unit	Quantum uses Expansion Unit when referring to a drive tray with the environmental services modules (ESMs).
E5600 (Code Name: Titan)	RAID Controller	Four 16Gb/s FC SFP+ host ports
E5500 (Code Name: Soyuz)	RAID Controller	Four 16Gb/s FC SFP+ host ports
E5400 (Code Name: Pikes Peak)	RAID Controller	Four 8Gb/s FC SFP+ host ports
DE6600 (Code Name: Wembley)	4U 60-drive enclosure	Sixty 3.5 inch disk drives

<b>E-Series NetApp Product</b>	<b>Quantum-Storage</b>	<b>Description</b>
<p>E5660</p> <ul style="list-style-type: none"> <li>• DE6600 4U drive enclosure</li> <li>• With E5600 RAID controllers (Titan)</li> </ul>	<p>Quantum StorNext QD7000</p>	
<p>E5560</p> <ul style="list-style-type: none"> <li>• DE6600 4U drive enclosure</li> <li>• With E5500 RAID controllers (Soyuz)</li> </ul>	<p>Quantum StorNext QD7000</p>	
<p>E5460</p> <ul style="list-style-type: none"> <li>• DE6600 4U drive enclosure</li> <li>• With E5400 RAID controllers (Pikes Peak)</li> </ul>	<p>Quantum StorNext QD6000</p>	

E-Series NetApp Product	Quantum-Storage	Description
<p>E5424</p> <ul style="list-style-type: none"> <li>• DE5600 24-drive 2U drive enclosure</li> <li>• Code Name: Camden</li> <li>• With E5400 RAID controllers (Pikes Peak)</li> </ul>	<p>Quantum StorNext QS2400</p>	
<p>E5412</p> <ul style="list-style-type: none"> <li>• DE1600 12-drive 2U drive enclosure</li> <li>• Code Name: Ebbets</li> <li>• With E5400 RAID controllers (Pikes Peak)</li> </ul>	<p>Quantum StorNext QS1200</p>	

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Quantum will not be held liable for damage arising from unauthorized use of the product. The user assumes all risk in this aspect.

This unit is engineered and manufactured to meet all safety and regulatory requirements. Be aware that improper use may result in bodily injury, damage to the equipment, or interference with other equipment.

**WARNING:** Before operating this product, read all instructions and warnings in this document and in the system, safety, and regulatory guide.

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**警告** 在使用本产品之前，请先阅读本文档及系统、安全和法规信息指南中所有的说明和警告信息。

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**警告** 操作本產品前，請先閱讀本文件及系統、安全與法規資訊指南中的指示與警告說明。

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**ADVERSAL** Læs alle instruktioner og advarsler i dette dokument og i *Vejledning om systemsikkerheds- og lovgivningsoplysninger*, før produktet betjenes.

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**AVERTISSEMENT** Avant d'utiliser ce produit, lisez la totalité des instructions et avertissements de ce document et du *Guide d'informations sur le système, la sécurité et la réglementation*.

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**HINWEIS** Lesen Sie vor der Verwendung dieses Produkts alle Anweisungen und Warnhinweise in diesem Dokument und im System, Safety, and Regulatory Information Guide (Info-Handbuch: System, Sicherheit und Richtlinien).

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**주의** *앞에 표기된 모든 경고와 안전 지침을 읽으시오.*

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**경고** 이 제품을 작동하기 전에 이 문서 및 시스템, 안전, 및 규제 정보 안내서에 수록된 모든 지침과 경고 표지를 숙지하십시오.

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**ПРЕДУПРЕЖДЕНИЕ**

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Перед началом эксплуатации данного устройства ознакомьтесь во всеми инструкциями и предупреждениями, приведенными в данном документе и в *Справочном руководстве по устройству, технике безопасности и действующим нормативам*.

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**ADVERTENCIA**

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Antes de utilizar este producto, lea todas las instrucciones y advertencias en este documento y en la Guía informativa sobre sistema, seguridad y normas.

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**VARNING**

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Läs alla anvisningar och varningar i detta dokument och i *System, säkerhet och krav från myndigheter - Informationshandbok* innan denna produkt tas i bruk.

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index.aspx#contact-support](http://www.quantum.com/serviceandsupport/get-help/index.aspx#contact-support)



**SANtricity® System Manager 11.41**

# **Installing and Configuring for VMware®**

Express Guide

December 2017 | 215-11894\_BO  
[doccomments@netapp.com](mailto:doccomments@netapp.com)





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## **Deciding whether to use this Express Guide**

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The "express method" for installing your storage array and accessing SANtricity System Manager is appropriate for setting up a standalone VMware host to an E-Series storage system. 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	<ul style="list-style-type: none"> <li>• You have used the Installation and Setup Instructions included with the controller shelves to install the hardware.</li> <li>• You have connected cables between the optional drive shelves and the array controllers.</li> <li>• You have applied power to the storage array.</li> <li>• You have installed all other hardware (for example, management station, switches) and made the necessary connections.</li> </ul>
Host	<ul style="list-style-type: none"> <li>• You have made a connection between the storage array and the data host.</li> <li>• You have installed the host operating system.</li> <li>• You are not using VMware as a virtualized guest.</li> <li>• You are not configuring the data (I/O attached) host to boot from SAN.</li> </ul>
Storage management station	<ul style="list-style-type: none"> <li>• You are using a 1 Gbps or faster management network.</li> <li>• You are using a separate station for management rather than the data (I/O attached) host.</li> <li>• 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.</li> <li>• You have attached the management station to the same subnet as the storage management ports.</li> </ul>

Component	Assumptions
IP addressing	<ul style="list-style-type: none"> <li>You have <b>not</b> yet made an Ethernet connection between the management station and the storage array.</li> </ul>
Storage provisioning	<ul style="list-style-type: none"> <li>You will not use shared volumes.</li> <li>You will create pools rather than volume groups.</li> </ul>
Protocol: FC	<ul style="list-style-type: none"> <li>You have made all host-side FC connections and activated switch zoning.</li> <li>You are using NetApp-supported FC HBAs and switches.</li> <li>You are using FC HBA driver versions as listed on the <a href="#">NetApp Interoperability Matrix Tool</a>.</li> </ul>
Protocol: iSCSI	<ul style="list-style-type: none"> <li>You are using Ethernet switches capable of transporting iSCSI traffic.</li> <li>You have configured the Ethernet switches according to the vendor's recommendation for iSCSI.</li> </ul>
Protocol: SAS	<ul style="list-style-type: none"> <li>You are using NetApp-supported SAS HBAs.</li> <li>You are using SAS HBA driver versions as listed on the NetApp Interoperability Matrix Tool.</li> </ul>

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

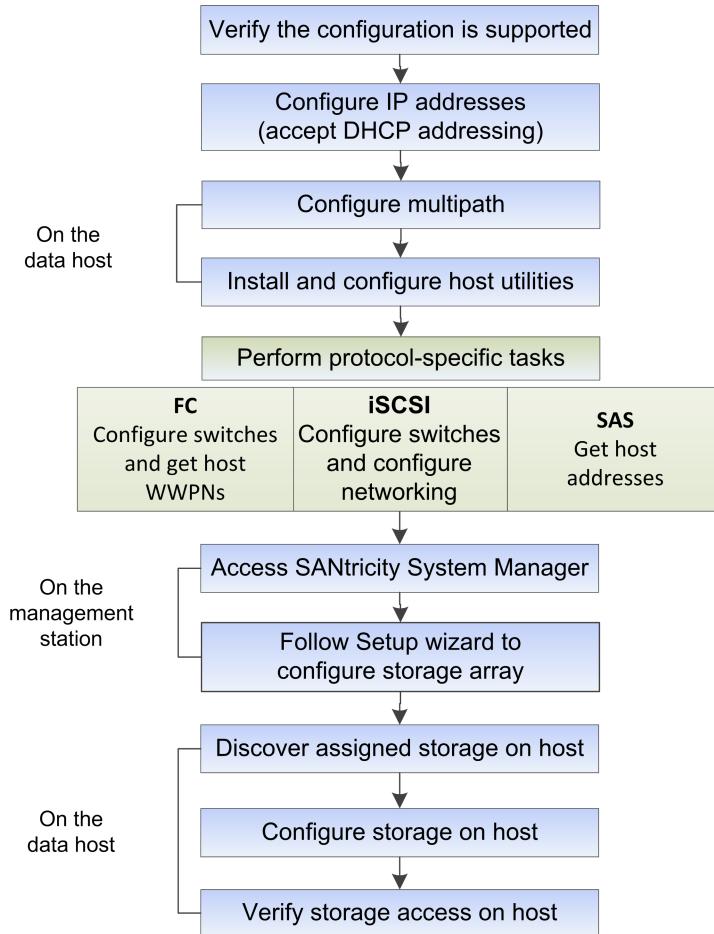
[NetApp Interoperability Matrix Tool](#)

[SANtricity 11.40 Installing and Configuring for VMware Power Guide for Advanced Users](#)

## Understanding the workflow

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

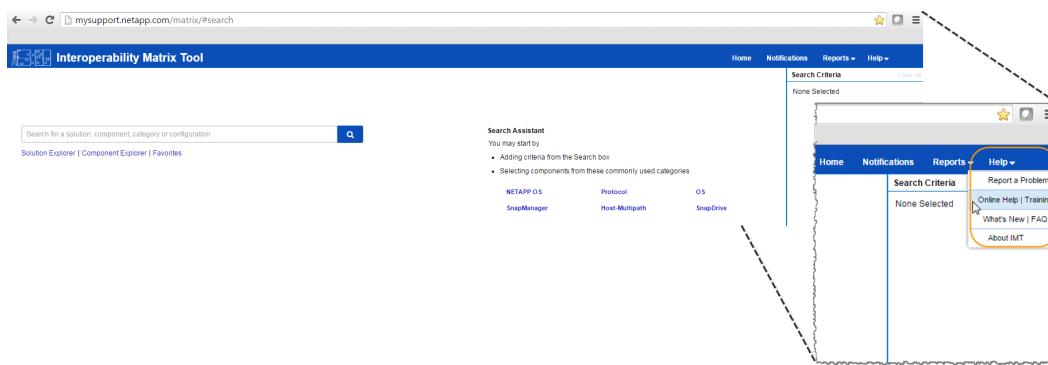


# Verifying the configuration is supported

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

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

## Example

The screenshot shows the 'Interoperability Matrix Tool' interface. At the top, there's a search bar labeled 'Search Criteria' with the sub-section 'What Works With What'. Below this, under the heading 'DTA Online (3)', there are four columns:

- Source MPIO (Host Multipath)**: Contains a single checked item: 'VMware Distributed with ESX'.
- Source Storage Array (Generic Storage)**: Contains a single checked item: 'NetApp E-Series'.
- DTA**: Contains a single checked item: 'DTA 2800'.
- DTA Firmware**: Contains two items: 'DTA Firmware 3.4.1.1' and 'DTA Firmware 3.3.2'.

Below these columns are three more sections:

- Migration Host OS (OS)**: Contains a list of VMware ESX versions from 4.0 to 4.1 (Update 3).
- Host Feature**: Contains two items: 'SAN Boot Yes' and 'SAN Boot No'.
- Host Volume Manager**: Contains a single checked item: 'VMware Distributed with ESX'.
- Destination NetApp Controller (G)**: Contains two items: 'NetApp V-Series' and 'NetApp FAS'.

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.

<b>Operating system updates</b>	<b>Protocol</b>	<b>Protocol-related updates</b>
<ul style="list-style-type: none"> <li>You might need to install out-of-box drivers to ensure proper functionality and supportability. You can install HBA drivers using the ESXi shell or a remote SSH connection to the ESXi host. To access the host using either of those methods, you must enable the ESXi shell and SSH access. For more information about the ESXi shell, refer to the VMware Knowledge Base regarding using the ESXi shell in ESXi 5.x or 6.x. For installation commands, refer to the instructions that accompany the HBA drivers.</li> <li>Each HBA vendor has specific methods for updating boot code and firmware. Some of these methods could include the use of a vCenter plugin or the installation of CIM provider on the ESXi host. Refer to the support section of the vendor's website to obtain the instructions and software necessary to update the HBA boot code or firmware. Refer to the <i>VMware Compatibility Guide</i> or the HBA vendor's website to obtain the correct boot code or firmware.</li> </ul>	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](#)

[VMware Knowledge Base](#)

# Configuring management port IP addresses using the Quick Connect utility

---

In this best-practices method for configuring communications, you configure the management station and array controllers to communicate using the Quick Connect utility.

## Before you begin

- You have obtained the network configuration information from your network administrator for the controllers (IP address, subnet mask, and gateway or IP address and routable IP address).

## About this task

The following figure shows the location of management port 1 on the controllers. Note that an EF570 controller back view is shown but the E5700 controller is identical.

## Steps

1. Go to [\*SANtricity Quick Connect\*](#). Download and install the utility.
2. Follow the directions on the wizard screens to configure your management port and to configure the IP address of each controller.
3. Connect an Ethernet cable to management port 1 (labeled P1) on each controller, and connect the other end to your network.

**Note:** Do not use port 2 on either controller. These ports are reserved for use by NetApp technical personnel.

## **Configuring the multipath software**

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Multipath software provides a redundant path to the storage array in case one of the physical paths is disrupted. The multipath software presents the operating system with a single virtual device that represents the active physical paths to the storage. The multipath software also manages the failover process that updates the virtual device. For VMware, you use the inbox Native Multipathing Plug-in (NMP).

VMware provides plug-ins, known as Storage Array Type Plug-ins (SATP), to handle the failover implementations of specific vendors' storage arrays. The SATP you should use is VMW\_SATP\_ALUA.

For additional information, see *[SANtricity 11.40 Installing and Configuring for VMware Power Guide for Advanced Users](#)*.

## Performing FC-specific tasks

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

### 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 26.

#### 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.

### Determining the host port WWPNs—FC

To configure FC zoning, you must determine the worldwide port name (WWPN) of each initiator port.

#### Steps

1. Connect to the ESXi host using SSH or the ESXi shell.
2. Run the following command:

```
esxcfg-scsidevs -a
```

3. Record the initiator identifiers. The output will be similar to this example:

```
vmhba3 lpfcc link-up fc.20000090fa05e848:10000090fa05e848
(0000:03:00.0)
Emulex Corporation Emulex LPe16000 16Gb PCIe Fibre Channel Adapter
vmhba4 lpfcc link-up fc.20000090fa05e849:10000090fa05e849
```

(0000:03:00.1)  
Emulex Corporation Emulex LPel6000 16Gb PCIe Fibre Channel Adapter

**Related concepts**

[\*FC worksheet\*](#) on page 26

## Performing iSCSI-specific tasks

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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.
- 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 28

### 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.

While planning your iSCSI networking, remember that the VMware Configuration Maximums guides state that the maximum supported iSCSI storage paths is 8. You must consider this requirement to avoid configuring too many paths.

By default, the VMware iSCSI software initiator creates a single session per iSCSI target when you are not using iSCSI port binding.

**Note:** VMware iSCSI port binding is a feature that forces all bound VMkernel ports to log into all target ports that are accessible on the configured network segments. It is meant to be used with arrays that present a single network address for the iSCSI target. NetApp recommends that iSCSI port binding not be used. For additional information, see the [VMware Knowledge Base](#) for the article regarding considerations for using software iSCSI port binding in ESX/ESXi. If the ESXi host is attached to another vendor's storage, NetApp recommends that you use separate iSCSI vmkernel ports to avoid any conflict with port binding.

To ensure a good multipathing configuration, use multiple network segments for the iSCSI network. Place at least one host-side port and at least one port from each array controller on one network segment, and an identical group of host-side and array-side ports on another network segment. Where possible, use multiple Ethernet switches to provide additional redundancy.

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

#### Before you begin

- You must know the IP address or domain name for one of the storage array controllers.
- You or your system administrator must have set up a password for the System Manager GUI, or you must configured Role-Based Access Control (RBAC) or LDAP and a directory service for the appropriate security access to the storage array. See the 11.40 version of *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 *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, then select the **Set Password** button. Log out, then log back in to System Manager with the `admin` credentials.

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**.

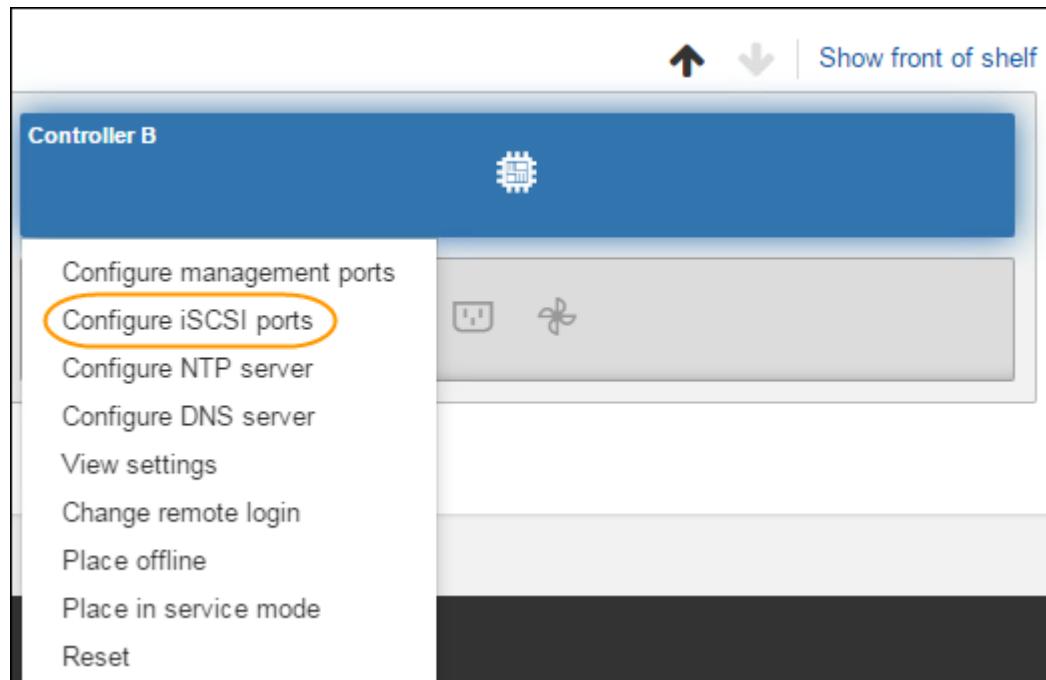
5. If the graphic shows the drives, click **Show back of shelf**.

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

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

The controller's context menu appears.

- Select **Configure iSCSI ports**.



The Configure iSCSI Ports dialog box opens.

- In the drop-down list, select the port you want to configure, and then click **Next**.
- 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). <b>Note:</b> 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 <b>Show more port settings</b> .)	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.

Port Setting	Description
MTU size (Available by clicking <b>Show more port settings.</b> )	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.

- 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 <b>Show more settings.</b> )	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 <b>Show more settings.</b> )	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.

- Click **Finish**.
- Close System Manager.

You will use System Manager to configure your storage in [Accessing SANtricity System Manager and using Setup wizard](#) on page 21. For the Setup wizard to appear again, you must close and re-open System Manager or refresh your browser.

## Configuring host-side networking—iSCSI

Configuring iSCSI networking on the host side enables the VMware iSCSI initiator to establish a session with the array.

### About this task

In this "express method" for configuring iSCSI networking on the host side, you allow the ESXi host to carry iSCSI traffic over four redundant paths to the storage.

After you complete this task, the host is configured with a single vSwitch containing both VMkernel ports and both VMNICs.

For additional information on configuring iSCSI networking for VMware, see the vSphere Documentation Center for your version of vSphere.

### Steps

1. Configure the switches that will be used to carry iSCSI storage traffic.
2. Enable send and receive hardware flow control **end to end**.
3. Disable priority flow control.
4. Complete the array side iSCSI configuration.
5. Use two NIC ports for iSCSI traffic.
6. Use either the vSphere client or vSphere web client to perform the host-side configuration.

The interfaces vary in functionality and the exact workflow will vary.

## 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. On the host, run one of the following commands, depending on whether jumbo frames are enabled:
  - If jumbo frames are not enabled, run this command:
 

```
vmkping <iSCSI_target_IP_address>
```
  - 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 `-s` switch sets the `packet_size` bit. The `-d` switch sets the DF (Don't Fragment) bit on the IPv4 packet. These options allow jumbo frames of 9,000 bytes to be successfully transmitted between the iSCSI initiator and the target.
 

```
vmkping -s 8972 -d <iSCSI_target_IP_address>
```

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

```
vmkping -s 8972 -d 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
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 vmkping 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 with the message `sendto() failed (Message too long)`, verify the MTU size (jumbo frame support) for the Ethernet interfaces on the host server, storage controller, and switch ports.
3. Return to the iSCSI Configuration procedure to finish target discovery.

## 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 29.
- 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 29.
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 29

# Accessing SANtricity System Manager and using Setup wizard

---

You use the Setup wizard in SANtricity System Manager to configure your storage array.

## Before you begin

- You have ensured that the device from which you will access SANtricity System Manager contains one of the following browsers:

Browser	Minimum version
Google Chrome	47
Microsoft Internet Explorer	11
Microsoft Edge	EdgeHTML 12
Mozilla Firefox	31
Safari	9

- You are using out-of-band management.

## 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:

- 0 pools and volume groups are detected.
- 0 workloads are detected.
- 0 notifications are configured.

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

**Important:** System Manager allows you to manage just your E2800 or E5700 storage array. You need SANtricity Storage Manager to manage the storage enterprise and arrays other than the E2800 or E5700. See the SANtricity *Storage Manager Express Guide* for your operating system for installation instructions.

## 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 *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, then select the **Set Password** button. Log out, then log back in to System Manager with the `admin` credentials.

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

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.
  - **Select applications** – Specify applications, such as Exchange or SQL. System Manager optimizes storage based on application type.
  - **Define workloads** – Set up workloads, which are storage objects that support applications. You define one or more workloads per application.
  - **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 automatically 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. Create volumes by going to **Storage > Volumes > Create > Volume**.

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

## **Discovering storage on the host**

---

After assigning volumes to the host, you perform a rescan so that the host detects and configures the volumes for multipathing.

### **About this task**

By default, an ESXi host automatically performs a rescan every five minutes. A volume might appear between the time you create it and assign it to a host, before you perform a manual rescan. Regardless, you can perform a manual rescan to ensure all volumes are configured properly.

### **Steps**

1. Create one or more volumes and assign them to the ESXi host.
2. If using a vCenter Server, add the host to the server's inventory.
3. Use the vSphere Client or the vSphere Web Client to connect directly to the vCenter Server or to the ESXi host.
4. For instructions on how to perform a rescan of the storage on an ESXi host, search for the VMware Knowledge Base article on this topic.

## **Configuring storage on the host**

---

You can use the storage assigned to an ESXi host as either a Virtual Machine File System (VMFS) datastore or a raw device mapping (RDM).

### **Before you begin**

The volumes mapped to the ESXi host must have been discovered properly.

### **About this task**

All 5.x versions of ESXi support VMFS versions 5 and 3. You must use VMFS version 5 unless the datastore also must be used by an ESX/ESXi 4.x host, which supports only VMFS version 3. All 6.x versions of ESXi support VMFS versions 5 and 3, although a new VMFS-3 cannot be created.

### **Choices**

- For instructions on creating VMFS datastores using either the vSphere Client or the vSphere Web Client, see the VMware pubs webpage (<https://www.vmware.com/support/pubs/>) for documentation on this topic.
- For instructions on using volumes as RDMs using either the vSphere Client or the vSphere Web Client, see the VMware pubs webpage (<https://www.vmware.com/support/pubs/>) for documentation on this topic.

## **Verifying storage access on the host**

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

### **Step**

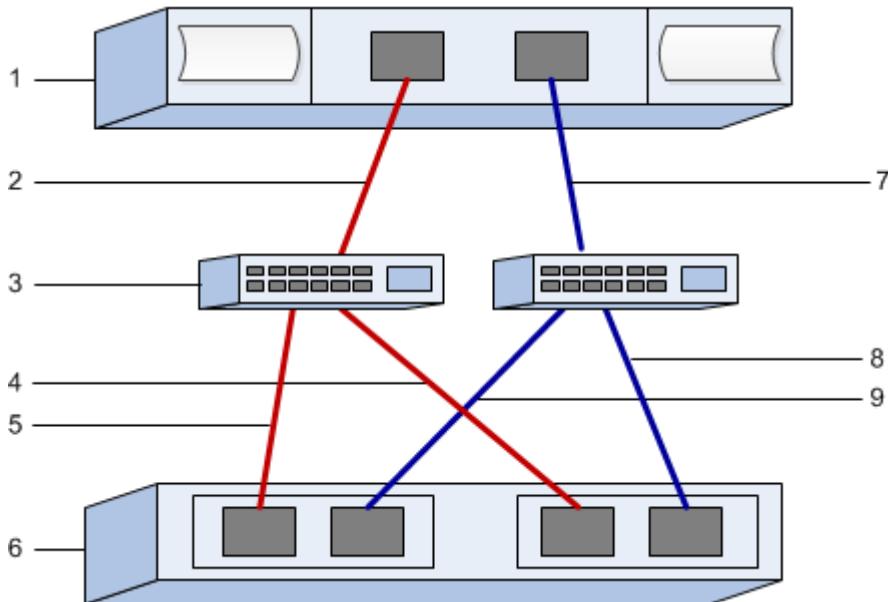
1. Verify that the volume has been used as a Virtual Machine File System (VMFS) datastore or has been mapped directly to a VM for use as a raw device mapping (RDM).

## 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. Each zone contains one initiator port and all target ports.



### Host identifiers

Callout No.	Host (initiator) port connections	WWPN
1	Host	<i>not applicable</i>
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	<i>not applicable</i>
6	Array controller (target)	<i>not applicable</i>
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	

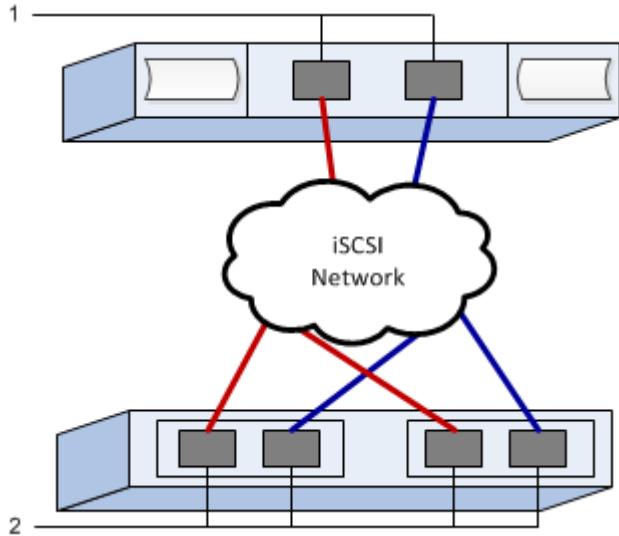
## iSCSI worksheet

---

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 for SANtricity System Manager.

- *SANtricity 11.40 Installing and Configuring for VMware Power Guide for Advanced Users* describes:
  - Software installation options
  - Configuration options
  - Multipath options
  - Installation on a boot device
- Online help describes how to use SANtricity System 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.
- **VMware Configuration Maximums** describe how to configure virtual and physical storage to stay within the allowed maximums that ESX/ESXi supports.  
vSphere 6.0 - search vmware.com for "vsphere 60 configuration maximums."  
vSphere 5.5 - search vmware.com for "vsphere 55 configuration maximums."  
vSphere 5.1 - search vmware.com for "vsphere 51 configuration maximums."
- **VMware iSCSI Port Binding** provides considerations for using software iSCSI port binding in ESX/ESXi. Search the VMware Knowledge Base for this topic.
- Other VMware Publications. Search vmware.com for ESXi vCenter Server documentation.
- 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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