

Symantec NetBackup™ SAN Client and Fibre Transport Guide

UNIX, Windows, Linux

Release 7.6 Draft

Symantec NetBackup™ SAN Client and Fibre Transport Guide

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Introducing SAN Client and Fibre Transport

This chapter includes the following topics:

- [About NetBackup SAN Client and Fibre Transport](#)
- [About Fibre Transport](#)
- [About FT media servers](#)
- [About SAN clients](#)
- [About the FT Service Manager](#)
- [About SAN Client and clustering](#)
- [About NetBackup Release Notes](#)

About NetBackup SAN Client and Fibre Transport

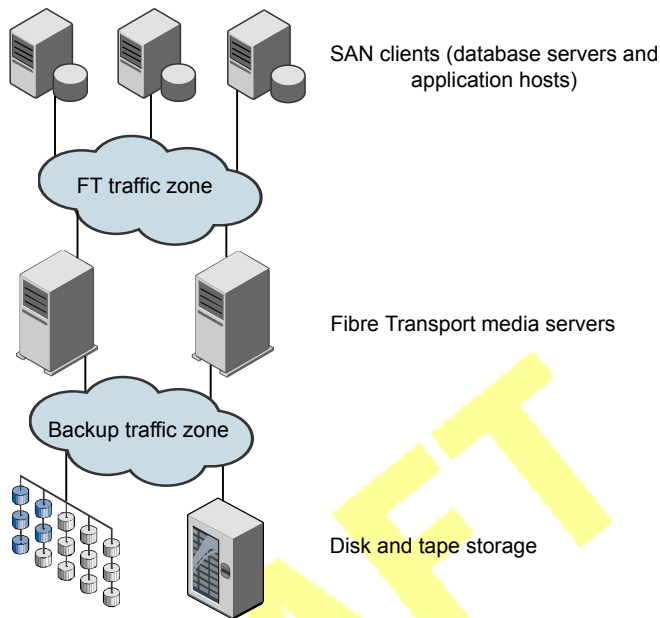
SAN Client is a **NetBackup** optional feature that provides high-speed backups and restores of NetBackup clients.

A **SAN client** is a special NetBackup client that can back up large amounts of data rapidly over a SAN connection rather than a LAN. For example, a database host can benefit from high-speed backups and restores. Fibre Transport is the name of the NetBackup high-speed data transport method that is part of the SAN Client feature.

The backup and restore traffic occurs over Fibre Channel, and the NetBackup server and client administration traffic occurs over the LAN.

[Figure 1-1](#) shows a SAN Client configuration.

Figure 1-1 A SAN Client configuration



About Fibre Transport

NetBackup Fibre Transport is a method of data transfer. It uses Fibre Channel and a subset of the SCSI command protocol for data movement over a SAN rather than TCP/IP over a LAN. It provides a high-performance transport mechanism between NetBackup clients and NetBackup media servers.

Fibre Transport supports multiple, concurrent logical connections. The NetBackup systems that support Fibre Transport contain Fibre Channel HBAs that are dedicated to FT communication.

The NetBackup Fibre Transport service is active on both the SAN clients and the NetBackup media servers that connect to the storage.

Throughout this documentation, Fibre Transport connections between NetBackup clients and NetBackup servers are referred to as FT pipes.

About FT media servers

A NetBackup FT media server is a NetBackup media server on which the Fibre Transport services are activated. NetBackup FT media servers accept connections from SAN clients and send data to the disk storage.

The host bus adapters (HBAs) that accept connections from the SAN clients use a special NetBackup target mode driver to process FT traffic.

The media server FT service controls data flow, processes SCSI commands, and manages data buffers for the server side of the FT pipe. It also manages the target mode driver for the host bus adaptors.

Requires the SAN Client license.

About SAN clients

A NetBackup SAN client is a NetBackup client on which the Fibre Transport service is activated. The SAN client is similar to the NetBackup SAN media server that is used for the Shared Storage Option; it backs up its own data. However, the SAN client is based on the smaller NetBackup client installation package, so it has fewer administration requirements and uses fewer system resources.

Usually, a SAN client contains critical data that requires high bandwidth for backups. It connects to a NetBackup media server over Fibre Channel.

The NetBackup SAN Client Fibre Transport Service manages the connectivity and the data transfers for the FT pipe on the SAN clients. The SAN client FT service also discovers FT target mode devices on the NetBackup media servers and notifies the FT Service Manager about them.

About the FT Service Manager

The FT Service Manager (FSM) resides on the NetBackup server that hosts the NetBackup Enterprise Media Manager service. FSM interacts with the FT services that run on SAN clients and on FT media servers. FSM discovers, configures, and monitors FT resources and events. FSM runs in the same process as EMM.

About SAN Client and clustering

The SAN client can be in a cluster and can host clustered applications. The FT client service and the Symantec PBX service must run on all failover nodes. The SAN client OS on every node must detect the FT media server target mode driver.

The backup policy references to client computers can be to aliases or dynamic application cluster names. SAN client application cluster information is updated every 5 minutes.

About NetBackup Release Notes

For information about supported systems and peripherals, limitations, and operational notes, see the *NetBackup Release Notes*.

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Planning your deployment

This chapter includes the following topics:

- [Planning your SAN Client deployment](#)
- [About SAN Client storage destinations](#)
- [How to choose SAN Client and Fibre Transport hosts](#)
- [About NetBackup agents on SAN clients](#)
- [Converting a SAN media server to a SAN client](#)

Planning your SAN Client deployment

[Table 2-1](#) provides an overview of planning your deployment of SAN Client and Fibre Transport.

Table 2-1 SAN Client deployment overview

Step	Deployment task	Section
Step 1	Determine the storage destination	See “About SAN Client storage destinations” on page 16.
Step 2	Determine the hosts to use	See “How to choose SAN Client and Fibre Transport hosts” on page 17.
Step 3	Prepare the SAN	See “Preparing the SAN” on page 21.
Step 4	License SAN Client	See “About the SAN Client license key” on page 27.
Step 5	Read about NetBackup agents	See “About NetBackup agents on SAN clients” on page 17.

Table 2-1 SAN Client deployment overview (*continued*)

Step	Deployment task	Section
Step 6	Configure SAN Client and Fibre Transport	See “ Configuring SAN Client and Fibre Transport ” on page 29.
Step 7	Convert a SAN media server to a SAN Client	See “ Converting a SAN media server to a SAN client ” on page 18.

About SAN Client storage destinations

You can use either disk or tape as a storage destination for the SAN Client and Fibre Transport feature.

NetBackup allows the storage devices to be connected to the FT media servers by any means.

About SAN Client tape storage destinations

SAN Client can use tape as a destination storage unit. Some tape drives are fast enough to read and write the large volume of data that the NetBackup Fibre Transport mechanism provides.

With tape as a destination you can use multistreaming, which divides automatic backups for a client into multiple jobs. Because the jobs are in separate data streams, they can occur concurrently. The data streams can be sent over one or more FT pipes to the FT media server. The media server multiplexes them together onto one or more tape media volumes. For example, if you have a database server that provides multiple streams of data, you can multistream those database backups to an FT media server. The FT media server multiplexes the data streams onto the media, increasing overall performance.

You can replace NetBackup SAN Media servers with SAN clients and continue to back up to tape. A SAN Client uses fewer system resources, both disk space and processor, than a SAN Media server.

To configure multistreaming, see the *NetBackup Administrator’s Guide for UNIX and Linux, Volume I*.

About SAN Client disk storage destinations

For disk storage, a NetBackup OpenStorage implementation provides the greatest opportunity for high performance backups and restores. Those solutions can provide enough bandwidth and read and write speed to accept the large volume of data that the NetBackup Fibre Transport mechanism provides.

How to choose SAN Client and Fibre Transport hosts

When you choose the systems to use for NetBackup Fibre Transport, be aware of the following:

- NetBackup SAN clients cannot also be NetBackup servers. Therefore, only configure a NetBackup client to be a SAN client on systems on which only the NetBackup client software is installed.
- Do not use the NetBackup master server as a SAN-attached media server. Data transfer consumes system resources and severely degrades NetBackup management performance.
- Do not use the host on which the NetBackup Enterprise Media Manager server runs as a Fibre Transport server. Data transfer consumes system resources and severely degrades EMM performance. Normally, the EMM server runs on the NetBackup master server host, but it can run on any NetBackup media server.

About Linux buffer size and concurrent pipe usage

On the Linux x86_64 computers that host FT media servers, Symantec recommends that you use 20 or fewer pipes concurrently.

If you use more than 20 pipes, Symantec recommends that you configure the number of data buffers to a value less than 10. To do so, create (if necessary) the following file and include a single integer that specifies the number of pipes:

```
/usr/openv/netbackup/db/config/NUMBER_DATA_BUFFERS_FT
```

To prevent jobs from failing when they attempt to obtain resources: Symantec recommends that the number of buffers times the number of pipes be 322 or fewer.

For the number of buffers per pipe, the default value is 16 for disk and 12 for tape.

About NetBackup agents on SAN clients

The SAN Client feature uses shared memory for data transfer. If you use a NetBackup agent on a SAN client, the agent must have privileges to read and write from that shared memory.

Ensure that the agent has the appropriate privileges, as follows:

- On UNIX systems, install the NetBackup agent using the same user account under which NetBackup is installed.

- On Windows SAN clients, ensure that the NetBackup agent and the SAN Client Fibre Transport Service use the same account (that is, **LogOnAs**). The account must have **Act as a part of the operating system** privilege enabled. By default, only the **Local System** account has the **Act as a part of the operating system** privilege enabled.

Converting a SAN media server to a SAN client

Table 2-2 provides an overview of how to convert a SAN media server to a SAN client. The computer host name remains the same. This procedure assumes that all NetBackup server run a release that supports the SAN Client feature.

Table 2-2 How to convert from a SAN media server to a SAN client

Step	Task	Instructions
Step 1	Delete the SAN media server	<p>Do the following:</p> <ul style="list-style-type: none"> ■ In the NetBackup Administration Console, in the left pane, select Media and Device Management > Devices > Media Servers. ■ Select the host. ■ Select Actions > Enterprise Media Manager Database > Remove Device Host.
Step 2	Uninstall the SAN media server software	See the <i>NetBackup Installation Guide for UNIX and Linux</i> .
Step 3	Prepare for Fibre Transport	<p>Prepare the SAN for Fibre Transport and install the HBAs on the Fibre Transport hosts and SAN client hosts.</p> <p>See “Preparing the SAN” on page 21.</p>
Step 4	Connect the storage to the FT media server host	<p>Connect the SAN media server storage device to the FT media server for the new SAN client. For disk storage, mount the storage if necessary.</p> <p>See “Preparing the SAN” on page 21.</p>
Step 5	Install the NetBackup media server software	<p>Install the media server software on the hosts to function as Fibre Transport media servers.</p> <p>See the <i>NetBackup Installation Guide for UNIX and Linux</i>.</p>
Step 6	Configure the FT media servers	See “Configuring SAN Client and Fibre Transport” on page 29.

Table 2-2 How to convert from a SAN media server to a SAN client (*continued*)

Step	Task	Instructions
Step 7	Install the NetBackup client software	<p>Install the client software on the host that was the SAN media server.</p> <p>See the <i>NetBackup Installation Guide for UNIX and Linux</i>.</p> <p>See the <i>NetBackup Installation Guide for Windows</i>.</p>
Step 8	Configure the SAN client	See “Configuring SAN Client and Fibre Transport” on page 29.
Step 9	Configure alternate server restore	<p>Because the current host is no longer a media server, configure an alternate server restore and specify the FT media server as the Restore server. NetBackup then uses the FT media server to restore the images that were associated with the SAN media server.</p> <p>See Media host override in the General Server properties of the Master Server Host Properties.</p> <p>After all of the images that were associated with the SAN media server expire, you can unconfigure the alternate server restore.</p>

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Preparing the SAN

This chapter includes the following topics:

- [Preparing the SAN](#)
- [About zoning the SAN for Fibre Transport](#)
- [About HBAs for SAN clients and FT media servers](#)
- [When selecting the HBA ports for SAN Client](#)
- [About supported SAN configurations for SAN Client](#)

Preparing the SAN

[Table 3-1](#) shows the preparation steps and the order to perform them.

Table 3-1 SAN preparation overview

Step	Procedure	Section
Step 1	Zone the SAN	See “About zoning the SAN for Fibre Transport” on page 22.
Step 2	Install HBAs	See “About HBAs for SAN clients and FT media servers” on page 23.
Step 3	Select HBA ports	See “When selecting the HBA ports for SAN Client” on page 24.
Step 4	Connect the fiber	See “About supported SAN configurations for SAN Client” on page 25.

About zoning the SAN for Fibre Transport

Before you can configure and use the NetBackup Fibre Transport (FT) mechanism, the SAN must be configured and operational.

See [“About supported SAN configurations for SAN Client”](#) on page 25.

For SAN switched configurations, proper zoning prevents Fibre Transport traffic from using the bandwidth that may be required for other SAN activity. Proper zoning also limits the devices that the host bus adapter (HBA) ports discover; the ports should detect the other ports in their zone only. Without zoning, each HBA port detects all HBA ports from all hosts on the SAN. The potentially large number of devices may exceed the number that the operating system supports.

Instructions for how to configure and manage a SAN are beyond the scope of the NetBackup documentation. However, the following recommendations may help you optimize your SAN traffic.

Table 3-2 Best practices for zoning the SAN on a NetBackup 5220

Guideline	Description
One initiator per zone, multiple targets acceptable.	<p>Symantec recommends that you create zones with only a single initiator per zone. Multiple targets in a single zone are acceptable, only if all of the targets are similar.</p> <p>Tape target resources should be in separate zones from disk target resources, regardless of initiator. However, both sets of resources may share the same initiator.</p>
Be aware of performance degradation when a port is configured for multiple zones.	<p>If you use a single port as an initiator or a target for multiple zones, this port can become a bottleneck for the overall performance of the system. You must analyze the aggregate required throughput of any part of the system and optimize the traffic flow as necessary.</p>
For fault tolerance, spread connectivity across HBA cards and not ports.	<p>To ensure the availability of system connections, if you incorporate a multi-path approach to common resources, pair ports on separate cards for like zoning. This configuration helps you avoid the loss of all paths to a resource in the event of a card failure.</p>

Table 3-2 Best practices for zoning the SAN on a NetBackup 5220 (*continued*)

Guideline	Description
Zone the SAN based on WWN to facilitate zone migrations, if devices change ports.	It is recommended that you perform SAN zoning based on WWN. If switch port configurations or cabling architectures need to change, the zoning does not have to be recreated.

[Table 3-3](#) describes the zones you should use for your SAN traffic.

Note: You must use physical port ID or World Wide Port Name (WWPN) when you specify the HBA ports on NetBackup Fibre Transport media servers.

See [“How to identify the HBA ports”](#) on page 32.

Table 3-3 Fibre Channel zones

Zone	Description
A Fibre Transport zone	<p>A Fibre Transport zone (or backup zone) should include only specific HBA ports of the hosts that use Fibre Transport, as follows:</p> <ul style="list-style-type: none"> ■ Ports on the FT media server HBAs that connect to the SAN clients. These ports use the Symantec target mode driver. See “About the target mode driver” on page 30. ■ Ports on the SAN client HBAs that connect to the media server ports that are in target mode. The ports on the SAN clients use the standard initiator mode driver. <p>You must define the FT media server target ports by physical port ID or World Wide Port Name (WWPN). The target mode driver WWPNs are not unique because they are derived from the Fibre Channel HBA WWPN.</p> <p>The NetBackup SAN clients should detect only the HBA ports that are in target mode on the NetBackup media servers. They should not detect HBA ports in initiator mode on the NetBackup media servers. They should not detect the FC HBAs on other hosts.</p> <p>To promote multistream throughput, each SAN client should detect all target mode devices of the media server HBA ports in the zone.</p>
External storage zone	<p>If the storage is on a SAN, create an external storage zone. The zone should include the HBA ports for the storage and the FT media server HBA ports that connect to the storage. All of the ports in the storage zone use the standard initiator mode HBA driver.</p>

About HBAs for SAN clients and FT media servers

The Fibre Channel host bus adapter (HBA) and driver requirements differ on the SAN clients and on the NetBackup FT media servers, as follows:

HBAs on SAN clients

The HBAs on the SAN clients can be any supported Fibre Channel HBA. The HBA ports must operate in the default initiator mode.

For the HBAs on the SAN client systems, do the following:

- Install the drivers for the HBA.
- Install the utilities for the HBA. Although not required for NetBackup operation, the utilities may help to troubleshoot connectivity problems.

HBAs on NetBackup FT media servers

The NetBackup media servers that host Fibre Transport require the following:

- For the connections to the SAN clients, use a QLogic HBA that NetBackup supports for Fibre Transport. For these HBAs, you must configure them to use the NetBackup target mode driver. See [“About nbhba mode and the ql2300_stub driver”](#) on page 31.
- If you use SAN attached storage, you can use any supported Fibre Channel HBA to connect to the storage. For these HBAs, you should install the QLogic driver and utilities. The HBA ports that connect to the storage must remain in the default initiator mode.
- The HBAs and their drivers must support 256K size buffers for data transfer.

For information about supported HBAs, see the *NetBackup Release Notes*.

When selecting the HBA ports for SAN Client

You must have adequate HBA ports in the FT media servers to support the FT pipes from the SAN clients. If you also use SAN attached storage, the media servers must have enough HBA ports to connect to the shared storage.

You must determine which ports to use for FT connections between the NetBackup media servers and the SAN clients, as follows:

- Determine which Fibre Channel HBAs you want to use for FT connections on the systems on which the NetBackup media servers are installed.
- Determine which Fibre Channel ports you want to use for FT connections on each SAN client.

All ports on QLogic HBAs must be either in target mode or initiator mode. You cannot connect one port on an HBA to a SAN client and another port to the storage.

About supported SAN configurations for SAN Client

NetBackup supports the following SAN configurations for Fibre Transport:

Node port (N_Port) switched configuration Connect the NetBackup media servers and SAN clients to a SAN switch as follows:

- Connect the HBA port on the NetBackup FT media server to a Fibre Channel switch port.
- Connect each SAN client HBA port to ports on the same Fibre Channel switch.
- Define the zones on the switch so that the client(s) and server(s) are in the same zone. Be aware of the following:
 - You must define the NetBackup FT media server target ports by physical port ID or World Wide Port Name (WWPN). The target mode driver WWPNs are not unique because they are derived from the Fibre Channel HBA WWPN.
 - You can define SAN client ports by either port ID or WWPN. However, if you use one method only, zone definition and management is easier.

Fibre Channel arbitrated loop (FC-AL) configuration Use Fibre Channel arbitrated loop (FC-AL) to connect a NetBackup FT media server HBA port directly to a NetBackup SAN client HBA port.

Note: FC-AL hubs are not supported.

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Installing SAN Client and Fibre Transport

This chapter includes the following topics:

- [About SAN Client installation](#)
- [About the SAN Client license key](#)
- [When upgrading SAN Client and Fibre Transport](#)

About SAN Client installation

No special installation is required for the core NetBackup Fibre Transport components. However, you must activate the feature by entering the SAN Client license key.

See [“About the SAN Client license key”](#) on page 27.

You must install the Symantec PBX service on the SAN clients that are UNIX and Linux systems.

The NetBackup master server and all NetBackup media servers that use the feature must be at NetBackup 6.5 or later.

About the SAN Client license key

Enter the SAN Client license key on the NetBackup master server.

If the NetBackup Enterprise Media Manager server runs on a host other than the master server, also enter the license key on that host. Normally, the EMM server runs on the NetBackup master server host, but it can run on any NetBackup media server.

If the license key expires or is unavailable (such as in a disaster recovery situation), backups and restores occur over the LAN.

When upgrading SAN Client and Fibre Transport

When you upgrade NetBackup, all components are upgraded including the SAN client and Fibre Transport components.

For NetBackup upgrade installation instructions, see the following:

- *NetBackup Installation Guide for UNIX and Linux*
- *NetBackup Installation Guide for Windows*

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Configuring SAN Client and Fibre Transport

This chapter includes the following topics:

- [Configuring SAN Client and Fibre Transport](#)
- [Configuring an FT media server](#)
- [Configuring SAN clients](#)
- [About configuring FT properties](#)
- [Configuring NetBackup FT properties](#)
- [Fibre Transport properties](#)
- [About SAN client usage preferences](#)
- [Configuring SAN client usage preferences](#)

Configuring SAN Client and Fibre Transport

To configure SAN Client and Fibre Transport, you must complete multiple procedures on multiple computers.

[Table 5-1](#) shows the configuration steps and the order to perform them.

Table 5-1 SAN Client and Fibre Transport configuration process

Step	Task	Section
Step 1	Configure the FT media servers	See “Configuring an FT media server” on page 30.
Step 2	Configure the SAN clients	See “Configuring SAN clients” on page 41.

Table 5-1 SAN Client and Fibre Transport configuration process (*continued*)

Step	Task	Section
Step 3	Configure FT properties	See “About configuring FT properties” on page 45.
Step 4	Configure SAN client usage preferences	See “About SAN client usage preferences” on page 49.

Configuring an FT media server

[Table 5-2](#) describes the process for configuring an FT media server.

Table 5-2 Process to configure an FT media server

Step	Task	Section
Step 1	Read the conceptual information about configuring an FT media server	<p>This information that may help you avoid serious problems.</p> <p>See “About Linux buffer size and concurrent pipe usage” on page 17.</p> <p>See “About HBAs for SAN clients and FT media servers” on page 23.</p> <p>See “About the target mode driver” on page 30.</p> <p>See “About nbhba mode and the ql2300_stub driver” on page 31.</p> <p>See “About FC attached devices” on page 31.</p> <p>See “How to identify the HBA ports” on page 32.</p> <p>See “About HBA port detection on Solaris” on page 33.</p>
Step 2	Start nbhba mode on the media server	See “Starting nbhba mode” on page 33.
Step 3	Mark the HBA ports	See “Marking the FT media server HBA ports” on page 35.
Step 4	Configure the FT services	See “Configuring the media server FT services” on page 38.

About the target mode driver

On NetBackup FT media servers, QLogic Fibre Channel host bus adapter (HBA) ports connect to the NetBackup SAN clients. Symantec provides a special target mode driver for the ports on those HBAs. Those ports must operate in target mode; the target mode driver replaces the default, initiator mode driver. Target mode applies only to QLogic HBAs; the target mode configuration process affects only QLogic HBA ports.

After the target mode driver binds to the HBA ports, those ports appear as two **ARCHIVE Python** tape devices during SCSI inquiry. However, they are not tape devices and do not appear as tape devices in NetBackup device discovery.

Each port appears as two tape devices because operating systems allow only one data stream per port. Two pseudo tape devices for each port increases throughput.

About nbhba mode and the ql2300_stub driver

The first step of the process to configure the media server HBA drivers is to start `nbhba` mode, which binds the `ql2300_stub` driver to all QLogic ISP2312 and ISP24xx HBA ports.

The NetBackup `ql2300_stub` driver prevents the standard initiator mode driver from binding to the ports. If the QLogic driver binds to the HBA ports, the NetBackup `nbhba` command cannot mark the ports that you want to operate in target mode. The target mode driver also cannot bind to the HBA ports.

The driver also lets NetBackup read and modify the device ID in NVRAM of the QLogic ports. After you start `nbhba` mode and mark the ports of the QLogic HBAs that connect to the SAN clients, those ports operate in target mode.

The computer exits `nbhba` mode when the FT server starts.

About FC attached devices

In `nbhba` mode, all devices that are attached to QLogic ISP2312 and ISP24xx HBA ports are unavailable. If disk or tape devices are attached to QLogic HBAs, those devices become unavailable. They remain unavailable until you exit `nbhba` mode on that computer.

Warning: Do not configure HBAs on a computer that has a start device that is attached to a QLogic ISP2312 or ISP24xx port. If you do, the computer may become unbootable. If any critical file systems are mounted on any devices that are attached to a QLogic HBA, the computer also may become unbootable. Before you begin HBA configuration, dismount any file systems that are attached to a QLogic HBA.

To determine if devices are attached to QLogic HBAs, you should examine your devices and your mounted file systems.

You can configure the QLogic HBAs on a different NetBackup media server that does not contain a QLogic HBA connected start device. Then, you can install them in the NetBackup FT media servers and configure the FT services. Afterward, you

should remove the nbhba driver from the media server on which you configured the HBAs.

See “Disabling an FT media server” on page 66.

The process also ends nbhba mode on that computer.

How to identify the HBA ports

If the computer on which you mark ports contains multiple HBAs, it may be difficult to determine how the World Wide Names (WWNs) relate to the HBAs. The NetBackup nbhba command that marks the HBA ports requires the port WWN. The port WWN also may be known as the World Wide Port Name (WWPN).

To avoid problems, you can install all of the QLogic HBAs in a NetBackup media server that has no other Fibre Channel HBAs installed. You can mark all HBA ports and then install the HBAs in the appropriate NetBackup media servers.

Warning: A QLogic HBA may exist as a chipset on a motherboard. To avoid problems, you should determine if the computer contains built-in QLogic ports.

If you cannot mark ports in a computer that has only the QLogic HBAs that you want to mark, the following may help:

- The HBA may identify the port WWNs on the card. Examine the HBA for the WWNs.
- The Fibre Channel switch may display WWNs for attached and operational HBA ports.
- The SAN utility software may provide the capability to list the WWNs of the HBA ports.
- On Solaris 10, you can list WWNs for native drivers by using the `fcinfo hba-port` command.
- The NetBackup nbhba command `-l` option lets you compare the port WWN addresses easily. (The computer must be in nbhba mode.) For the QLA-234x series, the port WWNs on the same card differ in the second byte and the sixth byte. The following example shows two, two-port HBAs. Lines 1 and 2 are one HBA; lines 3 and 4 are the other HBA.

```
/usr/opensv/netbackup/bin/admincmd/nbhba -l
1 2312 21:00:00:E0:8B:83:9D:A1 "QLA2342 " 0 0 101
2 2312 21:01:00:E0:8B:A3:9D:A1 "QLA2342 " 1 0 101
3 2312 21:00:00:E0:8B:8F:28:7B "QLA2342 " 0 0 101
4 2312 21:01:00:E0:8B:AF:28:7B "QLA2342 " 1 0 101
```

This output also shows that the ports are in initiator mode. The second rightmost column shows 0, and the rightmost column does not begin with 8.

- If the HBA contains LEDs on the metal mounting bracket, the color changes to green after you mark a port (yellow is initiator mode). (The computer must be in nbhba mode.) You can see if you marked the ports in the correct card. If you did not, you can return those ports to initiator mode and then mark other ports until you mark the correct ones.

About HBA port detection on Solaris

On systems earlier than Solaris 10 Update 7, NetBackup detects the PCI bus and allows ports on one bus only to be used for target mode.

The following is the port detection behavior on systems earlier than Solaris 10 Update 7:

- The first choice is the bus with the most 2312 target mode ports.
- If there are no 2312 target mode ports, the bus with the most 24xx target mode ports is used.
- Target mode ports on other busses are not used.

Beginning with Solaris 10 Update 7 and Solaris 11, target ports on more than one bus are supported.

Starting nbhba mode

Before you mark HBA ports, you must start nbhba mode, which binds the `ql2300_stub` driver to the QLogic HBA ports.

To start nbhba mode, see the following:

- [To start nbhba mode on Linux](#)
- [To start nbhba mode on Solaris](#)

You must be the root user.

To start nbhba mode on Linux

- 1 Ensure that the HBAs are not connected to the SAN.
- 2 Invoke the `nbftsrv_config -nbhba` command and option. The computer enters nbhba mode. The following is an example; output on your system may differ:

```
/usr/opensv/netbackup/bin/admincmd/nbftsrv_config -nbhba
Installing nbhba driver.
Are you sure you want to unload QLogic driver: qla2300? [y,n]
(y)
```

- 3 Answer **y** to unload the QLogic driver. The process continues as follows:

```
Removing qla2300
```

- 4 Continue by marking the HBA ports.

See [“Marking the FT media server HBA ports”](#) on page 35.

To start nbhba mode on Solaris

- 1 Ensure that the HBAs are not connected to the SAN.
- 2 Invoke the `nbftsrv_config -nbhba` command and option. The computer enters nbhba mode. The following is an example; output on your system may differ:

```
/usr/opensv/netbackup/bin/admincmd/nbftsrv_config -nbhba
Installing nbhba driver.
Waiting for driver references to ql2300_stub to free up (this
may take some time).
The following driver aliases need to be removed:
qlc "pci1077,2312.1077.10a"
Would you like to run update_drv to remove these now? [y,n] (y)
```

- 3 Answer **y** to remove any driver aliases. The process continues as follows:

```
/usr/sbin/update_drv -v -d -i "pci1077,2312.1077.10a" qlc
Done copying driver into system directories.
Done adding driver.
MUST REBOOT TO COMPLETE INSTALLATION.
```

- 4 Reboot the host.
- 5 Continue by marking the HBA ports.

See [“Marking the FT media server HBA ports”](#) on page 35.

Marking the FT media server HBA ports

You must mark the ports on the QLogic HBAs that you want to operate in target mode. The process modifies the port device IDs in NVRAM. When the FT server starts, the NetBackup target mode driver binds automatically to the QLogic HBA ports that you marked.

Before you mark ports, you must start `nbhba` mode.

See [“Starting nbhba mode”](#) on page 33.

The following procedures describe how to mark the HBA ports and if necessary how to reverse this process and return the ports to the initiator mode driver:

- [To mark the HBA ports](#)
- [To revert to the initiator mode driver](#)

You must be the root user to make these changes.

DRAFT

To mark the HBA ports

- 1 Display the QLogic HBA ports on the media server by using the `nbhba` command with the `-l` option. The following is an example; output on your system may differ:

```
/usr/opensv/netbackup/bin/admincmd/nbhba -l
1 2312 21:00:00:E0:8B:83:9D:A1 "QLA2342 " 0 0 101
2 2312 21:01:00:E0:8B:A3:9D:A1 "QLA2342 " 1 0 101
3 2312 21:00:00:E0:8B:8F:28:7B "QLA2342 " 0 0 101
4 2312 21:01:00:E0:8B:AF:28:7B "QLA2342 " 1 0 101
```

For the QLA-234x series, the port WWNs on the same card differ in the second byte and the sixth byte. This output shows two, two-port HBAs. Lines 1 and 2 are one HBA; lines 3 and 4 are the other HBA. The HBAs are in initiator mode: the second rightmost column shows 0, and the rightmost column does not begin with 8.

Alternatively, use the `nbhba -L` option to produce verbose output, which lets you identify the mode more easily.

- 2 Mark the ports by using the `nbhba` command. The following is the syntax:

```
/usr/opensv/netbackup/bin/admincmd/nbhba -modify -wwn string
-mode target
```

For example, the following two commands change the two ports on one of the HBAs from the example output in step 1:

```
nbhba -modify -wwn 21:00:00:E0:8B:8F:28:7B -mode target
nbhba -modify -wwn 21:01:00:E0:8B:AF:28:7B -mode target
```

- 3** Verify the changes by using the `nbhba` command and `-L` option to display the HBA card ports on the server. The following is an example; output on your system may differ:

```
/usr/opensv/netbackup/bin/admincmd/nbhba -L
HBA Port #1
  Device ID = 2312
  World Wide Name = 21:00:00:E0:8B:83:9D:A1
  Model Name = "QLA2342 "
  Port = 0
  Mode = initiator (designated for other use) (101)
HBA Port #2
  Device ID = 2312
  World Wide Name = 21:01:00:E0:8B:A3:9D:A1 "QLA2342
  Model Name = "QLA2342 "
  Port = 1
  Mode = initiator (designated for other use) (101)
HBA Port #3
  World Wide Name = 21:00:00:E0:8B:8F:28:7B
  Slot = ""
  Port = 0
  Fibre Not Attached
  Mode = target (designated for FT Server) (8101)
HBA Port #4
  World Wide Name = 21:01:00:E0:8B:AF:28:7B
  Slot = ""
  Port = 1
  Fibre Not Attached
  Mode = target (designated for FT Server) (8101)
```

The `nbhba -l` option also produces the output that lets you identify the mode:

```
/usr/opensv/netbackup/bin/admincmd/nbhba -l
1 2312 21:00:00:E0:8B:83:9D:A1 "QLA2342 " 0 0 101
2 2312 21:01:00:E0:8B:A3:9D:A1 "QLA2342 " 1 0 101
3 2312 21:00:00:E0:8B:8F:28:7B "QLA2342 " 0 1 8101
4 2312 21:01:00:E0:8B:AF:28:7B "QLA2342 " 1 1 8101
```

The rightmost two columns show the ports that are marked for target mode: the second rightmost column shows 1, and the rightmost column begins with 8. The other digits in the rightmost column are not significant.

- 4** If necessary, transfer the HBAs to the appropriate media servers.

5 If necessary, connect the HBAs to the SAN.

6 Continue by configuring the FT services.

See [“Configuring the media server FT services”](#) on page 38.

To revert to the initiator mode driver

- ◆ Invoke the `nbhba` command on the NetBackup FT server in which the HBA is installed. The following is the command syntax:

```
/usr/opensv/netbackup/bin/admincmd/nbhba -modify -wnn  
world_wide_port_name -mode initiator
```

Configuring the media server FT services

You must configure the media server FT services before you configure the SAN clients. The FT server must run on the media servers so that the client operating system discovers the target mode driver (the FT device). Two services (`nbftsrvr` and `nbfdrv64`) comprise the NetBackup FT server that runs on media servers.

The `nbftsrv_config` script configures the media server for Fibre Transport. In this process, the script does the following:

- Installs the required drivers
- Installs the FT server start-up scripts
- Starts the FT server
When the FT server starts, the NetBackup target mode driver binds automatically to the QLogic HBA ports that you marked. (The default QLogic driver is bound already to the ports that are not marked.) The HBA ports operate in target mode until you configure them to use the standard initiator mode again.
- Ends the `nbhba` mode on the computer (if it was in `nbhba` mode)

Configure the FT services on every NetBackup media server that connects to SAN clients.

For procedures, see the following:

- [To configure FT services on Linux](#)
- [To configure FT services on Solaris](#)

You must be the root user.

To configure FT services on Linux

- 1 Run the `nbftsrv_config` script. The following is an example; output on your system may differ:

```
/usr/opencv/netbackup/bin/admincmd/nbftsrv_config
Installing the Jungo driver and Fibre Transport Server.
The following automatic startup and shutdown scripts
(respectively) have been installed. They will cause the
NetBackup Fibre Transport Server daemon to be automatically shut
down and restarted each time the system boots.
/etc/rc.d/rc2.d/S21nbftserver
/etc/rc.d/rc3.d/S21nbftserver
/etc/rc.d/rc5.d/S21nbftserver
/etc/rc.d/rc0.d/K03nbftserver
/etc/rc.d/rc1.d/K03nbftserver
/etc/rc.d/rc6.d/K03nbftserver
It may be necessary to temporarily unload your QLogic drivers
to free up the ports for the nbhba drivers.
This is an optional step. If you choose not to do this, you may
not have access to all of the HBA ports until a subsequent
reboot.
Would you like to uninstall and reinstall your native QLogic
drivers now? [y,n] (y) y
```

- 2 The Qlogic drivers must be unloaded temporarily so that the stub driver (`ql2300_stub`) can bind to the marked HBA ports during this session.

If you answer `y`, you do not have to reboot the computer during this configuration process. However, any critical devices that are attached to QLogic HBAs in the computer may be unavailable during this session. To ensure that the critical devices remain available, answer `n`. Then, you must reboot when prompted. The stub driver binds to the marked ports during the boot process, and the default QLogic drivers bind to the unmarked ports.

If you answer `n`, go to step 5.

If you answer `y`, you are prompted again to unload each QLogic driver, as follows:

```
Are you sure you want to unload QLogic driver: qla2300? [y,n]
(y) y
```

- 3** To unload the QLogic driver, answer *y*. The process continues as follows:

```
Removing qla2300
Adding qla2300.
Adding qla2xxx.
Would you like to start the SANsurfer agent (qlremote)? [y,n]
(y) y
```

- 4** If the QLogic SANsurfer agent was loaded, the configuration process asks if you want to start the agent. To start the QLogic SANsurfer agent, answer *y*. The process continues as follows:

```
Starting qlremote agent service
Started SANsurfer agent.
/etc/udev/permissions.d/50-udev.permissions updated with Jungo
WinDriver permissions.
NetBackup Fibre Transport Server started.
Would you like to make these changes persist after a reboot?
[y,n] (y) y
```

- 5** To ensure that the FT server always starts after a computer reboot, answer *y*. The process continues as follows:

```
Running mkinitrd. Previous initrd image is saved at
/boot/initrd-2.6.9-11.ELsmp.img.05-21-07.11:24:03.
```

If you answered *y* in step 2, the FT services are started, and the target mode driver binds to the marked HBA ports.

- 6** If you answered *n* in step 2, reboot the computer when prompted.

The FT services are started, and the target mode driver binds to the marked HBA ports.

To configure FT services on Solaris

- 1 Run the `nbftsrv_config` script. The following is an example; output on your system may differ:

```
/usr/opensv/netbackup/bin/admincmd/nbftsrv_config
Installing the Jungo driver and Fibre Transport Server.
Waiting for driver references to ql2300_stub to free up (this
may take some time).
The following automatic startup and shutdown scripts
(respectively) have been installed. They will cause the
NetBackup Fibre Transport Server daemon to be automatically shut
down and restarted each time the system boots.
/etc/rc2.d/S21nbftserver
/etc/rc0.d/K03nbftserver
Adding "pci1077,2312.1077.101" to qlc.
No third party drivers found with conflicting driver aliases.
Done copying driver into system directories.
Done adding driver.MUST REBOOT TO COMPLETE INSTALLATION.
```

- 2 Reboot the host.

The FT services are started, and the target mode driver binds to the marked HBA ports.

Configuring SAN clients

[Table 5-3](#) shows the steps to configure SAN clients.

Table 5-3 SAN Client and Fibre Transport configuration process

Step	Task	Section
Step 1	Configure firewalls on SAN clients	See “About configuring firewalls on SAN clients” on page 41.
Step 2	Configure SAN client drivers	See “SAN client driver requirements” on page 42.
Step 3	Configure the SAN client FT service	See “Configuring the SAN client FT service” on page 43.

About configuring firewalls on SAN clients

NetBackup SAN clients require connectivity to the NetBackup master server and the NetBackup Enterprise Media Manager server.

Therefore, you must ensure that any firewall (software or hardware) allows the clients to communicate with the NetBackup master server and the EMM server. Normally, the NetBackup master server hosts the EMM server, so you may only have to allow communication with one system.

SAN client driver requirements

The operating systems of the NetBackup SAN clients may require device drivers that allow SCSI pass-through methods for the Fibre Transport traffic.

If the SAN client operating system is configured correctly, it recognizes each media server HBA port in target mode as two ARCHIVE Python devices.

[Table 5-4](#) lists the driver requirements for each supported SAN client operating system.

Table 5-4 SAN client operating system driver requirements

Operating system	Driver requirements
AIX	Client systems require the standard tape driver. The driver should work without modification.
HP-UX	Client systems require the sctl driver and pass-through device files. For information about how to configure the driver, see the <i>NetBackup Device Configuration Guide</i> .
Linux	Client systems require the SCSI Generic (sg) driver and pass-through device files. For information about how to configure the driver, see the <i>NetBackup Device Configuration Guide</i> .
Solaris	You must modify the <code>/kernel/drv/st.conf</code> file so that Solaris recognizes the FT devices on the NetBackup media servers. For information about how to do so, see the <i>NetBackup Device Configuration Guide</i> .
Windows	A device driver is not required. The media server FT devices appear in the Windows Device Manager "Other devices" section as ARCHIVE Python SCSI Sequential Devices.

Some operating systems require specific patch and driver updates. For information about them, see the *NetBackup Release Notes*.

Configuring the SAN client FT service

You must enable the SAN Client Fibre Transport Service on the NetBackup clients that you want to function as SAN clients. During this process, the SAN client operating system discovers the FT devices on the FT media servers.

Warning: NetBackup SAN clients cannot also be NetBackup servers. Therefore, only configure a client to be a SAN client on systems on which the NetBackup client software only is installed.

See [“Configuring SAN clients in a cluster”](#) on page 44.

See [“Registering a SAN client cluster virtual name”](#) on page 45.

To configure a NetBackup client to be a SAN client

- 1 Verify that the Symantec PBX service is active on the client, as follows:
 - On UNIX and Linux systems, run the NetBackup `bpps -x` command and verify that the `pbx_exchange` process is active.
 - On Windows systems, use the Computer Management console to verify that the Symantec Private Branch Exchange service is active.
- 2 On the client, run the following command to enable the SAN Client Fibre Transport Service (`nbftclnt`):

UNIX and Linux:

```
/usr/openv/netbackup/bin/bpclntcmd -sanclient 1
```

Windows:

```
install_path\NetBackup\bin\bpclntcmd.exe -sanclient 1
```

- 3 Do the following to start the SAN client FT service:
 - **Linux:** Boot the system, which also begins operating system device discovery. (Alternatively, you can run the NetBackup `bp.start_all` command to start the client FT service.)
 - **AIX, HP-UX, and Solaris:** Run the NetBackup `bp.start_all` command. The command resides in the following directory:
`/usr/openv/netbackup/bin`
 - **Windows:** Boot the system, which also begins operating system device discovery.

- 4 On the systems that were not booted in step 3, perform the action that forces the SAN client operating system to discover devices.

The operating system must discover two FT devices for each media server HBA port that is in target mode.

The SAN Client Fibre Transport Service (`nbftclnt`) validates the driver stack functionality during device discovery. If validation fails, Fibre Transport is not enabled on the client.

See [“Troubleshooting - SAN client FT service validation”](#) on page 61.

After the client OS discovers the FT devices, the SAN client is registered with NetBackup. You should not have to add the SAN client either manually or by using the Device Configuration Wizard.

- 5 If the client system does not discover the FT devices, verify the following:
 - The Fibre Channel driver is installed on the SAN client.
 - The SAN client HBA port is active on the Fibre Channel switch.
 - The media server HBA port is active on the Fibre Channel switch.
 - The SAN client is logged into the Fibre Channel switch name server.
 - The FT media server is logged into the Fibre Channel switch name server.
 - The FT media server port is zoned with the SAN client port.
 - The zone is included in the active configuration.

Alternatively, you can try a scan operation for FT devices on a client system.

See [“Rescanning a SAN client”](#) on page 54.

Configuring SAN clients in a cluster

The SAN client FT service is not a cluster application. To protect a SAN client with a cluster, you must configure NetBackup so that FT connections exist to every node.

Table 5-5 Process to configure a SAN client in a cluster

Step	Action	Description
Step 1	Install the NetBackup client software on each failover node	See the <i>NetBackup Installation Guide for UNIX and Linux</i> . See the <i>NetBackup Installation Guide for Windows</i> .

Table 5-5 Process to configure a SAN client in a cluster (*continued*)

Step	Action	Description
Step 2	Configure the SAN client on each failover node	Ensure that the FT service is active on all of the failover nodes. See “ About configuring firewalls on SAN clients ” on page 41. See “ SAN client driver requirements ” on page 42. See “ Configuring the SAN client FT service ” on page 43.
Step 3	Register the virtual node name with the EMM server	See “ Registering a SAN client cluster virtual name ” on page 45.

Registering a SAN client cluster virtual name

If you use a cluster to protect a client, you must register the cluster virtual name with the NetBackup Enterprise Media Manager.

See “[Configuring SAN clients in a cluster](#)” on page 44.

To register a cluster virtual name

- 1 Add the virtual name to the EMM database. The following is the command syntax:

```
nbemmcmd -addhost -machinename virtual_name -machinetype  
app_cluster
```

The following is the path to the `nbemmcmd` command:

- UNIX: `/usr/openv/netbackup/bin/admincmd`
- Windows: `install_path\Program Files\VERITAS\NetBackup\bin\admincmd`

- 2 For every client in the node, update the host so the virtual name is linked to the client host name. The following is the command syntax:

```
nbemmcmd -updatehost -add_server_to_app_cluster -machinename  
client_name -clustername virtual_name
```

About configuring FT properties

NetBackup Fibre Transport properties control how your SAN clients use the Fibre Transport services for backups. NetBackup uses a hierarchy of properties to provide increasingly granular control of how your clients use NetBackup Fibre

Transport. The following table describes the levels of property configuration in the **Host Properties** of the **NetBackup Administration Console**.

Table 5-6 Fibre Transport properties

Granularity	Description
Global FT properties for all SAN clients	Global FT properties apply to all SAN clients. Configure these properties in Host Properties > Master Servers in the NetBackup Administration Console .
FT properties for a media server or media servers	FT properties for a media server or servers apply to the SAN clients that the media server or servers back up. The properties override the global FT properties that are configured on the master server. Configure these properties in Host Properties > Media Servers in the NetBackup Administration Console . the master server Fibre Transport
FT properties for a SAN client or SAN clients	FT properties for a client or clients apply to the SAN clients. FT properties for SAN clients override the media server FT properties. Configure these properties in Host Properties > Clients in the NetBackup Administration Console .

See [“Configuring NetBackup FT properties”](#) on page 46.

NetBackup provides one finer level of granularity for Fibre Transport. SAN client usage preferences override the FT properties that you configure through **Host Properties**.

See [“About SAN client usage preferences”](#) on page 49.

Configuring NetBackup FT properties

NetBackup Fibre Transport properties control how your SAN clients use the Fibre Transport services for backups. NetBackup uses a hierarchy of properties to provide increasingly granular control of how your clients use NetBackup Fibre Transport.

See [“About configuring FT properties”](#) on page 45.

To configure NetBackup FT properties

- 1 In the **NetBackup Administration Console**, in the left pane, expand **NetBackup Management > Host Properties**.
- 2 Depending on which level of properties you want to configure, do one of the following:

To configure global FT properties Select **Master Servers**.

To configure FT properties for a media server or servers Select **Media Servers**.

To configure FT properties for a client or clients Select **Clients**.

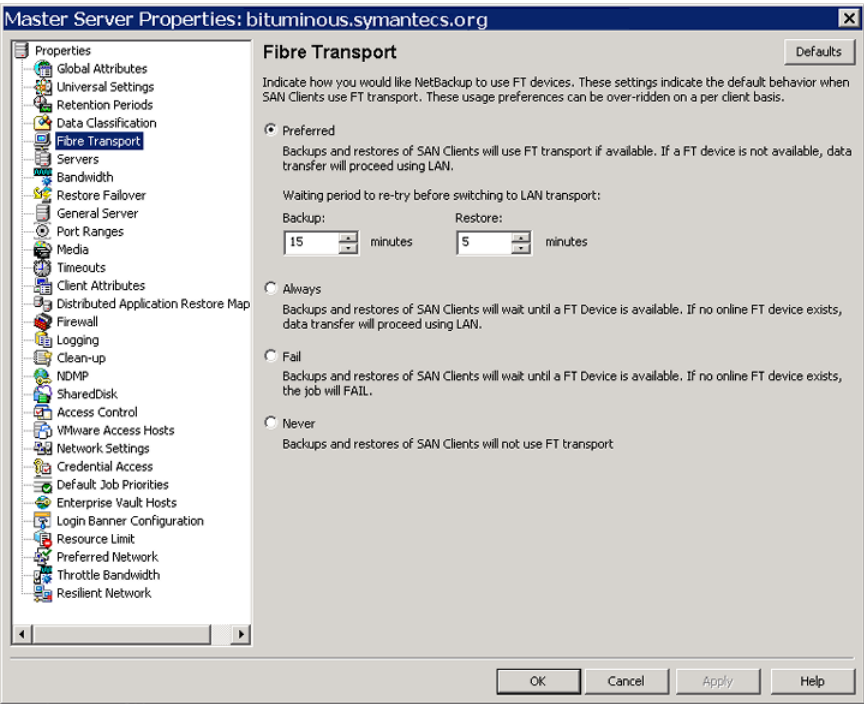
- 3 Select the host or hosts to configure, as follows:
 - To configure the properties on one host, double-click the name of the host in the right pane.
 - To configure properties for more than one host, select the hosts and then on the **Actions** menu select **Properties**.
- 4 In the host properties dialog box, click **Fibre Transport** in the left pane.
- 5 Configure the properties.
 See [“Fibre Transport properties”](#) on page 47.

Fibre Transport properties

NetBackup Fibre Transport properties control how your SAN clients use the Fibre Transport service for backups. The **Fibre Transport** properties apply to the hosts that you select in the **NetBackup Administration Console**, as follows:

Master server	The Fibre Transport properties apply to all SAN clients.
Media server or servers	The Fibre Transport properties apply to the SAN client or clients that the selected media servers back up. Media server properties override the global properties.
Client or clients	The Fibre Transport client properties apply to the selected SAN clients. The default values for clients are the property settings of the master server. Client properties override the media server properties.

Figure 5-1 Fibre Transport host properties for a master server



The **Fibre Transport** dialog box contains the following properties. All properties are not available for all hosts. In this table, FT device is an HBA port on a Fibre Transport media server. The port carries the backup and restore traffic. A media server may have more than one FT device.

Table 5-7 Fibre Transport dialog box properties

Property	Description
Maximum concurrent FT connections	<p>This property applies to media servers only.</p> <p>This property specifies the number of FT connections to allow to a media server.</p> <p>The default is four times the number of HBA target ports (maximum of 16).</p>
Use defaults from the master server configuration	<p>This property applies to clients only.</p> <p>This property specifies that the client follow the properties as they are configured on the master server.</p>

Table 5-7 Fibre Transport dialog box properties (*continued*)

Property	Description
Preferred	<p>The Preferred property specifies to use an FT device if one is available within the configured wait period in minutes. If an FT device is not available after the wait period elapses, NetBackup uses a LAN connection for the operation.</p> <p>If you select this option, also specify the wait period for backups and for restores.</p> <p>For the global property that is specified on the master server, the default is Preferred.</p>
Always	<p>The Always property specifies that NetBackup should always use an FT device for backups and restores of SAN clients. NetBackup waits until an FT device is available before it begins the operation.</p> <p>However, an FT device must be online and up. If not, NetBackup uses the LAN. An FT device may not exist because none is active, none have been configured, or the SAN Client license expired.</p>
Fail	<p>The Fail property specifies that NetBackup should fail the job if an FT device is not online and up. If the FT devices are online but busy, NetBackup waits until a device is available and assigns the next job to the device. An FT device may not exist because none is active, none have been configured, or the SAN Client license expired.</p>
Never	<p>The Never property specifies that NetBackup should never use an FT pipe for backups and restores of SAN clients. NetBackup uses a LAN connection for the backups and restores.</p> <p>If you specify Never for the master server, Fibre Transport is disabled in the NetBackup environment. If you select Never, you can configure FT usage on a per-client basis.</p> <p>If you specify Never for a media server, Fibre Transport is disabled for the media server.</p> <p>If you specify Never for a SAN client, Fibre Transport is disabled for the client.</p>

NetBackup provides one finer level of granularity for Fibre Transport. SAN client usage preferences override the FT properties that you configure through **Host Properties**.

See [“About SAN client usage preferences”](#) on page 49.

About SAN client usage preferences

SAN client usage preferences let you configure how a SAN client uses NetBackup Fibre Transport for backups.

See [“Configuring SAN client usage preferences”](#) on page 50.

The usage preferences override the FT transport properties.

See [“About configuring FT properties”](#) on page 45.

Configuring SAN client usage preferences

SAN client usage preferences let you configure how a specific client uses NetBackup Fibre Transport for backups.

SAN client usage preferences override the NetBackup Fibre Transport properties.

To configure SAN client usage preferences by using the Devices node

- 1 In the **NetBackup Administration Console**, in the left pane, expand **Media and Device Management > Devices**.
- 2 Select **SAN Clients**.
- 3 Select a client or clients in the right pane.
- 4 On the **Actions** menu, select **SAN Client Usage Preferences**.
- 5 In the **SAN Client Usage Preferences** dialog box, configure the properties.

SAN Client Usage Preferences for SAN Client: client1.symantecs.org

Indicate how you would like this client to use FT devices.

☐ Use defaults from the Master Server Configuration.

Configure specific to this client

☒ **Preferred**
Backups and restores of SAN Clients will use FT transport if available. If a FT device is not available, data transfer will proceed using LAN.
Waiting period to re-try before switching to LAN transport:
Backup: 15 minutes Restore: 5 minutes

☐ **Always**
Backups and restores of SAN Clients will wait until a FT Device is available. If no online FT device exists, data transfer will proceed using LAN.

☐ **Fail**
Backups and restores of SAN Clients will wait until a FT Device is available. If no online FT device exists, the job will FAIL.

☐ **Never**
Backups and restores of SAN Clients will not use FT transport

OK Cancel Apply Help

See [“SAN client usage preferences”](#) on page 51.

SAN client usage preferences

The following table describes the Fibre Transport usage preferences for SAN clients.

Table 5-8 SAN client Fibre Transport usage preferences

Property	Description
Use defaults from the master server configuration	This property specifies that the client follow the properties as they are configured on the master server.
Preferred	<p>The Preferred property specifies to use an FT device if one is available within the configured wait period in minutes. If an FT device is not available after the wait period elapses, NetBackup uses a LAN connection for the operation.</p> <p>If you select this option, also specify the wait period for backups and for restores.</p> <p>For the global property that is specified on the master server, the default is Preferred.</p>
Always	<p>The Always property specifies that NetBackup should always use an FT device for backups and restores of SAN clients. NetBackup waits until an FT device is available before it begins the operation.</p> <p>However, an FT device must be online and up. If not, NetBackup uses the LAN. An FT device may not exist because none is active, none have been configured, or the SAN Client license expired.</p>
Fail	The Fail property specifies that NetBackup should fail the job if an FT device is not online and up. If the FT devices are online but busy, NetBackup waits until a device is available and assigns the next job to the device. An FT device may not exist because none is active, none have been configured, or the SAN Client license expired.
Never	<p>The Never property specifies that NetBackup should never use an FT pipe for backups and restores of SAN clients. NetBackup uses a LAN connection for the backups and restores.</p> <p>If you specify Never for the master server, Fibre Transport is disabled in the NetBackup environment. If you select Never, you can configure FT usage on a per-client basis.</p> <p>If you specify Never for a media server, Fibre Transport is disabled for the media server.</p> <p>If you specify Never for a SAN client, Fibre Transport is disabled for the client.</p>

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Managing SAN clients and Fibre Transport

This chapter includes the following topics:

- [Enabling or disabling the FT services](#)
- [Rescanning a SAN client](#)
- [Viewing FT job details](#)
- [Viewing Fibre Transport traffic](#)
- [Adding a SAN client](#)
- [Deleting a SAN client](#)
- [About Fibre Transport throughput](#)
- [About restores over Fibre Transport](#)

Enabling or disabling the FT services

You can enable or disable the FT services on NetBackup FT media servers.

The following are the services that compose the FT server:

- The `nbftsrvr` service manages the server side of the FT pipe.
- The `nbfdrv64` service controls the target mode drivers on the media server.

The `nbftsrvr` service starts the `nbfdrv64` service. If you stop one, the other stops. If one ends abnormally, the other stops.

These services do not appear in the **NetBackup Activity Monitor**; they do appear in the operating system process displays.

Warning: Do not use the UNIX `kill -9` command and option to stop the `nbfdrv64` process. It does not allow the process to stop gracefully, and the SAN clients cannot detect the FT devices when the `nbfdrv64` process dies. You then may have to reboot the client systems so they detect the FT devices again (after you restart `nbfdrv64`).

To enable or disable FT services

- 1 In the **NetBackup Administration Console**, in the left pane, expand **Media and Device Management > Devices > Media Server**.
- 2 Select an FT media server in the right pane.
- 3 Click either **Actions > Enable FT Services** or **Actions > Disable FT Services**.

Rescanning a SAN client

A rescan operation tries to find new FT devices from the client. If the scan detects new FT devices, NetBackup adds them to the EMM database. A rescan operation is a time- and compute-intensive operation. It may not discover new devices (especially if the client system requires a reboot and you do not reboot it).

Depending on the operating system capabilities and the HBA driver and its settings, the scan may search for new Fibre Channel devices.

To rescan SAN clients

- 1 On Microsoft Windows clients, use the Windows Device Manager to scan for hardware changes.
- 2 In the **NetBackup Administration Console**, in the left pane, expand **Media and Device Management > Devices > SAN Clients**.
- 3 Select a client in the right pane.
- 4 Click **Action > Rescan SAN Client FT Devices**.
- 5 In the **Rescan SAN Client** dialog box, monitor the following status of the operation:
 - Initiated
 - Client system must be rebooted
 - Failure
- 6 If required, reboot the client system.

Viewing FT job details

The **NetBackup Administration Console** Activity Monitor **Jobs** tab displays all of the jobs that are in progress or have been completed.

The **Transport** column in the **Jobs** tab window shows the type of transport between the SAN client and the NetBackup media server: FT for Fibre Transport or blank for inactive or for a LAN.

The **Detailed Status** tab of the **Job Details** dialog shows more detailed information about the job, including the following:

- A **Transport Type** field in the header area shows the same information as the **Transport** column in the **Jobs** tab.
- Messages in the **Status** window show the status of jobs that use FT transport, as follows:
 - Queuing for FT transport
 - Allocated FT transport
 - Opening FT connection
 - Closing FT connection

To view job details

- ◆ Double-click the job in the **Jobs** tab.

The **Job Details** dialog appears that contains detailed job information on a **Job Overview** tab and a **Detailed Status** tab.

Viewing Fibre Transport traffic

You can view the current activity between FT media servers and SAN clients. The following two views are available:

- The media server view shows all of the inbound backup (and outbound restore) traffic for a selected FT media server.
Use this view to determine which SAN clients can send data to and receive data from the selected media server.
- The SAN client view shows all of the outbound backup (and inbound restore) traffic for a selected client.
Use this view to determine which FT media servers can send data to and receive data from the selected client.

To view FT pipe activity from the media server perspective

- 1 In the **NetBackup Administration Console**, in the left pane, expand **Media and Device Management > Devices > Media Server**.
- 2 Select an FT media server in the right pane.
- 3 Click **Actions > View FT Connections**.

The **Media Server Fibre Transport View** dialog box shows the connection activity for the media server.

To view FT pipe activity from the client perspective

- 1 In the **NetBackup Administration Console**, in the left pane, expand **Media and Device Management > Devices > SAN Clients**.
- 2 Select a client in the right pane.
- 3 Click **Actions > View FT Connections**.

The **SAN Client Fibre Transport View** dialog box shows the connection activity for the client.

Adding a SAN client

If you configure a SAN client and it does not appear as a SAN client in your NetBackup environment, you can add the client. To do so, use the **NetBackup Device Configuration Wizard** or the **NetBackup Administration Console**.

The SAN client must be configured correctly and the SAN client FT service must be active.

To add a SAN client by using the wizard

- 1 In the **NetBackup Administration Console**, in the left pane, select **Media and Device Management**.
- 2 In the right pane, click **Configure Storage Devices**.
- 3 Follow the wizard screens.
- 4 If the SAN client does not appear on the SAN clients screen, click **Add** to add it manually.

To add a SAN client by using the Administration Console

- 1 In the **NetBackup Administration Console**, in the left pane, select **Media and Device Management > Devices > SAN Clients**.
- 2 Click **Actions > New > New SAN Client**.
- 3 In the **New SAN Client** dialog box, enter the name of the client and click **OK**.
NetBackup queries the client and adds it to the **SAN Clients** list in the **Administration Console** window.

Deleting a SAN client

Use the following procedure to delete a SAN client from your NetBackup configuration. The SAN client remains a NetBackup client, but it no longer functions as a SAN client.

To delete a SAN client

- 1 Disable the SAN client services.
See [“Disabling a SAN client”](#) on page 65.
- 2 In the **NetBackup Administration Console**, in the left pane, select **Media and Device Management > Devices > SAN Clients**.
- 3 Select a client in the right pane.
- 4 Click **Edit > Delete**.

About Fibre Transport throughput

The slowest speed of the following components may limit the Fibre Transport throughput rate:

- The speed capability of the SAN client.
The speed with which the client reads and writes to the file system or database affects performance).
- The read and write speed of the storage unit.
- The bandwidth of the computer PCI I/O memory.
On the SAN clients, a non-PCI-X card on the PCI-X bus of the HBA reduces the speed of the controlling bus. NetBackup FT performance may not be affected as much as on a media server, but performance may degrade to unacceptable levels.
- The speed of the Fibre Channel pipe that transports the data.

- The topology of the Fibre Channel.
Bottlenecks may occur when multiple data streams are sent through a shared element such as a trunk or an inter-switch link.

About restores over Fibre Transport

In most cases, if a backup uses the NetBackup Fibre Transport data transfer method, a restore also occurs by the Fibre Transport method.

However, some backup methods may not support Fibre Transport restores. FlashBackup does not use shared memory for restores; therefore, FlashBackup does not support Fibre Transport restores. FlashBackup restores occur over the LAN.

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Troubleshooting SAN Client and Fibre Transport

This chapter includes the following topics:

- [When troubleshooting SAN Client and Fibre Transport](#)
- [SAN Client troubleshooting tech note](#)
- [Troubleshooting - Media server FT device is offline](#)
- [Troubleshooting - No FT devices discovered](#)
- [Troubleshooting - SAN client FT service validation](#)
- [Troubleshooting - SAN client does not select Fibre Transport](#)
- [Troubleshooting - SAN client service does not start](#)
- [Troubleshooting - Stopping and starting FT services](#)
- [Troubleshooting - Viewing FT logs](#)

When troubleshooting SAN Client and Fibre Transport

SAN Client and Fibre Transport troubleshooting information is available.

See [“SAN Client troubleshooting tech note”](#) on page 60.

See [“Troubleshooting - SAN client service does not start”](#) on page 63.

See [“Troubleshooting - Stopping and starting FT services”](#) on page 63.

See [“Troubleshooting - Media server FT device is offline”](#) on page 60.

See [“Troubleshooting - No FT devices discovered”](#) on page 61.

See “[Troubleshooting - SAN client FT service validation](#)” on page 61.

See “[Troubleshooting - SAN client does not select Fibre Transport](#)” on page 62.

See “[Troubleshooting - Viewing FT logs](#)” on page 64.

SAN Client troubleshooting tech note

More troubleshooting information about SAN clients and Fibre Transport is available on the Symantec Enterprise Support Web site in the following Tech Note:

<http://entsupport.symantec.com/docs/288437>

The Tech Note contents are updated when new information is available. The Tech Note may contain more current information than [this guide](#).

Troubleshooting - Media server FT device is offline

If NetBackup shows that a media server FT device is offline, the selected SAN client cannot detect the target mode driver on that media server. FT device status appears in the Media and Device Management > Devices > SAN Clients window of the NetBackup Administration Console. (An FT device represents the HBA target mode driver on a media server.)

An FT device may be offline because of the following:

- The nbfdrv64 service on a media server is down. The nbfdrv64 service manages the target mode drivers; if it is down, the FT device is not available.
- The physical connections between the SAN client and the SAN switch fail or were changed.
- SAN zoning changes removed either the media server or the SAN client from the zone.
- The SAN client failed the FT service validation.
See “[Troubleshooting - SAN client FT service validation](#)” on page 61.

If all media server FT devices for a client are offline, troubleshoot in the following order:

- Verify that the SAN client FT service validation passes.
- Verify that the physical connections from the SAN client to the SAN switch are correct.
- Verify that the SAN zones are correct.
- Verify that the nbfdrv64 service is active on each media server.

To determine if the nbfdrv64 service is down, use the operating system process status command to examine the processes on the media server. Both nbftsrvr and nbfdrv64 should be active.

See [“Troubleshooting - Stopping and starting FT services”](#) on page 63.

If the services do not start, examine the log files for those services to determine why they do not start.

See [“Troubleshooting - Viewing FT logs”](#) on page 64.

Troubleshooting - No FT devices discovered

If a "No FT devices discovered" message appears in the NetBackup logs on the SAN client, the pass-through driver may not be configured on the SAN client.

For information about how to configure pass-through drivers, see the *NetBackup Device Configuration Guide*.

Troubleshooting - SAN client FT service validation

The SAN Client Fibre Transport Service (nbftclnt) validates the client system's kernel and driver stack when it starts and during device discovery. Validation verifies that the kernel and the drivers are at supported levels.

If validation succeeds, the SAN client supports FT pipe transfers; FT pipe transfer can occur. If validation fails, FT pipe transfer cannot occur.

To manage the validation failure, the following occurs:

- The SAN Client Fibre Transport Service writes check driver messages in its log file.
- NetBackup sets the FT device status to offline for all FT target devices in the client's SAN zone. (For other clients in the zone that pass the validation, the FT devices are online.)

To see the FT device status from the client, select the client in the **Media and Device Management > Devices > SAN Clients** window in the **NetBackup Administration Console**.

The check driver messages in the nbftclnt log file are similar to the following:

```
VerifyCheckConditions:failed on <OS Device Name> - check driver
VerifyCheckConditions:failed on <OS Device Name>; <System Error
Message>
```

The following describes the variables in the messages:

- *OS Device Name* is the device name the SAN Client uses to open the OS device driver.
- *System Error Message* can be any OS-dependent system error message for a failure that is associated with the request.

See [“Troubleshooting - Viewing FT logs”](#) on page 64.

If validation fails, install the correct operating system version, operating system patches, or driver version.

For supported kernel and driver levels, see the *NetBackup Release Notes*.

Troubleshooting - SAN client does not select Fibre Transport

If either of the following are true, a SAN client **may not** be able to select Fibre Transport during a backup or restore operation:

- The FT media server host **operating system domainname** command returns fully qualified domain names and NetBackup is configured to use short names.
- The FT media server host **operating system domainname** command fails because of: DNS, NIS, or network problems and NetBackup is configured to use fully qualified domain names.

If so, the backup or restore may fail or it may occur over the LAN rather than the SAN.

To work around this problem, add an alias for the FT media server to the EMM database.

The following are the command syntaxes:

- To add a short name alias:

```
nbemmcmd -machinealias -addalias -alias shortservername  
-machinename servername.fully.qualified -machinetype media
```

- To add a fully qualified domain name alias:

```
nbemmcmd -machinealias -addalias -alias  
servername.fully.qualified -machinename shortservername  
-machinetype media
```

Troubleshooting - SAN client service does not start

If the SAN Client Fibre Transport Service (nbftclnt) does not start on UNIX or Linux systems, one possible cause may be the NetBackup configuration file. The following is the pathname of the file:

/usr/openv/netbackup/bp.conf

If the client host name is listed as a SERVER, the nbftclnt service does not start. If a SERVER entry exists for the client, remove the entry and then start the client service.

The client host name should be listed as CLIENT_NAME only.

Troubleshooting - Stopping and starting FT services

Fibre Transport services run on both the FT media servers and SAN clients.

The following are the FT services that run on media servers:

- The nbftsrvr service manages the server side of the FT pipe.
- The nbfdrv64 service controls the target mode drivers on the media server.

The nbftsrvr service starts the nbfdrv64 service. If you stop one, the other stops. If one ends abnormally, the other stops.

The nbftclnt FT service runs on SAN clients:

These services do not appear in the NetBackup Activity Monitor; they do appear in the operating system process displays.

In normal operation, you should not have to start or stop the services. A Symantec support engineer may direct you to stop and restart services for troubleshooting purposes.

See [“Enabling or disabling the FT services”](#) on page 53.

Alternatively, you can use the UNIX kill command without the -9 option to stop the services. The NetBackup bp.kill_all command stops the FT services, but it stops all other NetBackup services also.

Warning: Do not use the UNIX kill -9 command and option to stop the nbfdrv64 process. It does not allow the process to stop gracefully, and the SAN clients cannot detect the FT devices when the nbfdrv64 process dies. You then may have to reboot the client systems so they detect the FT devices again (after you restart nbfdrv64).

The NetBackup `bp.start_all` command starts all NetBackup services, including the FT services.

Troubleshooting - Viewing FT logs

You can monitor Fibre Transport activity and status by viewing the log messages that the FT processes generate. Veritas unified log (VxUL) files use a standardized name and file format for log files. An originator ID identifies the process that writes the log messages.

[Table 7-1](#) shows the VxUL originator IDs of the processes that log information about FT activity.

Table 7-1 FT originator IDs

Originator ID	FT processes that use the ID
199	nbftsrvr and nbfdrv64. The media server Fibre Transport services.
200	nbftclnt. The client Fibre Transport service.
201	The FT Service Manager. Runs in the Enterprise Media Manager service.

To view and manage VxUL log files, you must use NetBackup log commands. For information about how to use and manage VxUL logs on NetBackup servers, see the *NetBackup Troubleshooting Guide*.

Configure the amount of information that is collected and its retention length on the NetBackup master server in the Logging properties and Clean-up properties. For more information, see the *NetBackup Administrator's Guide, Volume I*.

Disabling SAN Client and Fibre Transport

This chapter includes the following topics:

- [About disabling SAN Client and Fibre Transport](#)
- [Disabling a SAN client](#)
- [Disabling an FT media server](#)

About disabling SAN Client and Fibre Transport

You cannot uninstall the SAN Client and Fibre Transport components. However, you can disable the SAN clients and the FT media servers.

See [“Disabling a SAN client”](#) on page 65.

See [“Disabling an FT media server”](#) on page 66.

Disabling a SAN client

You can disable a SAN client. If you do, the client cannot backup over the SAN to an FT media server.

See [“About disabling SAN Client and Fibre Transport”](#) on page 65.

After you disable a SAN client, you can remove it from your NetBackup environment.

See [“Deleting a SAN client”](#) on page 57.

To disable the NetBackup SAN client service on UNIX

- 1 To stop the service, run the following command on the client:

```
/usr/opensv/netbackup/bin/nbftclnt -terminate
```

- 2 To configure the host so it does not start the SAN client service after a computer restart, run the following command:

```
/usr/opensv/netbackup/bin/bpclntcmd -sanclient 0
```

To disable the NetBackup SAN client service on Windows

- 1 Use Windows Computer Management to stop the NetBackup SAN Client Service.
- 2 To configure the host so it does not start the SAN client service after a restart, run the following command:

```
install_path\NetBackup\bin\bpclntcmd.exe -sanclient 0
```

Disabling an FT media server

You can disable an FT media server and remove the operating system FT startup scripts from the media server. The process also removes the nbhba driver and exits nbhba mode. The media server then does not support NetBackup Fibre Transport.

See [“About disabling SAN Client and Fibre Transport”](#) on page 65.

Warning: On Solaris systems, `/etc/driver_aliases` file entries may remain after you remove the FT services and the nbhba driver. The entries are in the form of `qla2300 "pci1077,xxx"` or `qla2300 "pciex1077,xxx"`. The entries are harmless; however, if you attempt to remove them, the system may not boot. Sun Microsystems recommends that you do not edit the `/etc/driver_aliases` file.

To disable an FT media server and remove drivers

- 1** On the FT media server, run the following script:

```
/usr/opensv/netbackup/bin/admincmd/nbftsrv_config -d
```

- 2** Verify that the following startup scripts were removed:

On Linux systems, the following are the scripts:

```
/etc/rc.d/rc2.d/S21nbftserver  
/etc/rc.d/rc3.d/S21nbftserver  
/etc/rc.d/rc5.d/S21nbftserver  
/etc/rc.d/rc0.d/K03nbftserver  
/etc/rc.d/rc6.d/K03nbftserver  
/lib/modules/ 2.6.*smp/kernel/drivers/misc/ql2300_stub.ko  
/lib/modules/ 2.6.*smp/kernel/drivers/misc/windrvr6.ko
```

On Solaris systems, the following are the scripts:

```
/etc/rc2.d/S21nbftserver  
/etc/rc0.d/K03nbftserver  
/usr/kernel/drv/windrvr6.conf  
/usr/kernel/drv/sparcv9/windrvr6  
/usr/kernel/drv/sparcv9/ql2300_stub
```

- 3** If the startup scripts were not removed, delete them manually.
- 4** Run the following script:

```
/usr/opensv/netbackup/bin/admincmd/nbftconfig -ds  
ft_server_host_name
```

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