Converting a Fibre Channel Host Interface Card to iSCSI

You can apply a feature pack in the SANtricity® Storage Manager to convert the protocol used by the host interface card (HIC) in an E-Series storage system or EF-Series flash array.

These instructions are intended for system administrators who want to convert the protocol of a HIC from Fibre Channel to iSCSI. If you want to convert a Fibre Channel HIC to any other protocol, you must replace the HIC itself. To find the HIC upgrade instructions for your model, go to the *NetApp E-Series and EF-Series Systems Documentation Center*.

You can perform this conversion on the following storage systems:

- E2700
- E5500
- E5600
- EF550
- EF560

Attention: You must schedule a downtime maintenance window for this procedure because you must shut down the host to change hardware. In addition, you will not be able to access data on the storage array until you have successfully completed the conversion.

Before you begin

Be aware of the following:

- If your configuration contains SAN Boot hosts, check the *NetApp Interoperability Matrix Tool* to ensure that the configuration is supported on iSCSI. If it is not, you cannot convert the protocol of the HIC from Fibre Channel to iSCSI.
- The Data Assurance (DA) feature is not supported for iSCSI. If you are currently using Data Assurance and you want to convert a Fibre Channel HIC to iSCSI, you must disable this feature.

  Note: If you do not deactivate Data Assurance before converting to iSCSI, the array will be out of compliance after the conversion.

- The Synchronous Mirroring feature (also referred to as RVM) is not supported for iSCSI. If you are currently using Synchronous Mirroring relationships and you want to convert a Fibre Channel HIC to iSCSI, you must delete these relationships.

  Attention: If you do not deactivate Synchronous Mirroring relationships before converting to iSCSI, your system will lose data access and data loss may occur.

- The asynchronous mirroring feature (also referred to as ARVM) requires both the local storage array and the remote storage array to use the same protocol. If you use asynchronous mirroring and you want to continue using this feature after the conversion, you must remove all asynchronous mirrored pairs from the asynchronous mirror groups; delete the asynchronous mirror groups; convert the HICs in both storage arrays to the new protocol; and reestablish the relationships.
- The host interface cards in the E-Series and EF-Series models listed do not currently support using Fibre Channel and iSCSI protocols simultaneously. You must select one protocol or the other.

Confirm the following:

- You have obtained the necessary hardware for the conversion. For example, you might need replacement cables and Small Form-factor Pluggable (SFP) transceivers. Your NetApp Sales Representative can help you determine what hardware you need and help you order the correct parts.

  Note: If your storage array currently uses unified SFP transceivers that you purchased from NetApp, you do not need to change your SFP transceivers. Unified SFP transceivers support both Fibre Channel and iSCSI; however, they do not support 1-Gb/s iSCSI. See *Determining if you have unified SFP transceivers* on page 2 to determine what type of SFP transceivers are installed.

- SANtricity Storage Manager is installed.
- You are using out-of-band management.

  Attention: You cannot use in-band management to complete this procedure.

- The storage array is running SANtricity OS (controller firmware) version 8.10.11.00 or later. (If you are converting the HIC on an E2700 controller, you must have controller firmware version 8.20 or later.) To determine which firmware you have, check the **Summary** tab in the Array Management Window. To download new firmware, go to *NetApp Downloads* and select **Downloads > Software**. Download the correct version of **E-Series/EF-Series SANtricity OS (Controller Firmware)** for your storage array.

Steps

Determining if you have unified SFP transceivers

You can use the Array Management Window to determine what type of SFP transceivers you have. If you have unified SFP transceivers, you can continue to use them after converting the host protocol.

Before you begin

The array has been added to the Enterprise Management Window.

About this task

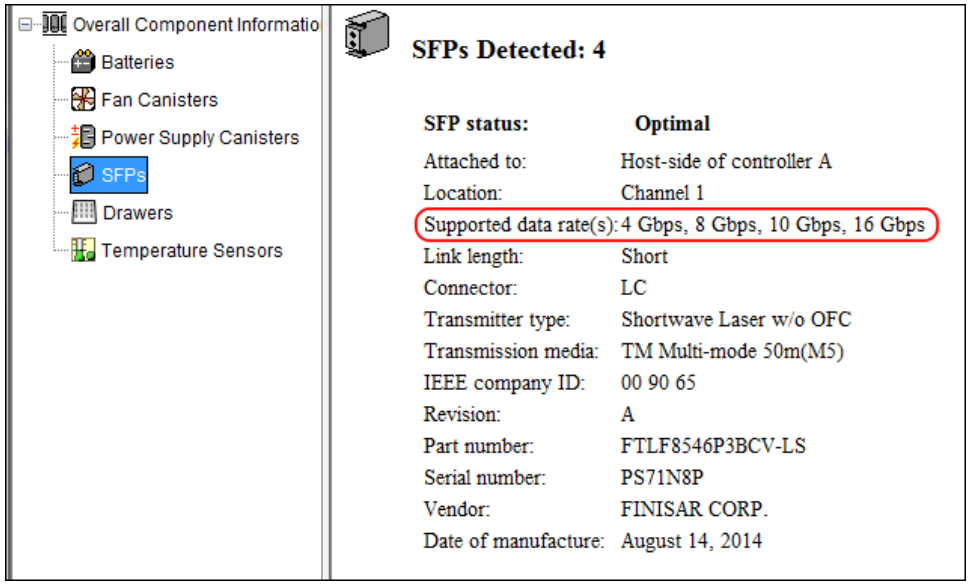
Unified SFP transceivers support both Fibre Channel and iSCSI; however, they do not support 1-Gb/s iSCSI.

If you are converting from Fibre Channel to 1-Gb/s iSCSI, you must remove the unified SFP transceivers and replace them with new ones that are compatible with 1-Gb/iSCSI.

Steps

1. From the Array Management Window, select **Hardware > Tray > View/Edit > Controller/Drive components**.
2. From the **Overall Component Information** navigator on the left, click **SFPs**.

   The SFP status is displayed. The screen shot shows the supported data rates for unified SFP transceivers.



3. Locate the **Supported data rate(s)** entry in the results.

If the supported data rate is...	This type of SFP transceiver is installed...
4 Gbps, 8 Gbps, 10 Gbps, 16 Gbps	Unified (supports both Fibre Channel and iSCSI)
10 Gbps	10G iSCSI
4 Gbps, 8 Gbps, 16 Gbps	16G Fibre Channel
2 Gbps, 4 Gbps, 8 Gbps	8G Fibre Channel

4. Determine whether you can reuse the SFP transceivers, as follows:
   - If you have unified SFP transceivers, you can continue using them after you convert the host protocol.
   - If you have Fibre Channel SFP transceivers, you must remove them and replace them with new SFPs after converting the host protocol.

Obtaining the feature pack key

You can apply a feature pack in the SANtricity Storage Manager to convert the protocol of the host interface card (HIC). To obtain the key file for the feature pack, you need a Feature Activation Code, the serial number for your storage system enclosure, and the Feature Enable Identifier for your storage system.

Steps

1. From the following table, locate the Feature Activation Code that applies to your storage system and conversion path, and copy the value to a text file.

Storage system	Converting from Fibre Channel to iSCSI
E2700	2F5-Q3J-ZK5IC
E5500	NFU-64J-ZXUQD
EF550	2F9-25J-ZPBBE
E5600	IFK-L4J-ZBL2P
EF560	LFY-H6J-Z32PD

2. Locate the serial number for your storage system. You can look at the silver label affixed to the top of your system enclosure, or you can get the serial number from the software, as follows:

   a. From the Array Management Window, select the **Summary** tab and click **View Storage Array Profile** in the Monitor area.

   b. On the Storage Array tab, locate the **Chassis Serial Number**.

   c. Copy and paste the value into a text file.

3. Locate and record the Feature Enable Identifier for your storage system:

   a. From the Array Management Window, select **Storage Manager > Premium Features** to display the Premium Features and Feature Packs window.

      The 32-digit Feature Enable Identifier is displayed under **Storage Array Feature Information**.

   b. Copy and paste this 32-digit identifier into a text file.

4. Go to *NetApp License Activation: Storage Array Premium Feature Activation* and enter the information required to obtain the feature pack.

   - Feature Activation Code from the table
   - Serial number for the storage system
   - Feature Enable Identifier

   Note: The Premium Feature Activation web site includes a link to "Premium Feature Activation Instructions." Do not attempt to use those instructions for this procedure.

5. Choose whether to receive the key file for the feature pack in an email or download it directly from the site.

Stopping host I/O

You must stop all I/O operations from the host before converting the protocol of the host interface cards (HICs). You cannot access data on the storage array until you successfully complete the conversion.

Steps

1. Ensure that no I/O operations are occurring between the storage array and all connected hosts. For example, you can perform these steps:

   - Stop all processes that involve the LUNs mapped from the storage to the hosts.
   - Ensure that no applications are writing data to any LUNs mapped from the storage to the hosts.
   - Unmount all file systems associated with volumes on the array.

   Note: The exact steps to stop host I/O operations depend on the host operating system and the configuration, which are beyond the scope of these instructions. If you are not sure how to stop host I/O operations in your environment, consider shutting down the host.

   Attention: Possible data loss – If you continue this procedure while I/O operations are occurring, you might lose data.

2. If the storage array participates in a mirroring relationship, stop all host I/O operations on the secondary storage array.
3. Wait for five minutes to allow any data in cache memory to be flushed to disk.
4. From the title bar of the **Array Management Window**, select **Monitor > Reports > Operations in Progress**.
5. Wait for all operations shown on the **Operations in Progress** window to complete before continuing with the next step.

Disabling Data Assurance

The Data Assurance (DA) feature is not supported for iSCSI. If you are currently using Data Assurance and you want to convert a Fibre Channel host interface card (HIC) to iSCSI, you must disable this feature on all volumes.

About this task

If you are currently using Data Assurance and you want to convert a Fibre Channel host interface card (HIC) to iSCSI, you must disable this feature on all volumes.

Note: If you do not deactivate Data Assurance before converting to iSCSI, the array will be out of compliance after the conversion.

Steps

1. From the Array Management Window, select **Storage > Volume > Advanced > Disable Data Assurance (DA)**.
2. In the **Volumes with Data Assurance (DA)** list box, select all volumes.

   You must permanently disable the Data Assurance feature on all volumes. In addition, you cannot select volume groups in this list, only individual volumes.
3. Click **Disable**.

   The **Confirm Disable Data Assurance** dialog is displayed.
4. In the **Are you sure you want to disable Data Assurance on the selected volumes** field, type **yes**.
5. Click **OK**.
6. For each data volume or disk pool, confirm that Data Assurance has been disabled.

Disabling Synchronous Mirroring relationships

The Synchronous Mirroring feature (also referred to as RVM) is not supported for iSCSI. If you are currently using Synchronous Mirroring relationships and you want to convert a Fibre Channel host interface card (HIC) to iSCSI, you must delete these relationships.

About this task

If you are converting from Fibre Channel to iSCSI, you must first deactivate the Synchronous Mirroring relationships.

Attention: If you do not deactivate these relationships before converting to iSCSI, your system will lose data access and data loss may occur.

Steps

1. In the Array Management Window, access the online help and search for the topics related to synchronous mirroring.
2. Follow the guidelines and instructions in the online help to identify all synchronous mirroring volumes that might exist.
3. Right-click the volume and select **Synchronous Mirroring > Remove Mirror Relationship**.
4. Select all volumes and click **Remove**.

Deleting asynchronous mirroring relationships

The asynchronous mirroring feature requires both the local storage array and the remote storage array to use the same protocol. If you use asynchronous mirroring and you want to continue using this feature after the conversion, you must remove all asynchronous mirrored pairs from the asynchronous mirror groups; delete the asynchronous mirror groups; convert the host interface cards in both storage arrays to the new protocol; and reestablish the relationships.

Steps

1. In the Array Management Window, access the online help and search for the topics related to asynchronous mirroring.
2. Follow the guidelines and instructions in the online help to remove all asynchronous mirrored pairs from the asynchronous mirror groups.

   Note: When removing each pair, select the **Delete all repositories associated with this mirrored pair** check box.
3. Follow the guidelines and instructions in the online help to delete all asynchronous mirror groups.

Applying the feature pack key

You can apply a key file for a conversion feature pack to change the protocol of your host interface card (HIC).

About this task

This task describes how to apply a feature pack to a single storage array. If you intend to use asynchronous mirroring after the conversion, you must apply a key to the local storage array and to the remote storage array. Each array requires its own key.

Steps

1. From the Array Management Window, select **Storage Array > Premium Features**.
2. In the **Feature Pack** section at the bottom of the screen, click **Change**.

   Note: Do not click the **Use Key File** button in the **Enable a Premium Feature** section.

   The Select Feature Key File dialog opens, which lets you select the generated key file.
3. Select the folder in which you placed the generated key file.
4. Select the key file, and click **OK**.
5. Click **Close**.

   Both controllers automatically reboot to allow the new feature pack to take effect. The storage array returns to a responsive state after the reboot is complete.

Changing the hardware configuration

After applying the protocol conversion feature pack, you can shut down the host and replace the existing hardware with new hardware for the new protocol.

Steps

1. Shut down the host.
2. As required, convert host adapters and switches to the new protocol.

Note: The exact steps for converting host adapters and switches are beyond the scope of these instructions.

3. Disconnect the I/O cables from the host interface card (HIC) on the storage array.
4. Determine whether to replace the SFP transceivers on the HIC.

If you...	Then...
Do not have unified SFP transceivers	Remove the SFP transceivers and insert new ones.
Have unified SFP transceivers	You do not need to remove the SFP transceivers. You can use the same transceivers after the conversion. Refer to *Determining if you have unified SFP transceivers* on page 2 for more information. **Note:** The unified SFP transceivers do not support 1-Gb iSCSI. If you are converting to 1-Gb iSCSI, you must replace the SFP transceivers.

5. Connect the new I/O cables.
6. Power on the host.

Configuring iSCSI networking

After converting the protocol of the host interface card (HIC) from Fibre Channel to iSCSI, you must configure iSCSI networking.

Before you begin

You have downloaded and reviewed the instructions in the *iSCSI Configuration and Provisioning Express Guide* for your operating system (see *NetApp Documentation: Express Guides for SANtricity Storage Manager*). The Express Guide provides important details for configuring iSCSI networking.

Steps

1. Configure the switches.

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

2. Close the Array Management Window and reopen it.

   Two iSCSI options are displayed on the Setup tab: **Configure iSCSI Host Ports** and **Manage iSCSI settings**.

3. Configure iSCSI networking from the array side, verify IP network connections, and verify iSCSI network from the host side.

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

4. Update the host definitions in SANtricity Storage Manager, as follows:

   a. From the Array Management Window, select the **Host Mappings** tab.

   b. Expand the storage array tree, right-click the host, and select **Manage Host Port Identifiers**.

   c. Select the host from the **Host Port Identifier** list.

   d. Click **Replace**.

      The Replace Host Identifier dialog is displayed.

   e. Confirm that **Replace by selecting a known unassociated host port identifier** is selected, and select the host port identifier from the list.

Note: If the host port identifier is not in the list, select **Replace by creating a new host port identifier**, and enter the new number.

f. Click **Replace**.

g. Repeat these steps to add any additional host port identifiers.

5. Reboot the host or perform a rescan so that the host properly discovers the LUNs.
6. Remount volumes or start using block volume.

Reestablishing asynchronous mirroring relationships

If you were using asynchronous mirroring and you converted the host interface cards in both the local storage array and the remote storage array to the same protocol, you can reestablish those relationships.

Steps

1. In the Array Management Window, access the online help and search for the topics related to asynchronous mirroring.
2. Follow the guidelines and instructions in the online help to create asynchronous mirror groups.
3. Follow the guidelines and instructions in the online help to create asynchronous mirror pairs.

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