



# Manage NVMe ports

## SANtricity software

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# Manage NVMe ports

## NVMe overview

Some controllers include a port for implementing NVMe (Non-Volatile Memory Express) over fabrics. NVMe allows for high-performance communication between hosts and the storage array.

### What is NVMe?

*NVM* stands for "Non-Volatile Memory" and is persistent memory used in many types of storage devices. *NVMe* (NVM Express) is a standardized interface or protocol designed specifically for high-performance multi-queue communication with NVM devices.

### What is NVMe over Fabrics?

*NVMe over Fabrics (NVMe-oF)* is a technology specification that enables NVMe message-based commands and data to transfer between a host computer and storage over a network. An NVMe storage array (called a *subsystem*) can be accessed by a host using a fabric. NVMe commands are enabled and encapsulated in transport abstraction layers on both the host side and the subsystem side. This extends the high performance NVMe interface end-to-end from the host to the storage and standardizes and simplifies the command set.

NVMe-oF storage is presented to a host as a local block storage device. The volume (called a *namespace*) can be mounted to a file system as with any other block storage device. You can use the REST API, the SMcli, or SANtricity System Manager to provision your storage as needed.

### What is an NVMe Qualified Name (NQN)?

The NVMe Qualified Name (NQN) is used to identify the remote storage target. The NVMe qualified name for the storage array is always assigned by the subsystem and may not be modified. There is only one NVMe Qualified Name for the entire array. The NVMe Qualified Name is limited to 223 characters in length. You can compare it to an iSCSI Qualified Name.

### What is a namespace and a namespace ID?

A namespace is the equivalent of a logical unit in SCSI, which relates to a volume in the array. The namespace ID (NSID) is equivalent to a logical unit number (LUN) in SCSI. You create the NSID at namespace creation time, and can set it to a value between 1 and 255.

### What is an NVMe controller?

Similar to a SCSI I\_T nexus, which represents the path from the host's initiator to the storage system's target, an NVMe controller created during the host connection process provides an access path between a host and the namespaces in the storage array. An NQN for the host plus a host port identifier uniquely identify an NVMe controller. While an NVMe controller can only be associated with a single host, it can access multiple namespaces.

You configure which hosts can access which namespaces and set the namespace ID for the host using SANtricity System Manager. Then, when the NVMe controller is created, the list of namespace IDs accessible by the NVMe controller is created and used to configure the permissible connections.

# Configure NVMe over InfiniBand ports

If your controller includes an NVMe over InfiniBand connection, you can configure the NVMe port settings from the Hardware page.

## Before you begin

- Your controller must include an NVMe over InfiniBand host port; otherwise, the NVMe over InfiniBand settings are not available in System Manager.
- You must know the IP address of the host connection.



The NVMe over InfiniBand settings and functions appear only if your storage array's controller includes an NVMe over InfiniBand port.

## Steps

1. Select **Hardware**.
2. If the graphic shows the drives, click **Show back of shelf**.

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

3. Click the controller with the NVMe over InfiniBand port you want to configure.

The controller's context menu appears.

4. Select **Configure NVMe over InfiniBand ports**.

The Configure NVMe over InfiniBand Ports dialog box opens.

5. Select the HIC port you want to configure from the drop-down list, and then enter the IP address.

If you are configuring an EF600 storage array with a 200Gb-capable HIC, this dialog box displays two IP Address fields, one for a physical port (external) and one for a virtual port (internal). You should assign a unique IP address for both ports. These settings allow the host to establish a path between each port, and for the HIC to achieve maximum performance. If you do not assign an IP address to the virtual port, the HIC will run at approximately half its capable speed.

6. Click **Configure**.
7. Complete the configuration, and then reset the NVMe over InfiniBand port by clicking **Yes**.

# Configure NVMe over RoCE ports

If your controller includes a connection for NVMe over RoCE (RDMA over Converged Ethernet), you can configure the NVMe port settings from the Hardware page.

## Before you begin

- Your controller must include an NVMe over RoCE host port; otherwise, the NVMe over RoCE settings are not available in System Manager.
- You must know the IP address of the host connection.

## Steps

1. Select **Hardware**.

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

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

3. Click the controller with the NVMe over RoCE port you want to configure.

The controller's context menu appears.

4. Select **Configure NVMe over RoCE ports**.

The Configure NVMe over RoCE Ports dialog box opens.

5. In the drop-down list, select the HIC port you want to configure.

6. Click **Next**.

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

#### Field details

Port Setting	Description
Configured ethernet port speed	Select the speed that matches the speed capability of the SFP on the port.
Enable IPv4 / Enable IPv6	Select one or both options to enable support for IPv4 and IPv6 networks.   If you want to disable port access, deselect both check boxes.
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.

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.

7. Configure the IPv4 and/or IPv6 settings, either automatically or manually.

## Field details

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. (If desired, you can cut and paste addresses into the fields.) For IPv4, include the network subnet mask and gateway. For IPv6, include the routable IP address and router IP address. If you are configuring an EF600 storage array with a 200Gb-capable HIC, this dialog box displays two sets of fields for network parameters, one for a physical port (external) and one for a virtual port (internal). You should assign unique parameters for both ports. These settings allow the host to establish a path between each port, and for the HIC to achieve maximum performance. If you do not assign an IP address to the virtual port, the HIC will run at approximately half its capable speed.

8. Click **Finish**.

## View NVMe over Fabrics statistics

You can view data about the NVMe over Fabrics connections to your storage array.

### About this task

System Manager shows these types of NVMe over Fabrics statistics. All statistics are read-only and cannot be set.

- **NVMe Subsystem statistics** — Shows statistics for the NVMe controller and its queue. The NVMe controller provides an access path between a host and the namespaces in the storage array. You can review the NVMe subsystem statistics for such items as connection failures, resets, and shutdowns.
- **RDMA Interface statistics** — Provides statistics for all NVMe over Fabrics ports on the RDMA interface, which includes performance statistics and link error information associated with each switch port. This tab only appears when NVMe over Fabrics ports are available.

You can view each of these statistics as raw statistics or as baseline statistics. Raw statistics are all of the statistics that have been gathered since the controllers were started. Baseline statistics are point-in-time statistics that have been gathered since you set the baseline time.

### Steps

1. Select **Settings > System**.
2. Select **View NVMe over Fabrics Statistics**.
3. **Optional:** To set the baseline, click **Set new baseline**.

Setting the baseline sets a new starting point for the collection of the statistics. The same baseline is used for all NVMe statistics.

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