

# NetBackup™ Snapshot Client Configuration



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## About the NetBackup™ Snapshot Client Configuration

This tech pdf (TECH51377) lists the operating systems, disk arrays, and other peripherals supported by NetBackup Snapshot Client. As a supplement to the *NetBackup Snapshot Client Administrator's Guide*, this document also provides configuration assistance for supported SAN/Fibre Channel devices, and assistance in setting up NetBackup for off-host data mover backups.

## Support information on NetBackup in a virtual environment

Support information on NetBackup in a virtual environment is available in a tech pdf titled :

For NetBackup 6.x:

<http://entsupport.symantec.com/docs/312604>

For NetBackup 7.x:

<http://entsupport.symantec.com/docs/340091>

## Matrix of client OS and Snapshot Client features

For listings of Snapshot Client features available for each client operating system and the snapshot methods available for each feature on each OS, see the following NetBackup Snapshot Client compatibility documents:

For NetBackup 6.x:

<http://entsupport.symantec.com/docs/279042>

For NetBackup 7.x:

<http://entsupport.symantec.com/docs/340298>

## New disk array methods in NetBackup 6.5

**Table 1-1** is an alphabetical listing of the disk array snapshot methods that were introduced in NetBackup 6.5.

For help configuring NetBackup policies for these arrays, see the "Configuration of snapshot methods for disk arrays" chapter in the *NetBackup 6.5 Snapshot Client Administrator's Guide*.

**Table 1-1** Disk array snapshot methods introduced in NetBackup 6.5

Snapshot method	Description and notes
EMC_CLARiiON_Snapview_Clone	For full-volume mirror snapshots with EMC CLARiiON disk arrays with Navisphere versions 6.19 to 6.24. (An EMC CLARiiON clone is actually a full-volume copy mirror, like a Symmetrix BCV.)
EMC_CLARiiON_SnapView_Snapshot	For space-optimized, copy-on-write snapshots with EMC CLARiiON disk arrays with Navisphere versions 6.19 to 6.24.
EMC_TimeFinder_Clone	For full-volume copy (clone) snapshots with EMC disk arrays with Solutions Enabler version 6.2, 6.3, 6.4, 6.5, 7.0 and 7.1. (Support for Solutions Enabler 7.x was added in NetBackup 6.5.6.)

**Table 1-1** Disk array snapshot methods introduced in NetBackup 6.5  
*(continued)*

Snapshot method	Description and notes
EMC_TimeFinder_Mirror	For full-volume copy (mirror) snapshots with EMC disk arrays with Solutions Enabler version 6.2, 6.3, 6.4, 6.5, 7.0 and 7.1. (Support for Solutions Enabler 7.x was added in NetBackup 6.5.6.)
EMC_TimeFinder_Snap	For space-optimized, copy-on-write snapshots with EMC disk arrays with Solutions Enabler version 6.2, 6.3, 6.4, 6.5, 7.0 and 7.1. (Support for Solutions Enabler 7.x was added in NetBackup 6.5.6.)
HP_EVA_Snapclone	For full-volume copy (clone) snapshots with Hewlett Packard EVA disk arrays with CommandView SSSU version 5.0, 6.0, 7.0, or 8.0.  <b>Note:</b> this is the only EVA disk array method that supports Instant Recovery.
HP_EVA_Snapshot	For space-optimized, fully allocated copy-on-write snapshots with Hewlett Packard EVA disk arrays with CommandView SSSU version 5.0, 6.0, 7.0, or 8.0.
HP_EVA_Vsnap	For space-optimized, on-demand copy-on-write snapshots with Hewlett Packard EVA disk arrays with CommandView SSSU version 5.0, 6.0, 7.0, or 8.0.

## New disk array methods in NetBackup 6.5.2

**Table 1-2** is an alphabetical listing of the disk array snapshot methods that were introduced in NetBackup 6.5.2.

For help configuring NetBackup with these arrays, see the *NetBackup 6.5.2 Documentation Updates* document, at <http://entsupport.symantec.com/docs/302438>

**Table 1-2** Disk array snapshot methods introduced in NetBackup 6.5.2

Snapshot method	Description and notes
Hitachi_CopyOnWrite	For space-optimized, copy-on-write snapshots with Hitachi SMS/WMS/AMS, USP/NSC, and USP-V/VM series of arrays.
Hitachi_ShadowImage (For Solaris, this snapshot method replaces the older ShadowImage method.)	For full-volume copy (mirror) snapshots with Hitachi SMS/WMS/AMS, USP/NSC, and USP-V/VM series of arrays.
IBM_DiskStorage_FlashCopy	For full-volume copy (clone) snapshots on IBM DS6000 and DS8000 series of arrays with DSCLI version 5.2.2.224 and later.

## New disk array method in NetBackup 6.5.4

**Table 1-3** lists the disk array snapshot method that was introduced in NetBackup 6.5.4.

For help configuring NetBackup with this array, see the *NetBackup 6.5.4 Documentation Updates* document, at <http://entsupport.symantec.com/docs/318350>

**Table 1-3** Disk array snapshot method introduced in NetBackup 6.5.4

Snapshot method	Description and notes
IBM_StorageManager_FlashCopy	For full-volume copy (clone) snapshots on the IBM DS4000 series of arrays (excluding 4100), with SMcli version 9.60.

## Media servers require server privileges for Instant Recovery backups

Any media server used in an Instant Recovery backup must have full server privileges. If the media server does not have server privileges, the snapshots created by each backup do not properly expire in the NetBackup catalog. Snapshots are correctly retained, storage unit backups occur if scheduled, and the snapshots are correctly rotated (all according to the policy settings). However, as older snapshots are deleted, the catalog entries for the deleted snapshots do not properly

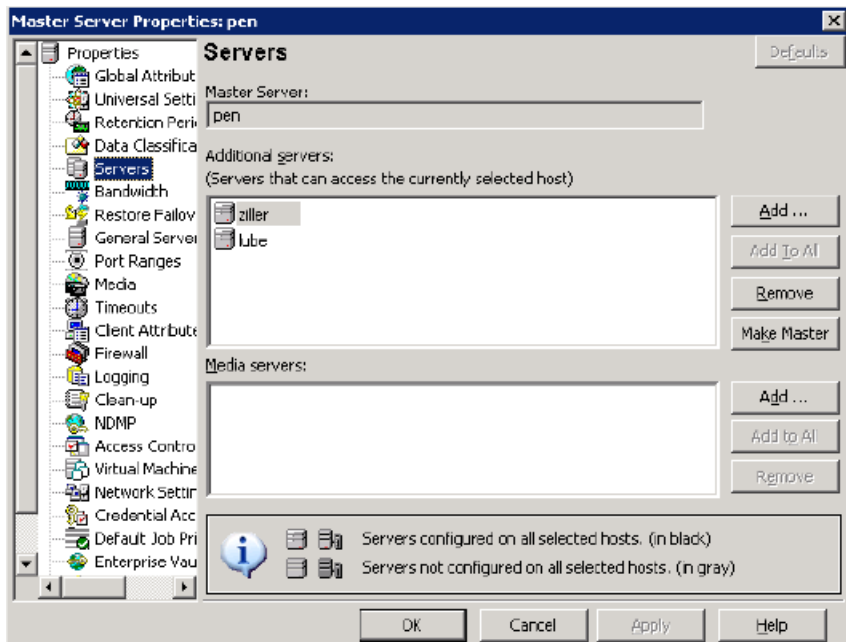
expire. It may therefore incorrectly appear as though older snapshots that have been deleted according to the rotation schedule can still be restored.

## Giving full server privileges to the media server for Instant Recovery

The media server used in an Instant Recovery backup must have the full server privileges. The following steps help you to add the privileges.

To give full server privileges to the media server

- 1 In the NetBackup Administration Console, click **Host Properties > Master Server > double click master server > Master Server Properties > Servers**.
- 2 Make sure that the media server is listed under **Additional servers**, not under **Media servers**.



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**Note:** on UNIX, this procedure places a `SERVER =` entry in the `bp.conf` file for each host listed under **Additional servers**. In the `bp.conf` file, the media server must not be designated by a `MEDIA_SERVER =` entry.

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## Removing the Instant Recovery feature from a policy

Use caution when de-selecting the Instant Recovery feature from a policy ("Retain snapshots for Instant Recovery"). Snapshot resources for Instant Recovery backups are managed differently from snapshot backups that do not use Instant Recovery.

If you de-select the Instant Recovery feature, you should also do one of the following:

- Expire any of the policy's existing snapshot images before you run the next backup. Expiring the snapshot images makes their snapshot resources available to non-Instant Recovery backups.

For instructions on searching for backup images, see the *NetBackup Administrator's Guide*. When searching for snapshot images, specify Copy 1 under **Copies**, and include the policy name and an appropriate date/time range. (In the NetBackup Administration Console catalog display, a snapshot image is listed as copy number 1.)

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**Caution:** If the policy schedule was configured for Instant Recovery "Snapshots only" (under Destination), no backup images were created on a storage unit. When you expire the snapshot images, you are expiring all backup data created by that particular schedule.

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- For non-Instant Recovery snapshots, allocate a new mirror or snapshot resource (if the snapshot method requires one), and configure the policy accordingly.

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**Caution:** If you do not take one of these actions, new backups from this policy may fail, and the policy's previous Instant Recovery backups may be invalidated.

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## About enabling the NetBackup client to execute VxVM commands on the CVM master node

The cluster functionality of Veritas Volume Manager (CVM) allows the hosts (nodes) in a cluster to simultaneously access and manage a set of disks under Volume Manager control. If one node fails, the other nodes can still access the shared disks.

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**Note:** The cluster functionality of Veritas Volume Manager requires a separate license.

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To back up a VxVM volume that is in a shared disk group on a CVM slave node, certain VxVM commands may have to be executed remotely on the CVM master node. Therefore, you must enable the NetBackup client to execute the commands on any node. (This requirement applies to the FlashSnap or vxvm snapshot methods only.)

You can use any of the following methods to enable the NetBackup client to execute the commands on any node.

- Preferred method: use the vxship command. vxship is available in Storage Foundations 5.0MP3 and later.

You can use vxship in either of the following modes:

- VxAT by means of the AT broker.

Note that the vxatd authentication service must be running. See the *NetBackup Security and Encryption Guide* for more information on vxatd.

- Standalone mode. You must run the vxadm command on each node of the cluster.

vxadm is available in Storage Foundations 5.0MP3 VRTSdcli or in Storage Foundations 4.x VRTSvmpro.

- If you do not have Storage Foundations 5.0MP3 or later, you can use the no-password version of SSH (instead of vxship). Verify that such use of SSH conforms with your local security policy.

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**Note:** Before you run a backup, make sure that one of these remote-access methods is configured.

---

## Enable authentication by means of VxAT and the AT broker

VxVM commands need to be executed to backup the VxVM volume. The NetBackup client should be enabled to execute the commands on any node. The following steps help you to enable the client using the VxAT and AT broker.

See [“Enable authentication by means of vxadm”](#) on page 11.

### To enable authentication by means of VxAT and the AT broker

- 1 Verify that an AT broker is configured on the network.

Enter the following:

```
/opt/VRTSat/bin/srvscan -x 20 -p 2821 -f /var/VRTSat/findrb.in
/opt/VRTSat/bin/findrb -i /var/VRTSat/findrb.in -o var/VRTSat/
findrb.out
```

The second command (findrb) lists the root brokers in output file findrb.out. The broker information is configured in /etc/default/csf\_resolv.conf during the VRTSxmh installation and configuration.

- 2 Create an AT account called *cluster\_admin@cluster\_id* on the AT broker.

Refer to the *Symantec Product Authentication Service Administrator's Guide* for instructions on how to create a new AT account on an AT broker.

- 3 Configure DCLI on all nodes in the CVM cluster to use this AT account.

To do so, run the following command on each node to configure DCLI to use this AT account:

```
vxadm --broker broker --user user_name security setup
```

where is .

For example:

```
vea_agent@vea_domain@vxsssparc8.veritas.com.vx
```

where *vea\_agent* is the username, *vea\_domain@vxsssparc8.veritas.com* is the domain name, and *vx* is the domain type.

- 4 Grant administrator privilege to the cluster administrator on all the hosts in the cluster.

To do so, run the following command on each node:

```
vxadm security addadmin user=user_name
```

where is *username@domainname.domaintype*.

- 5 Create a `.command` file that specifies the commands that vxship is allowed to run. See [Specify the VxVM commands that vxship is allowed to run](#).

## Enable authentication by means of vxadm

You can enable the NetBackup client through VxAT and the AT broker or vxadm. The following steps help you to enable the client using vxadm.

See [“Enable authentication by means of VxAT and the AT broker”](#) on page 10.

**To enable authentication by means of vxadm**

- 1 Run the following command on each node of the cluster, including the master node:

```
vxadm -h host_name --user root --password password security login
```

For example: if the cluster has three nodes (A, B, and C), run the following commands:

On node A:

```
vxadm -h host_B --user user_name --password password security login  
vxadm -h host_C --user user_name --password password security login
```

On node B:

```
vxadm -h host_A --user user_name --password password security login  
vxadm -h host_C --user user_name --password password security login
```

On node C:

```
vxadm -h host_A --user user_name --password password security login  
vxadm -h host_B --user user_name --password password security login
```

- 2 Create a `.command` file that specifies the commands that vxship is allowed to run.

See [Specify the VxVM commands that vxship is allowed to run](#).

## Specify the VxVM commands that vxship is allowed to run

nodes of the cluster are enabled to run VxVM commands by means of vxship, you must specify which commands they are allowed to run.

## To specify the VxVM commands that vxship is allowed to run

- 1 Create the following file on each node of the cluster:

```
/etc/vx/dcli/security/.command
```

The name of the file must be `.command`. This file will be used to specify which commands vxship can run remotely on the nodes of the cluster. If a VxVM command is not listed in the `.command` file, vxship cannot run it.

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**Note:** The `/etc/vx/dcli/security/` path is correct for Storage Foundation 5.0 MP3. If you use a different version of Storage Foundation, obtain the correct path by contacting Symantec support.

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- 2 For NetBackup Snapshot Client, include the following commands in the `.command` file:

```
/usr/sbin/vxassist
/usr/sbin/vxdg
/usr/sbin/vxedit
/usr/sbin/vxprint
/usr/sbin/vxsnap
/usr/sbin/vxvol
/usr/lib/vxvm/type/fsgen/vxvol
/usr/lib/vxvm/type/gen/vxvol
```

## Test the vxship configuration

Before you back up a cluster node, run the vxship command on all the cluster nodes to verify that vxship is configured properly.

For example, to verify that cluster host A can use vxship to run VxVM commands on host B, run the following vxship command on host A:

```
/etc/vx/bin/vxship -h host_B vxprint -g disk_group
```

where `disk_group` specifies a shared disk group that contains a VxVM volume that NetBackup is configured to back up. If the vxship command is successful, the vxprint command lists disk group information for host B. The `.command` file on host B allows host A to use vxship to run the vxprint command on host B. The vxship command is authenticated on host B.

## Supported database agents and cluster environments

This section points to sources of further information on the database agents and cluster environments supported by Snapshot Client.

### Database agents

For a list of snapshot methods supported for particular database agents, see the NetBackup Database Agent Compatibility document.

For NetBackup 6.x:

<http://entsupport.symantec.com/docs/279042>

For NetBackup 7.x:

<http://entsupport.symantec.com/docs/337049>

### Cluster environments

For a list of cluster system versions that Snapshot Client supports, see the NetBackup Cluster Compatibility document.

For NetBackup 6.x:

<http://entsupport.symantec.com/docs/278991>

For NetBackup 7.x:

<http://entsupport.symantec.com/docs/337053>

## Note on vxvm and FlashSnap methods (Windows)

For the vxvm or FlashSnap snapshot methods, note that the FlashSnap option of Veritas Volume Manager for Windows (or of Storage Foundation for Windows) must be licensed.

## Supported platforms for NetBackup 7.x

The tables in this section list the NetBackup client hardware types and operating systems that NetBackup 7.x supports for Snapshot Client.

For listings of Snapshot Client features available for each client operating system and the snapshot methods available for each feature on each OS, see the following Snapshot Client compatibility document:

**NetBackup 6.x:**

<http://entsupport.symantec.com/docs/279042>

**NetBackup 7.x:**

<http://entsupport.symantec.com/docs/340298>

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**Note:** Unless otherwise stated in this section, the master and media servers supported by Snapshot Client are the same as those supported by NetBackup, as listed in the *NetBackup Release Notes*. For particular OS versions, refer to the *NetBackup Release Notes*.

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## Local and alternate client backup

For a local backup and for alternate client off-host backup, Snapshot Client supports the following client hardware types and operating systems. The information in this table also applies to Instant Recovery and FlashBackup.

The alternate client must be running the same OS as the principal client.

**Table 1-4** NetBackup client platforms supported

Hardware type	OS	Usage limitations
HP PA-RISC	HP-UX	The new disk array methods in NetBackup 6.5 do not support clients on HP.
HP IA64	HP-UX	The new disk array methods in NetBackup 6.5 do not support clients on HP.
IBM	AIX	The new disk array methods in NetBackup 6.5 do not support clients on AIX.
Intel x86	RHEL 4, 5	For local backup, Instant Recovery, and alternate client off-host backup, only the VxFS file system is supported. This restriction does not apply to FlashBackup or FlashBackup-Windows.

**Table 1-4** NetBackup client platforms supported (*continued*)

Hardware type	OS	Usage limitations
Intel Pentium	Windows 2003, 2008, 2008 R2	To back up Windows 2000 client data configured in Veritas Volume Manager volumes, Storage Foundation for Windows 4.1 or later or Volume Manager 3.1 HF03 or later is required. For Windows 2003 clients, Storage Foundation for Windows 4.0 or later is required.
Intel Itanium	Windows 2003	For Instant Recovery or alternate client off-host backup, Intel Itanium clients are not supported.  For NetBackup clients on Itanium machines, the only snapshot methods currently supported are VSS and VSP, for local backup (not off-host).
SPARC	Solaris	None.

## Master server platforms for FlashBackup-Windows clients

For NetBackup 6.5.4 and 7.0, there are no restrictions as to supported master server platforms for FlashBackup-Windows. Any master server platform that NetBackup supports for ordinary backups (without FlashBackup) is also supported for FlashBackup-Windows.

For releases earlier than 6.5.4, the following table shows which NetBackup master server platforms are supported for FlashBackup-Windows clients. "MP" means NetBackup maintenance pack.

**Table 1-5** Master server platforms supported for FlashBackup-Windows clients

Master server hardware type	Master server OS	NetBackup release supporting this platform
HP PA-RISC	HP	5.0 MP4 and later
IBM	AIX	5.0 MP2 and later
Intel x86	RHEL 4, SLES 9	6.0 MP5 and later
Intel Pentium	Windows 2000, 2003	5.0 and later



**Table 1-5** Master server platforms supported for FlashBackup-Windows clients (continued)

Master server hardware type	Master server OS	NetBackup release supporting this platform
SPARC	Solaris	5.0 MP1 and later

## Block level incremental backup

For block level incremental backups using an Oracle or DB2 policy, Snapshot Client supports the following client hardware types and operating systems.

NetBackup for Oracle or DB2 database software is required in order to use the block level incremental feature of Snapshot Client.

**Table 1-6** NetBackup client platforms supported for BLIB

Hardware type	OS
HP PA-RISC	HP-UX
IBM	AIX
Intel x86	RHEL 4, SLES 9
SPARC	Solaris

## Off-host backup data mover: Media Server, Third-Party Copy

For the NetBackup Media Server and Third-Party Copy Device off-host backup methods, Snapshot Client supports the following client platforms.

The following restrictions apply to media server platform support (as opposed to master server):

- If the media server is on Linux, Snapshot Client supports the NetBackup Media Server off-host data mover method only (not Third-Party Copy).
- Windows media servers are not supported.

**Table 1-7** NetBackup client platforms supported for NetBackupMedia Server and Third-Party Copy Device methods

Hardware type	OS
HP PA-RISC	HP-UX
IBM	AIX <sup>a</sup>

**Table 1-7** NetBackup client platforms supported for NetBackupMedia Server and Third-Party Copy Device methods (*continued*)

Hardware type	OS
Intel x86  (See following note on Media Server and Volume Manager)	RHEL 4 <sup>b</sup>
SPARC	Solaris

a. Client requires VxFS 4.0 MP2.

b. Only the VxFS file system is supported.

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**Note:** For HP-UX 11.31 IA/PA, mapping support through VxMS is not there if a machine is configured with new persistent Device Special File (DSF) naming scheme.

Example of DSF naming scheme is `/dev/disk` for block device and `/dev/rdisk` for raw device files.

However, it is supported if machine is configured with Legacy device special file naming convention.

Example of legacy DSF naming scheme is `/dev/dsk` for block device and `/dev/rdsk` for raw device files.

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## Note on NetBackup Media Server and Volume Manager

To back up Veritas Volume Manager volumes on Linux clients by means of the NetBackup Media Server data mover method, your Storage Foundations Volume Manager must be at version 4.1 MP4RP2 or later. If you use an earlier version of Volume Manager, such as 4.1 MP4, the backup fails.

## Off-host backup data mover: Network Attached Storage

For the Network Attached Storage off-host backup method (required for the NAS\_Snapshot method), Snapshot Client supports the hardware types and operating systems listed in [Table 1-8](#).

This table shows the platforms on which NetBackup software is installed. The client data must reside on a NAS host and be mounted on a NetBackup client by means of NFS on UNIX or CIFS on Windows.

More information on supported NAS hosts is available.

[NAS\\_Snapshot method: supported NAS platforms](#)

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**Note:** To use the NetBackup Instant Recovery feature for single file restore, a NetApp host must have the NetApp SnapRestore license.

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For master server and media server platforms, Snapshot Client supports only the hardware types and operating systems listed in this table.

**Table 1-8** NetBackup client platforms supported for Network Attached Storage

Hardware type	OS
Intel Pentium	Windows 2000, 2003
SPARC	Solaris
HP PA-RISC	HP-UX
Intel x86	RHEL 4SLES 9
HP PA-RISC	HP-UX
IBM	AIX
IBM	AIX

## NAS\_Snapshot method: supported NAS platforms

The NAS\_Snapshot method of Snapshot Client supports the following NAS hardware types and operating systems.

**Table 1-9** NAS platforms supported for NAS\_Snapshot

Hardware type	OS
Network Appliance filers	Data ONTAP version 6.5.1 and later
Network Appliance NearStore	Data ONTAP version 6.5.1 and later
ONStor NAS Gateway	Software version 1.2.2 and later

## Notes on NAS\_Snapshot with Network Appliance

The following notes apply to the NAS\_Snapshot method, and to SnapVault:

- For NetBackup releases prior to 6.0: When configuring NAS volumes on the filer for NetBackup Windows clients, set the volume language type to `en_US.UTF-8` (this is the UNICODE filer language). The default is `POSIX`, which is not appropriate for Windows. If the volumes are not configured to `en_US.UTF-8`, subdirectory and file names may not appear at all when browsing NetBackup snapshots for restore.  
If the NAS volume was not configured with the correct language before the Windows client NAS\_Snapshot was created, set the volume's language to `en_US.UTF-8` and then reboot the filer to make the change effective. When browsing for restore from the next NAS\_Snapshot, directories and file names should display correctly.
- NetBackup does not restore to the root volume of a Network Appliance filer by means of file promotion (called "SnapRestore" by NetApp), because SnapRestore causes the filer to reboot, thus disrupting service. Instead, you can "snaprestore" to a root volume using the NetApp SnapRestore command line tools.
- Currently, the Network Appliance Data ONTAP operating system limits snapshots to 255 per volume. Note, however, that NetBackup Snapshot Client controls the maximum number of NetBackup snapshots on a per client/per policy basis, using the policy's parameter. When the configured maximum is reached, the oldest snapshot is deleted prior to creating the next snapshot.
- Because the Data ONTAP operating system limits total snapshots to 255 per volume, consider disabling any unneeded scheduled Data ONTAP snapshots (configured with the `snap sched` command) when using the NAS\_Snapshot feature on the same volume.
- If there are open references to a file (such as from snapshots or Oracle open file handles), a restore of the file cannot be done by file promotion (NetApp "SnapRestore"). As a result, restoring the file may take longer.
- Removing a file from the primary file system (such as with the UNIX `rm` command) does not increase disk space if the file's blocks are referenced by one or more snapshots. The snapshots that refer to the file must be deleted before the file can actually be removed.
- The NAS\_Snapshot method is a copy-on-write type, which requires additional disk space for storing changes made to the client's data during the life of the snapshot. In Data ONTAP, this space is called `snap reserve`, and is configured on the NAS filer (not through NetBackup). The amount of space needed for `snap reserve` depends upon how much data is changed during the lifetime of

the snapshot: the more data that changes, the more snap reserve space required. For Data ONTAP, the default snap reserve is 20% of the file system or volume. Network Appliance recommends 10% for large ATA disk drives. A NAS\_Snapshot fails if the snap reserve space is insufficient for the data change activity.

## SnapVault: platforms and licenses

For backups to SnapVault storage units, NetBackup supports Network Appliance NearStore as the SnapVault secondary storage system, running Data ONTAP version 7.1 through 7.2.x.

This table lists the NAS vendor licenses required on the primary NAS filer and SnapVault secondary system.

**Table 1-10** NAS licenses and settings for SnapVault

NAS vendor	On primary NAS filer	On SnapVault secondary system	Notes
Network Appliance	License: ■ SnapRestore (Snapshot), Snapvault_primary (add sv_primary) Settings/options: ■ ndmpd on ■ snapvault.enable on ■ snapvault.access: host=sv_secondary	License: ■ Snapvault_secondary (add sv_secondary) Settings/options: ■ snapvault.enable on ■ snapvault.access: host=sv_primary1, sv_primary2	Cannot license the same platform as a primary and secondary

## SnapVault notes and requirements

The following requirements and configuration notes apply to backups to SnapVault storage units.

- The SnapVault secondary system must have the NetApp NAS software license.
- The primary NAS filer and SnapVault secondary system must be licensed as primary and secondary through Network Appliance. A single host cannot have both licenses.
- The SnapVault subvolumes must be shared on the NAS filer by means of NFS on UNIX or CIFS on Windows.

- The primary filer must have access to the SnapVault secondary and the SnapVault secondary must have access to the primary. You can use the following OnTap command on the primary and secondary:

```
options snapvault.access host=hostname
```

Enter this command on the primary and specify the secondary as the . On the secondary, specify the primary as the .

If this access is not granted prior to running a SnapVault job, the job fails with status 156 and the following may be seen in the

`/usr/openv/netbackup/logs/bpfiis` log on the NetBackup client:

```
13:43:20.038 [13387] <2> onlfi_vfms_logf: INF - filer1: NDMP_LOG_ERROR 0  
service not enabled on the source
```

```
13:43:20.056 [13387] <2> onlfi_vfms_logf: INF - NDMP  
snapvault backup error = 0x20500004 (NDMP_SV_RPL_NEGOTIATION)
```

```
13:43:20.056 [13387] <2> onlfi_vfms_logf: INF - NAS_Snapshot_freeze_commit:  
snapvault backup status: NDMP internal error
```

- The SnapVault feature supports subvolume-to-subvolume transfers only. Subvolumes are Qtrees in Network Appliance Data ONTAP terminology. For a description of Qtrees, refer to the *ONTAP System Administration Guide*.
- The Windows Server Appliance Kit (SAK) is not supported.
- Open Systems SnapVault (OSSV) is not supported.
- Network Appliance does not support SnapVault destination WORM volumes. The NetBackup interface informs the administrator that WORM volumes exist on the secondary system and the WORM attribute will be displayed for the individual volumes. WORM destination volumes should not be used until Network Appliance resolves the SnapVault WORM issues.

Additional notes are also available.

[Notes on NAS\\_Snapshot with Network Appliance.](#)

## Supported peripherals and SAN equipment

The following table lists the peripherals and SAN equipment that NetBackup Snapshot Client supports.

For the latest drivers, updates, and advisories, refer to the device vendor's website.

**Table 1-11** Supported devices

Component type	Vendor supported
Host Bus Adapters (HBAs)	<p>For Solaris and Linux servers:</p> <ul style="list-style-type: none"> <li>■ Emulex</li> <li>■ JNI (for legacy disk array methods only)</li> <li>■ QLogic</li> </ul> <p>For HP servers (for legacy disk array methods only):</p> <ul style="list-style-type: none"> <li>■ HP</li> </ul> <p>For AIX servers (for legacy disk array methods only):</p> <ul style="list-style-type: none"> <li>■ Cambex</li> <li>■ IBM</li> <li>■ JNI</li> </ul> <p>For Windows:</p> <ul style="list-style-type: none"> <li>■ Emulex</li> <li>■ Qlogic</li> </ul> <p><b>Note:</b> Contact your hardware sales representative for the latest firmware level for these devices and for compatibility with SAN equipment.</p>
Tape libraries and tape drives	Any tape libraries and tape drives supported by NetBackup SSO option.
Disks and disk arrays	<ul style="list-style-type: none"> <li>■ <b>For legacy disk array methods::</b> any disk or disk array that supports serialization or SCSI Inquiry Page Code 83 is supported. This includes disk arrays such as EMC Symmetrix and DMX, Hitachi 77xx/92xx/95xx/99xx and TagmaStore and AMS500/1000, HP XP 128/256/512/1024, and SUN T3.</li> <li>■ <b>For new disk array methods in NetBackup 6.5:</b> EMC CLARiiON CX and CX3, EMC DMX, and HP EVA 4000 and 8000.</li> <li>■ <b>For new disk array methods in NetBackup 6.5.2:</b> Hitachi SMS/WMS/AMS, USP/NSC, and USP-V/VM series of arrays; IBM DS6000 and DS8000 series of arrays.</li> </ul>
Disk drivers (for dynamic multipathing and load leveling)	<ul style="list-style-type: none"> <li>■ EMC PowerPath</li> <li>■ Hitachi HDLM (for legacy disk array methods only)</li> </ul>

**Table 1-11** Supported devices (*continued*)

Component type	Vendor supported
Switches	Any SAN compliant Fibre Channel switch is supported. Examples are: <ul style="list-style-type: none"> <li>■ Brocade</li> <li>■ Cisco</li> <li>■ Inrange</li> <li>■ McData</li> <li>■ QLogic</li> </ul>
Third party copy devices	<ul style="list-style-type: none"> <li>■ ADIC (standalone and in own libraries)</li> <li>■ ATTO (standalone and in ATL libraries)</li> <li>■ Crossroads/Compaq</li> <li>■ Hitachi/HP/SUN ServerFree (in disk array)</li> </ul> <p><b>Note:</b> Contact your hardware sales representative for the latest firmware level.</p> <p><b>Note:</b> These devices are supported as standalone devices or as part of another system such as a tape library.</p>

---

**Note:** For each component type in this table (HBAs, tape libraries, etc.), NetBackup Snapshot Client supports all models currently supported by each vendor listed above.

---

## Test configurations for NetBackup 5.x and 6.0

The following table lists the components used in NetBackup 5.x and 6.0 test configurations.

Information is also available on NetBackup 6.5 test environments with disk arrays.

See [“Test configurations for new disk array methods in NetBackup 6.5 with UNIX clients”](#) on page 26..



**Table 1-12** Components used in NetBackup 5.x and 6.0 test configurations

Component type	Vendor
Host Bus Adapters (HBAs)	<p>For Solaris servers:</p> <ul style="list-style-type: none"> <li>■ Emulex: LP7000E, LP8000, LP9002</li> <li>■ QLogic: QLA2300, QLA2310, QLA2340</li> </ul> <p>For HP servers:</p> <ul style="list-style-type: none"> <li>■ HP: A5158A</li> </ul>
Tape drives	<ul style="list-style-type: none"> <li>■ HP ULTRIUM</li> <li>■ IBM ULTRIUM</li> <li>■ LTO-2</li> <li>■ Quantum DLT 7000</li> <li>■ Quantum DLT 8000</li> <li>■ Quantum SDLT320</li> <li>■ SONY SDX-500C</li> <li>■ SONY SDX-300C</li> <li>■ SONY SDX-700C</li> <li>■ StorageTek T9940A</li> <li>■ StorageTek 9840, 9840A, 9840B</li> </ul>
Fibre-attached tape libraries	<ul style="list-style-type: none"> <li>■ ADIC Scalar 100</li> <li>■ ATL P1000</li> <li>■ ATL P7000</li> <li>■ Overland Storage Neo Series</li> <li>■ Spectra Logic 2000</li> <li>■ Spectra Logic 12000</li> <li>■ Spectra Logic 20000</li> </ul> <p><b>Note:</b> SCSI-attached tape libraries are not directly involved with extended copy operation so are not listed (but all are supported).</p>
Fibre-attached disks and disk arrays	<ul style="list-style-type: none"> <li>■ EMC Symmetrix</li> <li>■ EMC DMX</li> <li>■ Hitachi 9900, 9900V, TagmaStore USP</li> <li>■ HP XP 256, XP 512</li> <li>■ Seagate ST336605FC</li> <li>■ SUN T3</li> </ul>

**Table 1-12** Components used in NetBackup 5.x and 6.0 test configurations  
*(continued)*

Component type	Vendor
Switches	<ul style="list-style-type: none"> <li>■ Brocade: Silkworm 2400, 2800</li> <li>■ Inrange: FC-90000</li> <li>■ McData: ED-6064</li> <li>■ QLogic: SanBox2 16</li> </ul>
Third Party Copy Devices in Fibre Channel routers, tape libraries, disk arrays	<ul style="list-style-type: none"> <li>■ ADIC/Pathlight (standalone and in own libraries)                      San Gateway - Firmware: 0343.13                      5100/5101 - Firmware: 0410.09</li> <li>■ ATTO (standalone and in ATL libraries)                      4500 - Firmware: 005E</li> <li>■ Crossroads/Compaq                      6000 - Firmware: 5.6.19                      10000 - Firmware: 5.6.19</li> <li>■ Hitachi Data Systems                      9900, 9900V, TagmaStore USP/NSC eCopy (ServerFree)</li> </ul>

## Test configurations for new disk array methods in NetBackup 6.5 with UNIX clients

This section lists hardware and software components used in NetBackup 6.5 disk array test configurations with UNIX clients.

### EMC CLARiiON

The dot version (.xx) of the CLI, Agent and FLARE software versions must match. For example, if you use Navisphere Secure CLI 6.24, the Navisphere Agent should be 6.24 and the version of FLARE should be either 2.24 for the CX series or 3.24 for the CX3 series.

**Table 1-13** EMC CLARiiON CX500

Software	Version
Fibre Channel HBA	QLogic 2460 Emulex LP9802
Navisphere Secure CLI	6.19 to 6.24 (Versions of Navisphere CLI earlier than 6.19 are not supported.)

**Table 1-13** EMC CLARiiON CX500 (continued)

Software	Version
Navisphere Agent	6.19 to 6.24
CLARiiON SnapView software	N/A
CLARiiON FLARE operating environment	2.19 to 2.24 (CX series) 3.19 to 3.24 (CX3 series)
EMC PowerPath	5.0 (Solaris only; PowerPath is not supported on Linux)

**Note:** To use an EMC CLARiiON disk array with Volume Shadow Copy Service, contact EMC Corporation for the VSS provider, for other required software, and for the supported arrays. EMC supplies this software as a bundle, to ensure that the software components are at the right level and function correctly.

## EMC Symmetrix DMX

The following table lists the software and version for EMC DMX 800

**Table 1-14** EMC DMX 800

Software	Version
Fibre Channel HBA	QLogic 2460 Emulex LP9802
EMC Solutions Enabler	6.2, 6.3, 6.4, or 6.5 For Windows: EMC VSS provider version 3.2.1 software kit, which contains Solutions Enabler 6.4.1.0-827
EMC PowerPath	5.0 (Solaris only; PowerPath is not supported on Linux)

**Note:** To use an EMC Symmetrix disk array with Volume Shadow Copy Service, contact EMC Corporation for the required software and for the supported arrays. EMC supplies this software as a bundle, to ensure that the software components are at the right level and function correctly.

## HP EVA

The following table lists the software and version information for HP EVA 4000.

**Table 1-15** HP EVA 4000

Software	Version
Fibre Channel HBA	QLogic 2460 Emulex LP9802
SSSU for HP StorageWorks Command View EVA (CLI)	5.0 for Command View 5.0 6.0 for Command View 6.0

**Note:** To use an HP EVA disk array with Volume Shadow Copy Service, contact HP Corporation for the required software and for the supported arrays. HP supplies this software as a bundle, to ensure that the software components are at the right level and function correctly.

# Test configurations for new disk array methods in NetBackup 6.5 with Windows clients and VSS

This section lists hardware and software components used in NetBackup 6.5 disk array test configurations with Windows clients, using the VSS method with the Snapshot Client Instant Recovery feature.

The following tables indicate the array technology that was used with the VSS provider for each tested array. [Table 1-16](#), for instance, lists the components used with the VSS provider for EMC CLARiiON with snapview clone technology.

In the following tables, the component version applies to both the NetBackup primary (local) client and the alternate client, unless otherwise noted.

## EMC CLARiiON

The components used with the VSS provider for EMC CLARiiON with the snapview clone technology are listed in the following table.

**Table 1-16** EMC CLARiiON snapview clone

Component (software or hardware)	Model and/or version
Microsoft Windows Server 2003 R2 Enterprise Edition	SP1 (on local client) and with hotfix KB913648 and KB916048 (on alternate client).
Fibre Channel HBA	Qlogic QLA2340 with Storport driver 9.0.0.2 (local client) and 9.1.2.19 (alternate client)
EMC CLARiiON VSS Provider	1.5.0.3.5
NaviCLI/Agent	6.19.0.4.14
CLARiiON FLARE operating environment	02.24.500.5.006
EMC PowerPath	4.5.1

## EMC TimeFinder

The components for EMC TimeFinder snap are listed in the following table.

**Table 1-17** EMC TimeFinder snap

Component (software or hardware)	Model and/or version
Microsoft Windows Server 2003 Enterprise Edition	SP1 with hotfix KB913648, KB911062 and KB916048.
Fibre Channel HBA	Emulex LP9002 with Storport driver 1.30A6 (local client); Emulex LP9802 with Storport driver 1.11A7 (alternate client)
EMC VSS Hardware Provider	3.2.1.0
EMC SE (Solutions Enabler)	6.4.1

**Table 1-17** EMC TimeFinder snap (*continued*)

Component (software or hardware)	Model and/or version
EMC PowerPath	4.5.1

## HP EVA

The components for HP EVA Snapclone are listed in the following table.

**Table 1-18** HP EVA Snapclone

Component (software or hardware)	Model and/or version
Microsoft Windows Server 2003 Enterprise Edition	SP1 with hotfix KB913648 and KB916048
Fibre Channel HBA	Emulex LP9802 with Storport driver 1.20A7
HP EVA VSS Hardware Provider	4.00.01.00
StorageWorks Command View EVA	5.0
HP MPIO DSM	v2.00.01
SSSU	5.0

## Test configurations for new disk array methods in NetBackup 6.5.2

This section lists software components used in NetBackup 6.5.2 disk array test configurations with UNIX clients.

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**Note:** Windows clients were not supported with these arrays in the 6.5.2 release.

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## IBM DS6000

The following table lists the IBM DS6000 software components

**Table 1-19** IBM DS6000 software components

Software	Version
Microcode release bundle	6.2.2.78 Bundle contents: DS6000 Microcode: 5.2.2.374 DS6000 Storage Manager: 5.2.200.1650 DSCLI: 5.2.2.224 and 5.2.2.37

## Hitachi AMS, USP, and USP-V

The following table lists the software components for Hitachi AMS, USP, and USP-V.

**Table 1-20** Hitachi AMS, USP, and USP-V software components

Software	Version
RMLIB version	01-12-03/04

# Test configurations for new disk array method in NetBackup 6.5.4

This section lists software components used in NetBackup 6.5.4 disk array test configurations with UNIX clients.

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**Note:** For the DS4000 array, NetBackup 6.5.4 supports AIX clients only.

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## IBM DS4000

The following table lists the software components and the version for IBM DS4000.

**Table 1-21** IBM DS4000 software components

Software	Version
Controller	Firmware Version: 06.60.02.00 Appware Version: 06.60.02.00 Bootware Version: 06.60.02.00 NVSRAM Version: N1814D470R960V03 Board ID: 3992
Storage Manager	SANtricity Storage Manager: 09.60
Command Line Interface	SMclient : 9.60.6502.0 SMagent : 9.16.6505.0 SMruntime : 9.16.6502.0 SMutil : 9.16.6505.0

## Legacy disk array snapshot methods

The legacy disk array snapshot methods are TimeFinder (for EMC), ShadowImage (for Hitachi), and BusinessCopy (for HP). Each of these array-specific snapshot methods must be used for its own disk-array type. These methods are currently supported for Solaris, HP-UX, Linux, and AIX clients (except as noted).

More information is available on these legacy methods.

See [“Configuration of legacy snapshot methods for disk arrays”](#) on page 34.

**Table 1-22** Snapshot methods for particular arrays

To back up the following:	Use this snapshot method:
EMC Symmetrix/DMX disk arrays	TimeFinder (Supports only EMC BCV mirrors)
Hitachi 700/900/900/900V, TagmaStore USP/NSC, and AMS500/1000 disk arrays	ShadowImage



**Table 1-22** Snapshot methods for particular arrays (*continued*)

To back up the following:	Use this snapshot method:
HP XP 128/256/512/1024 disk arrays	BusinessCopy (Not supported on Linux or AIX clients)

These snapshot methods are not interchangeable: for example, selecting TimeFinder to back up an Hitachi array will cause the backup to fail.

## Snapshot dependencies

Note the following libraries required for each disk array snapshot method.

**Table 1-23** Disk array snapshot dependencies

Snapshot method	Required library and version
TimeFinder (EMC)	EMC Solutions Enabler 6.2, 6.3, 6.4, or 6.5.
ShadowImage (Hitachi)	RAID Manager Library version 01-03-03/01 or higher. <b>Note:</b> The RAID Manager Library is installed on the host but the ShadowImage firmware is installed on the HDS array—NOT on the host where NetBackup is installed.
BusinessCopy (HP)	RAID Manager Library version 01-03-03/01 or higher. <b>Note:</b> The RAID Manager Library is installed on the host but the BusinessCopy firmware is installed on the HP arrays—NOT on the host where NetBackup is installed.

## Disk arrays and the VSS snapshot method for NetBackup 5.1 and 6.0

The following table lists the disk arrays supported by the VSS snapshot method in NetBackup 5.1 and 6.0. The VSS method in NetBackup 5.1 and 6.0 is for Windows 2003 clients only and supports alternate client backup on these arrays (but not Instant Recovery). Contact the array manufacturer for the most up-to-date list of models that support the VSS providers listed below.

**Table 1-24** Disk arrays supported for the VSS snapshot method (no Instant Recovery)

Disk vendor	Disk models and providers tested	Usage restrictions
Hitachi	7700, 9200, 9500, 9970, 9900, 9900V, and TagmaStore USP/NSC, with RM Shadow Copy Provider 01-02-03/05	None.
EMC	CLARiiON CX series, with VSS Provider version 1.3.0.1.6	Requires NetBackup 6.0 MP2 or later.
HP	StorageWorks 3000/4000/5000/6000/8000 Enterprise Virtual Array (EVA), with EVA VSS Hardware Provider version 3.1	Requires NetBackup 6.0 MP2 or later.
IBM	DS6800/DS8000, with IBM TotalStorage Hardware Provider for VSS version 2.4.1.0808	Requires NetBackup 6.0 MP2 or later.  Supported only for backups that do not use the Instant Recovery feature.
Engenio	26xx/28xx with SmVssProvider version 09.16.03	Requires NetBackup 6.0 MP2 or later.  Supported only for backups that do not use the Instant Recovery feature.

## Configuration of legacy snapshot methods for disk arrays

See the *NetBackup Snapshot Client Administrator's Guide* for information on the newer disk array methods.

The disk array methods described in this topic are deprecated.

This topic describes the EMC TimeFinder, Hitachi ShadowImage, and HP BusinessCopy array snapshot methods. These three methods are deprecated in NetBackup 6.5. They are supported in NetBackup 6.5, but will be removed in a future release.

[Table 1-25](#) describes the three legacy (deprecated) array methods.

**Table 1-25** Legacy (deprecated) snapshot methods

Snapshot method	Description and notes	Client platforms supported
BusinessCopy	For mirror snapshots on HP XP series disk arrays with BusinessCopy Services. Supports UFS and VxFS file systems, VxVM logical volumes, and raw partitions.	Solaris or HP.
ShadowImage	For mirror snapshots on Hitachi Data Systems (HDS) disk arrays with ShadowImage (HOMRCF). Supports UFS and VxFS file systems, VxVM logical volumes, and raw partitions.	Solaris, HP, Linux, and AIX.
TimeFinder	For mirror snapshots on EMC Symmetrix/DMX disk arrays with TimeFinder SYMCLI (with or without Veritas Volume Manager 3.1 or later). Supports UFS and VxFS file systems, VxVM logical volumes, and raw partitions. Requires EMC Solutions Enabler 6.2.	Solaris, HP, Linux, and AIX.

## Select a method according to the array hardware

For mirror-type snapshot backups on supported disk arrays, select the TimeFinder, ShadowImage, or BusinessCopy snapshot method according to the vendor-type of your disk array. If the snapshot method does not match the vendor-type of the array, the backup fails.

See [Table 1-26](#).

VSS, on the other hand, is not designed for any particular array.

**Table 1-26** Match array-based snapshot method to type of array

To back up the following:	Use this snapshot method:
EMC Symmetrix/DMX disk arrays	TimeFinder

**Table 1-26** Match array-based snapshot method to type of array (*continued*)

To back up the following:	Use this snapshot method:
Hitachi disk arrays	ShadowImage
HP XPdisk arrays	BusinessCopy

Note the following:

- These snapshot methods cannot be switched: selecting TimeFinder to back up an Hitachi array causes the backup to fail.
- Configuration of client data over VxVM volumes is supported only on certain combinations of disk arrays and platforms. A list of VxVM supported arrays/platforms is available, in the *NetBackup 6.5 Snapshot Client Configuration* document. This document may be accessed from the following link:

<http://entsupport.symantec.com/docs/288300>

- If client data is not configured over VxVM, all arrays are supported (no restrictions).  
 As an alternative, the vxvm snapshot method can be used for any of the disk arrays if the data is configured over Volume Manager volumes.

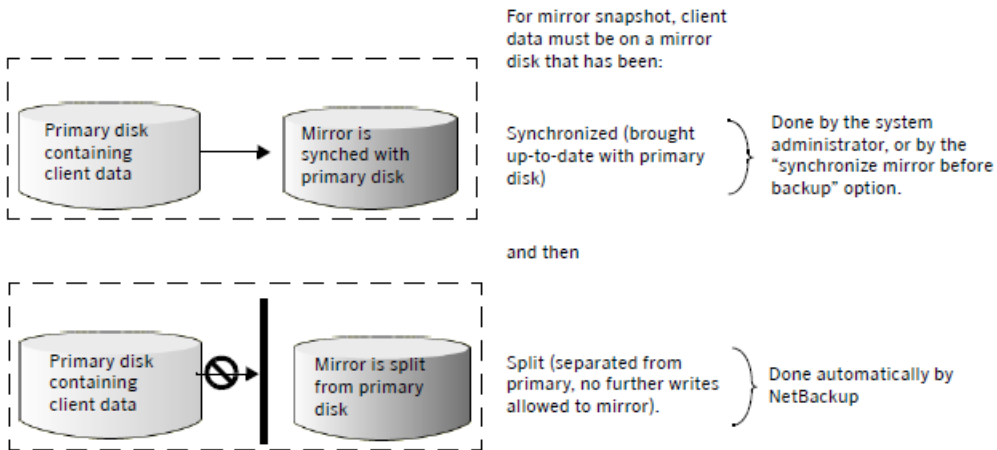
## Arrays currently supported for VSS

The VSS snapshot method offers a general interface to Windows Shadow Copy Services. VSS selects the actual snapshot method depending on which snapshot provider is configured on the client. For instance, VSS selects the appropriate EMC CLARiiON snapshot method for the backup in the following case: if the client data is stored on an EMC CLARiiON disk array, and the array administrator has configured the array and its snapshot capability.

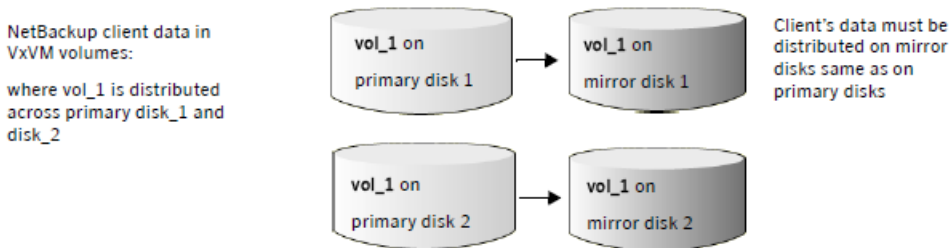
## Client data must be mirrored

When NetBackup makes a mirror-type snapshot, the client data on the primary disk must be mirrored on a secondary disk prior to the backup.

**Figure 1-1** Client data must be mirrored



**Figure 1-2** Multiple primaries and multiple mirrors



## Disk terms

The terms in this chapter for array disk mirroring are primary and mirror (or primary and secondary). Some array vendors refer to these as follows:

- EMC: The primary is called the standard, and the mirror is called a BCV.
- Hitachi and HP: Primary and secondary are called primary volume and secondary volume.

## Configuration checklist for legacy disk array methods

This checklist includes major caveats and important information. Read this table before setting up your disk arrays for the array-specific snapshot methods. The right column refers to sources of further information.

**Table 1-27** Checklist for legacy disk array methods

<b>Check the following</b>	<b>Refer to these topics for help</b>
If you want client data to be configured over Volume Manager volumes, make sure Volume Manager (VxVM) supports your arrays and operating system.	<a href="http://entsupport.symantec.com/docs/288300">http://entsupport.symantec.com/docs/288300</a> .
Make sure the client data is correctly mirrored to secondary disks in the array.	See <a href="#">Configuring primary and secondary disks</a> .
When you configure a backup policy, be sure to select a snapshot method that supports your arrays.	See See <a href="#">“Select a method according to the array hardware”</a> on page 35..
Solaris: If client data is configured over Volume Manager volumes, label all secondary disks using the <code>format</code> command (label option).	See <a href="#">Disk configuration requirements</a> .

**Table 1-27** Checklist for legacy disk array methods (*continued*)

<b>Check the following</b>	<b>Refer to these topics for help</b>
Solaris: The EMC Symmetrix/DMX array must be configured in <i>Common Serial Number Mode</i> to support multiple client SCSI and/or Fibre Channel connections.	See <a href="#">Multiple connectivity to EMC array: Common Serial Number mode</a>
Do not include secondary disks in a Volume Manager disk group. Be sure to follow all restrictions when using Volume Manager.	See <a href="#">Disk types</a> .
Read the <a href="#">Best practices</a> section.	See <a href="#">Best practices</a> .

**Table 1-27** Checklist for legacy disk array methods (*continued*)

Check the following	Refer to these topics for help
<p>For NetBackup Media Server or Third-Party Copy Device off-host methods (for the deprecated TimeFinder, ShadowImage, and BusinessCopy methods only): ask your array support technician to configure your array as follows:</p> <ul style="list-style-type: none"> <li>■ The NetBackup clients must have access to primary and secondary disks in the array.</li> <li>■ The media server must have access to the secondary disks.</li> </ul>	<p>See <a href="#">Disk configuration requirements</a>.</p>

## Disk configuration requirements

Contact the array's support technicians for help in configuring arrays to your specifications.

## Access to disk arrays

Note the following:

- For NetBackup Media Server or Third-Party Copy Device methods only: NetBackup clients must have access to both primary and secondary disks (over SCSI or Fibre Channel, or both). If the clients do not have access to both primary and secondary disks, the backup fails.



- For NetBackup Media Server or Third-Party Copy Device methods only: the media server requires access to the secondary disks only (over SCSI or Fibre Channel, or both). If the media server does not have access to the secondary disks, the backup fails.

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**Note:** A support technician for your disk array vendor must configure this access.

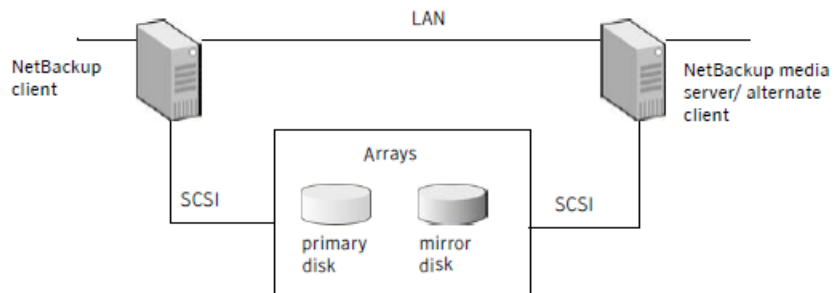
---

## Connection to disk array: SCSI and Fibre Channel

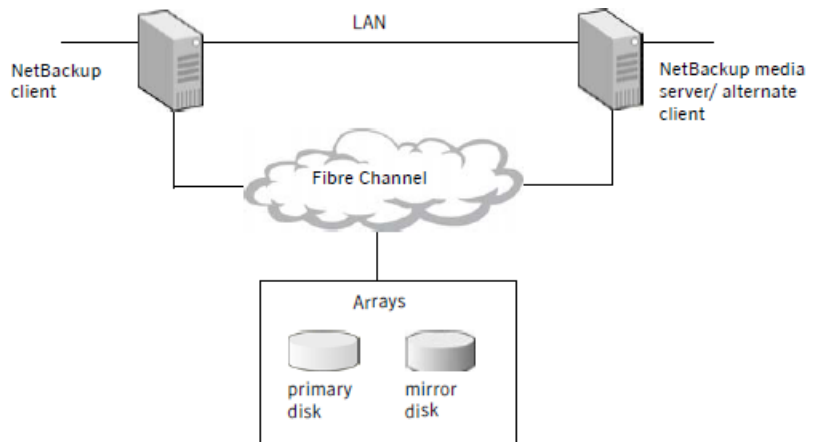
NetBackup supports three configurations, each requiring setup assistance from your array vendor. See the following three figures.

Note that Fibre Channel and SCSI are both supported.

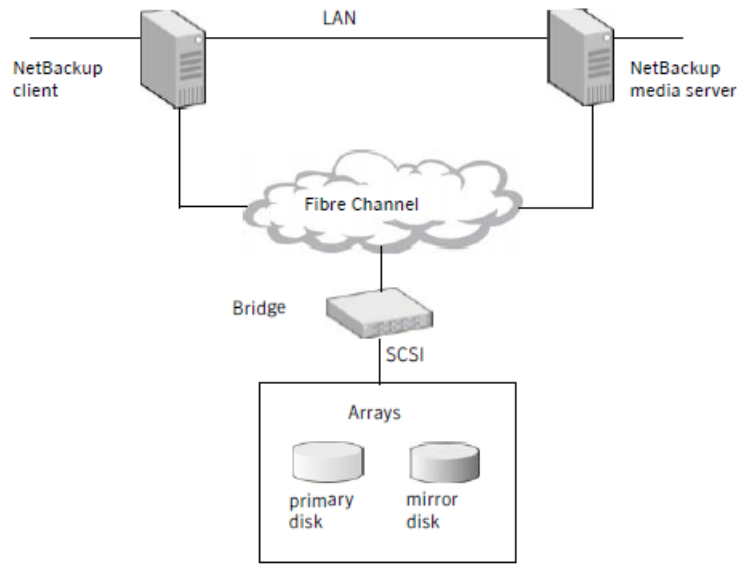
**Figure 1-3** Configuration 1: Local SCSI (no Fibre Channel)



**Figure 1-4** Configuration 2: Array on Fibre Channel



**Figure 1-5** Configuration 3: Array Behind Bridge; Bridge on Fibre Channel



## Multiple connectivity to EMC array: Common Serial Number mode

The following must be configured in Common Serial Number Mode: EMC Symmetrix and EMC DMX disk arrays with multiple connections from NetBackup clients and media servers (multiple SCSI or both Fibre Channel and SCSI).

If the arrays are not in Common Serial Number Mode, and multiple Fibre Channel or SCSI connections exist to the same array disks, note: NetBackup and Volume Manager see two different serial numbers for the same disk—one for the SCSI path and one for the Fibre Channel path. As a result, note the following:

- Volume Manager cannot run in DMP (Dynamic Multipath) mode.
- NetBackup data movement services encounter a problem, since the disk serial number is used to identify the proper disk to back up.

To prevent these problems, the array must be configured in Common Serial Number Mode. If Common Serial Number Mode is not configured for an EMC disk array that has multiple client and media server connections, the backup may fail.

## Configuring primary and secondary disks

The following is a listing of the commands that are required for making the primary-to-mirror disk association, for EMC, Hitachi, and HP arrays. The primary-to-mirror association can be set up before or after installation of

NetBackup Snapshot Client, but must be done prior to running the backup. The primary-to-mirror association is done on the NetBackup client only.

If a mirror disk is not correctly associated and synchronized with the primary disk, a snapshot of the client's data cannot be made. (A snapshot has to be made on the mirror, not on the primary.) In that case, if the backup policy is configured with a mirror-type snapshot, the backup fails.

## EMC Symmetrix and EMC DMX

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**Note:** This section applies to the deprecated EMC TimeFinder method only.

---

For an EMC Symmetrix or DMX disk array on the NetBackup client: you must create device groups, add primary and mirror (secondary) devices to the groups, and associate or pair the primaries with the secondaries. Once they are associated, the secondary disks must be synchronized with the primary disks. During synchronization, the primary disks are copied to the secondaries.

Use the following commands.

Refer to your EMC TimeFinder SYMCLI documentation for more details on these commands:

<code>symdg</code>	Creates a disk group.
<code>symld</code>	Adds a primary disk to the disk group.
<code>symbcv</code>	Associates a secondary disk with a primary disk.

### To create the EMC disk groups

- 1 Create a disk group that is to contain any number of primary and secondary disks.

```
symdg create nbfim_test
```

Creates a disk group named `nbfim_test`.

- 2 Add primary disks to the disk group.

```
symld -g nbfim_test add dev 02A
```

Adds a primary disk `02A` to disk group `nbfim_test`.

- 3 Add secondary (BCV) disks to the disk group.

```
symbcv -g nbfim_test associate dev 08C BCV001
```

Adds the secondary disk 08C to the same disk group.

- 4 Synchronize the secondary disks with the primaries in the disk group.

```
symmir -g nbfim_test establish
```

Pairs, or associates, the primary with the mirror, and synchronizes the mirror with the primary. If there are multiple primaries and mirrors, they are paired according to the order in which they were added to the group.

- 5 Show the output.

```
symmir -g nbfim_test query
```

When these commands are successfully entered, NetBackup can run snapshot requests involving primary device 02A and its associated mirror 08C.

## Hitachi and HP arrays

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**Note:** This topic applies to the deprecated ShadowImage and BusinessCopy methods only.

---

Hitachi arrays can be set up in the same manner as HP arrays. For more detail on the commands and files that are described in this section, refer to your Hitachi Data Systems or HP documentation.

These are the procedures, to be performed on the NetBackup client:

- [Create array configuration files](#)
- [Add array service names to /etc/services file \(UNIX only\)](#)
- [Restart the inetd daemon \(UNIX only\)](#)
- [Start the RAID Manager daemons](#)
- [Set the instance number and enable the listing of output](#)
- [View the state of the arrays](#)
- [Configure the arrays, depending on your requirements](#)

You need a configuration file for each set of primary disks, and another file for each set of mirror (secondary) disks. The entries in the file must be space-delimited.

## Create array configuration files

Use the following procedure to create the array configuration files.

### To create array configuration files

- 1 Create a configuration file for your primary disks.

Use this path and file name:

UNIX

```
/etc/horcmX.conf
```

where X is an integer. For example: `/etc/horcm0.conf`. This integer is called the instance number.

- 2 Create a configuration file for your mirror disks, using the same path and file name as used in 1, but with a different instance number.

For example: `/etc/horcm1.conf`

On the following pages are two example files. Note that entries must be separated by spaces.

Except for comment lines (`#`), the file must contain the `HORCM_MON`, `HORCM_CMD`, `HORCM_DEV`, and `HORCM_INST` parameters, followed by appropriate entries. These are described in the remainder of this procedure.

- 3 For `HORCM_MON`, enter values for the following:

- host

The NetBackup client where this configuration file resides. The client accesses the disks that are specified here under `HORCM_DEV`, when backing up or restoring data using the ShadowImage, VSS, or BusinessCopy snapshot method.

- service

The port name of the RAID Manager instance (for this configuration file) to be registered in the `/etc/services` file (UNIX only).

- poll

The interval at which the disks are monitored, expressed as tens of milliseconds.

- timeout

The time-out period for attempting to communicate with the "partner" service, expressed as tens of milliseconds.

- 4 For `HORCM_CMD`, enter values for the following:

- **cmd\_dev\_file**

The command device file(s) for the array. For example:

UNIX

```
/dev/rdisk/c2t8d14s2
```

Windows (VSS)

```
\\.\PhysicalDrive4
```

**5** Following applies to UNIX only:

You can use the NetBackup `bptpcinfo` command to determine the command device file, as follows:

```
bptpcinfo -d /dev/rdisk -o- | grep CM
```

Here is sample output showing a command device file for an Hitachi device and for an HP device.

The format of the output is:

```
p=/dev/rdisk/c#t#d#s2 s=VID:PID:SN
```

where:

- VID (vendor ID) must be HP or HITACHI.
- PID (product ID) must include -CM.
- The first five characters of the serial number (SN) must match the serial number of the disks.

In this UNIX example, the command device file for the Hitachi array is

```
/dev/rdisk/c2t8d14s2
```

 and for the HP array it is

```
/dev/rdisk/c2t5d35s2.
```

**6** Following applies to Windows only, for VSS:

You can use the `inqraid` command to determine the command device file, as follows:

```
inqraid -CLI $Phys
```

**7** For HORCM\_DEV, enter values for the following:

- **dev\_group**  
A user-defined name of a logical grouping of primary and secondary disks.
- **dev\_name**

A user-defined name that is assigned to a primary-secondary pair of disks within the logical group.

The `dev_group` and `dev_name` parameters are used on the "pair" configuration commands described later in this section.

- **port #**  
The port number that is specified for the disk, configured by means of the array's dedicated console (not from a NetBackup host).
- **Target ID**  
The SCSI or Fibre Channel target ID number of the disk, configured by means of the array's dedicated console (not from a NetBackup host).
- **LUN**  
The SCSI or Fibre Channel logical unit number of the disk, configured by means of the array's dedicated console (not from a NetBackup host).
- **MU**  
A numeric mirror descriptor for cascading disks (default 0). If you do not use cascading disks, this value may be left blank. A cascading disk has more than one mirror (secondary) associated with a given primary.

**8** For `HORCM_INST`, enter values for the following:

- **dev\_group**  
Same as under `HORCM_DEV`.
- **partner host**  
The host where the corresponding secondary (or primary) configuration file resides (may be the same as the host that is specified under `HORCM_MON`). For this example, the host and partner host are both turnip. (See under "partner service" for a discussion of partner.)
- **partner service**  
The port name of the RAID Manager instance for the corresponding secondary (or primary) configuration file, to be registered in the `/etc/services` file (UNIX only).  
For the example `horcm0.conf` file (`/etc/horcm0.conf` on UNIX, `%WINDIR%\horcm0.conf` on Windows), the partner service for `horcmgr0` (entered under `HORCM_MON, service`) is `horcmgr1`. For the secondary-disk configuration example `horcm1.conf` file (see next example), the partner service is the opposite: `horcmgr0`.

"Partner" is a relative term. From the viewpoint of the configuration file for the primary disks (`horcm0.conf` file), the partner file would be `horcm1.conf` (for the secondary disks). It is the same with partner service and partner host:

each refers to the secondary from the viewpoint of the primary, or to the primary from the viewpoint of the secondary.

- 9 The partner service value must be entered in the `/etc/services` file.  
A description of these entries (`horcm0.conf`) is available.

## Add array service names to `/etc/services` file (UNIX only)

The values that are listed under "service" in the configuration files (`horcmgr1` and `horcmgr0` in the examples) must be entered in `/etc/services` file.

## Restart the `inetd` daemon (UNIX only)

For example:

```
kill -SIGHUP pid_of_inetd
```

## Start the RAID Manager daemons

Use the following procedure.

**To start the RAID Manager daemons**

- ◆ Enter the following command to start the RAID Manager daemons.

UNIX

```
/bin/horcmstart.sh x x
```

Windows (VSS)

```
C:\HORCM\etc\horcmstart x
```

where `x` is the instance number of each configuration file.

For the UNIX example, the command would be:

```
/bin/horcmstart.sh 0 1
```

The daemons must be running in order to configure your primary and secondary disks.

## Set the instance number and enable the listing of output

Use the following procedure.

**To set the instance number and enable output listing**

- ◆ Do the following:



## UNIX

If you use the Bourne shell, and the instance number for your primary disks is 0, enter the following:

```
HORCMINST=0
HORCC_MRCF=1
export HORCMINST HORCC_MRCF
```

If you are using the C shell, enter the following:

```
setenv HORCMINST 0
setenv HORCC_MRCF 1
```

## Windows

Go to **Control Panel > System > Advanced** and click **Environment Variables** to enter the following variables:

Variable	Value
HORCMINST	0
VSHTCHORCMINST_LOCAL	0
VSHTCHOMRCF_MUN	0
HORCC_MRCF	1

The HORCMINST parameter determines three things:

- The array to which commands are sent.
- Which disk is the primary and which is the secondary, when using the `paircreate` command (described below).
- Which disk (primary or secondary) is listed first in each pair when using the `pairdisplay` command to view the state of the arrays (described below). In this example (HORCMINST=0), the primaries are listed first. That is because the configuration file that defines the primary disks is named `horcm0.conf`, with 0 as the instance number.

## View the state of the arrays

The following steps help you to view the state of the arrays..

## To view the state of the arrays

- 1 To display status information on all the disks, enter the following:

```
pairdisplay -g groupname -CLI -fc
```

where *groupname* is the name specified in the configuration files under `dev_group`. CLI and fc are options:

-CLI formats headers and columns in the resulting display.

-fc includes the percentage of synchronization progress in the display.

For example:

```
pairdisplay -g wiltest -CLI -fc
```

Resulting output:

Group	PairVol	L/R	Port#	TID	LU-M	Seq#	LDEV#	P/S	Status	%	P-LDEV#	M
wiltest	dev1	L	CL1-A	8	0 0	60159	0	P-VOL	PAIR	100	43	
wiltest	dev1	R	CL2-A	16	32 0	60159	43	S-VOL	PAIR	100	0	
wiltest	dev2	L	CL1-A	8	1 0	60159	1	P-VOL	PSUS	99	44	
wiltest	dev2	R	CL2-A	16	33 0	60159	44	S-VOL	SSUS	99	1	
wiltest	dev3	L	CL1-A	8	2 0	60159	2	SMPL	-	-	-	
wiltest	dev3	R	CL2-A	16	34 0	60159	45	SMPL	-	-	-	

- 2 For status information on a particular pair of disks, enter the following:

```
pairdisplay -g groupname -d dev_name [-CLI] [-fc]
```

where *dev\_name* is the name specified in the configuration files under `dev_name`.

If no primary-secondary associations (pairings) exist, all disks are listed as SMPL in the P/S column. Information on creating a primary-secondary pairing is available.

See [To configure the arrays, if disks are not paired](#).

## Important headers in the pairdisplay listing

<b>Group</b>	The <code>dev_group</code> name defined in the configuration file.
<b>PairVol</b>	Lists the devices by device name. In the <code>pairdisplay</code> output that is shown under step 1, dev1 is listed twice: the first line is the primary disk, the second is the mirror (secondary). In the P/S column, P-VOL indicates the primary, S-VOL the secondary.

<b>L/R</b>	Indicates the local or remote host, with respect to the current instance number.
<b>Port#</b>	The port number for the disk, configured by means of the array's dedicated console (not from a NetBackup host).
<b>TID</b>	The SCSI or Fibre Channel target ID number of the disk, configured by means of the array's dedicated console (not from a NetBackup host).
<b>LU-M</b>	LU indicates the SCSI or Fibre Channel LUN of the disk, configured by means of the array's dedicated console (not from a NetBackup host). M is the numeric mirror descriptor for cascading disks. A cascading disk has more than one mirror (secondary) associated with a given primary.
<b>Seq#</b>	The unit serial number of the array.
<b>LDEV#</b>	Logical device number of the disk.
<b>P/S</b>	Indicates whether or not the disk is configured in a primary-secondary pair: <ul style="list-style-type: none"> <li>■ P-VOL: the disk is the primary.</li> <li>■ S-VOL: the disk is the secondary.</li> <li>■ SMPL: the disk is not paired (associated) with any other disk.</li> </ul>
<b>Statuss</b>	Shows the current state of each disk in the array: <ul style="list-style-type: none"> <li>■ PAIR: the secondary disk in the pair is synchronized with the primary.</li> <li>■ PSUS: the pair is split (primary disk).</li> <li>■ SSUS: the pair is split (secondary disk).</li> <li>■ COPY: a synch or split is in progress. If synchronization, the status changes to PAIR at completion of the COPY. If a split, the result is PSUS for primary disk, or SSUS for secondary disk.</li> </ul> <p><b>Note:</b> If a backup is attempted while a disk is split (PSUS, SSUS), the backup fails with a status code 156. If a backup is attempted while a disk is in the COPY state, note two possible results: if the disks synchronize (shown as PAIR), the backup proceeds; if the disks split (PSUS, SSUS), the backup fails with a status code 156.</p>
<b>%</b>	Shows the percentage of the status that has completed.
<b>P-LDEV#</b>	The LDEV number of the "partner" disk in the pair.

**M** Indicates whether the secondary is writable, as a result of being split from the primary.

## Configure the arrays, depending on your requirements

These steps depend on the results of the `pairdisplay` listings and the requirements of your site, as follows:

- If all required disks are correctly paired (status of PAIR), the primary-secondary configuration is finished.
- If required disks are paired but currently split (PSUS, SSUS), or they are not paired at all (SMPL), resynchronize or configure them, respectively.  
If a mirror-type snapshot backup attempts to access a disk that is split or not paired, the backup fails with a status code 156.
- If disks are paired but need to be unpaired or otherwise reconfigured, you must split them and create a new association.

### To configure the arrays, if disks are split

- 1 Enter the following to resynchronize the split disks:

```
pairresync -g groupname -d dev_name
```

where *groupname* is the name listed under `dev_group`, and *dev\_name* is the device name, as defined in the configuration files.

To resynchronize the disks that are listed as split (PSUS, SSUS) in the example, refer to the following:

Resulting output:.

Then enter:

```
pairresync -g wiltest -d dev2
```

- 2 Enter the following to view the result:

```
pairdisplay -g wiltest -d dev2 -CLI -fc
```

When the resynchronization starts, the Status column reads COPY. When it is nearly completed, the Status column reads PAIR (see the column for percentage completion).

### To configure the arrays, if disks are not paired

- 1 Enter the following to create a pair of primary and secondary:

```
paircreate -g groupname -d dev_name -v1
```

where:

- *groupname* is the name listed under `dev_group`
- *dev\_name* is the device name, as defined in the configuration files
- `-v1` specifies that the current instance number is the primary

To associate the `dev3` disks as a pair (listed as SMPL in the example), refer to the following.

Resulting output:

Then enter the following:

```
paircreate -g wiltest -d dev3 -v1
```

- 2 Enter the following to view the result:

```
pairdisplay -g wiltest -d dev3 -CLI -fc
```

When the synchronization starts, the Status column reads COPY. When it is nearly completed, the Status column reads PAIR (see the % column for percentage completion).

### To configure the arrays, if disks are paired but need to be split or reconfigured

- 1 To split the secondary disk from the primary but maintain the pair association, enter the following:

```
pairsplit -g groupname -d dev_name
```

where *groupname* is the name listed under `dev_group`, and *dev\_name* is the device name, as defined in the configuration files. The `pairedisplay` command shows a status of PSUS and SSUS.

For example:

```
pairsplit -g wiltest -d dev1
```

This command splits the secondary from the primary in the `dev1` pair.

- 2 To split the secondary disk from the primary and remove the pair association between them, enter the following:

```
pairsplit -g groupname -d dev_name -S
```

where `-S` means break the pair association. The `pairedisplay` command shows `SMPL` in the P/S column for the affected disks, meaning that the disks are no longer paired.

For more information on array configuration, refer to the array vendor documentation.

## Volume Manager configuration

These topics describe the use of Volume Manager volumes with the EMC, Hitachi, and HP disk array methods.

### Disk label

On Solaris only: If client data is configured in Volume Manager volumes, be sure to label all secondary devices using the `format` command (`label` option). Labeling the secondary disks prevents Volume Manager from marking the disks as disabled (if they are split from their primary disks) during a system reboot.

While a secondary disk is synchronized with its primary, the secondary is invisible to Volume Manager. When the secondary is split off from its primary disk, the secondary becomes visible again. If the secondaries are labeled (using the `format label` command), Volume Manager does not disable the disks when they are split.

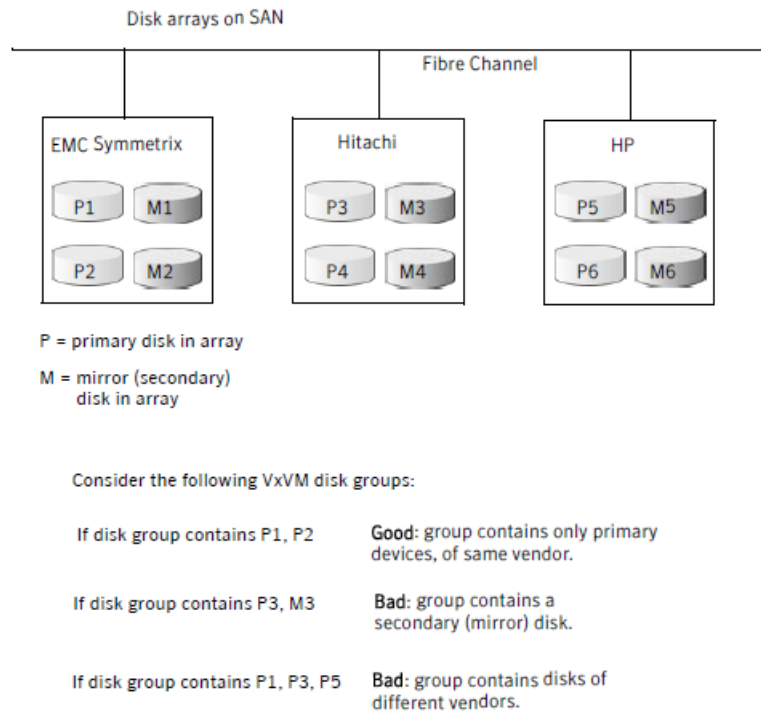
## Disk types

Note these important restrictions involving the use of Volume Manager with Snapshot Client. If the following restrictions are not observed, the backup fails:

- Do not include secondary (mirror) disks in a Volume Manager disk group.
- The Volume Manager disk group must contain disks of one vendor type only. Do not configure disks of different vendors in the same Volume Manager disk group.
- The vendor type of the snapshot method must match the vendor-type of the disks in the Volume Manager disk group.

Concerning these restrictions, refer to the next two diagrams.

**Figure 1-6** Example VxVM Disk Groups: the Good and the Bad



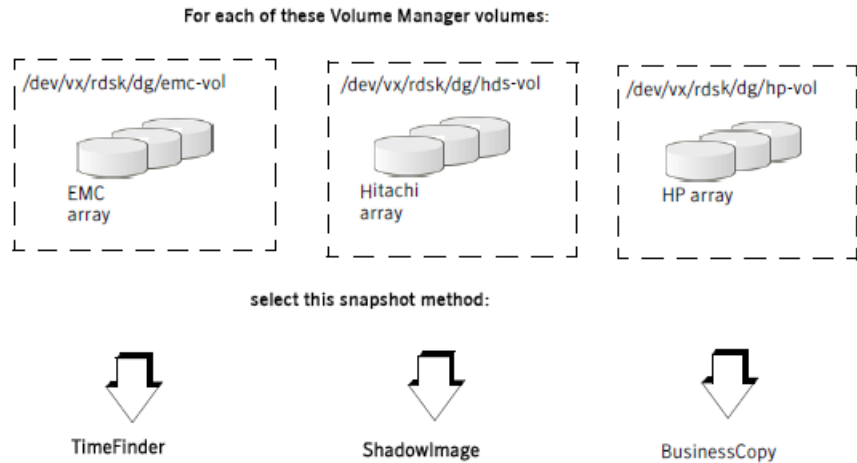
As [Figure 1-6](#) shows, no secondary (mirror) disks should be included in VxVM disk groups, and groups must contain disks of the same vendor.

---

**Note:** These restrictions apply when using any of the array-specific snapshot methods; they do NOT apply to the snapshot method.

---

**Figure 1-7** When Using Volume Manager and Array-Specific Methods



## Disk group clones

If you use the array-specific methods with Volume Manager volumes, NetBackup creates a temporary disk group (clone) of the disks containing the mirror volume. To avoid a naming conflict in the Volume Manager, NetBackup names the temporary disk group as follows:

```
diskgroup_name_clone
```

For alternate client backup, the temporary disk group is named as follows:

```
client_name_diskgroup_name_clone
```

While the backup is in progress, this clone appears in the output of the Volume Manager `vxvg` command. When the backup completes, NetBackup automatically removes the disk group clone.

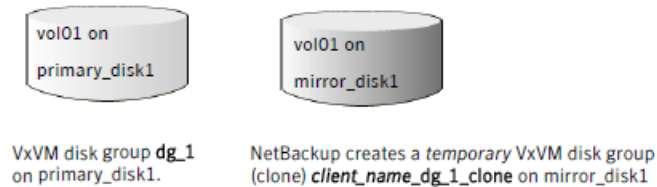


**Figure 1-8** Disk Group Cloning Example:

Client data is in:

- file system /fs\_1

- configured over VxVM volume /dev/vx/rdisk/dg\_1/vol01



In this example, NetBackup removes the VxVM disk group `client_name_dg_1_clone` after the backup has completed. If a major system interruption occurs (such as a crash or unexpected reboot), NetBackup may not be able to remove the clone. You must use the `bpdgcclone` command with the `-c` option to remove the clone, and then resynchronize the mirror disk with the primary disk.

See the topic "Removing a VxVM volume clone" in the *NetBackup Snapshot Client Administrator's Guide*.

## When secondary disks are split and synched

This situation is described for your information only. A backup occurring in this circumstance should complete normally, in spite of the following Volume Manager error.

When the secondary (mirror) device is split from its primary, Volume Manager recognizes the secondary disk as a separate device. When the secondary disk is re-synched to the primary (provided Volume Manager had seen it before), note: the synched secondary disk is no longer visible and VxVM issues an I/O error. In addition, if DMP is enabled, the secondary disks are marked as disabled. The next time the secondary is split, it reappears in Volume Manager only to disappear when the disk is again synched to the primary.

## Best practices

The recommendations in this section apply primarily to the use of the array-specific snapshot methods and Volume Manager, except where noted.

## NetBackup access to arrays

In connection with the information listed under [Access to disk arrays](#), note the following recommendation:

- The NetBackup media server only needs read access to the secondary disks in the array; it does not need access to the primary disks.

## Resynchronizing disks at end of backup

Resynchronizing very large mirror disks can take time. If disk-resynchronization significantly delays completion of the backup, set the **Resynchronize mirror in background** option to Yes. This setting allows the backup to complete without waiting for the mirror disks to be resynchronized. The disks are resynchronized after the backup completes.

## Hardware-level disk restore

---

**Warning:** Hardware-level disk-restore (such as by means of the `symmir` command with the `-restore` option) can result in data loss if: more than one file system or more than one VxVM volume share the primary disk. The hardware-level restore overwrites the entire primary disk with the contents of the mirror disk.

Note this problem if you attempt to do the following: restore a snapshot of of the file systems or of the VxVM volumes that share the same disk. The other file systems or volumes sharing the disk may have older data that you do not want to write back to the primary. When the hardware-level disk-restore takes place, the older data replaces the newer data on the primary disk.

---

## Volume Manager disk groups

When you create a VxVM disk group, create a group that corresponds to the primary disks that were grouped as described in the following topic:

[Configuring primary and secondary disks.](#)

If you create an array disk group with two primary disks, a VxVM disk group should be created with the same primaries. The VxVM disk group configuration should follow the array disk group configuration for the primaries.

## Volume Manager with dynamic multipathing (DMP)

For VxVM with DMP enabled, if multiple paths exist to the same disk array (for instance, one Fibre Channel connection and one SCSI), note: DMP renames the array's disks with DMP encapsulated names.

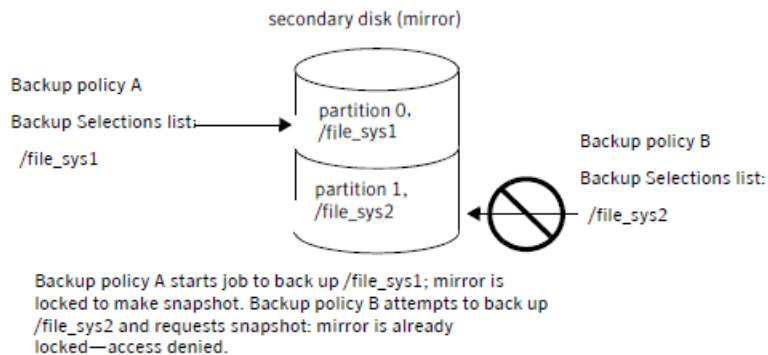
## Backups concurrently accessing same disk (no VxVM)

A conflict occurs if two or more backups using array-specific snapshot methods attempt to access a disk at the same time.

When the snapshot process is started, NetBackup reserves ("locks") the secondary (mirror) disk for that backup job, denying other backup jobs access to that disk. If a second job requests a snapshot on the same disk before the first job is complete, access is denied and the second job fails.

This conflict can arise when two backup policies, each using an array-specific method, require access to the same disk at the same time. See [Figure 1-9](#).

**Figure 1-9** Backup Policies in Conflict: Two Backups Accessing Same Disk




---

**Note:** Snapshot disk locks are applied to the entire disk: when a backup job requires a snapshot, the entire disk is locked.

---

This conflict can be avoided.

See [Avoiding concurrent access conflicts](#).

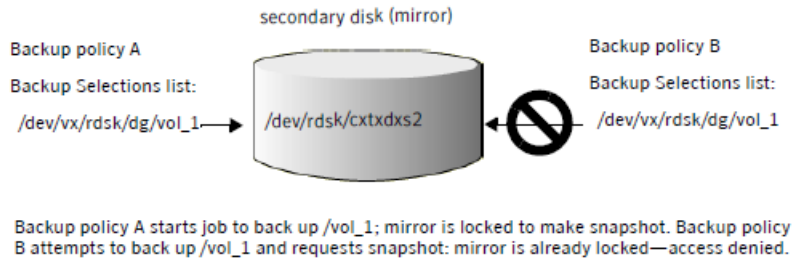
## Backups concurrently accessing VxVM volumes

A conflict can occur in this case: if concurrent backups with array-specific methods attempt to access data in the same Volume Manager volume or in volumes on the same disk(s).

### Concurrent access to same VxVM volume

A conflict can occur if two or more backups using an array-specific method attempt to access the same Volume Manager volume at the same time.

**Figure 1-10** Backup Policies in Conflict: Two Backups Accessing Same Volume



This diagram shows `/dev/vx/rdisk/dg/vol_1` on a single disk. The same conflict occurs if `/vol_1` is distributed across two or more disks.

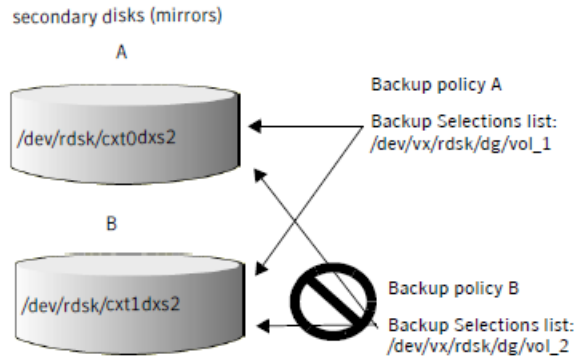
See [Avoiding concurrent access conflicts](#).

## Concurrent access to volumes on same disks

A conflict can occur in this case: if concurrent backups using array-specific methods attempt to access Volume Manager volumes that are distributed across the same disks.

Veritas Volume Manager (VxVM) supports three means of distributing volumes across disks: striping, concatenating, and RAID 5 (described in the Volume Manager documentation). Use of these distribution methods can lead to access problems for NetBackup with an array-specific method. The following diagram shows two VxVM volumes, `/dev/vx/rdisk/dg/vol_1` and `/dev/vx/rdisk/dg/vol_2`. Each is distributed across two disks in an array (using any of the three distribution methods). If two backups concurrently request snapshots of these volumes, a conflict occurs, even though the two backups attempt to access different volumes. This situation occurs because the array-specific snapshot methods split the mirror disk from the primary disk at the disk device layer, not the volume layer.

**Figure 1-11** Backup Policies in Conflict: Two Backups Accessing Volumes Distributed on Same Disks



Backup policy A starts to back up `/vol_1`; both disks A and B are locked to make a snapshot of `/vol_1`. Backup policy B attempts to back up `/vol_2` and requests snapshot: disks A and B are already locked—access denied.

## Avoiding concurrent access conflicts

These are recommendations for the backups that encounter concurrent-access problems.

- Schedule the policies so that none can start a backup at the same time as another.
- If possible, combine the separate policies into one policy. Snapshots are created before backups begin, on a global basis across all streams at once.
- If you want the backups to run concurrently, combine the separate policies into one and configure that policy for multiple data streaming. Multiple data streaming prevents concurrent backups from encountering snapshot conflicts. See the *NetBackup Administrator's Guide*, for help with multiple data streams.
- If the data to back up is configured in Volume Manager (VxVM) volumes, use the vxvm snapshot method. vxvm allows snapshot backups to run concurrently without conflicts, provided that the backup data consists of file systems that are mounted on VxVM volumes.  
 See "Creating a snapshot mirror of the source" in the *NetBackup Snapshot Client Administrator's Guide*.

Use the Volume Manager administration interface to determine which disks the volumes are configured on, and configure the volumes on different disks.

## Configuring SAN devices

This section provides configuration assistance for switches, host-bus adapters, and third-party copy devices, as a supplement to the *NetBackup Snapshot Client Administrator's Guide*.

For assistance configuring NetBackup for off-host data movers, see See [“Configuring NetBackup for off-host data mover backups”](#) on page 106. in this document.

## Switches

This section provides troubleshooting tips for the Fibre Channel switches supported by NetBackup Snapshot Client. It begins with general points that apply to all supported switches, followed by a troubleshooting procedure for each switch.

Topics covered for each switch:

- Obtaining world-wide port names of the devices connected to the switch.
- Troubleshooting the switch, when the media server or third-party copy device cannot access required devices:
  - Make sure port LEDs are green
  - Make sure your fabric has the correct number of domains (if multiple switches are connected together)
  - Make sure devices have name server entries
  - Make sure ports are online and initialized correctly
  - Make sure the zones are configured correctly, so the media server and third-party copy device can access the devices used for the backup
  - Avoid switch reconfiguration during the backup
  - Make a switch log dump

## Device accessibility

For a successful Snapshot Client backup, note the following:

- both the tape libraries and the client disks used for the backup must be accessible to the NetBackup media server.
- the tape libraries used for the backup must be accessible to the media server, but both the tape libraries and the client disks must be accessible to the third-party copy device (data mover).

## What to avoid during a Snapshot Client backup

For a successful Snapshot Client backup, there are certain things that you should avoid. The following points give you the information:

- Do not change zones.
- Do not disable or enable a switch.
- Do not chain switch connections.

If these actions are attempted during the backup, I/O pauses will occur and the backup may fail.

## Brocade

After installing the Brocade switch and connecting your Fibre Channel devices to it, the following procedures may be helpful in setting up the switch for Snapshot Client.

---

**Note:** For tips that apply to all supported switches, see [Switches](#).

---

These steps refer to Brocade commands you can use after telneting into the switch (`telnet switch_name`). A Brocade Web interface is also available for many of these tasks.

Obtain the world-wide port name of the devices connected to the Brocade by entering the following:

```
nsShow
```

- For the Snapshot Client third-party copy device method, you can find a device's world-wide port name from this output. For example, the world-wide port name of the first device in the above listing is `20:00:00:50:13:b1:06:19`.

---

**Note:** When copying the world-wide port name into the `3pc.conf` file, be sure to delete the colons.

---

### To troubleshoot the Brocade

If the media server or third-party copy device cannot access a tape or disk, try the following.

- 1 Check the LEDs on the front of the switch: the LED for each port you are using must be green.
- 2 If you have multiple Brocades daisy-chained together, make sure you have the correct number of domains in your fabric by entering the following.

**fabricShow**

Example `fabricShow` output:

Switch ID	Worldwide Name	Enet IP Addr	FC IP Addr	Name
1:	fffc01 10:00:00:60:69:12:34:76	166.98.29.38	0.0.0.0	"brocade21"
3:	fffc03 10:00:00:60:69:20:22:81	166.98.26.137	0.0.0.0	"brocade2"

The Fabric has 2 switches

The above example shows two domains in the fabric: domains 1 and 3.

---

**Note:** There should be one domain for each switch on the SAN.

---

If one of your domains does not appear in the above, check the following:

- Check all physical connections to the switch corresponding to the domain.
- Make sure the switch is turned on and operating correctly.
- Use the `switchShow` command to make sure the switch's connection to the other switch is correct (the switch's port should be listed as an E-port; see 3).



- 3 Make sure the Brocade ports are online and initialized correctly by entering the following.

**switchShow**

**Example output:**

```
switchType:      2.4
switchState:     Online
switchRole:      Subordinate
switchDomain:    1
switchId:        fffc01
switchWwn:       10:00:00:60:69:12:34:76
switchBeacon:   OFF
port 0: id Online      L-Port 1 public
port 1: id Online      L-Port 1 public
port 2: id Online      L-Port 1 public
port 3: id Online      L-Port 1 public
port 4: id Online      L-Port 1 public
port 5: id Online      L-Port 1 public
port 6: id Online      L-Port 1 public
port 7: id Online      F-Port 20:00:00:e0:69:c0:50:b2
port 8: id Online      F-Port 50:06:04:82:b8:91:61:1f
port 9: sw Online      F-Port 20:00:00:e0:69:c0:0c:81
port 10: id Online     F-Port 10:00:00:e0:02:21:b8:6c
port 11: id Online     F-Port 20:00:00:e0:69:f0:20:31
port 12: id No_Light
port 13: id Online     E-Port 10:00:00:60:69:20:22:81
"brocade2" (upstream)
port 14: id Online     F-Port 20:00:00:e0:69:f0:17:6c
```

The Brocade ports you are using should be listed as `Online`. If a port is not online, the device connected to it is not visible to other components on the SAN and cannot be configured for NetBackup Snapshot Client. Look for a bad connection or a malfunction in the connected device.

#### 4 Make sure the devices have name server entries by entering the following.

**nsShow**

Example output:

---

**Note:** Refer to your Brocade documentation for descriptions of these fields.

---

```
The Local Name Server has 4 entries {
Type Pid    COS    PortName                               NodeName                               TTL(sec)
NL  0210ef;   3;20:00:00:50:13:b1:06:19;10:00:00:50:13:b1:06:19;na
FC4s: FCP [CNSi   VFS113           R520]
Fabric Port Name: 20:00:00:60:69:10:28:ee
NL  0211e2;   3;50:01:04:f0:00:43:08:aa;50:01:04:f0:00:43:08:a9;na
FC4s: FCP [STK    T9940A           1.28]
Fabric Port Name: 20:01:00:60:69:10:28:ee
N   021200;   2,3;20:00:00:e0:69:c0:0e:74;10:00:00:e0:69:c0:0e:74;na
FC4s: FCIP
Fabric Port Name: 20:02:00:60:69:10:28:ee
N   021300;   3;10:00:00:e0:02:41:de:84;10:00:00:e0:02:01:de:84;na
FC4s: FCP [Crossrds8000 Router    02aw]
Fabric Port Name: 20:03:00:60:69:10:28:ee
```

If the ports are initialized correctly but a name server entry is missing, enter the following to update the name server listing:

```
portDisable port_number
```

followed by

```
portEnable port_number
```

- 5 Make sure the zone configuration allows the media server and third-party copy device to access the devices needed for the backup.

---

**Note:** Refer to [Device accessibility](#) for access requirements according to the Snapshot Client backup method you are using. Note that for the third-party copy device method, the media server does not need access to the client disks.

```
-x client_name
```

---

Enter the following:

```
zoneShow
```

Example output:

Defined configuration:

```
cfg:   brocade_cfg
      Bear_Tur_zone; vert_zone
zone:  Bear_Tur_zone
      1,4; 1,5; 1,6; 1,7; 1,8; 1,9; 1,10; 1,11; 1,12; 1,13; 1,14;
      1,15
zone:  Veg_zone
      Tur_JNI_HBA_1; rut_JNI_HBA_1; Pth_plg;
      XP256_Beijing_array_1; Datalink_Edina_array;
      Tur_JNI_HBA_1_port; Pth_plg_port;
      Datalink_Edina_array_port;
XP256_Beijing_array_1_port; edi2;
      plg_2; tur2
zone:  vert_zone
      1,0; 1,1; 1,2; 1,3
alias: Blz_HBA_1
      10:00:00:10:83:fc:81:cd
alias: Blz_HBA_1_port
      0,4
alias: Datalink_Edina_array
      50:00:00:00:00:40:00:e0; 50:00:00:00:00:00:00:e1
alias: Datalink_Edina_array_port
      0,7
alias: Pth_plg
      20:02:00:60:45:16:08:22
alias: Pth_plg_port
      0,2
alias: rut_JNI_HBA_1
```

```
50:00:00:00:00:40:00:e0
alias: rut_JNI_HBA_1_port
0,1
alias: Tur_JNI_HBA_1
10:00:00:e0:69:c0:0c:81
alias: Tur_JNI_HBA_1_port
0,3
alias: XP256_Beijing_array_1
50:00:0e:10:00:00:87:49
alias: XP256_Beijing_array_1_port
0,0
alias: edi 50:00:00:00:00:40:00:e0
alias: plg_2 20:02:00:60:45:16:08:22; 10:00:00:60:45:16:08:22
alias: tur 10:00:00:e0:69:c0:0c:81; 20:00:00:e0:69:c0:0c:81
```

- 6 Before contacting the switch vendor for technical support, get a log dump as follows:

```
supportShow
```

## QLogic SANbox

After installing the QLogic SANbox switch and connecting your Fibre Channel devices to it, the following procedures may be helpful in setting up the switch for Snapshot Client.

---

**Note:** For tips that apply to all supported switches, see [Switches](#).

---

These steps refer to QLogic SANbox commands you can use after telneting into the switch (`telnet switch_name`). A QLogic SANbox web interface is also available for many of these tasks.

### About obtaining world-wide port names for the 3pc.conf file

Obtain the world-wide port names of the devices connected to the QLogic SANbox by entering the following:

```
show topology
```

Example output:

---

**Note:** Refer to your QLogic SANbox documentation for output descriptions.

---

Port Number	Local Type	Local PortWWN	Remote Type	Remote NodeWWN	Unique ID
3	F	20:03:00:c0:dd:00:b8:73	N	10:00:00:50:13:e0:01:54	010300
4	F	20:04:00:c0:dd:00:b8:73	N	10:00:00:50:13:e0:00:d3	010400
5	F	20:05:00:c0:dd:00:b8:73	N	50:00:60:e8:02:ea:ff:16	010500
8	F	20:08:00:c0:dd:00:b8:73	N	50:00:60:e8:02:ea:ff:07	010800
15	F	20:0f:00:c0:dd:00:b8:73	N	10:00:00:e0:69:f0:21:09	010f00

- For the Snapshot Client third-party copy device method, you can find a device's world-wide port name from this output. For example, the world-wide port name of the first device in the above listing is 20:03:00:c0:dd:00:b8:73.

---

**Note:** When copying this value into the 3pc.conf file, be sure to delete the colons.

---

## Troubleshooting the QLogic SANbox

This section provides the information on troubleshooting the QLogic SANbox.

### To troubleshoot the QLogic SANbox

If the media server or third-party copy device cannot access a tape or disk, try the following.

- 1 Check the LEDs on the front of the switch: the LED for each port you are using must be green.
- 2 Make sure you have the correct number of domains in your fabric by entering the following.

```
show fabric
```

Example show fabric output:

```
Switch ID WWN NodeIPAddress PortIPAddress SymbolicName
-----
1      fffc01 10:00:00:c0:dd:00:b8:73
```

The above example shows one domain in the fabric.

---

**Note:** There should be one domain for each switch on the SAN.

---

If one of your domains does not appear in the above, try the following:

- Check all physical connections to the switch corresponding to the domain.

- Make sure the switch is turned on and operating correctly.
  - Use the `show port` command to make sure the switch's connection to the other switch is correct (the switch's port should be listed as `E` under `Config Type` in the output for the `show port` command; see 3).
- 3 Make sure the QLogic SANbox ports are online and initialized correctly by entering the following.

```
show port
```

Example output:

Port Number	Admin State	Operational State	Login Status	Config Type	Running Type	Link State	Link Speed
0	Online	Offline	NotLoggedIn	FL	Unknown	Inactive	Auto
1	Online	Offline	NotLoggedIn	FL	Unknown	Inactive	Auto
2	Online	Offline	NotLoggedIn	F	Unknown	Inactive	Auto
3	Online	Online	LoggedIn	FL	F	Active	2Gb/s
4	Online	Online	LoggedIn	FL	F	Active	2Gb/s
5	Online	Online	LoggedIn	F	F	Active	1Gb/s
6	Online	Offline	NotLoggedIn	FL	Unknown	Inactive	Auto
7	Online	Offline	NotLoggedIn	F	Unknown	Inactive	Auto

The ports you are using should be listed as `Online`. If a required port is not online, the device connected to it is not visible to other components on the SAN and cannot be configured for NetBackup Snapshot Client. Look for a bad connection or a malfunction in the connected device.

#### 4 Make sure that the devices have name server entries by entering the following.

```
show ns
```

##### Example output.

```
The local Name Server has 5 entries.
```

PortID	PortType	COS	PortWWN	NodeWWN
010300	N	3	20:01:00:50:13:e0:01:54	10:00:00:50:13:e0:01:54
FC4Type: FCP			FC4Desc: CNSi FS2620	(Rev. S500)
010400	N	3	20:01:00:50:13:e0:00:d3	10:00:00:50:13:e0:00:d3
FC4Type: FCP			FC4Desc: CNSi FS2620	(Rev. S500)
010500	N	3	50:00:60:e8:02:ea:ff:16	50:00:60:e8:02:ea:ff:16
FC4Type: FCP			FC4Desc: HITACHI OPEN-9	(Rev. 0116)
010800	N	3	50:00:60:e8:02:ea:ff:07	50:00:60:e8:02:ea:ff:07
FC4Type: FCP			FC4Desc: (NULL)	
010f00	N	0	20:00:00:e0:69:f0:21:09	10:00:00:e0:69:f0:21:09
FC4Type: Unknown			FC4Desc: (NULL)	

If the ports are initialized correctly but a name server entry is missing, enter the following to update the name server listing:

```
reset port port_number
```

- 5 Make sure the zone configuration allows the media server and third-party copy device to access the devices needed for the backup.

---

**Note:** Refer to [Device accessibility](#) for access requirements according to the Snapshot Client backup method you are using. Note that for the third-party copy device method, the media server does not need access to the client disks (the `-x client_name` option of the `bptpcinfo` command is used to identify the client disks for the media server).

---

Enter the following:

```
zone list
```

Example output:

```
Zone          ZoneSet
-----
The Zone list is empty.
```

- 6 Before contacting the switch vendor for technical support, get a log dump as follows:

```
show support
```

## McDATA

After you have installed the McDATA switch and connected your Fibre Channel devices to it, the following procedures may be helpful in setting up the switch for Snapshot Client.

---

**Note:** For tips that apply to all supported switches, see [Switches](#).

---

---

**Note:** The McDATA supports point-to-point mode only (does not support loop mode).

---

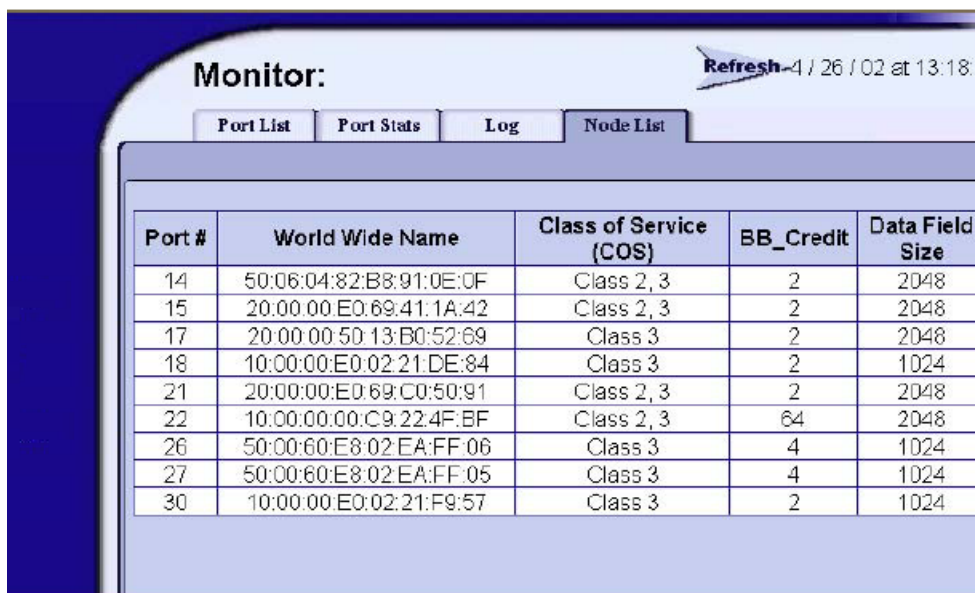


**To obtain world-wide port names for the 3pc.conf file**

- 1 Log into the McDATA switch using a web browser.
- 2 Select **Monitor > Node List**.

The World Wide Name column lists the world-wide port name of each device connected to the switch.

Example:



The screenshot shows a web interface titled "Monitor:" with a "Refresh" button and a timestamp "4 / 26 / 02 at 13:18:1". Below the title are four tabs: "Port List", "Port Stats", "Log", and "Node List". The "Node List" tab is selected, displaying a table with the following data:

Port #	World Wide Name	Class of Service (COS)	BB_Credit	Data Field Size
14	50:06:04:82:B8:91:0E:0F	Class 2, 3	2	2048
15	20:00:00:E0:69:41:1A:42	Class 2, 3	2	2048
17	20:00:00:50:13:B0:52:69	Class 3	2	2048
18	10:00:00:E0:02:21:DE:84	Class 3	2	1024
21	20:00:00:E0:69:C0:50:91	Class 2, 3	2	2048
22	10:00:00:00:C9:22:4F:BF	Class 2, 3	64	2048
26	50:00:60:E8:02:EA:FF:06	Class 3	4	1024
27	50:00:60:E8:02:EA:FF:05	Class 3	4	1024
30	10:00:00:E0:02:21:F9:57	Class 3	2	1024

---

**Note:** When copying the world-wide name into the 3pc.conf file, be sure to delete the colons.

---

**To troubleshoot the McDATA**

If the media server or third-party copy device cannot access a tape or disk, try the following.

- 1 Check the LEDs on the front of the switch: the LED for each port you are using must be green.
- 2 Make sure you have the correct number of domains in your fabric, as follows.

---

**Note:** There should be one domain for each switch on the SAN.

---

- Log into the McDATA switch using a web browser.
- Select **Configure > Switch > Operating Parameters** and check the domain ID.

If one of your domains does not appear, try the following:

- Check all physical connections to the switch corresponding to the domain.
- Make sure the switch is turned on and operating correctly.

- 3 Use **Configure > Zoning** to determine whether the zone configuration allows the media server and third-party copy device to access the devices needed for the backup.

---

**Note:** Refer to [Device accessibility](#) for access requirements according to the Snapshot Client backup method you are using. Note that for the third-party copy device method, the media server does not need access to the client disks. The `-x client_name` option of the `bptpcinfo` command is used to identify the client disks for the media server.

---

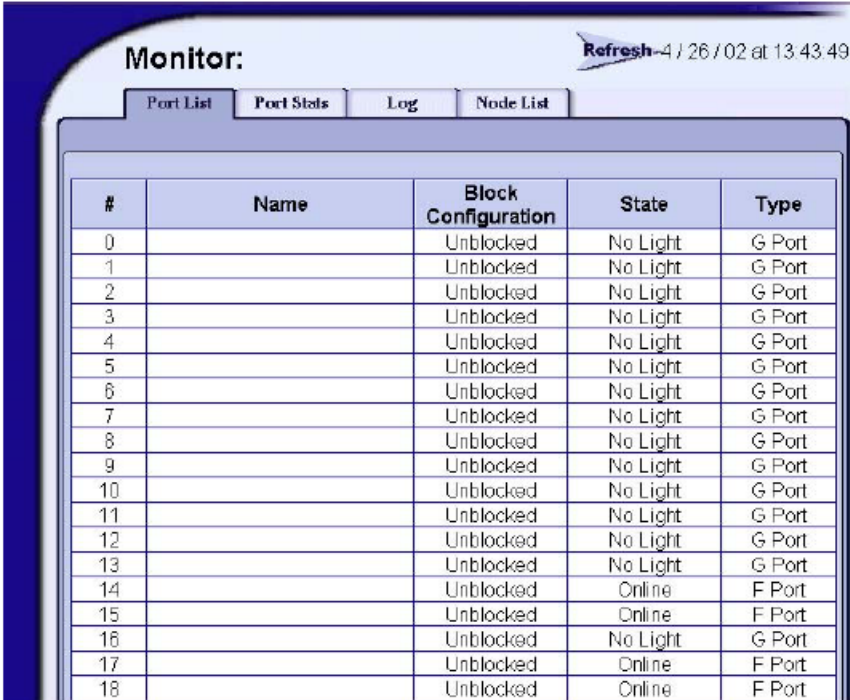
- 4 To make sure that the devices have name server entries (see 2 for an example display), use the **Monitor > Node List** tab. The world-wide names are the name server entries.

If a device does not have a name server entry, reset the FC port as follows:

- Click the **Operations > Port Reset** tab and place a Port Reset check mark for the appropriate port.
- Click the **Activate** button at the bottom of the Port Reset display.
- Go back to the **Monitor > Node List** tab and re-examine the name server entries.

- 5 To make sure the McDATA ports are online and initialized correctly, use the **Monitor > Port List** tab and look at the **State** column.

Example:



**Monitor:** Refresh-4 / 26 / 02 at 13:43:49

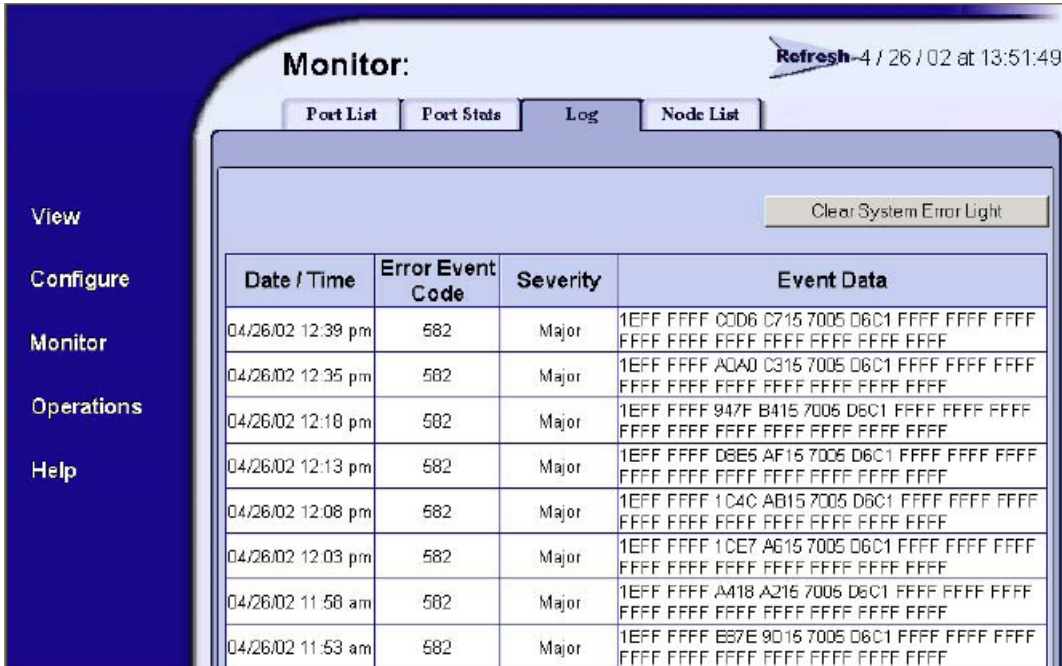
Port List | Port Stats | Log | Node List

#	Name	Block Configuration	State	Type
0		Unblocked	No Light	G Port
1		Unblocked	No Light	G Port
2		Unblocked	No Light	G Port
3		Unblocked	No Light	G Port
4		Unblocked	No Light	G Port
5		Unblocked	No Light	G Port
6		Unblocked	No Light	G Port
7		Unblocked	No Light	G Port
8		Unblocked	No Light	G Port
9		Unblocked	No Light	G Port
10		Unblocked	No Light	G Port
11		Unblocked	No Light	G Port
12		Unblocked	No Light	G Port
13		Unblocked	No Light	G Port
14		Unblocked	Online	F Port
15		Unblocked	Online	F Port
16		Unblocked	No Light	G Port
17		Unblocked	Online	F Port
18		Unblocked	Online	F Port

The ports you are using should be listed as **Online**. If a required port is not online, the device connected to it is not visible to other components on the SAN and cannot be configured for NetBackup Snapshot Client. Look for a bad connection or a malfunction in the connected device.

- Before contacting the switch vendor for technical support, use the **Monitor > Log** tab to get a log dump.

Example:



## Host Bus Adapters (HBAs)

This section provides troubleshooting tips and configuration assistance for the host-bus adapters supported by NetBackup Snapshot Client.

A list of supported HBAs is available.

See [“Supported peripherals and SAN equipment”](#) on page 22..

## Checking the HBA configuration

For assistance with the interface, refer to the documentation provided by the HBA vendor. An example is available.

[JNI Host Bus Adapter - using EZFibre.](#)

Set the following, using the HBA user interface:

- Mode of operation

There are variables specific to each HBA vendor for setting the mode of operation. Fabric mode or public loop mode are recommended.

- Persistent binding

Fibre Channel devices should be bound to specific OS target IDs by modifying the HBA driver configuration files. The binding process assures that the target ID will not change after a system reboot or Fibre Channel reconfiguration. If persistent binding is not used, the target ID may change after a reboot, causing a Snapshot Client backup to fail. Please refer to the documentation available for your specific HBA for more information.

The binding may be based on the world wide name of either the port (WWPN), the node (WWNN), or the destination ID (AL-PA or fabric assigned). Once the selected binding is in place, the rest of the configuration proceeds in the same manner as is used for parallel SCSI installations.

---

**Note:** Each time a new device is added or an old device removed, the binding must be updated to reflect the new configuration. If you use the WWNN/WWPN binding, you can move the devices on a switch, change the AL-PA address, and so forth, without having to reconfigure your media server. However, if you replace or add a device, the WWNN and the WWPN will change and result in a backup failure until the device information is updated and re-bound.

---

## JNI Host Bus Adapter - using EZFibre

---

**Note:** For NetBackup 6.5 and later, the JNI host bus adapter is not supported.

---

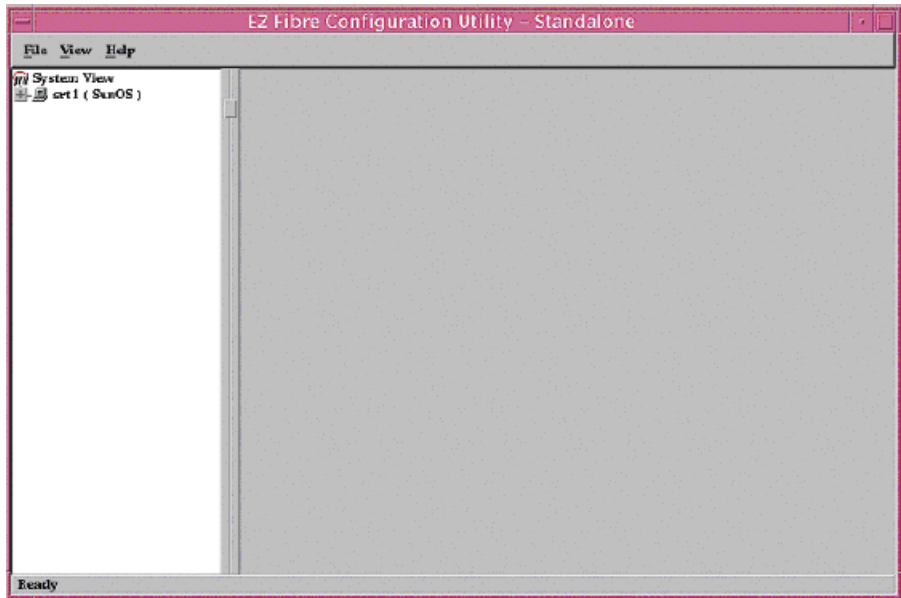
You can use the EZFibre interface to configure the JNI host bus adapter (HBA). Make sure that the correct HBA driver version is installed. The installation directory contains an EZFibre Readme file; refer to that file for detailed information about installing and uninstalling, patch information, how to start EZFibre, and so forth.

## Starting EZFibre

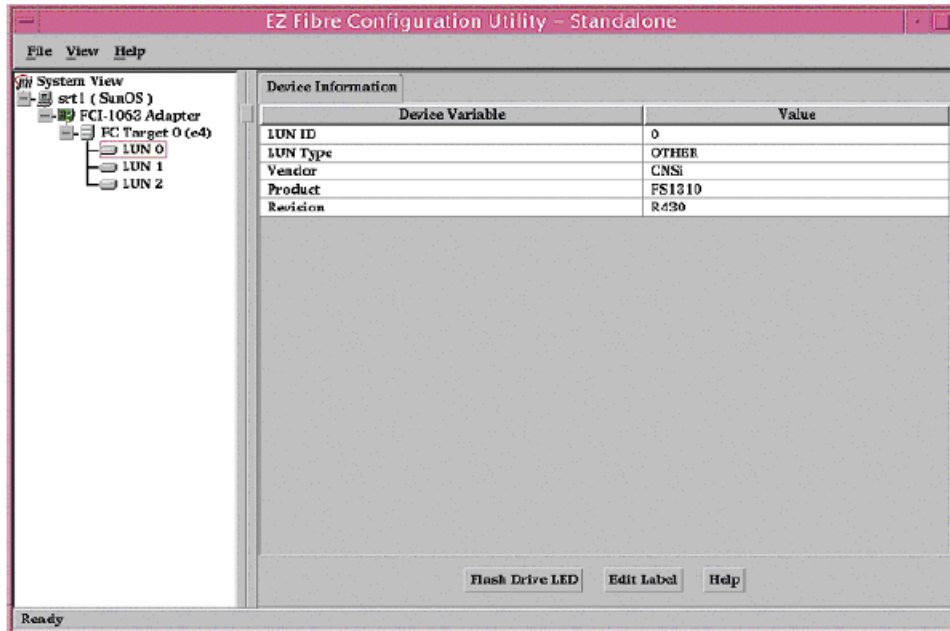
Once the installation of the EZFibre software has completed, go to the installation target directory and launch EZFibre by executing:

```
./ezf
```

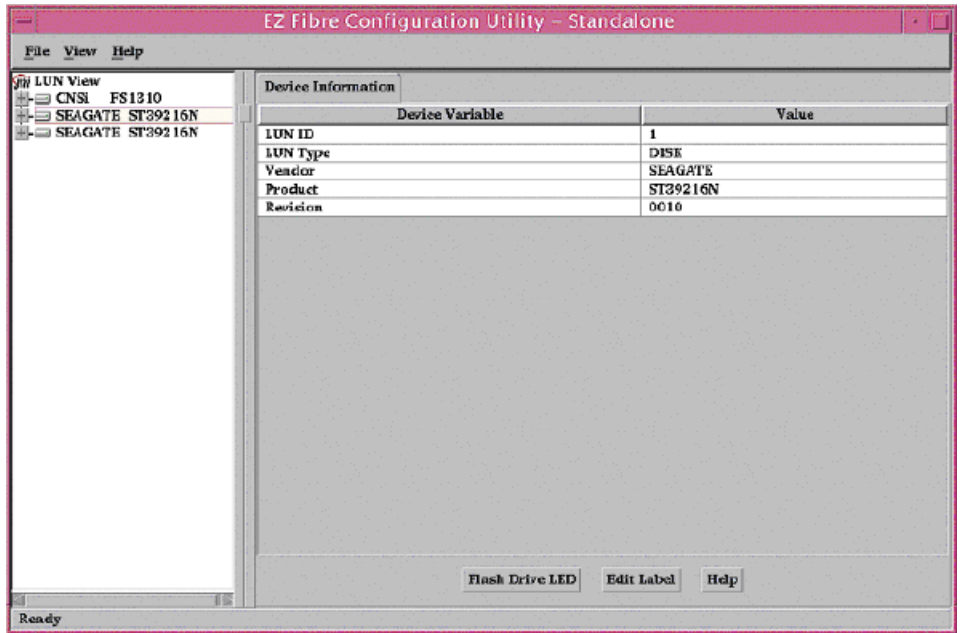
When the EZFibre display first appears, you are in a Systems View mode. To view additional components, expand the tree by clicking on the "+".



Expanding the tree shows the host bus adapter(s) on your system and the targets and LUNs associated with the JNI HBA. Highlighting any item from the adapter down in the tree should present additional information about the item that you select.

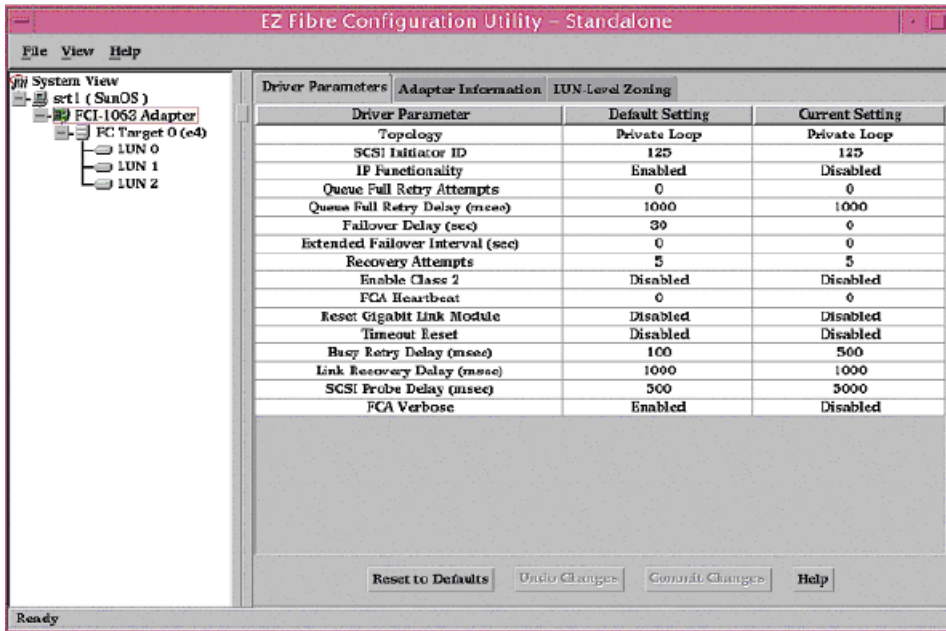


An alternate way of viewing information is by selecting the **LUN View** option in the **View** menu. This gives a clearer view of the LUNs.

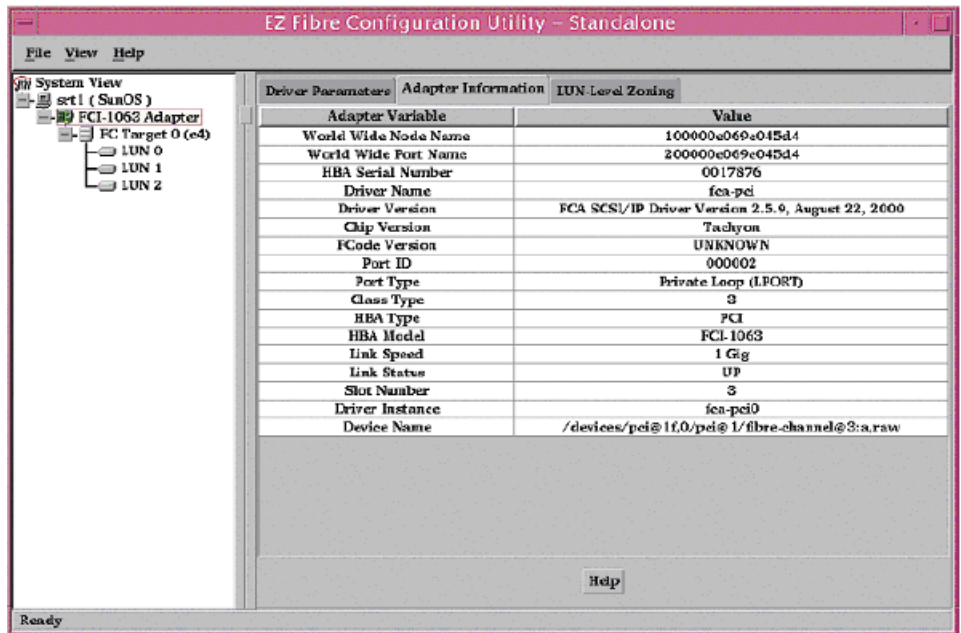


If you return to the **System View** (from the View menu) and select the adapter, you see parameters for the driver as well as default settings for other configuration-related items.

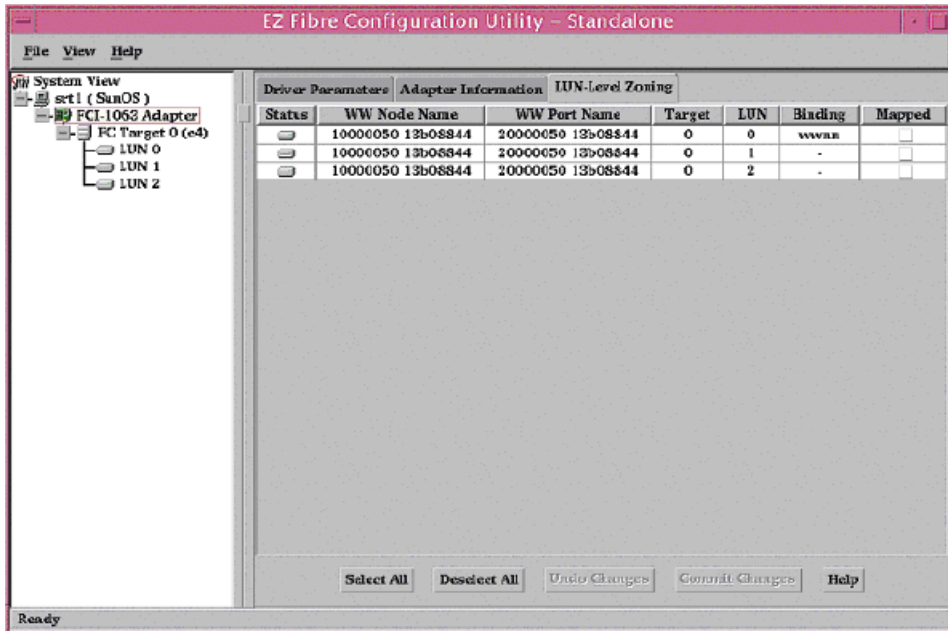




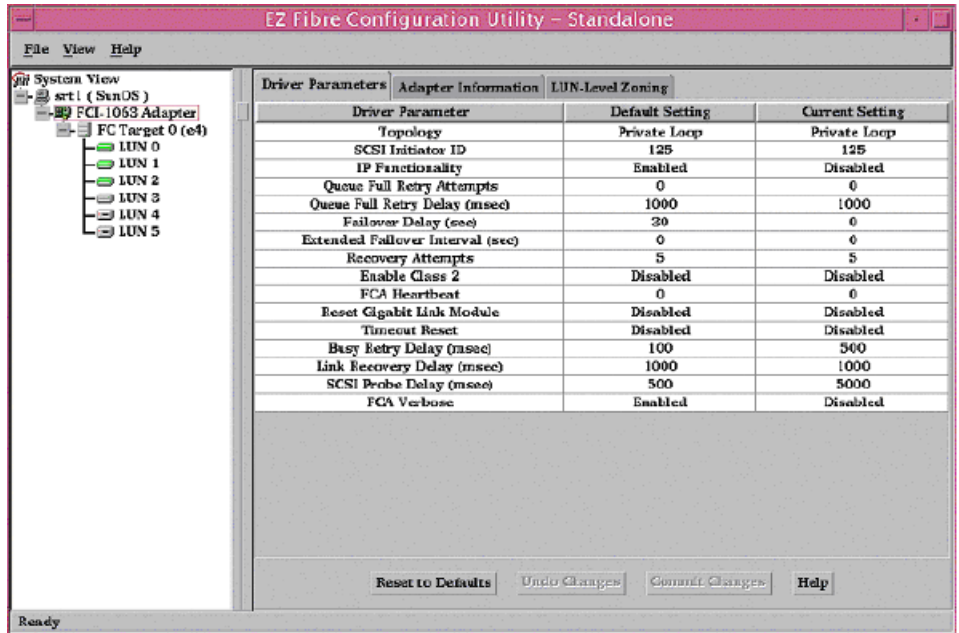
The **Adapter Information** tab displays information about the world-wide node name (WWNN) and world-wide port name (WWPN) for the HBA.



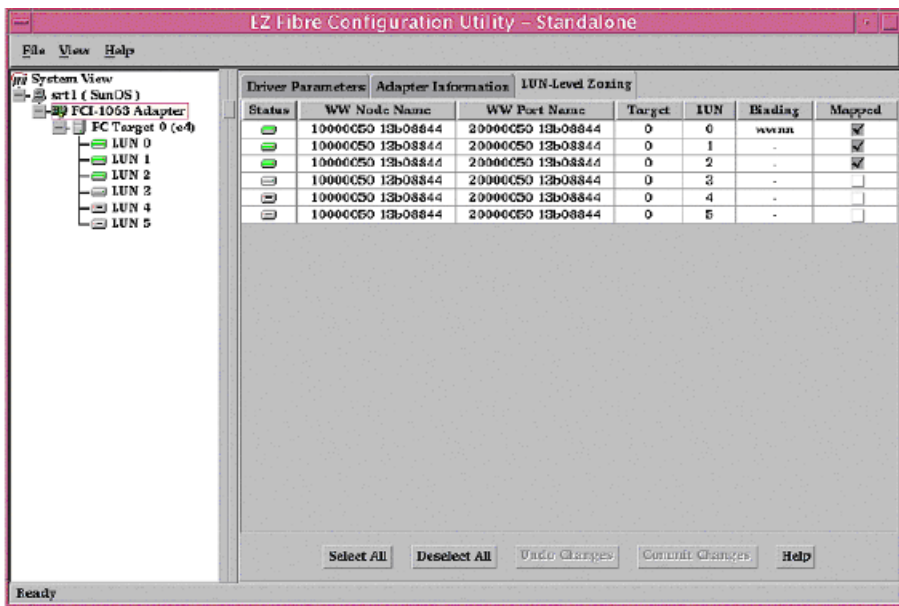
The **LUN-Level Zoning** tab displays information necessary for setting the persistent bindings for this HBA.



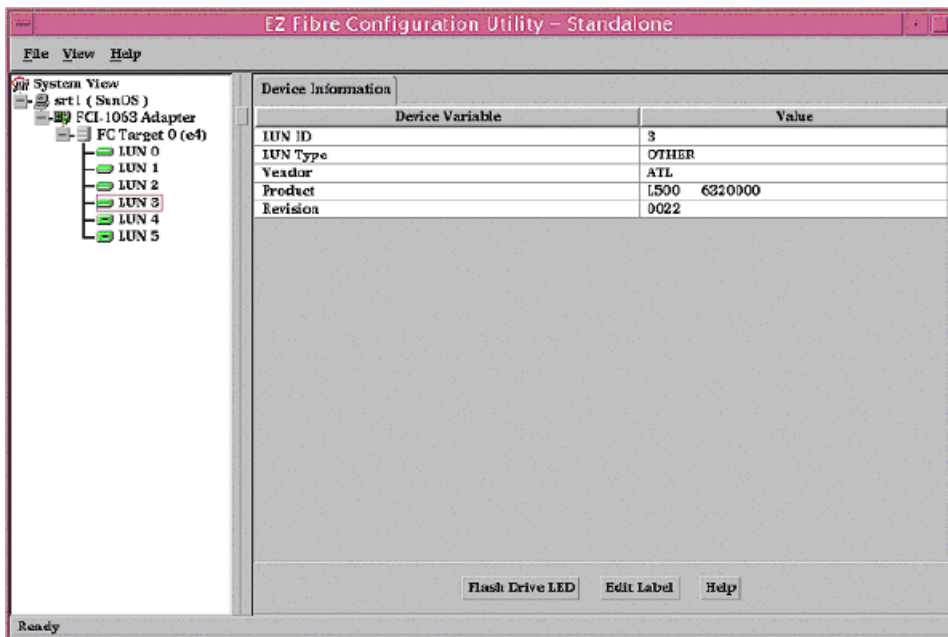
Assuming you now attach a tape robot to your third-party copy device, the following additional LUNS would be displayed. You should review the information found in all of the tabs and make sure it is correct.



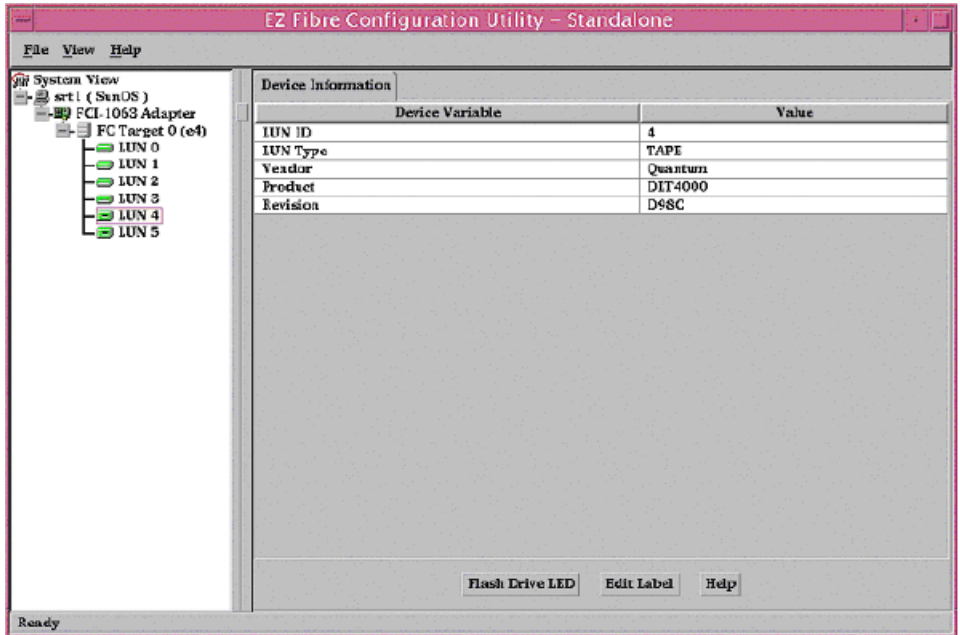
To set the bindings for any new tape devices, you can click on the check boxes individually, or click on the **Select All** button. Once you select the LUNs, the **Commit Changes** button activates. Clicking that button will prompt you to reboot the host, which will edit the appropriate system files.



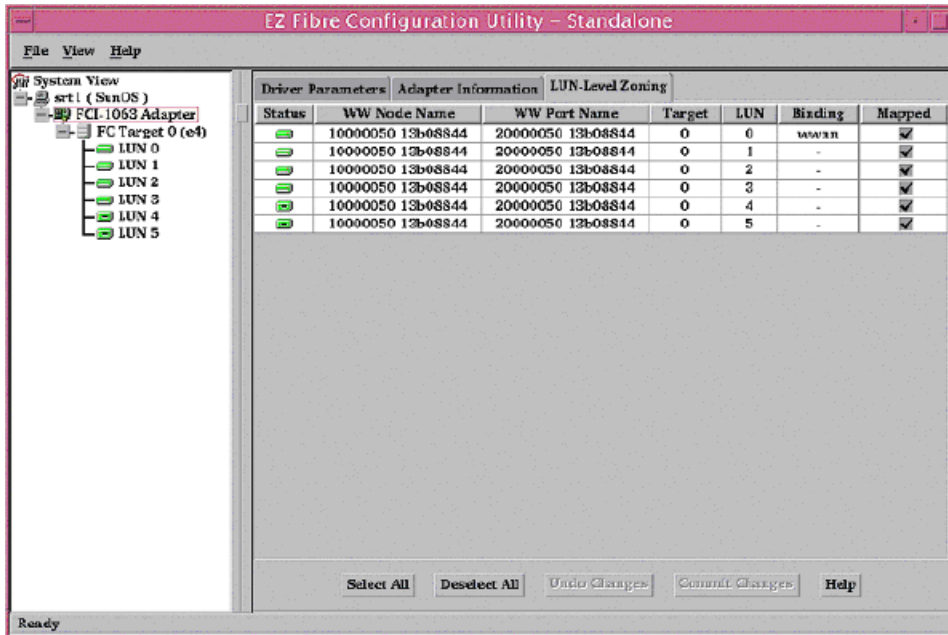
Highlighting each individual LUN will display device-specific information for that LUN.



You can determine which LUN is the tape drive, changer arm, or disk device by viewing each LUN individually.



Once you have set the bindings, committed the changes, and rebooted your host, you should rerun EZFibre and make sure the mapping is set.



## Third-party copy devices

This section provides configuration assistance for the third-party copy devices supported by NetBackup Snapshot Client.

A list of supported third-party copy devices is available.

See [“Supported peripherals and SAN equipment”](#) on page 22.

Information on tested firmware levels is also available.

See [“Test configurations for NetBackup 5.x and 6.0”](#) on page 24.

Third Party Copy Devices in Fibre Channel routers, tape libraries, disk arrays.

## Obtaining world-wide names

In the following procedures for third-party copy devices, an important step is locating world-wide names. Each procedure describes how to use the device's interface to determine world-wide names.

---

**Note:** If all devices required for the backup support identification descriptors (E4 target), you do not need to use the switch or third-party copy device to locate world-wide names. At the start of the backup, NetBackup supplies all device information, including world-wide names and luns.

---

## Do not use LUN-masking

LUN-masking is not compatible with backups using the third-party copy device method. If LUN masking is in effect when using the third-party copy device backup method, the backup may fail or be invalid.

## Improving concurrent backup performance

When sending backups to tape, you can use multiple `/dev/rmt` device paths (or the TAPE keyword) in the `mover.conf` file for better concurrent backup processing, so that two or more backup jobs can execute simultaneously.

## Terminology

The following definitions may be helpful.

### copy manager

Each device capable of third-party copy backup uses a program, which implements ANSI SCSI-3 Extended Copy functionality. The copy manager is sometimes referred to as the data mover.

### control LUN

The Fibre Channel LUN to which the NetBackup media server sends Extended Copy commands. This enables communication between the NetBackup media server and the copy manager in the third-party copy device.

---

**Note:** A control LUN is needed only when the backup is sent to a storage device that is not connected directly to the third-party copy device.

---

### Fibre Channel LUN (FC LUN)

The LUN that identifies the Fibre Channel device on the SAN. In this document, this is referred to as the FC LUN.

### Fibre Channel port

The port that connects a Fibre Channel device to the Fibre Channel switch.

### Fibre Channel-to-SCSI mapping



A table maintained in the third-party copy device that correlates or maps a Fibre Channel port to the SCSI bus, target, and LUN of an attached SCSI device. This mapping enables the attached SCSI device to be accessed on the SAN.

initiator mode (for Fibre Channel port)

A mode that enables the third-party copy device to discover other devices on the SAN.

## Crossroads/Compaq Storage Router

After you have installed the Crossroads/Compaq router, the following procedure may be helpful in setting it up for Snapshot Client.

---

**Note:** The Crossroads 6000 and 10000 support both T10 and SNIA 143 versions of the SCSI Extended Copy command. They also support identification descriptors (E4 target).

---

This procedure provides only general guidelines and pointers. Refer to the router's documentation for details regarding the Crossroads/Compaq interface.

### To set up the Crossroads/Compaq router for the Snapshot Client

- 1 Initiate the Crossroads interface by entering the host name or IP address of the Crossroads router in a web browser.
- 2 Check the firmware level on the Crossroads display.  
Make sure your firmware level supports third-party copy functionality. Also make sure the level is at or above the firmware level.  
Third Party Copy Devices in Fibre Channel routers, tape libraries, disk arrays.
- 3 Obtain the world-wide node and port names of the Crossroads.  
The world-wide node name and port name are useful when setting the HBA persistent bindings, and the port name is useful when editing the `3pc.conf` file (described in the *NetBackup Snapshot Client Administrator's Guide*).
- 4 Make sure the router's third-party copy functionality is enabled, so the router can accept Extended Copy commands (for third-party copy).
- 5 Display the FC LUN-to-SCSI bus, target, LUN mapping.

---

**Note:** You can use this information for Solaris operating system device configuration (`sd.conf` and `st.conf` files).

---

## ADIC/Pathlight Gateway

After you have installed the ADIC/Pathlight, the following procedure may be helpful in setting it up for Snapshot Client.

---

**Note:** Supports both T10 and SNIA 143 versions of the SCSI Extended Copy command. Also supports the identification descriptor (E4 target).

---

---

**Note:** Certain changes may require a reboot.

---

- 1 Telnet into the ADIC/Pathlight. For example:

```
telnet plg
```

- 2 Check firmware level by entering the version command:

```
version
```

```
SAN Gateway Test Build Version 0343.773 Built Nov 7 2001, 16:08:53  
VxWorks (for Pathlight (i960RD)) version 5.3.1.  
Kernel: WIND version 2.5.  
value = 26 = 0x1a
```

---

**Note:** Make sure your firmware level supports third-party copy functionality. Also make sure the level is at or above the firmware level listed in the table See [“Test configurations for NetBackup 5.x and 6.0”](#) on page 24. under Third Party Copy Devices in Fibre Channel routers, tape libraries, disk arrays.

---

- 3 Obtain the world-wide node and port names of the ADIC/Pathlight, by entering the following.

```
fcShowNames
```

**Example output:**

```
-----
Ctlr  : PCI Addr : ISP   :      Node      :      Port
Id    : Bs Dv Fn  : Type  :      Name      :      Name
-----
  1   : 00 06 00 : 2200 : 10000060.451616f7 : 20010060.451616f7
  2   : 00 07 00 : 2200 : 10000060.451616f7 : 20020060.451616f7
  3   : 01 08 00 : 2200 : 10000060.451616f7 : 20030060.451616f7
  4   : 00 18 00 : 2200 : 10000060.451616f7 : 20040060.451616f7
  5   : 00 19 00 : 2200 : 10000060.451616f7 : 20050060.451616f7
  6   : 01 20 00 : 2200 : 10000060.451616f7 : 20060060.451616f7
-----
value = 66 = 0x42 = 'B'
```

To find the correct world-wide port name, you must know which port the switch is connected to.

The world-wide node name and port name are useful when setting the HBA persistent bindings, and the world-wide port name is useful when editing the 3pc.conf file (described in the *NetBackup Snapshot Client Administrator's Guide*).

- 4 Do the following to ensure that the third-party copy functionality (data mover) is enabled:

To perform a third-party copy device backup, you must install the data mover license and then enable it.

- Verify that the ADIC/Pathlight (data mover) license is installed by entering the following:

```
licenseShow
```

**Sample output:**

```
License "73TN2-99D24": Valid
  Features:
  Data Mover.

License "73TN2-99D23-HSVBW": Valid
  Features:
  Virtual Private SAN - VPS (TM),
```

```
Data Mover,  
SAN Director (TM) ,  
SAN Replication Services - SRS (TM) ,  
Virtual Private Map - VPM (TM) .  
value = 2 = 0x2
```

- Verify that the license key is enabled:

```
sncFeatureEnable
```

**Sample output:**

```
value = 1 = 0x1
```

In this example, the ADIC/Pathlight is enabled and the license is installed.  
If the output reads as follows:

```
value = -1 = 0xffffffff
```

the license is not installed and you must enter the license key.

## 5 Check the copy manager's FC LUN (control LUN).

The ADIC/Pathlight can intercept Extended Copy commands that are sent to the tape device. If you have a tape storage device behind ADIC/Pathlight, you can use the tape device path to identify the third-party copy device in the NetBackup mover.conf file. In this case, there is no need for a control LUN.

The control LUN will be used by the NetBackup media server to send Extended Copy commands to the ADIC/Pathlight's copy manager if the backup is sent to a storage device that is not connected directly to the ADIC/Pathlight.

The ADIC/Pathlight allows the use of one control LUN (by default, LUN 0). This control LUN can be assigned to any other LUN, as shown below.

To display the current control LUN:

```
sysConfigShow
```

### Example output:

```
Current System Parameter Settings:
Comamnd and Control Device (CC) : 0 Enabled
                                LUN : 0
Allow Early Write Status for Tape : 1 Enabled
Allow R/W Acceleration for Tape : 1 Enabled
Enet MAC Address: 0.72.22.12.8.12
Active System Node Name Mode is 0
FC Node WWN: 10000060.45160822
Memory Snoop: Enabled
Device Inquiry after Host SCSI Bus Reset: Disabled
value = 0 = 0x0
```

The above shows that the control LUN is 0.

To assign a new LUN, enter:

```
setSnaCCLun new_lun
```

For example:

```
setSnaCCLun 99
```

### Example output:

```
value = 0 = 0x0
plg > 0xc1f36b00 (tCsAsapN): FC 0 LUN 0 - Removed
0xc1f36b00 (tCsAsapN): FC 1 LUN 0 - Removed
0xc1f36b00 (tCsAsapN): FC 2 LUN 0 - Removed
0xc1f36b00 (tCsAsapN): FC 3 LUN 0 - Removed
```

```
0xc1f36b00 (tCsAsapN): FC 5 LUN 0 - Removed  
0xc1f36b00 (tCsAsapN): FC 6 LUN 0 - Removed  
0xc1f36b00 (tCsAsapN): FC 7 LUN 0 - Removed
```

To check the result, enter:

```
sysConfigShow
```

**Example output:**

```
Current System Parameter Settings:  
Comamnd and Control Device (CC) : 0 Enabled  
LUN : 99  
Allow Early Write Status for Tape : 1 Enabled  
Allow R/W Acceleration for Tape : 1 Enabled  
Enet MAC Address: 0.72.22.12.8.12  
Active System Node Name Mode is 0  
FC Node WWN: 10000060.45160822  
Memory Snoop: Enabled  
Device Inquiry after Host SCSI Bus Reset: Disabled  
value = 0 = 0x0
```

**6 Check the Fibre Channel port connection type by entering the following:**

```
fcConnTypeGet port_number
```

For example:

```
fcConnTypeGet 1
```

Example output:

```
value = 1 = 0x1
```

value = indicates the connection type as follows:

0 is loop

1 is point-to-point

2 is loop preferred

3 is point-to-point preferred

To change the connection type, enter the following:

```
fcConnTypeSet port_number, connection_type
```

For example:

```
fcConnTypeSet 2, 2
```

This sets the connection type to loop preferred.

**7 Do the following to display the FC LUN-to-SCSI bus, target, LUN mapping:**

You can use this information for Solaris operating system device configuration (`sd.conf` and `st.conf` files).

- Find out how many SCSI devices are connected to the ADIC/Pathlight.

```
scsiShow
```

This command lists the physical devices that are connected and running.

Example output for `scsiShow`:

```
=====
SCSI Initiator Channel 1: 0xc10771f0
ID LUN Vendor   Product      Rev | Sync/Off Width
-----|-----
0  0 EXABYTE   Exabyte 690D   2.06 | 12/ 0 8      0/ 0 8
1  0 QUANTUM  DLT7000     1E46 | 25/15 16 S W 25/15 16 S W
2  0 QUANTUM  DLT7000     1E46 | 25/15 16 S W 25/15 16 S W
=====
```

```

SCSI Initiator Channel 2: 0xc103d9f0
ID LUN Vendor Product Rev| Sync/Off Width
-----|-----
0 0 SEAGATE ST39204LCSUN9.0G 8507| 12/15 16 S W 0/ 0 8 S W Q
1 0 SEAGATE ST39204LCSUN9.0G 8507| 12/15 16 S W 0/ 0 8 S W Q
2 0 SEAGATE ST39204LCSUN9.0G 8590| 12/15 16 S W 0/ 0 8 S W Q
3 0 SEAGATE ST39204LCSUN9.0G 8590| 12/15 16 S W 0/ 0 8 S W Q
4 0 SEAGATE ST39204LCSUN9.0G 8590| 12/15 16 S W 0/ 0 8 S W Q
5 0 SEAGATE ST39204LCSUN9.0G 8590| 12/15 16 S W 0/ 0 8 S W Q
=====
SCSI Initiator Channel 3: 0xc1093df0
No Devices
=====
SCSI Initiator Channel 4: 0xc105a5f0
No Devices
=====
value = 4 = 0x4

```

The above shows the SCSI devices connected to the ADIC/Pathlight. The first grouping in the display lists the devices connected to SCSI channel 1, the second grouping lists devices connected to SCSI channel 2, and so forth.

- To display the FC LUN-to-SCSI mapping for a Fibre Channel port, enter the following:

```
fcShowDevs
```

Example output (in this example, the mapping is for Fibre Channel port 6):

```

FC 6:
LUN Chan Id Lun Vendor Product Rev SN
-----
0 0 0 0 PATHLGH SAN Gateway 32bd 100516
1 1 0 0 EXABYTE Exabyte 690D 2.06 33001206
2 1 1 0 QUANTUM DLT7000 1E46 TNA36S0007
4 1 2 0 QUANTUM DLT7000 1E46 TNA49S0183
6 2 0 0 SEAGATE ST39204LCSUN9.0G 8507 3BV0FYFA00002051909G
7 2 1 0 SEAGATE ST39204LCSUN9.0G 8507 3BV0FQ9A000020517XGG
8 2 2 0 SEAGATE ST39204LCSUN9.0G 8590 3BV0B0BT000010431YPW
9 2 3 0 SEAGATE ST39204LCSUN9.0G 8590 3BV0BYDW00001046J7FW
10 2 4 0 SEAGATE ST39204LCSUN9.0G 8590 3BV0EQC30000204962CE
11 2 5 0 SEAGATE ST39204LCSUN9.0G 8590 3BV0B03M000010440PU2
value = 72 = 0x48 = 'H'

```



Use the output from `scsiShow` to identify the SCSI devices in this output, to determine the FC LUN assignment.

- 8 Do the following to make sure that the devices that are used for third-party copy backup are visible to the ADIC/Pathlight's copy manager:
  - Before checking SAN device visibility, make sure that Fibre Channel port mode is set to Target and Initiator (private or public).

```
fcPortModeGet port_number
```

where *port\_number* is the number of the ADIC/Pathlight's physical Fibre Channel port (SAN connection) you are using.

The number displayed indicates the port mode as follows.

- 1 indicates the port mode is Private Target
- 2 indicates the port mode is Private Initiator
- 3 indicates the port mode is Private Target and Initiator
- 17 indicates the port mode is Public Target
- 18 indicates the port mode is Public Initiator
- 19 indicates the port mode is Public Target and Initiator

If your SAN environment is fabric, the port mode of the ADIC/Pathlight should be Public Target and Initiator (value 19), as follows:

Enter, for example:

```
fcPortModeGet 2
```

Example output:

```
value = 19 = 0x13
```

If your SAN environment is fabric and you receive a different value, use the following command to change it (be sure to reboot the ADIC/Pathlight if you make this change):

```
fcPortModeSet port_number,mode
```

For example:

```
fcPortModeSet 2,19
```

Example output:

```
value = 0 = 0x0
```

Then enter, for example:

fcPortModeGet 2

Example output:

value = 19 = 0x13

To display the Fibre Channel devices, enter the following command:

targets

Example output:

Idx	Tdev	Vendor	Product	Rev	Type Specific
0	0xc1029780	PATHLIGHTSAN	Gateway	32bD	Cmd/Cntrl Status 0h
1	0xc1ffc710	EXABYTE	Exabyte 690D	2.06	Changer: flags 40000001h
2	0xc0c3fb90	QUANTUM	DLT7000	1E46	Tape: Blk Size 0 , flags 40000000h
4	0xc0c3e890	QUANTUM	DLT7000	1E46	Tape: Blk Size 0 , flags 40000000h
6	0xc1f4df90	SEAGATE	EST39204LCSUN9.0	G8507	Disk 17689266 blks of 512 bytes RCE
7	0xc0c1a010	SEAGATE	EST39204LCSUN9.0	G8507	Disk 17689266 blks of 512 bytes RCE
8	0xc0c3de90	SEAGATE	EST39204LCSUN9.0	G8590	Disk 17689266 blks of 512 bytes RCE
9	0xc0bea010	SEAGATE	EST39204LCSUN9.0	G8590	Disk 17689266 blks of 512 bytes RCE
10	0xc0bc8210	SEAGATE	EST39204LCSUN9.0	G8590	Disk 17689266 blks of 512 bytes RCE
11	0xc0bc7c10	SEAGATE	EST39204LCSUN9.0	G8590	Disk 17689266 blks of 512 bytes RCE
12	0xc0b79510	ADIC	Scalar SNC	40aD	Controller: flags 0h
13	0xc0b70c90	IBM	DDYS-T18350N	S80D	Disk 35843669 blks of 512 bytes RCE
14	0xc0b53610	SONY	SDX-500C	010B	Tape: Blk Size 0 , flags 40000000h
17	0xc0b0c010	SPECTRA	215	1014	Changer: flags 40000001h
18	0xc0af2b90	SONY	SDX-500C	01cd	Tape: Blk Size 0 , flags 40000000h
19	0xc0af1410	SONY	SDX-500C	01cd	Tape: Blk Size 0 , flags 40000000h

For example, if you want to back up data from the IBM disk DDYS-T18350N on FC LUN 13 to the Quantum tape drive DLT7000 on FC LUN 2, the above example shows that both those devices are visible to the copy manager.

## ATTO

After you have installed the ATTO, the following procedure may be helpful in setting it up for Snapshot Client.

---

**Note:** Supports SNIA 143 version of the Extended Copy SCSI command (support for T10 is in progress). Does not currently support the identification descriptor (E4 target).

---

---

**Note:** When making changes to your configuration, use the `SaveConfiguration` command after entering each change. Also, certain changes may require a reboot.

---

### To set up ATTO for the Snapshot Client

#### 1 Telnet into the ATTO.

For example:

```
telnet atto
```

#### 2 Check firmware level by entering the Info command:

Third-party copy (Extended Copy) capability is enabled by the firmware.

```
Info
```

#### Example output for the FibreBridge 4500:

```
Device                = "FibreBridge 4500"  
Serial Number        = 230H100555  
Device Version       = 005E  
Device Build         = 005E  
Build Date           = "Mar 1 2002" 12:01:14  
NVRAM Revision       = 0  
CLI Revision         = 0.23  
FC Firmware Revision = 2.1.14  
FibreBridge Name     = "ATTO "  
World Wide Name 0    = 10 0d 5c  
World Wide Name 1    = 10 0d 5d  
World Wide Name 2    = 10 0d 5e  
SCSI Port 0          = HVD  
SCSI Port 1          = HVD  
SCSI Port 2          = HVD  
SCSI Port 3          = HVD
```

Make sure your firmware level supports third-party copy functionality. Also make sure the level is at or above the correct firmware level.

Third Party Copy Devices in Fibre Channel routers, tape libraries, disk arrays.

- 3 Obtain the world-wide node and port names of the ATTO by enter the following.

```
get FcWWName fibre_channel_port
```

For example:

```
get FcWWName 2
```

Example output:

```
FcWWName[2] = 20 00 00 10 86 10 0D 5E
```

In this output, the node name is the same as the world-wide port name.

The world-wide node name and port name are useful when setting the HBA persistent bindings. The world-wide port name is useful when editing the `3pc.conf` file.

See “[3pc.conf Description](#)” on page 123.

#### 4 Determine the copy manager's FC LUN (Fibre Bridge Target LUN).

The ATTO can intercept Extended Copy commands that are sent to the tape device. If you have a tape storage device behind the ATTO, you can use the tape device path to identify the third-party copy device in the NetBackup mover.conf file. In this case, there is no need for a control LUN.

The control LUN will be used by the NetBackup media server to send Extended Copy commands to the ATTO's copy manager if the backup is sent to a storage device that is not connected directly to the ATTO.

For the FibreBridge 4500, enter:

```
get FibreBridgeTargetLUN [fibre_channel_port] [fibre_channel_lun]
```

For example:

```
get FibreBridgeTargetLUN
```

Example output:

```
4
;fp fl
 0  0
 1  0
 2  3
```

In this output, `fp` is the Fibre Channel port number, and `fl` (FC LUN) is the Fibre Bridge Target LUN.

To assign a new Fibre Bridge Target LUN, enter:

```
set FibreBridgeTargetLUN [fibre_channel_port] [fibre_channel_lun]
```

Any map coinciding with a user-specified FibreBridgeTargetLUN must be set to **offline** before attempting to change a FibreBridgeTargetLUN.

**5 Check the Fibre Channel port connection type by entering the following:**

```
get FcConnMode port_number
```

**For example:**

```
get FcConnMode
```

**Example output:**

```
FcConnMode = ptp  
Ready
```

ptp indicates the connection type is point-to-point, and loop indicates loop.

To change the port connection type to loop, enter the following:

```
set FcConnMode loop
```

**6 Do the following to display the FC LUN-to-SCSI bus, target, LUN mapping:**

- Find out how many SCSI devices are connected to the ATTO.

```
SCSITargets SCSI_port
```

This command lists the physical devices that are connected and running on the specified SCSI port.

**For example:**

```
SCSITargets 2
```

**Example output:**

```
4  
;sb st sl Device Type      Vendor ID Product ID      Rev. Serial Number  
1  0  0 Medium-changer HP          C7200-8000      1330 US9DY00105  
1  1  0 Tape                QUANTUM      DLT8000         023B PXB33P0850  
1  2  0 Tape                QUANTUM      DLT8000         023B CX949P1208
```

- For the FibreBridge 4500:

To display the mapping, enter the following:

```
RouteDisplay online
```

This command returns a list of currently mapped Fibre Channel to SCSI routes sorted by Fibre Channel address.

**Example output:**

```
8
;fp fl sb st sl Status
0 0 xx xx xx FibreBridge
0 1 xx xx xx Services
1 0 xx xx xx FibreBridge
1 1 xx xx xx Services
2 0 2 0 0 Online
2 1 2 1 0 Online
2 2 2 2 0 Online
```

The above shows, for instance, that Fibre Channel port 2 (in the `fp` column) and FC LUN 0 (in the `fl` column) are mapped to SCSI bus 2, target 0, and LUN 0.

To change the mapping, use the following command:

```
RouteChange [fp][fl][sb][st][sl]
```

You can use this information for Solaris operating system device configuration (`sd.conf` and `st.conf` files).

**7** Make sure Fibre Channel port initiator mode is enabled for device discovery.

To use the third-party copy device backup method, initiator mode must be enabled on all ports where Fibre Channel devices need to be accessed.

```
get FcInitiator
```

Example output:

```
FcInitiator = enabled
```

To enable port initiator mode, enter the following:

```
set FcInitiator enabled
```

**8** Make sure the devices used for third-party copy backup are visible to the ATTO's copy manager, by entering the following:

```
FCTargets fp [immediate]
```

This command lists the physical target devices that are connected and running on the specified Fibre Channel port (*fp*).

For example:

```
FCTargets 2
10
Node Name          | LUN | VendorID | ProductID          | Rev. | Device Type
=====|=====|=====|=====|=====|=====
1000005013001000 | 0   | QUANTUM  | DLT8000            | 0119 | Tape
1000006045170453 | 0   | ADIC     | Scalar SNC         | 40aD | RAID
20000090A5000464 | 0   | SPECTRA  | 215                 | 1014 | Medium-changer
20000090A5000824 | 0   | SPECTRA  | GATOR              | 0128 | Medium-changer
10000060451616F7 | 0   | PATHLGH | SAN Gateway        | 32b* | RAID
1000006045160822 | 0   | PATHLGH | SAN Gateway        | 32b* | RAID
200000203742595A | 0   | SEAGATE  | ST336605FC         | 0002 | Disk
20000020374259B5 | 0   | SEAGATE  | ST336605FC         | 0002 | Disk
```

## Hitachi/HP/SUN disk arrays

Please note the following:

- Third-party copy functionality (ServerFree) is enabled by the array firmware (microprogram).
- Discovery of disk and tape devices on the SAN is automatic.



- Because the third-party copy functionality is embedded in the disk array logic, the client disks that you want to back up must be in the array.
- Because the third-party copy functionality is embedded in the disk array logic, reserve (10) does not apply.
- The array has a separate initiator-only port, for sending the backup data to tape. Extended Copy commands can be received on any disk LUN. There is no separate control LUN.
- The array supports both T10 and SNIA 143 versions of the SCSI Extended Copy command.
- The array does not currently support the identification descriptor (E4 target descriptor).

After you have installed the disk array, you can configure it for the Snapshot Client.

#### To configure the disk array for the Snapshot Client

- 1 Check the firmware level (microprogram version).

The firmware level of the disk array can be viewed on the configuration console installed in the disk array cabinet. Click the "maintenance" button, then "version." Since the ServerFree functionality is enabled by the firmware, a proper version of the firmware must be installed.

Make sure your firmware level supports third-party copy functionality. Also make sure the level is at or above the correct firmware level.

Third Party Copy Devices in Fibre Channel routers, tape libraries, disk arrays.

- 2 Configure a pair of ports for ServerFree: one target port and one initiator port.

The ServerFree capability of the array requires a pair of Fibre Channel connections: one target port (to which the media server sends the Extended Copy commands), and one initiator port (by which the array's data mover writes the data to tape).

Be sure to record the target port LUN; this information is needed for configuring the sg driver on the media server.

- 3 Set the target and initiator port topology, as follows.
  - Initiator port: set to point-to-point, with fabric on.
  - Target port: set to point-to-point, with fabric off.
- 4 For best performance, create a mover.conf.*policy\_name* file for each backup job, and specify a different /dev/sg (Solaris) or /dev/sctl (HP-UX) passthru path in each mover.conf.*policy\_name* file for each backup.

# Configuring NetBackup for off-host data mover backups

This section provides NetBackup configuration assistance for off-host backups using a data mover: either the NetBackup Media Server or Third-Party Copy Device backup methods. If your backup policies are not using either of these off-host data mover methods, you may skip this section.

Please note the following assumptions:

- You have considerable technical expertise in both SAN and NetBackup configuration.
- Your hardware environment is already configured and functional, including switches, hubs, optional bridges or third-party copy devices, robots, tape drives, and disk arrays.
- Tape devices are visible to the NetBackup media server, and all passthru paths exist for tape devices and third-party copy devices.

This section includes the following topics:

- [Supported peripherals](#)
- [SAN Configuration diagram](#)
- [Media Server/Third-Party Copy Requirements](#)
- See “[Configuration flowcharts](#)” on page 111.
- See “[Verify NetBackup Access to SAN Devices](#)” on page 115.
- See “[Solaris only: Configure HBA Drivers](#)” on page 121.
- See “[Create Backup Configuration Files](#)” on page 122.

## SAN Configuration diagram

The following diagram shows the devices and configuration files described by the procedures in this section. This diagram shows devices configured behind a third-party copy device as well as directly attached to the SAN.

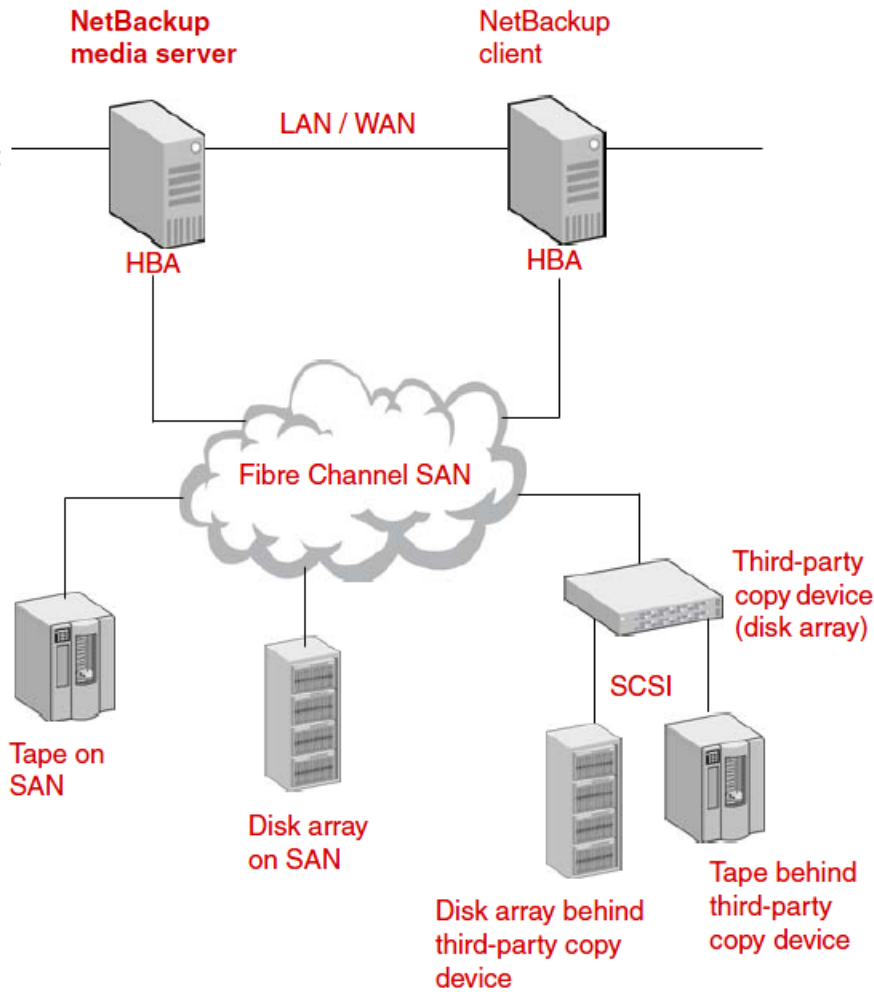
Backup configuration files on media server:

**3pc.conf file:**

Identifies tape and client disk devices used by third-party copy device.

**mover.conf file:**

Identifies the third-party copy device.



## Supported peripherals

A list of Snapshot Client supported peripherals is available.

See [“Supported peripherals and SAN equipment”](#) on page 22..

## Media Server/Third-Party Copy Requirements

The configuration requirements for NetBackup Media Server and Third-Party Copy Device backup methods are as follows:

- The information needed for the NetBackup Media Server method is obtained by means of the `bptpcinfo` command described later in this section.
  - The information needed for the Third-Party Copy Device method requires the `bptpcinfo` and `bpmoverinfo` commands. Depending on your devices, you may need the following:
    - The Veritas CommandCentral Storage product (or SANPoint Control) for locating the world-wide port name and luns. If you have CommandCentral Storage or SANPoint Control, you can use the `bpSALinfo` command to look up world-wide name and lun information. See the note below.
    - The instructions provided with your HBA and third-party copy device.
  - NetBackup multi-stream backups that use an off-host data mover method may take too long to create the `3pc.conf` file on a large media server
- The client disks to back up
  - The devices on which to store the data

For a media server that has access to a large number of disks and storage devices, a multi-stream data mover backup may take too long to create the `3pc.conf` file. If no `3pc.conf` file exists on the media server, the first multi-stream backup that uses a data mover method may fail. The job status code is 103 (error occurred during initialization, check configuration file).

To avoid this problem, create the `3pc.conf` file manually before running the first multi-stream data mover backup. Use the following command to create the `3pc.conf` file: `/usr/opensv/netbackup/bin/bptpcinfo -a`

The `3pc.conf` file is created at `/usr/opensv/volmgr/database/3pc.conf`.

## Diagram for NetBackup Media Server

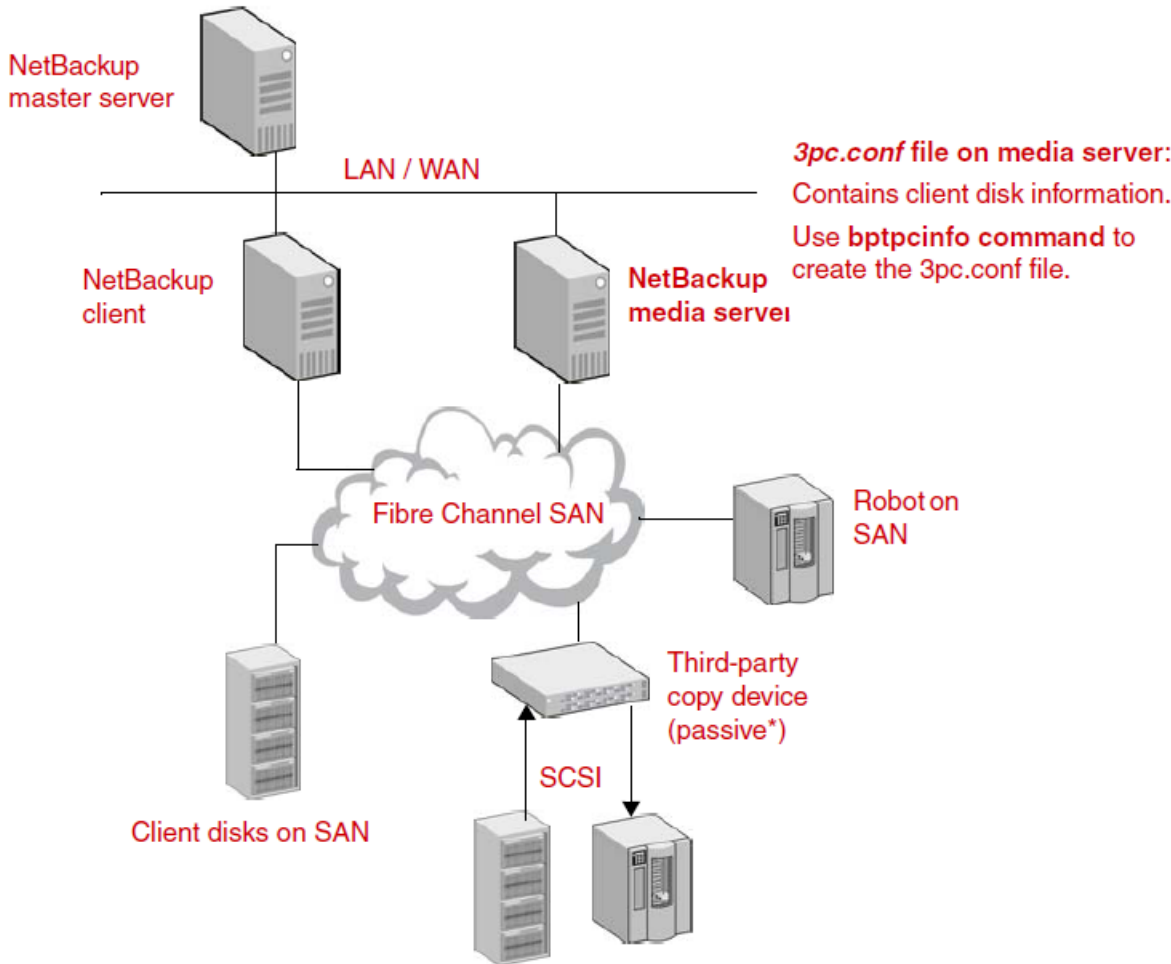
In this backup method, the NetBackup media server handles the backup processing and sends the backup data over Fibre Channel to the storage device.

---

**Note:** If you have a multi-ported SCSI disk array, a Fibre Channel SAN is not required.

---

Figure 1-12 NetBackup Media Server Backup Method



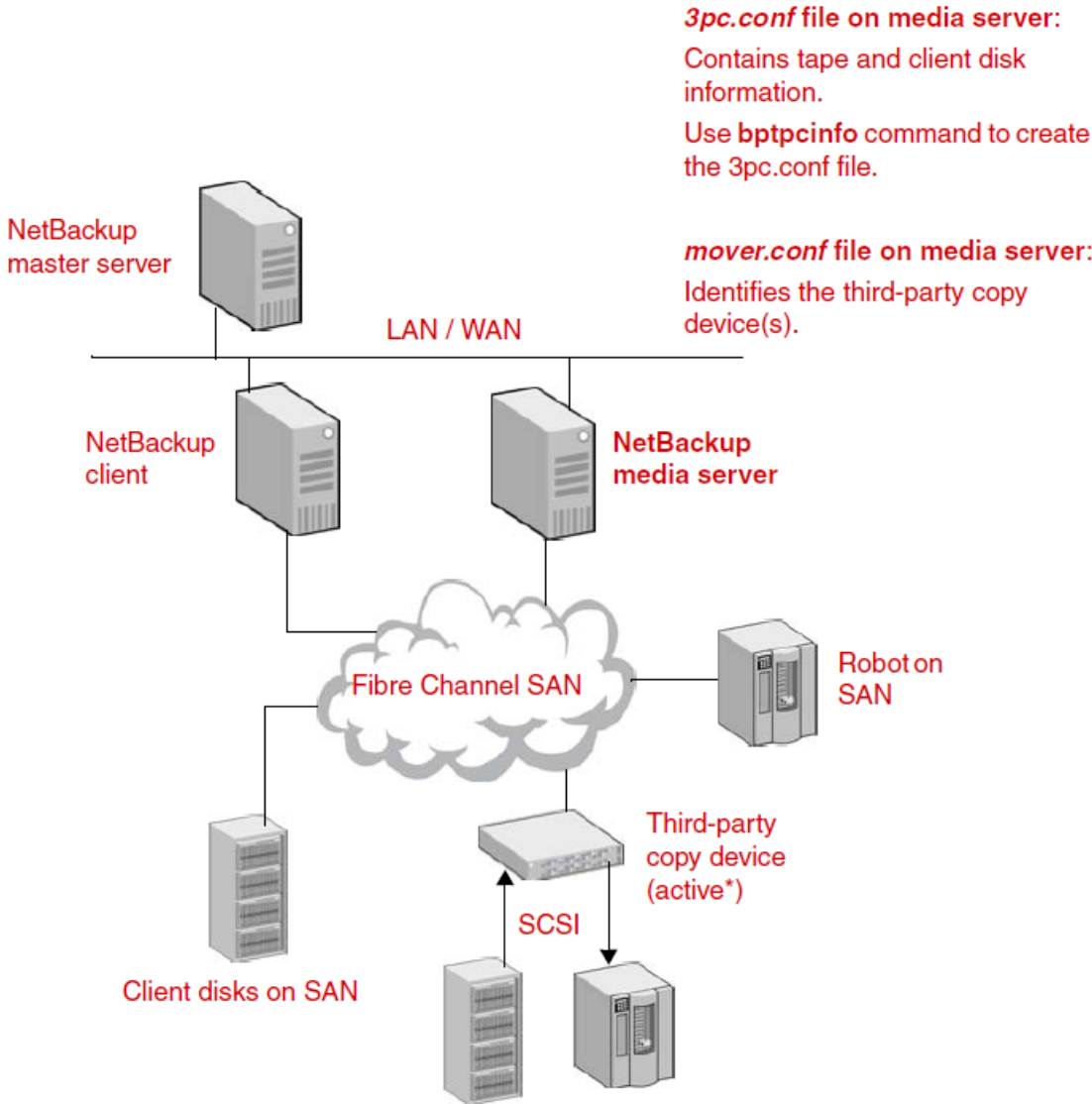
*\*passive* means the third-party copy device allows media server access to the disks/tapes but does not perform SCSI Extended Copy commands.

## Diagram for Third-Party Copy Device

In this backup method, a third-party copy device performs the I/O processing of the backup (data movement). The 3pc.conf file describes the disks to be backed up

and the tape devices for data storage. Be sure to use the flowcharts under See “Configuration flowcharts” on page 111..

Figure 1-13 Third-Party Copy Device Backup Method



\*active means the third-party copy device performs SCSI Extended Copy commands to move the data.

## Diagram for Third-Party Copy Device - Remote

```
bptpcinfo -x client_name
```

---

**Note:** If all devices support identification descriptors (E4 target), NetBackup automatically creates a complete 3pc.conf file and you do not need to run the `bptpcinfo` command.

---

## Configuration flowcharts

The following four charts show the process for setting up configuration files for Media Server or Third-Party Copy backup. Instructions are included later in this section.

Figure 1-14 Chart I: Verify SAN device visibility for the Netbackup Media Server

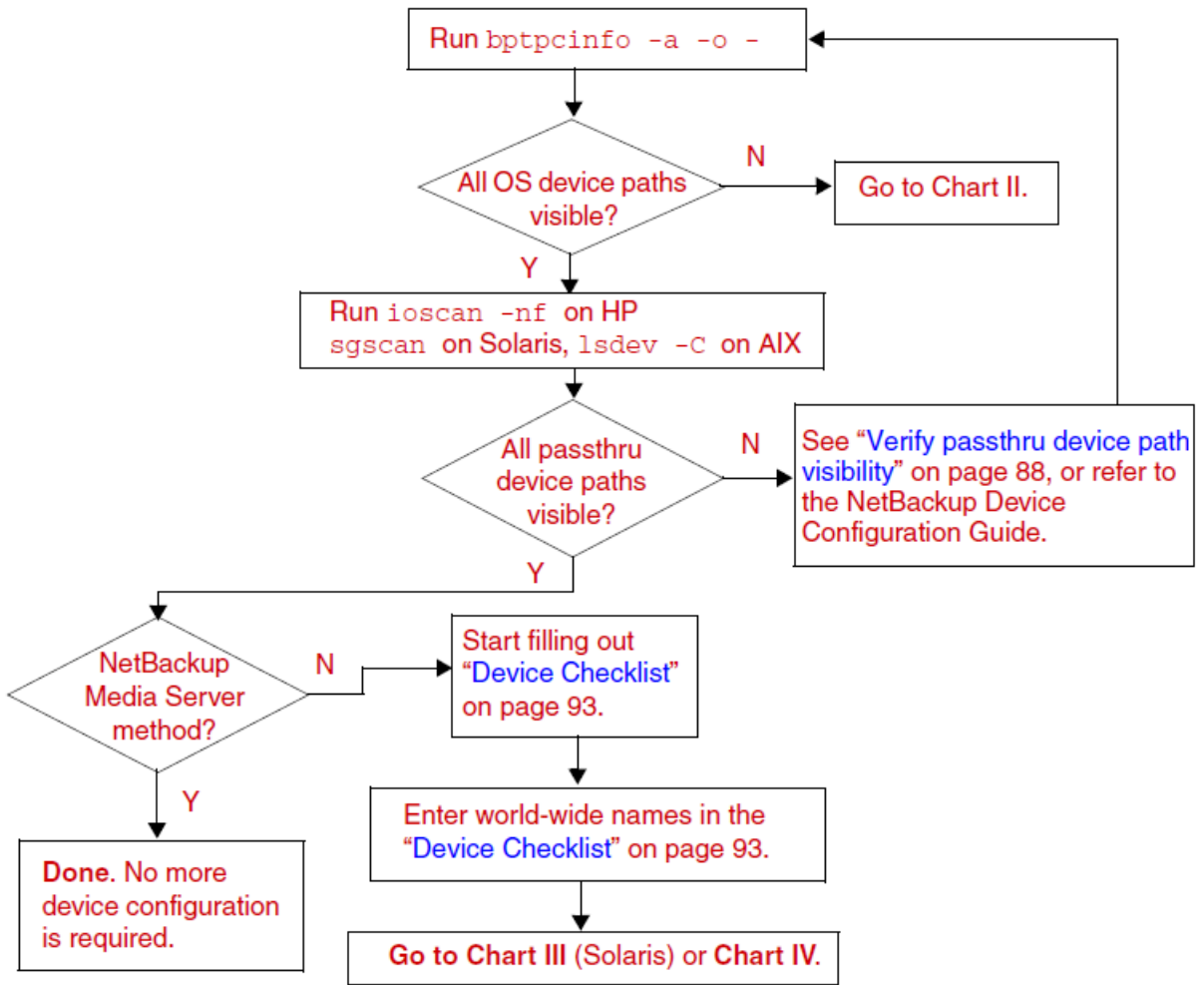




Figure 1-15 Chart II: Verify OS Device Paths Visibility

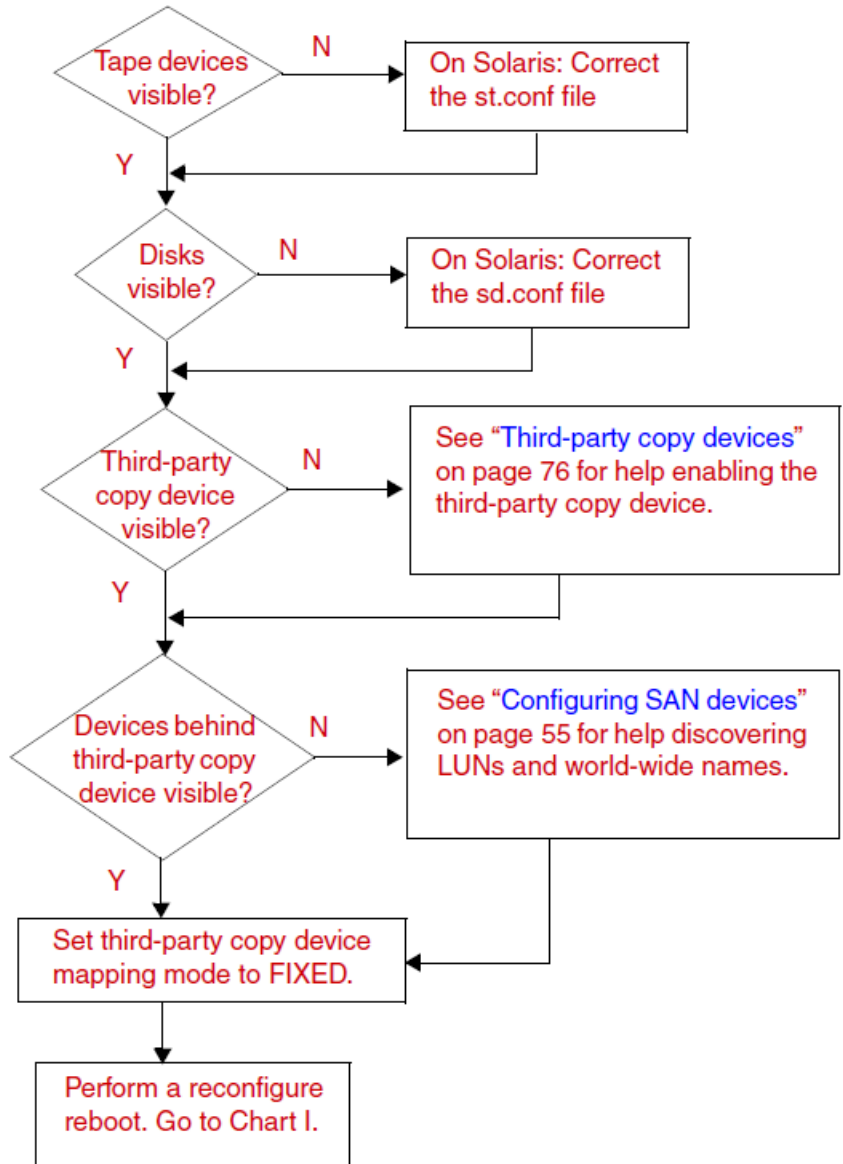
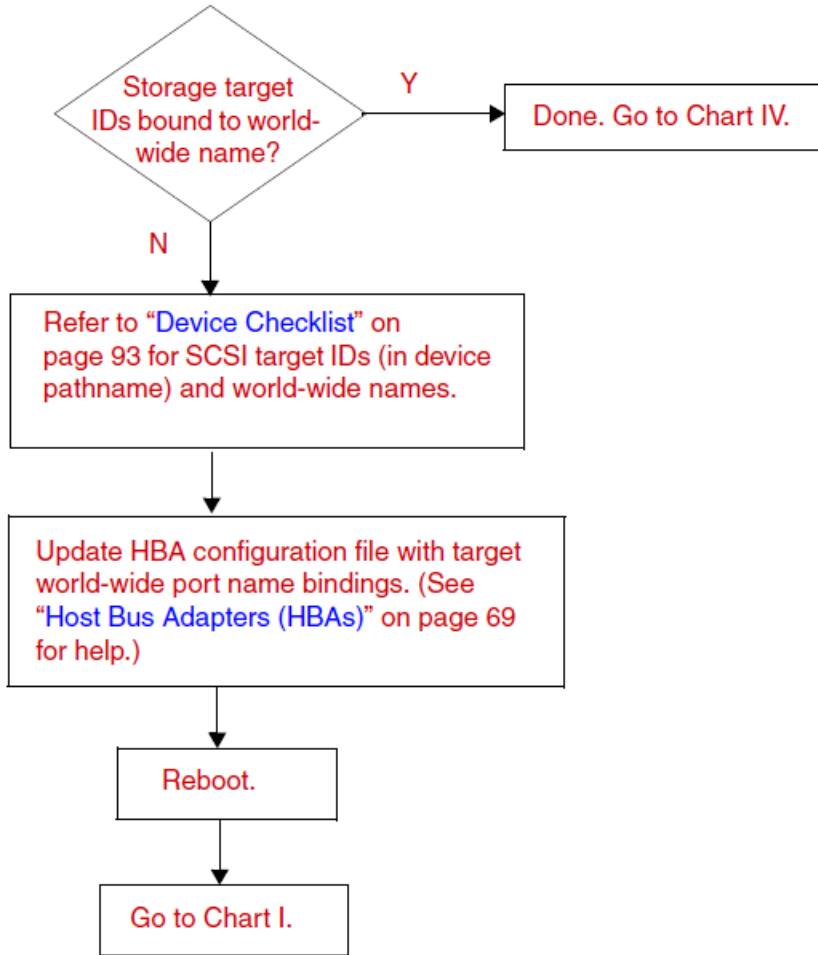
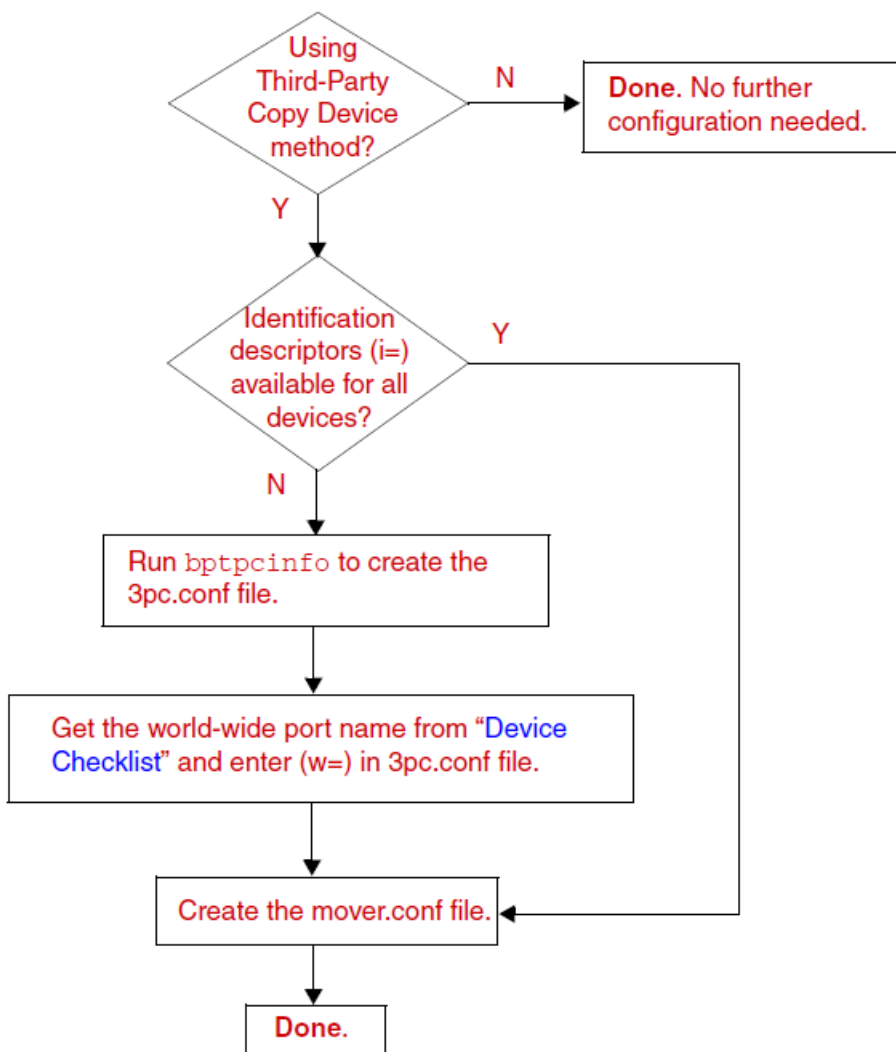


Figure 1-16 Chart III: Solaris only: Configure HBA Drivers



**Figure 1-17** Chart IV: Create the Backup Configuration Files



## Verify NetBackup Access to SAN Devices

The following sections lists the various processes required to verify NetBackup access to SAN devices.

---

**Note:** It is assumed that NetBackup and all device drivers are installed, and that devices are properly connected and powered up.

---

### To verify OS device path visibility

- 1 On the media server, run the `btpcinfo` command.

The following sends the output to the screen, using `-o -` (note the space before the final hyphen).

```
/usr/openv/netbackup/bin/btpcinfo -a -o -
```

The following sends the output to a file:

```
/usr/openv/netbackup/bin/btpcinfo -a -o output_file_name
```

- 2 Examine the `btpcinfo` output to see if your OS device paths are listed. If all devices are listed, go to [1](#) for HP, [2](#) for AIX, or to [3](#) for Solaris.

### To make OS device paths visible

- 1 If your tape devices are not listed in the `btpcinfo` output, make sure you have target and LUN values for each tape device in the `st.conf` file.
- 2 If your disks are not listed in the `btpcinfo` output, make sure you have target and LUN values for each disk in the `sd.conf` file.
- 3 If the devices behind the bridge (or third-party copy device) are not listed in the `btpcinfo` output, or if the third-party copy device is not enabled for third-party copy data movement, see See [“Third-party copy devices”](#) on page 87.
- 4 On the bridge or third-party copy device, set the address mapping mode to `FIXED`. This prevents the addresses from changing when the devices are reset. For help configuring third-party copy devices, see See [“Third-party copy devices”](#) on page 87.
- 5 Enter the following to reboot the operating system on the media server:

Solaris:

```
reboot -- -r
```

HP and AIX:

```
reboot
```

## To verify passthru device path visibility

- 1 For HP, enter the following to list all passthru devices:

```
ioscan -nf
```

If all devices now appear, enter the following to regenerate HP special files:

```
insf -e
```

Then go to [4](#).

If some devices do not appear in the `ioscan` output, check hardware connections to the devices that are not appearing. Then repeat [1](#). On HP 11.00, there is a limit of eight devices per target. For instance, if you have a JBOD disk array consisting of ten disks, and the array is connected to a bridge, it may be that only the first eight disks in the array are accessible.

- 2 For AIX, enter the following to list all passthru devices and create the paths:

```
cfgmgr
```

Enter the following to list the results:

```
lsdev -C
```

If all devices now appear, go to [4](#).

If some devices do not appear in the output, check hardware connections to the devices that are not appearing. Then repeat [2](#).

- 3 For Solaris, do the following:

- Perform an `sgscan` to list all passthru devices. Check for proper output and recognition of devices.

Here is sample output from `sgscan`:

```
/dev/sg/c0t6l4: Tape (/dev/rmt/2): "QUANTUM DLT7000"  
/dev/sg/c0t6l5: Changer: "HP C6280-7000"
```

- If tape devices still do not show up, make sure you have entries for all SCSI target and LUN combinations in the `sg.links` and `sg.conf` files. Refer to the *NetBackup Device Configuration Guide* for information on SCSI pass-through drivers.
- If tape devices are fibre attached, make sure you have entries for the tape devices in the above files.

- If tape devices are behind a bridge (or third-party copy device), make sure you have entries for the tape devices AND for the bridge/third-party copy device.

An example is available.

[Solaris only: Example for sg.links, sg.conf, and st.conf files.](#)

See [“Matrix of client OS and Snapshot Client features”](#) on page 5.

- When finished updating the `sg.links`, `sg.conf`, and `st.conf` files, remove the old `sg` configuration:

```
rm /kernel/drv/sg.conf
rem_drv sg
```

- Run the `/usr/opensv/volmgr/bin/driver/sg.install` script to copy the files into the correct locations.
- Copy the `sg.links` and `sg.conf` files (in `/usr/opensv/volmgr/bin /driver`) to another location, for future reference. Whenever NetBackup is re-installed, these files in `/usr/opensv/volmgr/bin/driver` are overwritten.

- 4 Run the `btpcinfo` command again to see which devices are now visible to the media server.

Repeat at 2 if any of your SAN devices are not showing up in the `btpcinfo` command output.

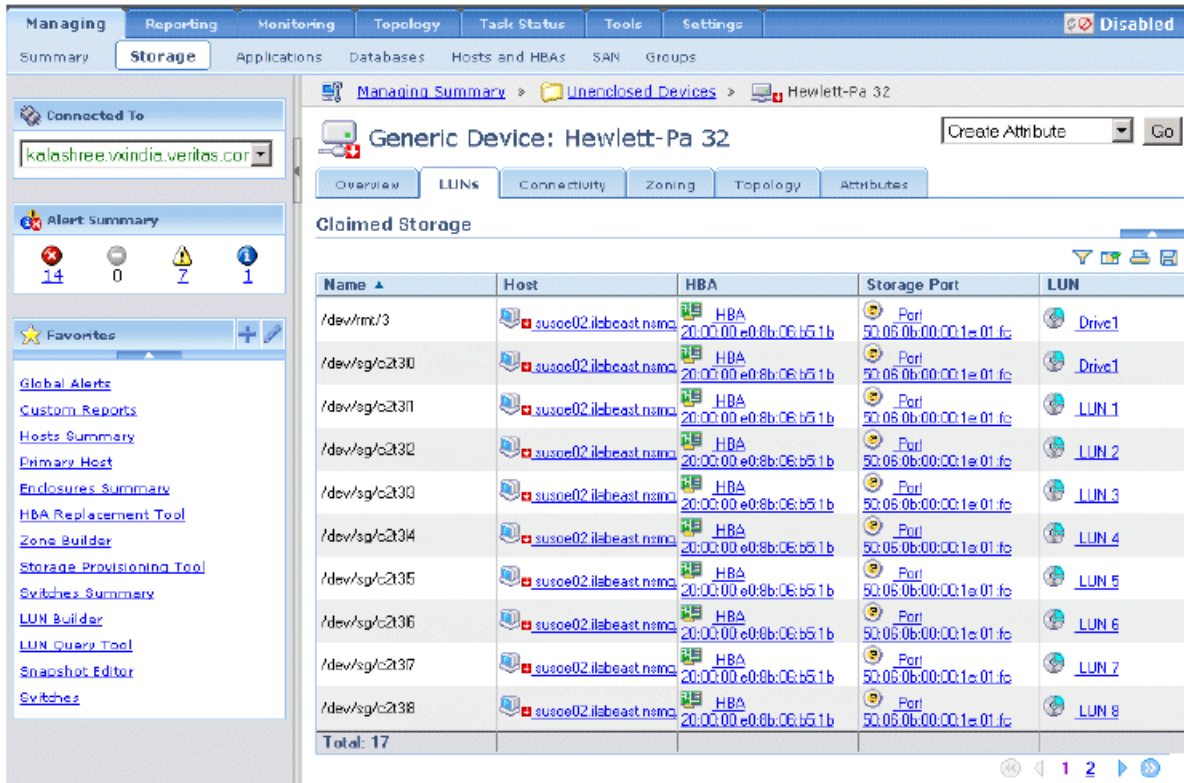
- 5 If the off-host backup method is NetBackup Media Server, no more device configuration is required. You can skip the rest of this section.
- 6 When all devices are listed in the `btpcinfo` command output, use that information to fill in the device pathname (p=), serial number (s=), and LUN (l=) for each device.

[Device Checklist.](#)

#### To determine the world-wide name for each device

- 1 Use Veritas CommandCentral Storage, formerly SANPoint Control.  
More help is available on determining the world-wide name of your devices.  
See [“Configuring SAN devices”](#) on page 62.
- 2 Go to 4.

- 3 You can use Veritas CommandCentral Storage (or SANPoint Control) to determine the world-wide port names (storage ports) for the devices.



- 4 Update the device checklist with the with the world-wide port names of your devices.

#### Device Checklist

It is important to record this information. It will be needed again, to complete the configuration.

- 5 Continue with one of the following procedures:

For Solaris: [Solaris only: Configure HBA Drivers](#)

For HP: [Create Backup Configuration Files](#)

For AIX: [Create Backup Configuration Files](#)

## Solaris only: Example for `sg.links`, `sg.conf`, and `st.conf` files

The following is an example for 3. For the devices in this example, Fibre Channel LUNs 0, 1, 4, and 5 are needed for target (Loop ID) 6. In this example, LUN 0 is the third-party copy device, LUN 1 is the tape controller, and LUNs 4 and 5 are the tape drives.

- Add entries in the `/usr/opensv/volmgr/bin/driver/sg.links` file so that the necessary `/dev/sg/*` nodes are created.

Note that the target and LUNs in the address part of the `sg.links` entries are hexadecimal, but are decimal in the `sg/c\N0tmln` part of the entries. Also, make sure there are tabs between the columns, not spaces.

```
type=ddi_pseudo;name=sg;addr=6,0;      sg/c\N0t610
type=ddi_pseudo;name=sg;addr=6,1;      sg/c\N0t611
type=ddi_pseudo;name=sg;addr=6,4;      sg/c\N0t614
type=ddi_pseudo;name=sg;addr=6,5;      sg/c\N0t615
```

- Add additional target and LUN entries to the `/usr/opensv/volmgr/bin/driver/sg.conf` file.

```
name="sg" class="scsi" target=6 lun=0;
name="sg" class="scsi" target=6 lun=1;
name="sg" class="scsi" target=6 lun=4;
name="sg" class="scsi" target=6 lun=5;
```

- In the `/kernel/drv/st.conf` file, do the following:

- Add (or un-comment) the appropriate drive entries in the `tape-config-list` section.

```
tape-config-list =
"DEC      TZ89",      "DEC DLT",      "DLT7k-data";
```

- Then add (un-comment) the matching `data-property-name` entry:

```
DLT7k-data = 1,0x38,0,0x39639,4,0x82,0x83,0x84,0x85,2;
```

- For each tape drive, add a `name` entry to the `st.conf` file.

Here is an example `name` entry:

```
name="st" class="scsi" target=6 lun=4;
name="st" class="scsi" target=6 lun=5;
```

Make sure you have entries for all target and bus combinations for each device.





---

**Note:** Each time a device is added or removed, the binding must be updated to reflect the new configuration.

---

If storage device SCSI target IDs are bound to world-wide port names in your HBA configuration file, skip this section and continue with creating backup configuration files.

### [Create Backup Configuration Files](#)

#### To configure HBA drivers on the media server

- 1 If storage device target IDs are not already bound to world-wide port names, refer to the device checklist that you completed for the world-wide names. Use the world-wide names to make the binding for each device.

#### [Device Checklist](#)

- 2 Update your HBA configuration file by binding all SCSI device target IDs to their associated world-wide port name.

More information is available for your particular HBA file.

See “[Host Bus Adapters \(HBAs\)](#)” on page 76..

- 3 Reboot the media server (`reboot -- -r`).
- 4 To ensure device visibility, repeat the steps to verify NetBackup access SAN devices.

#### [Verify NetBackup Access to SAN Devices.](#)

When you are finished, the `bptpcinfo` command should list device pathnames and serial numbers for all of your devices.

#### [Device Checklist](#)

- 5 Continue with creating backup configuration files.

#### [Create Backup Configuration Files](#)

## Create Backup Configuration Files

If you are using any other backup method, you can skip this section.

For the Third-Party Copy Device method, you must create the following file on the media server (as explained in later sections):

```
/usr/opensv/volmgr/database/mover.conf
```

If some devices (such as disks, tapes, or third-party copy devices) do NOT support identification descriptors (E4 target), you must add world-wide port name information for those devices in the following file on the media server:

```
/usr/opensv/volmgr/database/3pc.conf
```

At the start of the backup, NetBackup creates a 3pc.conf file if one does not exist. If all devices support identification descriptors, you do not need to create or edit the 3pc.conf file.

You can continue with creating the mover.conf file.

[mover.conf Description](#)

[Create the mover.conf File.](#)

## The 3pc.conf and mover.conf Files: An Overview

The NetBackup media server needs certain information about the devices available on the SAN in order to coordinate the backup. This information is provided in two files:

<code>3pc.conf</code>	Identifies the client disks on the SAN that can be backed up, and the robotic libraries/tape drives on which NetBackup can store the data. The NetBackup media server uses this information to access client disks when performing the backup. It also uses this information to generate the SCSI Extended Copy commands required by third-party copy devices.
<code>mover.conf</code>	Identifies the third-party copy devices. These are devices that can execute the SCSI Extended Copy commands. A variety of devices can be designed to operate SCSI Extended Copy, such as routers, bridges, and disk arrays. The <code>mover.conf</code> file is needed for the Third-Party Copy Device backup method only, not for the NetBackup Media Server method.

## 3pc.conf Description

In the `3pc.conf` file, each SAN device needs a one-line entry containing several kinds of values. The values required depend on several factors (explained below). Typically, these include (but are not limited to) the device ID, host-specific device path, and serial number. One or more of the following are also required: the identification descriptor, logical unit number (LUN) and world-wide port name.

[Determining Requirements.](#)

Some of this information will be automatically discovered and filled in by the `bptpcinfo` command,.

[What bptpcinfo automatically provides.](#)

The procedure for using the `bptpcinfo` command is also available.

Create the 3pc.conf File.

### Example 3pc.conf file

Below is an example 3pc.conf file, followed by descriptions of each field. This file is located in /usr/opensv/volmgr/database.

Figure 1-18 Example 3pc.conf

```
# devid [a=wwpn:lun] [c=client] [p=devpath] [P=clientpath] [s=sn] [l=lun] [w=wwpn] [W=wwpn] [i=iddesc]
0 p=/dev/rdisk/c0t0d0s2 s=FUJITSU:MAB3091SSUN9.0G:01K52665 l=0
1 p=/dev/rdisk/c0t1d0s2 s=FUJITSU:MAG3091LSUN9.0G:00446161 l=0
2 p=/dev/rdisk/c4t0d0s2 s=HP:OPEN-3:30436000000 l=0 a=500060E80276E401:0
3 p=/dev/rdisk/c4t1d0s2 s=FUJITSU:MAN3367MSUN36G:01X37938 l=0 a=100000E00221C153:0
4 p=/dev/rdisk/c4t3d0s2 s=HITACHI:OPEN-3-CM:20461000000 l=0 i=10350060E800000000000004FED00000000 a=50060E80034FED00:0
5 p=/dev/rdisk/c4t1d0s2 s=HITACHI:OPEN-9:60159003900 l=0 w=500060e802eaff12
6 p=/dev/rdisk/c4t0d1s2 s=HP:OPEN-3:30436000100 l=1 a=500060E80276E401:1 a=1111222233334444:0
7 p=/dev/rdisk/c4t0d2s2 s=HP:OPEN-3:30436000200 l=2 a=500060E80276E401:2
8 p=/dev/rdisk/c4t0d3s2 s=HP:OPEN-3:30436000300 l=3 a=500060E80276E401:3
9 p=/dev/rdisk/c4t0d4s2 s=HP:OPEN-3-CM:30436005100 l=4 a=500060E80276E401:4
10 p=/dev/rdisk/c4t0d5s2 s=HP:OPEN-3:30436002600 l=5 a=500060E80276E401:5
11 p=/dev/rdisk/c4t0d6s2 s=HP:OPEN-3:30436002700 l=6 a=500060E80276E401:6
12 p=/dev/rdisk/c4t0d7s2 s=HP:OPEN-3:30436002800 l=7 a=500060E80276E401:7
13 p=/dev/rdisk/c4t0d8s2 s=HP:OPEN-3:30436002900 l=8 a=500060E80276E401:8
14 p=/dev/rdisk/c4t1d1s2 s=FUJITSU:MAN3367MSUN36G:01X37958 l=1 a=100000E00221C153:1
15 p=/dev/rdisk/c4t1d2s2 s=FUJITSU:MAN3367MSUN36G:01X38423 l=2 a=100000E00221C153:2
16 p=/dev/rdisk/c4t1d3s2 s=FUJITSU:MAN3367MSUN36G:01X38525 l=3 a=100000E00221C153:3
17 p=/dev/rdisk/c4t1d4s2 s=FUJITSU:MAN3367MSUN36G:01X37951 l=4 a=100000E00221C153:4
18 p=/dev/rdisk/c4t1d5s2 s=FUJITSU:MAN3367MSUN36G:01X39217 l=5 a=100000E00221C153:5
19 p=/dev/rdisk/c4t3d1s2 s=HITACHI:OPEN-3-SUN:20461000300 l=1 i=10350060E800000000000004FED00000003 a=50060E80034FED00:1
20 p=/dev/rdisk/c4t3d2s2 s=HITACHI:OPEN-3-SUN:20461000400 l=2 i=10350060E800000000000004FED00000004 a=50060E80034FED00:2
```

The 3pc.conf file can contain the following types of entries (keyword, if any, is in parentheses):

- # A number sign (#) can be used to comment out whatever occurs to the right of the # sign to the end of the line. You can use this to introduce a comment, or to block out an existing device-entry or portion of a line. For instance, if you remove a device from your configuration temporarily, you could comment out the corresponding line for that device in the 3pc.conf file, then remove the # later when the device is added back to the configuration.

device ID (devid)	A unique NetBackup number for the device. In the 3pc.conf file, the device ID numbers need not be in sequential order, but must be unique.
address (a=wwpn:lun)	The world-wide port name and lunas provided by the bpSALinfo command (see 3 for information on this command). For a device that has multiple FC ports, there can be multiple a= entries.
client name (c=client)	The name of the remote client provided by the bptpcinfo command with the -x option (see 2 for more information on this command).  <b>Note:</b> the client name entry is valid only through NetBackup 6.0. Starting with NetBackup 6.5, this option is ignored.
device path (p=devpath)	The path to the Fibre Channel device. This entry must be specific to the media server on which the 3pc.conf file resides.
client path (P=clientpath)	The path to the remote client provided by the bptpcinfo command with the -x option.  <b>Note:</b> the client path entry is valid only through NetBackup 6.0. Starting with NetBackup 6.5, this option is ignored.
serial number (s=sn)	The serial number of the device, of the form: <i>Vendor ID:Product ID:device serial number</i>  <b>Note:</b> The disk devices must support SCSI serial-number inquiries or page code 83 inquiries. If a page code inquiry returns an identification descriptor (i=) for a disk, the serial number is not required.
lun (l=lun)	The device's logical unit number. The LUN allows NetBackup to identify devices that are attached by SCSI connection to the third-party copy device, bridge, or other SAN device, or that are directly attached to the Fibre Channel.

world-wide port name (w=wwpn)

**Note:** w=wwpn is allowed for backwards compatibility with 4.5 clients. If you run the `btpcinfo` command, the w=wwpn entry will be converted to a=wwpn:lun.

Indicates the device's Fibre Channel , which identifies the device on the SAN. This is a 16-digit identifier, consisting of an 8-digit manufacturer name, and an 8-digit device name (numeric).

**Figure 1-19**

is an example message showing a world-wide name for a device, written to the `/var/adm/messages` log on the server. Note the two versions of the world-wide name: the node wwn and port wwn. For Snapshot Client, use the port wwn.

On some devices, the world-wide port name can be found on the back of the device or in the boot-time messages written to the `/var/adm/messages` log on the NetBackup media server.

alternate world-wide port name (W=wwpn)

**Note:** W=wwpn is allowed for backwards compatibility with 4.5 clients. If you run the `btpcinfo` command, the W=wwpn entry will be converted to a=wwpn:lun.

A disk in a disk array can be assigned to multiple Fibre Channel ports. This is done, for instance, for load balancing or redundancy, to allow other devices on the SAN to access the same disk through different ports. The two ports allow NetBackup to select the port by which the storage device will access the disk.

In such a configuration, while w= specifies the first world-wide port name, W= specifies the second world-wide port name for the disk. (Note the uppercase "W" in W=wwpn.)

identification descriptor (i=iddesc)

When available, this value (up to 43 characters) identifies the device on the SAN. If available, the identification descriptor is automatically included in the `3pc.conf` file when you run the `btpcinfo` command.

More information is available on this value. [Determining Requirements](#)

**Figure 1-19** Example of World-Wide Name in `/var/adm/messages` log

```
Dec 12 16:07:19 sundog unix:fca-pci0: Target 1 : Port 0000e8 (1000005013b10619:2000005013b10619) online
```

**NOTE!**

The format of this message may vary depending on the host bus adapter card that is used.

This is the "Node WWN"      This is the "Port WWN"

## Determining Requirements

The following determines which values are required in the `3pc.conf` file.

### What `bptpcinfo` automatically provides

identification descriptor	<p>The identification descriptor is optional, and is not supported by all vendors. To produce this descriptor, the device must support a page code inquiry with a type 2 or 3 descriptor of less than 20 bytes. The NetBackup <code>bptpcinfo</code> command (explained below) will detect the device's identification descriptor and place it in the <code>3pc.conf</code> file if the identification descriptor is available.</p> <p>Even when this descriptor is available, some third-party copy devices do not support its use.</p> <p>If an identification descriptor is available and the third-party copy device supports it, the descriptor is used to identify the device on the SAN; in this case, there is no need for the LUN or world-wide name. You can determine whether your third-party copy device supports identification descriptors.</p> <p>See <a href="#">“Third-party copy devices”</a> on page 87.</p>
world-wide port name	<p>If an identification descriptor is not available or the third-party copy device does not support identification descriptors, the device's world-wide port name must be included in the <code>3pc.conf</code> file.</p>

The NetBackup `bptpcinfo` command detects some or all of the device information needed for the backup and places that information in the `3pc.conf` file, as follows:

- The `bptpcinfo` command provides the device path, serial number, identification descriptor (if available), and the LUN.
- The `bptpcinfo` command does not provide the world-wide name.

### What the backup methods require

For the NetBackup Media Server backup method, the `bptpcinfo` command provides all the information you need (no manual editing is required).

The Third-Party Copy Device method requires more information for each disk. In some instances, the `bptpcinfo` command cannot gather all the information required.

## mover.conf Description

The `/usr/openv/volmgr/database/mover.conf` file identifies the third-party copy devices that NetBackup can use for the Third-Party Copy Device backup method. This file is needed for the Third-Party Copy Device backup method only.

You can use the `bpmoverinfo` command to create the `mover.conf` file (see [Create the mover.conf File](#)). In most cases, the `bpmoverinfo` command makes the appropriate entry in the `mover.conf` file and no further configuration is needed.

The next few sections describe the types of entries that can be made in `mover.conf`.

### Types of entries in mover.conf

Depending on your device configuration, the `mover.conf` file can consist of the following:

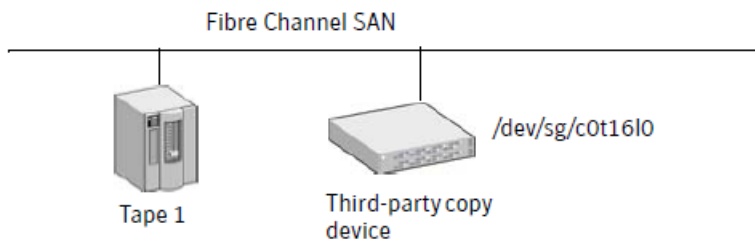
- The passthru driver device path.
- the `/dev/rmt/device_name` of the third-party-copy-capable tape drive(s), or the TAPE keyword
- The `/dev/rdisk/device_name` of the third-party-copy-capable disk drive(s), or the DISK keyword.

Please note the following:

### passthru driver device path

You must enter a passthru path (`/dev/sg` for Solaris, `/dev/sct1` for HP-UX, or `/dev/ovpassn` for AIX) in the `mover.conf` file when the storage device for the backup is not behind (SCSI-connected to) the third-party copy device that will handle the backup.

**Figure 1-20** When passthru path is required in `mover.conf` file



In this example, to use the third-party copy device to send the backup to **Tape 1**, the `mover.conf` file must include the passthru device path of the third-party copy device: `/dev/sg/c0t16l0`.

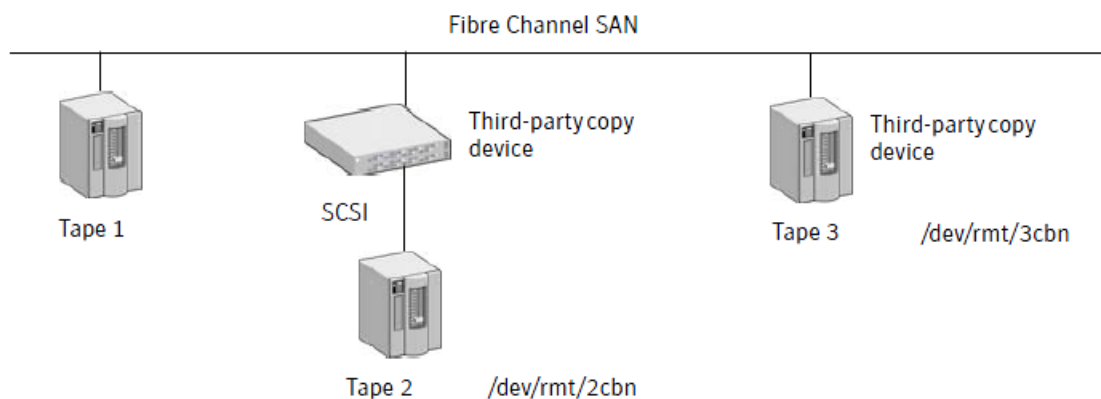


You can enter the `/dev/rdisk/device_name` of a disk in the `mover.conf` file when the disk is behind a third-party copy device, or when the disk has built-in third-party copy functionality. The third-party copy device in front of (or inside) the disk drive is used for the backup.

The `/dev/rmt/device_name` path will be used if it matches the drive path that NetBackup selects for the backup. As a rule, this is not a problem, since the `bpmoverinfo` command detects all available third-party copy devices (and any tape devices behind them) and enters them in the `mover.conf` file.

See [Create the mover.conf File](#).

**Figure 1-21** `/dev/rmt/device_name` in `mover.conf` file



In this example, to use a third-party copy device to send the backup to **Tape 2** or to **Tape 3**, the `mover.conf` file can specify the `device_name` of the tape drive: `/dev/rmt/2cbn` or `/dev/rmt/3cbn`. To use **Tape 1**, the `mover.conf` file would need the `passthru` device path of a third-party copy device.

---

**Note:** To use a tape unit as a third-party copy device (such as Tape 3), a SCSI passthru device path must have been configured for that tape device.

---

## TAPE and DISK keywords

For convenience, you can specify the `DISK` or `TAPE` keyword in `mover.conf` instead of listing individual disk paths.

See [Keywords in the mover.conf File](#)

For sites that have one third-party copy device:

- The `mover.conf` file can consist of one line specifying the device by means of its device path:

For example, on Solaris:

```
/dev/sg/c6t110
```

On HP:

```
/dev/sctl/c6t110
```

On AIX:

```
/dev/ovpass0
```

That is all you need in the `mover.conf` file. In most cases, you can use the `bpmoverinfo` command to provide this entry.

You can use the following command to make sure the `sg` driver device path is correct. This command is also useful for creating the `mover.conf.policy_name` or `mover.conf.storage_unit_name` version of the `mover.conf` file (see [Naming the mover.conf file](#)).

```
/usr/opensv/volmgr/bin/sgscan
```

Here is some sample `sgscan` output showing third-party copy devices (see notes following):

```
/dev/sg/c0t1610: Mover: "ADIC      Scalar SNC"/  
/dev/sg/c0t1213: Mover: "ATTO      FB 4500H"  
/dev/sg/c0t1510: Mover: "CNSi      FS2620"  
/dev/sg/c0t1710: Mover: "PATHLIGHTSAN Gateway"  
/dev/sg/c0t1113: Mover: "Crossrds4250 Router"  
/dev/sg/c0t2110: Mover: "Crossrds8000 Router"  
/dev/sg/c0t2312: Mover: "OVERLANDNEO VIA FCO"  
/dev/sg/c4t010: Changer: "SPECTRA 215"
```

Notes:

- "CNSi0 indicates a Chaparral device.
- The number of entries returned for Crossroads depends on how many controller LUNS have been configured on that device. The `mover.conf` file must contain the `/dev` path for each controller LUN that is configured on the Crossroads.
- The Spectra Logic tape library does not have separate controller LUNs for the third-party functionality. For this reason, the `sgscan` output lists the library as a "Changer" rather than as a "Mover."

For an Hitachi, HP, or Sun disk array, you must check the HBA binding to obtain the SCSI target number for the array's ECopy target port, and use that SCSI target number to identify the correct `/dev` path in the `sgscan` output.

- An alternative: the `mover.conf` file can consist of one or more lines specifying devices by means of the `/dev/rdisk/device_file_name`, where *device\_file\_name* specifies the actual file name of the disk. Note that the tape device must be the same as the device that NetBackup selects for the backup, and the disk must be one that is involved in the backup.
- Instead of the `/dev/rdisk/device_file_name` path, you can use the `TAPE` or `DISK` keyword. For more information, refer to [Keywords in the mover.conf File](#).

## For sites that have multiple third-party copy devices

Note the following:

- In the `mover.conf` file, if you want to specify one of the third-party copy devices and prevent the others from being used, specify the device by means of its driver device path (such as `/dev/sg/c6t110` on Solaris, `/dev/sct1/c6t110` on HP, or `/dev/ovpass0` on AIX), or specify its `/dev/rmt/device_file_name` or `/dev/rdisk/device_file_name`.  
See the list of example `/dev/sg` paths on the previous page.
- If you want to use any available tape or disk drive that is third-party-copy capable or connected to a third-party copy device, specify the `TAPE` or `DISK` keyword.
- If you want to limit the third-party copy device to that of a particular vendor or type, while including a variety of devices in the file, use the `END` keyword. First enter the device(s) you want to use, followed by `END`, then specify any other devices you might want to use at another time. For more information, refer to [Keywords in the mover.conf File](#).

## SCSI reservations

For backups that use the third-party copy device method, SCSI reserve may be required to prevent unintended sharing of tape devices by multiple hosts on the SAN.

With SCSI reserve, either the media server or the third-party copy device acquires exclusive control over the tape drive, thus preventing other jobs from accessing the tape during the backup.

The `bptm` process logs all SCSI reserve commands. For background information on SCSI reserve, refer to the *NetBackup Administrator's Guide* and .

## To use SCSI reserve/release

---

**Note:** If your `mover.conf` file contains only `/dev/rmt/device_path` entries or the `TAPE` keyword, SCSI reserve/release will be used for the backup. No further configuration is needed for SCSI reserve/release.

---

SCSI reserve/release is configured by means of the `mover.conf` file. The type of entry to make in `mover.conf` depends on the type of tape device and the network connection it is using, as follows:

- If the tape device is a Fibre Channel device (not connected behind a router or bridge) and does not have third-party copy functionality:  
Specify the passthru path of the third-party copy device followed by the `i=reserve_value`. For example:

```
/dev/sg/c6t110 i=2000001086100d5e
```

where 2000001086100d5e is a 16-digit user-supplied value. See `i=reserve_value` for more information on this value.

The third party copy device must be the tape device itself, or the tape drive must support a special kind of SCSI reserve/release called third-party reservation; otherwise, SCSI reserve/release will not be used. As of this writing, the only Snapshot Client-supported device that supports third-party reservation is the ADIC/Pathlight Gateway. See `i=reserve_value` for more information on the `reserve_value` required by the ADIC/Pathlight.

- If the tape device does not have third-party copy functionality and does not support the `i=reserve_value`:  
Specify the passthru path of the third-party copy device followed by the `hr` keyword. For example:

```
/dev/sg/c6t110 hr
```

The `hr` keyword tells NetBackup to use SCSI reserve/release. If the `hr` keyword is omitted, SCSI reserve/release is not used.

- If the tape is behind the third-party copy device or has its own third-party copy functionality:  
Specify the tape device path or the `TAPE` keyword. For example:

```
/dev/rmt/2cbrn
```

or

```
TAPE
```

## Keywords in the mover.conf File

The following keywords can be included in the mover file:

**DISK** For a third-party copy backup, the DISK keyword tells NetBackup to attempt to use a disk involved with the current backup if that disk has third-party copy functionality or is behind (SCSI-connected to) a third-party copy device. This allows better concurrent backup processing, so that two or more backup jobs can execute simultaneously.

**Note:** A valid SCSI passthru driver device path must be included in the mover.conf file, after the DISK keyword. This device path is used for tape verification and tape movement before a third-party copy capable disk is discovered. An example of a passthru driver device path is `/dev/sg/c6t110` on Solaris, `/dev/sct1/c6t110` on HP, or `/dev/ovpass0` on AIX.

**TAPE** For a third-party copy backup, attempt to use the current tape device selected for the backup if that device has third-party copy functionality or is behind (SCSI-connected to) a third-party copy device. This has two advantages:

- There is no need to specify a device path or passthru driver device path. Instead of having to enter `/dev/rmt/` paths for a number of tape devices, you can use the `TAPE` keyword as shorthand for all of them.
- Allows better concurrent backup processing, so that two or more backup jobs can execute simultaneously.

## GROUP

For a third-party copy backup, enable a third-party copy device to process two or more backup jobs simultaneously. This applies to devices that can handle multiple jobs simultaneously; not all third-party copy devices can do so. When enabled, simultaneous execution prevents multiple jobs waiting in a queue for the same device.

This keyword must be specified as `GROUP filename`, where *filename* is a file containing the device paths to be used for each simultaneous third-party copy backup. The file is assumed to be in the same directory as the `mover.conf` file, `/usr/opensv/volmgr/database`.

For example, the device paths for a third-party copy device that can run four jobs simultaneously might be as follows:

### ■ Solaris:

```
/dev/sg/c0t0l0  
/dev/sg/c0t0l1  
/dev/sg/c0t0l2  
/dev/sg/c0t0l3
```

### ■ HP:

```
/dev/sctl/c6t1l0  
/dev/sctl/c6t1l1  
/dev/sctl/c6t1l2  
/dev/sctl/c6t1l3
```

### ■ AIX:

```
/dev/ovpass0  
/dev/ovpass1  
/dev/ovpass2  
/dev/ovpass3
```

**END** Stop searching the `mover.conf` file for third-party copy devices for the current third-party copy backup.

If there are two or more third-party copy devices in the `mover.conf` file, NetBackup tries them sequentially, starting with the first one listed in the file, until one is found that can successfully move the data. **END** means do not look further in the current `mover` file and do not look in any other `mover` files, even if the last device tried was unsuccessful. Note that if no successful device is found before **END** is reached, the backup fails.

The **END** keyword limits the search for a third-party copy device in a `mover.conf` file that contains entries for more than one device. This can save you the trouble of deleting device entries and re-entering them later.

For example, if the `mover.conf` file contains the following:

```
/dev/sg/c6t410
END
/dev/sg/c6t412
/dev/sg/c6t413
```

NetBackup will try to use device `/dev/sg/c6t410` and will not try the other devices.

The following optional keywords can be added to each entry in `mover.conf`:

***i=reserve\_value*** Use SCSI reserve/release for third-party reservation, if supported by the tape device or by the third-party copy device to which the tape device is connected. The `reserve_value` is a world-wide port name or Fibre Channel port identifier, as follows.

- For the ADIC/Pathlight Gateway, the `reserve_value` is the world-wide port name of the ADIC/Pathlight.
- For devices made by other vendors, the `reserve_value` may be the Fibre Channel port identifier (destination ID) of the third-party copy device, with two leading zeros. For example, if the Fibre Channel port identifier is 231DE4, the `reserve_value` is 00231DE4. Please contact the vendor of the device for specifications.

**hr** Hold the tape reservation (SCSI reserve/release) when a third-party copy device that is not a tape device is designated by means of a passthru device path (`/dev/sg/` on Solaris, `/dev/sctl/` on HP, `/dev/` on AIX). If you do not specify the **hr** keyword, the default is to drop or omit the reservation.

**dr** Omit the use of SCSI reserve/release when a tape device is designated by the `TAPE` keyword or its tape device path (such as `/dev/rmt/2cbn`). If you do not specify the `dr` keyword, the default is to hold the reservation.

For example:

```
/dev/rmt/2cbn  
/dev/rmt/3cbn  
TAPE dr
```

In this example, if neither of the specified `/dev/rmt` devices can use SCSI reserve/release, NetBackup will try a tape device without the reserve.

**to** If the third-party copy device needs additional time to respond to a backup request, you can increase the time-out value by specifying `to` followed by the limit in seconds. The default is 300 seconds (5 minutes). Additional time may be needed, for instance, if the third-party copy device is running in debug mode.

The following example resets the time-out for third-party copy device `/dev/rdisk/c6t1d0sx` to 600 seconds:

```
/dev/rdisk/c6t1d0sx to 600
```

In this example, NetBackup will allow the third-party copy device (accessible through `/dev/rdisk/c6t1d0sx`) ten minutes to respond to a backup request. If the device does not respond within 10 minutes, NetBackup will try the next third-party copy device listed in the mover file. If no other devices are listed, the backup fails.

## A Note on Keywords for SCSI Reserve/Release

The same path (`passthru` or `/dev/rmt/device_name` path) can be specified several times with different keywords or no keywords. NetBackup tries each path in succession (whether or not they specify the same path), attempting to use SCSI reserve/release or not, as specified.

Example:

```
/dev/sg/c6t110 i=4873968475898744  
/dev/sg/c6t110 hr  
/dev/sg/c6t110
```

In this example, NetBackup will try to use the third-party copy device specified by `/dev/sg/c6t110` and will attempt to use reserve/release by means of the `i=reserve_value`. If unsuccessful, NetBackup will try to use the same third-party



copy device and reserve/release by means of the `hr` keyword (hold the reserve). If unsuccessful, NetBackup will use the third-party copy device without the reserve.

## Naming the `mover.conf` file

In addition to the standard `mover.conf` file name, there are two other options for naming the mover file:

### Per Policy

```
/usr/opensv/volmgr/database/mover.conf.policy_name
```

where *policy\_name* is the name of a NetBackup policy. All backups for this policy will use the third-party copy device specified in this `mover.conf.policy_name` file.

For a disk that has third-party copy device capability, use the `mover.conf.policy_name` to specify the disk as the third-party copy device for the policy that backs up that disk.

### Per Storage Unit

```
/usr/opensv/volmgr/database/mover.conf.storage_unit_name
```

where *storage\_unit\_name* is the name of a storage unit. This allows a third-party copy device to use a particular storage device by means of a storage unit name. Here is an example `mover.conf` file name of the *storage\_unit\_name* type:

```
mover.conf.nut-4mm-robot-t14-0
```

where `nut-4mm-robot-t14-0` was selected as the storage unit in the policy.

---

**Note:** The *storage\_unit\_name* in this file name must exactly match the name of the storage unit as it appears in the "Policy storage unit" field of the Change Policy dialog.

---

## Selection Priority for `mover.conf` files

NetBackup looks for an appropriate `mover.conf` file in the following order:

- `mover.conf.policy_name`
- `mover.conf.storage_unit_name`
- `mover.conf`

## Create the 3pc.conf File

The `/usr/opensv/volmgr/database/3pc.conf` file contains a list of all disk and tape devices on the SAN that NetBackup Snapshot Client can use. NetBackup automatically creates this file at the start of the backup. In certain circumstances, however, you must create this file manually.

---

**Note:** You must create a `3pc.conf` file if you are using the Third-Party Copy Device backup method AND some of your devices do not support identification descriptors (E4 target). Otherwise, you can skip to [Create the mover.conf File](#).

---

### To create the 3pc.conf file

- 1 Create a `3pc.conf` file as follows when no backups are in progress.

On the media server, run the `btpcinfo` command:

```
/usr/opensv/netbackup/bin/btpcinfo -a
```

- If a `3pc.conf` file already exists in `/usr/opensv/volmgr/database`, you are asked if you want to overwrite it. You can use the `-o output_file_name` option to send the output to a temporary file. However, the correct output must be included in the `/usr/opensv/volmgr/database/3pc.conf` file before backups can succeed.
- If a storage device is currently involved in a backup, the `btpcinfo` command cannot gather information on that device and skips to the next device. If the `3pc.conf` file contains no entry for a storage device on your network, use the verbose mode (`-v`) of the `btpcinfo` command to

determine if the device was busy (see the *NetBackup Commands for UNIX* guide for more information on `bptpcinfo`).

- 2 If the media server does not have access to all disks (due to zoning or LUN-masking issues), run the following command on the media server:

```
/usr/openv/netbackup/bin/bptpcinfo -x client_name
```

where `client_name` is the name of a NetBackup client on the Fibre Channel network where the third-party copy device is located. The `3pc.conf` file will be updated with information about the disks on this network, allowing the media server to "see" those disks. This information may have to be edited by adding the world-wide name (`wwn=`) of each device, as explained in the next two steps.

---

**Note:** Note that the entries added by the `-x` option do not include `p=devpath`. Instead, they have `c=client` and `P=clientpath`. In the following example, lines 21 and 22 were added by the `-x` option:

---

- 3 If you have Veritas CommandCentral Storage or SANPoint Control, you can use it to add world-wide name and lun information to the `3pc.conf` file, by entering the following command on the media server:

```
/usr/openv/netbackup/bin/admincmd/bpSALinfo -S SPC_server
```

where `-S` identifies the host where CommandCentral Storage (or SANPoint Control) is running. `bpSALinfo` adds world-wide name and lun values to device entries in the `3pc.conf` file. For additional command options, refer to the man page for `bpSALinfo`, or to the *NetBackup Commands for UNIX* guide.

---

**Note:** If using CommandCentral Storage, the SAL remote component must be installed on all NetBackup clients in order for the `bpSALinfo` command to gather all required information.

---

If `bpSALinfo` successfully updates the `3pc.conf` file, no further editing of the `3pc.conf` file is required. You can skip to [Create the mover.conf File](#).

- 4 If you do not have CommandCentral or SANPoint Control or it does not support your environment, Edit the `3pc.conf` file as follows:

For each storage device listed in the `3pc.conf` file, you may need to provide world-wide port names, depending on what NetBackup was able to discover about the device and what the third-party copy device supports.

These are the editing tasks:

- In the `3pc.conf` file, if each device that will be backed up with Snapshot Client has an identification descriptor (`i=`), and if the third-party copy device supports the use of identification descriptors, the `3pc.conf` file is complete. No editing is needed; skip the rest of this section and continue with [Create the mover.conf File](#).
- If the `3pc.conf` file does not have an identification descriptor for each device (or the descriptor is not supported by the third-party copy device), enter the world-wide port name (`w=`) for each device. (Obtain the world-wide port name from your [Device Checklist](#).)

## Create the mover.conf File

This section describes how to create a `mover.conf` file that identifies third-party copy devices.

---

**Note:** This procedure is required for the Third-Party Copy Device method only.

---

### To create the mover.conf file

- 1 On the NetBackup media server, create the following file:

```
/usr/opensv/volmgr/database/mover.conf
```

- 2 In the `mover.conf` file, enter the `/dev/rdisk/device_name` or `/dev/rmt/device_name` of the third-party-copy-capable disk or tape drive(s) available on the SAN. Or enter the DISK or TAPE keyword.

For example:

```
/dev/rdisk/c6t1d0sx  
/dev/sg/c0t16l0
```

or

```
DISK
```

[Types of entries in mover.conf](#)

[Keywords in the mover.conf File](#).

Note the following:

- If the `mover.conf` file has several device name entries but only one of them identifies an actual third-party copy device, NetBackup selects that device during the backup.

- The NetBackup media server must have access to the client disks. Make sure, for instance, that no zoning issues prevent the media server from accessing the disks.
- 3 If you need to control the circumstances under which a third-party copy device is used, create a separate mover.conf file for a policy or storage unit:

```
/usr/opensv/volmgr/database/mover.conf.policy_name
```

or

```
/usr/opensv/volmgr/database/mover.conf.storage_unit_name
```

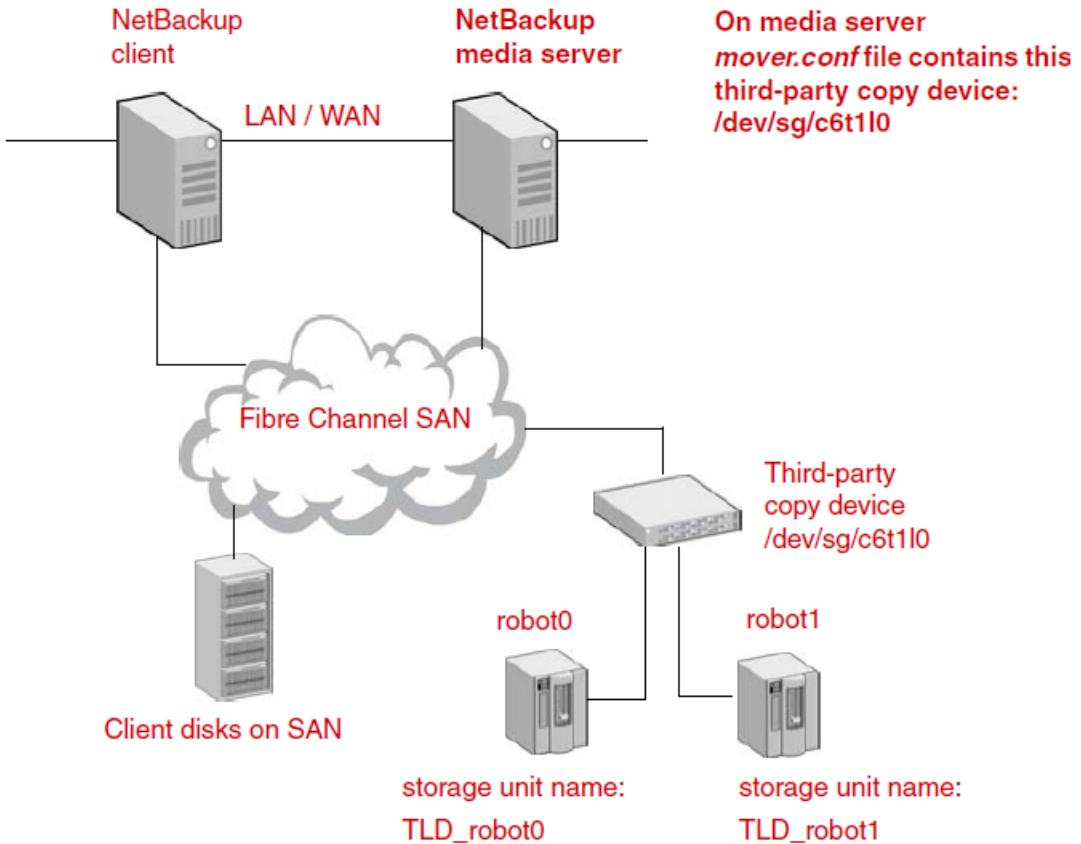
More information on these naming formats and possible mover file entries is available.

[mover.conf Description](#)

[Naming the mover.conf file.](#)

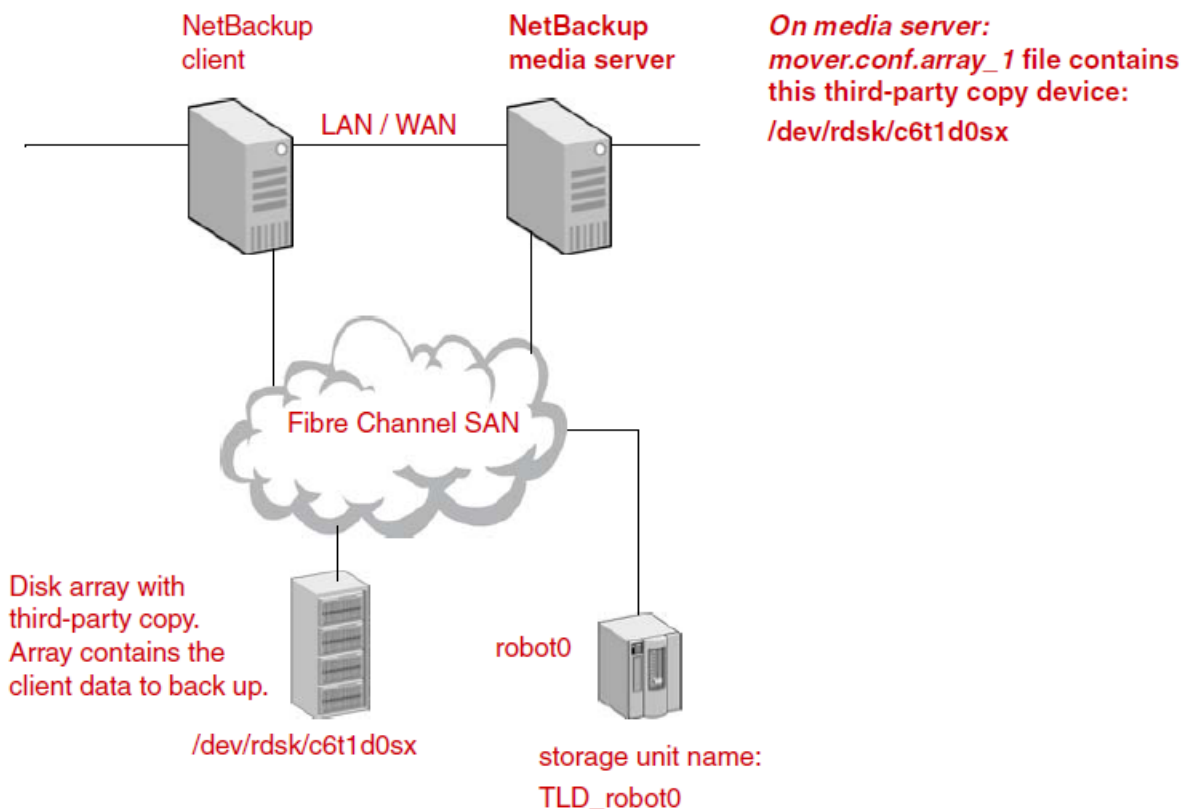
See the next figure for an example configuration involving a disk array with third-party copy device capability.

Figure 1-22 Example mover.conf file for a site with one third-party copy device



In the above example, backups will use third-party copy device `/dev/sg/c6t110` specified in the `mover.conf` file. The backup uses the storage unit (`TLD_robot0` or `TLD_robot1`) specified for the policy on the Change Policy dialog.

**Figure 1-23** Example mover.conf.policy\_name file for site with third-party copy capability in disk array



In this example, policy `array_1` is configured to back up the client data contained on the disk array. The backup uses storage unit `TLD_robot0` to store the data.

All backups configured in this policy will use the disk array as the third-party copy device. The `mover.conf.array_1` file specifies that array.

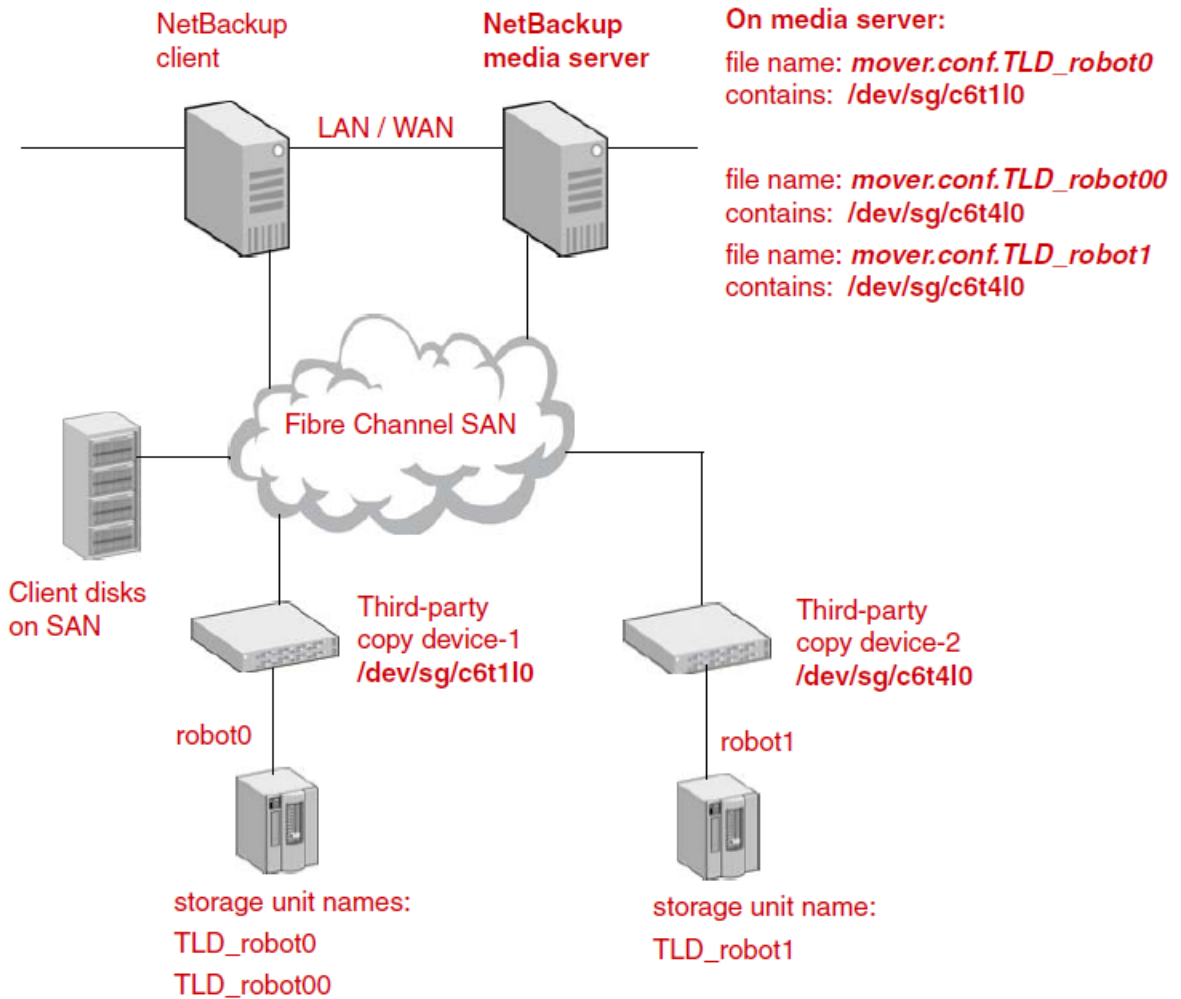
---

**Note:** The client data must reside in the array that is used as the third-party copy device.

---

See the next figure for an example configuration with two third-party copy devices, where both devices can use the same robot.

**Figure 1-24** Example mover.conf.storage\_unit\_name files for two third-party copy devices



The above example shows two robots (robot0 and robot1). Robot0 has been assigned two storage unit names, `TLD_robot0` and `TLD_robot00`. Robot1 has been assigned one storage unit name, `TLD_robot1`.

The above example also shows two third-party copy devices, device-1 with a SCSI passthru device path of `/dev/sg/c6t110`, and device-2 with a SCSI passthru device path of `/dev/sg/c6t410`.

Note the following:



- To allow third-party copy device-1 to use robot0, create a file named `mover.conf.TLD_robot0`. In the file, include the device path of device-1 (`/dev/sg/c6t110`).
- To allow third-party copy device-2 to use the same robot (robot0), create a file named `mover.conf.TLD_robot00`. In the file, include the device path of device-2 (`/dev/sg/c6t410`). Notice that the file name must refer to a different storage unit, `TLD_robot00`, which is assigned to robot0.
- To allow third-party copy device-2 to use robot1, create a file named `mover.conf.TLD_robot1` that includes the device path of device-2 (`/dev/sg/c6t410`).

---

**Note:** The *storage\_unit\_name* portion of the `mover.conf.storage_unit_name` file name must exactly match the actual name of the storage unit.

---

