Symantec NetBackup™ SAN Client and Fibre Transport Guide

UNIX, Windows, Linux

Release 7.5
Symantec NetBackup™ SAN Client and Fibre Transport Guide

The software described in this book is furnished under a license agreement and may be used only in accordance with the terms of the agreement.

Documentation version: 7.5

Legal Notice

Copyright © 2012 Symantec Corporation. All rights reserved.

Symantec and the Symantec Logo, Veritas, and NetBackup are trademarks or registered trademarks of Symantec Corporation or its affiliates in the U.S. and other countries. Other names may be trademarks of their respective owners.

This Symantec product may contain third party software for which Symantec is required to provide attribution to the third party (“Third Party Programs”). Some of the Third Party Programs are available under open source or free software licenses. The License Agreement accompanying the Software does not alter any rights or obligations you may have under those open source or free software licenses. Please see the Third Party Legal Notice Appendix to this Documentation or TPIP ReadMe File accompanying this Symantec product for more information on the Third Party Programs.

The product described in this document is distributed under licenses restricting its use, copying, distribution, and decompilation/reverse engineering. No part of this document may be reproduced in any form by any means without prior written authorization of Symantec Corporation and its licensors, if any.

THE DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID. SYMANTEC CORPORATION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE FURNISHING, PERFORMANCE, OR USE OF THIS DOCUMENTATION. THE INFORMATION CONTAINED IN THIS DOCUMENTATION IS SUBJECT TO CHANGE WITHOUT NOTICE.

The Licensed Software and Documentation are deemed to be commercial computer software as defined in FAR 12.212 and subject to restricted rights as defined in FAR Section 52.227-19 "Commercial Computer Software - Restricted Rights" and DFARS 227.7202, "Rights in Commercial Computer Software or Commercial Computer Software Documentation", as applicable, and any successor regulations. Any use, modification, reproduction release, performance, display or disclosure of the Licensed Software and Documentation by the U.S. Government shall be solely in accordance with the terms of this Agreement.
Technical Support

Symantec Technical Support maintains support centers globally. Technical Support’s primary role is to respond to specific queries about product features and functionality. The Technical Support group also creates content for our online Knowledge Base. The Technical Support group works collaboratively with the other functional areas within Symantec to answer your questions in a timely fashion. For example, the Technical Support group works with Product Engineering and Symantec Security Response to provide alerting services and virus definition updates.

Symantec’s support offerings include the following:

- A range of support options that give you the flexibility to select the right amount of service for any size organization
- Telephone and/or Web-based support that provides rapid response and up-to-the-minute information
- Upgrade assurance that delivers software upgrades
- Global support purchased on a regional business hours or 24 hours a day, 7 days a week basis
- Premium service offerings that include Account Management Services

For information about Symantec’s support offerings, you can visit our Web site at the following URL:

www.symantec.com/business/support/

All support services will be delivered in accordance with your support agreement and the then-current enterprise technical support policy.

Contacting Technical Support

Customers with a current support agreement may access Technical Support information at the following URL:

www.symantec.com/business/support/

Before contacting Technical Support, make sure you have satisfied the system requirements that are listed in your product documentation. Also, you should be at the computer on which the problem occurred, in case it is necessary to replicate the problem.

When you contact Technical Support, please have the following information available:

- Product release level
- Hardware information
- Available memory, disk space, and NIC information
- Operating system
- Version and patch level
- Network topology
- Router, gateway, and IP address information
- Problem description:
  - Error messages and log files
  - Troubleshooting that was performed before contacting Symantec
  - Recent software configuration changes and network changes

**Licensing and registration**

If your Symantec product requires registration or a license key, access our technical support Web page at the following URL:


**Customer service**

Customer service information is available at the following URL:


Customer Service is available to assist with non-technical questions, such as the following types of issues:

- Questions regarding product licensing or serialization
- Product registration updates, such as address or name changes
- General product information (features, language availability, local dealers)
- Latest information about product updates and upgrades
- Information about upgrade assurance and support contracts
- Information about the Symantec Buying Programs
- Advice about Symantec's technical support options
- Nontechnical presales questions
- Issues that are related to CD-ROMs, DVDs, or manuals
Support agreement resources

If you want to contact Symantec regarding an existing support agreement, please contact the support agreement administration team for your region as follows:

Asia-Pacific and Japan                          customercare_apac@symantec.com
Europe, Middle-East, and Africa                seea@symantec.com
North America and Latin America               supportsolutions@symantec.com
Troubleshooting - Stopping and starting FT services ...................... 61
Troubleshooting - Viewing FT logs .................................................. 62

Index ................................................................................................. 63
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.
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*. 
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 SAN Client and NetBackup agents
- 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>
<thead>
<tr>
<th>Step</th>
<th>Deployment task</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Determine the storage destination</td>
<td>See “About SAN Client storage destinations” on page 16.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Determine the hosts to use</td>
<td>See “How to choose SAN Client and Fibre Transport hosts” on page 17.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Prepare the SAN</td>
<td>See “Preparing the SAN” on page 21.</td>
</tr>
<tr>
<td>Step 4</td>
<td>License SAN Client</td>
<td>See “About the SAN Client license key” on page 25.</td>
</tr>
<tr>
<td>Step 5</td>
<td>Read about NetBackup agents</td>
<td>See “About SAN Client and NetBackup agents” on page 17.</td>
</tr>
<tr>
<td>Step</td>
<td>Deployment task</td>
<td>Section</td>
</tr>
<tr>
<td>------</td>
<td>-----------------</td>
<td>---------</td>
</tr>
<tr>
<td>Step 6</td>
<td>Configure SAN Client and Fibre Transport</td>
<td>See “Configuring SAN Client and Fibre Transport” on page 29.</td>
</tr>
<tr>
<td>Step 7</td>
<td>Convert a SAN media server to a SAN Client</td>
<td>See “Converting a SAN media server to a SAN client” on page 18.</td>
</tr>
</tbody>
</table>

### 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 SAN Client and NetBackup agents

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 as the appropriate privileges, as follows:

■ On UNIX systems, install the NetBackup agent using the same user account under which NetBackup is installed.
On Windows systems, use Windows Computer Management to specify the account under which to run the agent. It should be the same account as the NetBackup services.

## 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**

<table>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Delete the SAN media server</td>
<td>Do the following:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- In the NetBackup Administration Console, in the left pane, select Media and Device Management &gt; Devices &gt; Media Servers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Select the host.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Select Actions &gt; Enterprise Media Manager Database &gt; Remove Device Host.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Uninstall the SAN media server software</td>
<td>See the NetBackup Installation Guide for UNIX and Linux.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Prepare for Fibre Transport</td>
<td>Prepare the SAN for Fibre Transport and install the HBAs on the Fibre Transport hosts and SAN client hosts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See “Preparing the SAN” on page 21.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Connect the storage to the FT media server host</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See “Preparing the SAN” on page 21.</td>
</tr>
<tr>
<td>Step 5</td>
<td>Install the NetBackup media server software</td>
<td>Install the media server software on the hosts to function as Fibre Transport media servers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See the NetBackup Installation Guide for UNIX and Linux.</td>
</tr>
<tr>
<td>Step 6</td>
<td>Configure the FT media servers</td>
<td>See “Configuring SAN Client and Fibre Transport” on page 29.</td>
</tr>
<tr>
<td>Step</td>
<td>Task</td>
<td>Instructions</td>
</tr>
<tr>
<td>-------</td>
<td>-------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Step 7</td>
<td>Install the NetBackup client software</td>
<td>Install the client software on the host that was the SAN media server. See the <em>NetBackup Installation Guide for UNIX and Linux</em>. See the <em>NetBackup Installation Guide for Windows</em>.</td>
</tr>
<tr>
<td>Step 8</td>
<td>Configure the SAN client</td>
<td>See “Configuring SAN Client and Fibre Transport” on page 29.</td>
</tr>
<tr>
<td>Step 9</td>
<td>Configure alternate server restore</td>
<td>Because the current host is no longer a media server, configure an alternate server restore and specify the FT media server as the <em>Restore server</em>. NetBackup then uses the FT media server to restore the images that were associated with the SAN media server. See <em>Media host override</em> in the <em>General Server</em> properties of the <em>Master Server Host Properties</em>. After all of the images that were associated with the SAN media server expire, you can unconfigure the alternate server restore.</td>
</tr>
</tbody>
</table>

Table 2-2: How to convert from a SAN media server to a SAN client (continued)
Planning your deployment

Converting a SAN media server to a SAN client
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>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Zone the SAN</td>
<td>See “About zoning the SAN for Fibre Transport” on page 22.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Install HBAs</td>
<td>See “About HBAs for SAN clients and FT media servers” on page 23.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Select HBA ports</td>
<td>See “When selecting the HBA ports for SAN Client” on page 24.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Connect the fiber</td>
<td>See “About supported SAN configurations for SAN Client” on page 24.</td>
</tr>
</tbody>
</table>
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 24.

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 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 31.

<table>
<thead>
<tr>
<th>Zone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Fibre Transport zone</td>
<td>A Fibre Transport zone (or backup zone) should include only specific HBA ports of the hosts that use Fibre Transport, as follows:</td>
</tr>
<tr>
<td></td>
<td>■ Ports on the FT media server HBAs that connect to the SAN clients. These ports use the Symantec target mode driver.</td>
</tr>
<tr>
<td></td>
<td>See “About the target mode driver” on page 30.</td>
</tr>
<tr>
<td></td>
<td>■ 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.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>To promote multistream throughput, each SAN client should detect all target mode devices of the media server HBA ports in the zone.</td>
</tr>
</tbody>
</table>
### 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:

<table>
<thead>
<tr>
<th>Zone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>External storage zone</td>
<td>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.</td>
</tr>
</tbody>
</table>

#### 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 30.
- 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*. 

---

**Table 3-2** Fibre Channel zones (continued)
## 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:

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node port (N_Port) switched configuration</td>
<td>Connect the NetBackup media servers and SAN clients to a SAN switch as follows:</td>
</tr>
<tr>
<td></td>
<td>- Connect the HBA port on the NetBackup FT media server to a Fibre Channel switch port.</td>
</tr>
<tr>
<td></td>
<td>- Connect each SAN client HBA port to ports on the same Fibre Channel switch.</td>
</tr>
<tr>
<td></td>
<td>- Define the zones on the switch so that the client(s) and server(s) are in the same zone. Be aware of the following:</td>
</tr>
<tr>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td>Fibre Channel arbitrated loop (FC-AL) configuration</td>
<td>Use Fibre Channel arbitrated loop (FC-AL) to connect a NetBackup FT media server HBA port directly to a NetBackup SAN client HBA port.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> FC-AL hubs are not supported.</td>
</tr>
</tbody>
</table>
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 uninstalling 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 25.

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*

About uninstalling SAN Client and Fibre Transport

You cannot uninstall SAN client components; however, you can disable the SAN client FT service.

See “Disabling the SAN client service” on page 26.

On FT media servers, you convert a NetBackup FT media server to a regular NetBackup media server.

See “Removing media server FT services and drivers” on page 27.

Disabling the SAN client service

You can disable the Fibre Transport Service on a SAN client. If you do, the NetBackup client then does not function as a SAN client.

**To disable the NetBackup SAN client service on UNIX**

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

   ```bash
   /usr/openv/netbackup/bin/goodies/nbclient stop
   ```

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

   ```bash
   /usr/openv/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 reboot, run the following command:

   \textit{install\_path\\NetBackup\bin\bpclntcmd.exe -sanclient 0}

Removing media server FT services and drivers

You can remove the operating system startup scripts and the NetBackup nbhba driver from an FT media server. The process also removes the nbhba driver and exits nbhba mode.

The FT media server then does not support NetBackup Fibre Transport.

\textbf{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 remove media server FT services and drivers

1. Invoke the following script:
   ```
   /usr/openv/netbackup/bin/admincmd/nbftsrv_config -d
   ```

2. Verify that the following start-up 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 start-up scripts were not removed, delete them.
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 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>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Configure the FT media servers</td>
<td>See “Configuring an FT media server” on page 29.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Configure the SAN clients</td>
<td>See “Configuring SAN clients” on page 40.</td>
</tr>
<tr>
<td>Step 5</td>
<td>Configure FT properties</td>
<td>See “About configuring FT properties” on page 44.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
<th>Section</th>
</tr>
</thead>
</table>
| Step 1 | Read the conceptual information about configuring an FT media server | This information that may help you avoid serious problems.  
See “About Linux buffer size and concurrent pipe usage” on page 17.  
See “About HBAs for SAN clients and FT media servers” on page 23.  
See “About the target mode driver” on page 30.  
See “About nbhba mode and the ql2300_stub driver” on page 30.  
See “About FC attached devices” on page 31.  
See “How to identify the HBA ports” on page 31.  
See “About HBA port detection on Solaris” on page 33. |
| 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 34. |
| Step 4 | Configure the FT services | See “Configuring the media server FT services” on page 37. |

### 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 “Removing media server FT services and drivers” on page 27. 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/openv/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/openv/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 34.
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/openv/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 34.

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.
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/openv/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/openv/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/openv/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/openv/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 37.

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/openv/netbackup/bin/admincmd/nbhba -modify -wwn
   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 nbftsrvcfg 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/openv/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 \textit{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 \textit{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 \textit{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 \textit{y} in step 2, the FT services are started, and the target mode driver binds to the marked HBA ports.

6  If you answered \textit{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/openv/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

<table>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Configure firewalls on SAN clients</td>
<td>See “About configuring firewalls on SAN clients” on page 40.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Configure SAN client drivers</td>
<td>See “SAN client driver requirements” on page 41.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Configure the SAN client FT service</td>
<td>See “Configuring the SAN client FT service” on page 42.</td>
</tr>
</tbody>
</table>

### 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>
<thead>
<tr>
<th>Operating system</th>
<th>Driver requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIX</td>
<td>Client systems require the standard tape driver. The driver should work without modification.</td>
</tr>
</tbody>
</table>
| HP-UX            | Client systems require the sctl driver and pass-through device files.  
                  | For information about how to configure the driver, see the NetBackup Device Configuration Guide. |
| Linux            | Client systems require the SCSI Generic (sg) driver and pass-through device files.  
                  | For information about how to configure the driver, see the NetBackup Device Configuration Guide. |
| Solaris          | You must modify the `/kernel/drv/st.conf` file so that Solaris recognizes the FT devices on the NetBackup media servers.  
                  | For information about how to do so, see the NetBackup Device Configuration Guide. |
| 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 43.

See “Registering a SAN client cluster virtual name” on page 44.

**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 `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 59.

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 52.

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>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Install the NetBackup client software on each failover node</td>
<td>See the NetBackup Installation Guide for UNIX and Linux. See the NetBackup Installation Guide for Windows.</td>
</tr>
</tbody>
</table>
Table 5-5  Process to configure a SAN client in a cluster (continued)

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Configure the SAN client on each failover node</td>
<td>Ensure that the FT service is active on all of the failover nodes. See “About configuring firewalls on SAN clients” on page 40. See “SAN client driver requirements” on page 41. See “Configuring the SAN client FT service” on page 42.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Register the virtual node name with the EMM server</td>
<td>See “Registering a SAN client cluster virtual name” on page 44.</td>
</tr>
</tbody>
</table>

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 43.

To register a cluster virtual name

1. Add the virtual name to the EMM database. The following is the command syntax:
   
   ```
   nbemcmd –addhost –machinename virtual_name –machinetype app_cluster
   ```
   
   The following is the path to the nbemcmd 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:
   
   ```
   nbemcmd –updatehost –add_server_to_app_cluster –machinename client_name –clustername virtual_name
   ```

About configuring FT properties

You can configure Fibre Transport host properties for your NetBackup environment, as follows:

■ FT properties for media servers.
See “Configuring FT properties for media servers” on page 45.

■ FT properties for SAN clients.
See “About configuring FT properties for SAN clients” on page 45.

Configuring FT properties for media servers

You can configure the maximum number of FT connections that are allowed for a specific media server or for specific media servers.

To configure FT properties for media servers

1 In the NetBackup Administration Console, in the left pane, expand NetBackup Management > Host Properties > Media Servers.
2 In the right pane, double-click the name of the media server for which you want to configure properties.
   To configure properties for more than one media server, select the media servers and then on the Actions menu select Properties.
3 In the host properties dialog box, click Fibre Transport in the left pane.
4 Configure the properties.
   See “Fibre Transport properties” on page 48.

About configuring FT properties for SAN clients

You can configure SAN client FT properties as follows:

■ Global FT properties for all SAN clients.
See “Configuring global FT properties for SAN clients” on page 45.

■ Properties for a specific SAN client or specific SAN clients.
See “Configuring SAN Client FT properties in Host properties” on page 46.
   FT properties for SAN clients override the global FT properties for the SAN clients that are configured on the master server.

■ Properties for a specific SAN client.
See “Configuring SAN client FT usage preferences” on page 46.
   SAN client usage preferences override SAN client properties that are configured on the master server.

Configuring global FT properties for SAN clients

NetBackup master server global FT properties apply to all SAN clients unless you override them for specific clients.
To configure global FT properties for SAN clients

1. In the NetBackup Administration Console, in the left pane, expand NetBackup Management > Host Properties > Master Servers.
2. In the right pane, double-click the name of the master.
3. In the host properties dialog box, in the left pane, click Fibre Transport.
4. Configure the properties.

See “Fibre Transport properties” on page 48.

Configuring SAN Client FT properties in Host properties

SAN client FT properties override the global FT properties for the SAN clients.

To configure FT properties for SAN clients

1. In the NetBackup Administration Console, in the left pane, expand NetBackup Management > Host Properties > Clients.
2. In the right pane, double-click the name of the client for which you want to configure properties.
3. In the host properties dialog box, click Fibre Transport in the left pane.
4. Configure the properties.

See “Fibre Transport properties” on page 48.

Configuring SAN client FT usage preferences

SAN client usage preferences override the global FT properties for the SAN clients.

To configure FT usage preferences for a client 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 Fibre Transport Usage Preferences dialog box, configure the properties.

See “SAN client FT usage preferences” on page 47.

SAN client FT usage preferences

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

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferred</td>
<td>The Preferred property specifies to use an FT pipe if an FT device 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. If you select this option, also specify the wait period for backups and for restores. For the global property that is specified on the master server, the default is Preferred.</td>
</tr>
</tbody>
</table>
### Table 5-6: SAN client Fibre Transport usage preferences (continued)

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>The <strong>Always</strong> property specifies that NetBackup should always use an FT pipe for backups and restores of SAN clients. NetBackup waits until an FT device is available before it begins the operation. However, an FT device must be active and available. If no FT device exists, NetBackup uses the LAN. An FT device may not exist because none is active, none have been configured, or the SAN Client license expired.</td>
</tr>
<tr>
<td>Never</td>
<td>The <strong>Never</strong> 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. If you specify <strong>Never</strong> for the master server, Fibre Transport is disabled in the NetBackup environment. If you select <strong>Never</strong>, you can configure FT usage on a per-client basis. If you specify <strong>Never</strong> for a media server, Fibre Transport is disabled for the media server. If you specify <strong>Never</strong> for a SAN client, Fibre Transport is disabled for the client.</td>
</tr>
<tr>
<td>Use defaults from the master server configuration</td>
<td>This property applies to the client properties only. This property specifies that the client follow the properties as they are configured on the master server.</td>
</tr>
</tbody>
</table>

### Fibre Transport properties

The **Fibre Transport** master server properties apply to the SAN clients whose preferences have not been set explicitly.

The **Fibre Transport** properties apply only when the SAN Client license is installed.

The **Fibre Transport** media server property applies to the SAN clients for selected media servers.

The **Fibre Transport** client properties apply to the selected SAN clients. The defaults for clients are the property settings of the master server.

An FT device is the target mode driver on a NetBackup FT media server. An FT pipe is the logical connection that carries backup and restore data between an FT media server and a SAN client.

For more information about NetBackup Fibre Transport, see the *NetBackup SAN Client and Fibre Transport Guide*. 
The master server **Fibre Transport** dialog box contains the following properties.

### Table 5-7  Fibre Transport dialog box properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferred</td>
<td>The <strong>Preferred</strong> property specifies to use an FT pipe if an FT device 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. If you select this option, also specify the wait period for backups and for restores. For the global property that is specified on the master server, the default is <strong>Preferred</strong>.</td>
</tr>
<tr>
<td>Always</td>
<td>The <strong>Always</strong> property specifies that NetBackup should always use an FT pipe for backups and restores of SAN clients. NetBackup waits until an FT device is available before it begins the operation. However, an FT device must be active and available. If no FT device exists, NetBackup uses the LAN. An FT device may not exist because none is active, none have been configured, or the SAN Client license expired.</td>
</tr>
</tbody>
</table>
Table 5-7  Fibre Transport dialog box properties *(continued)*

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>The <strong>Never</strong> 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.</td>
</tr>
<tr>
<td></td>
<td>If you specify <strong>Never</strong> for the master server, Fibre Transport is disabled in the NetBackup environment. If you select <strong>Never</strong>, you can configure FT usage on a per-client basis.</td>
</tr>
<tr>
<td></td>
<td>If you specify <strong>Never</strong> for a media server, Fibre Transport is disabled for the media server.</td>
</tr>
<tr>
<td></td>
<td>If you specify <strong>Never</strong> for a SAN client, Fibre Transport is disabled for the client.</td>
</tr>
<tr>
<td>Maximum concurrent FT connections</td>
<td>This property applies to the media properties only.</td>
</tr>
<tr>
<td></td>
<td>This property specifies the number of FT connections to allow to a media server.</td>
</tr>
<tr>
<td></td>
<td>The default is four times the number of HBA target ports (maximum of 16).</td>
</tr>
<tr>
<td>Use defaults from the master server configuration</td>
<td>This property applies to the client properties only.</td>
</tr>
<tr>
<td></td>
<td>This property specifies that the client follow the properties as they are configured on the master server.</td>
</tr>
</tbody>
</table>
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 \texttt{nbftsrvr} service manages the server side of the FT pipe.
- The \texttt{nbfdrv64} service controls the target mode drivers on the media server.

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

These services do not appear in the \textbf{NetBackup Activity Monitor}; they do appear in the operating system process displays.
Warning: Do not use the UNIX \texttt{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 
   \textbf{Actions > Enable FT Services} or \textbf{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 \textbf{Action > Rescan SAN Client FT Devices}.
5. In the \textbf{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 FT service must be inactive.

See “Disabling the SAN client service” on page 26.

To delete a SAN client

1 In the NetBackup Administration Console, in the left pane, select Media and Device Management > Devices > SAN Clients.
2 Select a client in the right pane.
3 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.
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 58.

See “Troubleshooting - SAN client service does not start” on page 61.

See “Troubleshooting - Stopping and starting FT services” on page 61.

See “Troubleshooting - Media server FT device is offline” on page 58.

See “Troubleshooting - No FT devices discovered” on page 59.
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 59.

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 61.

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 62.

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 62.

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 51.

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>
<thead>
<tr>
<th>Originator ID</th>
<th>FT processes that use the ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>199</td>
<td>nbftsrvr and nbfdrv64. The media server Fibre Transport services.</td>
</tr>
<tr>
<td>200</td>
<td>nbftclnt. The client Fibre Transport service.</td>
</tr>
<tr>
<td>201</td>
<td>The FT Service Manager. Runs in the Enterprise Media Manager service.</td>
</tr>
</tbody>
</table>

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*. 
A
activity
    viewing BMR logs  62
Always property in SAN Client Usage Preferences  48

F
Fibre Transport
    restores  56
Fibre Transport host properties  48
FlashBackup restores
    over Fibre Transport  56

L
logging
    originator IDs  62
    viewing logs  62

M
maximum
    concurrent FT connections property  50

N
nbhba driver
    removing  27
Never property in SAN Client Usage Preferences  48

O
originator IDs  62

P
Preferred property in SAN Client Usage
    Preferences  47

R
removing  27
restores over Fibre Transport  56

S
SAN client usage preference
    Always  48
    Never  48
    Preferred  47
    Use defaults from the master server configuration  48

T
target mode driver  27

U
Use defaults from the master server configuration
    property  48, 50

V
viewing FT logs  62