VERITAS NetBackup Advanced Client: Configuration and Compatibility

This document lists the operating systems, disk arrays and other peripherals (including SAN equipment) supported by VERITAS NetBackup Advanced Client 5.1. As a supplement to the *NetBackup Advanced Client System Administrator's Guide*, this document also includes the following:

- Configuration information for Advanced Client
- Troubleshooting assistance for particular SAN devices when they are used in conjunction with Advanced Client

Support for Database Agents

For a table of Advanced Client features and snapshot methods supported for particular database agents, see the VERITAS support web site at www.support.veritas.com. Go to NetBackup Products, NetBackup Enterprise Server, Compatibility.

Support for Cluster Environments

Advanced Client supports the Microsoft Cluster Server and VERITAS Cluster Server. For a list of supported cluster system versions, see the VERITAS support web site at www.support.veritas.com. Go to NetBackup Products, NetBackup Enterprise Server, Compatibility.

Supported Operating Systems

Local Snapshot Backup

For a local snapshot backup, Advanced Client supports the following platforms and operating systems. This assumes that the instant recovery and FlashBackup features of Advanced Client are not being used.

Note For platforms supported for NAS snapshots (NDMP), see the table under Offhost Backup: Network Attached Storage.

Platforms Supported for Local Snapshot Backup

Hardware Type	OS	Master Server	Media Server	Client
HP Alpha	Tru64 UNIX		X	
HP PA-RISC	HP-UX	X	X	X
IBM	AIX	X	X	
Intel x86	Linux	X	X	
Intel x86, Pentium	Windows NT	X	X	
Intel Pentium	Windows 2000, 2003	X	X	X[a]
Intel Itanium	Windows 2003	X	X	X[b]
SGI	IRIX		X	
SPARC	Solaris	X	X	X

a. For Windows 2000 clients, Storage Foundation for Windows 4.1 or Volume Manager 3.1 HF03 or later is required. For Windows 2003 clients, Storage Foundation for Windows 4.0 or 4.1 is required.

b. VxVM does not currently support Itanium hardware. For NetBackup clients on Itanium machines, the only snapshot options currently available are VSS and VSP, for local backup (not offhost). Note that VSS and VSP are part of the base NetBackup product, not Advanced Client.

Snapshots for Instant Recovery

For backups enabled for instant recovery, Advanced Client supports the following platforms and operating systems. Note that a media server is not required.

Platforms Supported for Instant Recovery

Hardware Type	OS	Master Server	Client
HP PA-RISC	HP-UX	X	X
IBM	AIX	X	
Intel x86	Linux	X	
Intel Pentium	Windows 2000, 2003	X	X[a]
Intel Itanium	Windows 2003	X	
SPARC	Solaris	X	X

a. For Windows 2000 clients, Storage Foundation for Windows 4.1 or Volume Manager 3.1 HF03 or later is required. For Windows 2003 clients, Storage Foundation for Windows 4.0 or 4.1 is required.

FlashBackup

For backups from a FlashBackup or FlashBackup-Windows policy, Advanced Client supports the following platforms and operating systems.

Platforms Supported for FlashBackup

Hardware Type	OS	Master Server	Media Server	Client
HP Alpha	Tru64 UNIX		X	
HP PA-RISC	HP-UX	X	X	X
IBM	AIX	X	X	
Intel x86	Linux	X	X	
Intel Pentium	Windows 2000, 2003	X	X	X[abc]
Intel Itanium	Windows 2003	X	X	X[bcd]

Platforms Supported for FlashBackup

Hardware Type	OS	Master Server	Media Server	Client
SGI	IRIX	X	X	
SPARC	Solaris	X	X	X

a. For Windows 2000 clients, Storage Foundation for Windows 4.1 or Volume Manager 3.1 for Windows HF03 or later is required. For Windows 2003 clients, Storage Foundation for Windows 4.0 or 4.1 is required.

b. Use the FlashBackup-Windows policy type for Windows clients. For all other platforms in this table, use the FlashBackup policy type.

c. To back up Windows mount-point volumes using FlashBackup-Windows, Advanced Client version 5.0 MP1a or later is required.

d. VxVM does not currently support Itanium hardware. For NetBackup clients on Itanium machines, the only snapshot options currently available are VSS and VSP, for local backup (not offhost). Note that VSS and VSP are part of the base NetBackup product, not Advanced Client.

Platforms Supported for FlashBackup Restore (individual file restore)

Hardware Type	OS	Master Server	Media Server	Client
HP PA-RISC	HP-UX	X	X	X
IBM	AIX	X	X	
Intel x86	Linux	X	X	
Intel Pentium	Windows 2000, 2003	X	X	X
Intel Itanium	Windows 2003	X	X	X[a]
SPARC	Solaris	X	X	X

a. VxVM does not currently support Itanium hardware. For NetBackup clients on Itanium machines, the only snapshot options currently available are VSS and VSP, for local backup (not offhost). Note that VSS and VSP are part of the base NetBackup product, not Advanced Client.

Master Server Platforms for FlashBackup-Windows Clients

The following table shows which NetBackup master server platforms are supported for FlashBackup-Windows clients. “MP” means NetBackup maintenance pack.

Master Server Platforms Supported for FlashBackup-Windows Clients

Master Server Hardware Type	Master Server OS	NetBackup Release supporting this platform
HP PA-RISC	HP	future (not yet supported)
IBM	AIX	5.0 MP2 and later
Intel x86	Linux	future (not yet supported)
Intel Pentium	Windows 2000, 2003	5.0 and later
SPARC	Solaris	5.0 MP1 and later

Block Level Incremental Backup

For block level incremental backups using an Oracle policy, Advanced Client supports the following platforms and operating systems.

Note The NetBackup for Oracle database software is required in order to use the block level incremental feature of Advanced Client.

Platforms Supported for BLIB

Hardware Type	OS	Master Server	Media Server	Client
HP Alpha	Tru64 UNIX		X	
HP PA-RISC	HP-UX	X	X	X
IBM	AIX	X	X	X
Intel x86	Linux			
SGI	IRIX	X	X	
SPARC	Solaris	X	X	X

Offhost Backup: Alternate Client

For a snapshot backup of an alternate client, Advanced Client supports the following platforms and operating systems.

Platforms Supported for Alternate Client Backup

Hardware Type	OS	Master Server	Media Server	Client
HP Alpha	Tru64 UNIX		X	
HP PA-RISC	HP-UX	X	X	X
IBM	AIX	X	X	
Intel x86	Linux	X	X	
Intel x86, Pentium	Windows NT		X	
Intel Pentium	Windows 2000, 2003	X	X	X[a]
Intel Itanium	Windows 2003	X	X	
SGI	IRIX	X	X	
SPARC	Solaris	X	X	X

a. For Windows 2000 clients, Storage Foundation for Windows 4.1 or Volume Manager 3.1 HF03 or later is required. For Windows 2003 clients, Storage Foundation for Windows 4.0 or 4.1 is required.

Note For alternate client backup, the alternate client must be running the same OS as the principal client.

Offhost Backup: Media Server, Third Party Copy

For the NetBackup Media Server and Third-Party Copy Device offhost backup methods, Advanced Client supports the following platforms.

Platforms Supported for Media Server and Third-Party Copy Device

Hardware Type	OS	Master Server	Media Server	Client
HP PA-RISC	HP-UX	X	X	X

Platforms Supported for Media Server and Third-Party Copy Device

Hardware Type	OS	Master Server	Media Server	Client
IBM	AIX	X	X[a]	
Intel x86	Linux	X		
Intel Pentium	Windows 2000, 2003	X		
SGI	IRIX	X		
SPARC	Solaris	X	X	X

a. Supports the Third-Party Copy device backup method only.

Offhost Backup: Network Attached Storage

For the Network Attached Storage offhost backup method (required for the NAS_Snapshot feature), Advanced Client supports the following NetBackup platforms.

Note This table shows the platforms on which NetBackup software is installed. The client data, however, must reside on a NAS host and be mounted on a NetBackup client by means of NFS on UNIX or CIFS on Windows. See the following section (NAS Platforms) for a list of supported NAS hosts.

NetBackup Platforms Supported for Network Attached Storage

Hardware Type	OS	Master Server	Media Server	Client
HP PA-RISC	HP-UX	X	X	
IBM	AIX	X	X	
Intel x86, Pentium	Windows NT	X	X	
Intel Pentium	Windows 2000, 2003	X	X	X
Intel x86	Linux Red Hat	X	X	
SPARC	Solaris	X	X	X

NAS Platforms

The NAS_Snapshot method of Advanced Client supports the following NAS platforms.

NAS Platforms Supported for NAS_Snapshot

Hardware Type	OS
Network Appliance filers	**Data ONTAP version 6.5.1**
Network Appliance NearStore	**Data ONTAP version 6.5.1**

Notes on NAS_Snapshot with Network Appliance

- 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 will not restore 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" 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 Advanced Client controls the maximum number of NetBackup snapshots on a per client/per policy basis, using the policy's **Maximum Snapshots (Instant Recovery only)** 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) will not increase disk space if the file's blocks are referenced by one or more snapshots. The snapshot(s) referencing that 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 will fail if the snap reserve space is insufficient for the data change activity.

Supported Peripherals

Peripherals and SAN Equipment

The following table shows the peripherals and SAN equipment that NetBackup Advanced Client supports.

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

Supported Peripherals and SAN Equipment

Component Type	Vendor Supported
Host Bus Adapters (HBAs)	**For Solaris servers:** ◆ **Emulex** ◆ **JNI** ◆ **QLogic** **For HP servers:** ◆ **HP** **For AIX servers:** ◆ **Cambex** ◆ **IBM** ◆ **JNI** **Note** **Contact your hardware sales representative for the latest firmware level for these devices and for compatibility with SAN equipment.**
Tape Libraries and Tape Drives	**Any tape libraries and tape drives supported by NetBackup SSO option.**
Disks and Disk Arrays	**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 77/92xx/99xx, HP XP 246/48/512, and SUN T3.** **Note** **As of this writing, the Hitachi 9200 and 9500 arrays do not correctly support serialization. As a result, the ShadowImage snapshot method is not supported on the Hitachi 9200 and 9500 arrays.**

Supported Peripherals and SAN Equipment

Component Type	Vendor Supported
Disk Drivers (for dynamic multipathing and load leveling)	◆ EMC PowerPath ◆ Hitachi HDLM
Switches	Any SAN compliant FC switch is supported. Examples are: ◆ Brocade ◆ Cisco ◆ Inrange ◆ McData ◆ QLogic
Third Party Copy Devices	◆ ADIC (standalone and in own libraries) ◆ ATTO (standalone and in ATL libraries) ◆ Chaparral (standalone and in Overland Storage Neo Series libraries) ◆ Crossroads/Compaq ◆ Hitachi/HP/SUN eCopy (in disk array) ◆ Spectra Logic (in own libraries) **Note** Contact your hardware sales representative for the latest firmware level for these devices. **Note** These devices are supported as standalone devices or as part of another system such as a tape library.

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

Peripherals and SAN Equipment Used in Test Configurations

The official list of supported equipment is in the table "Supported Peripherals and SAN Equipment" on page 10. The following is a list of the actual vendors and models used in VERITAS test configurations.

Components Used In Test Configurations

Component Type	Vendor Supported
Host Bus Adapters (HBAs)	**For Solaris servers:** ◆ **Emulex** ◆ **LP7000E** ◆ **LP8000** ◆ **LP9002** ◆ **JNI** ◆ **FCI-1063** ◆ **FCI-6410-N** ◆ **FCE-6460-N** ◆ **QLogic** ◆ **QLA2300** ◆ **QLA2310** **For HP servers:** ◆ **HP** ◆ **A5158A**

Components Used In Test Configurations

Component Type	Vendor Supported
Tape Drives	◆ **HP ULTRIUM** ◆ **IBM ULTRIUM** ◆ **LTO-2** ◆ **Quantum DLT 7000** ◆ **Quantum DLT 8000** ◆ **Quantum SDLT320** ◆ **SONY SDX-500C** ◆ **SONY SDX-300C** ◆ **SONY SDX-700C** ◆ **StorageTek T9940A** ◆ **StorageTek 9840, 9840A, 9840B**
Fibre-attached Tape Libraries	◆ **ADIC Scalar 100** ◆ **ATL P1000** ◆ **ATL P7000** ◆ **Overland Storage Neo Series** ◆ **Spectra Logic 2000** ◆ **Spectra Logic 12000** ◆ **Spectra Logic 20000** **Note** **SCSI-attached tape libraries are not directly involved with extended copy operation so are not listed (but all are supported).**
Fibre-attached Disks and Disk Arrays	◆ **EMC Symmetrix** ◆ **EMC DMX** ◆ **Hitachi 9900, 9900V** ◆ **HP XP 256, XP 512** ◆ **Seagate ST336605FC** ◆ **SUN T3**

Components Used In Test Configurations

Component Type	Vendor Supported
Switches	◆ **Brocade** ◆ **Silkworm 2400, 2800** ◆ **Inrange** ◆ **FC-90000** ◆ **McData** ◆ **ED-6064** ◆ **QLogic** ◆ **SanBox2 16**
Third Party Copy Devices in FC Routers, Tape Libraries, Disk Arrays	◆ **ADIC/Pathlight (standalone and in own libraries)** ◆ **San Gateway - Firmware: 0343.13** ◆ **5100/5101 - Firmware: 0410.09** ◆ **ATTO (standalone and in ATL libraries)** ◆ **4500 - Firmware: 005E** ◆ **Chaparral (standalone and in Overland Storage Neo Series libraries)** ◆ **VFS113 - Firmware: R520R01** ◆ **VFS212 - Firmware: T520R01** ◆ **Crossroads/Compaq** ◆ **4250/4450 - Firmware: 2008J** ◆ **8000 - Firmware: 4.02.aw** ◆ **10000 - Firmware: 4.02.aw** ◆ **Hitachi Data Systems** ◆ **9900 eCopy** ◆ **Spectra Logic** ◆ **Spectra 2000 (TreeFrog) - Firmware: 4.1.32.0** ◆ **Spectra 12000 (Gator) - Firmware: 4.1.32.0**

Disk Arrays

Each of the following array-specific snapshot methods must be used for its own disk array-type. These are currently supported for Solaris and HP clients only.

Snapshot Methods for Particular Arrays

To back up the following:	Use this snapshot method:
EMC Symmetrix/DMX disk arrays	TimeFinder
Hitachi 7700/9900/9900V disk arrays	ShadowImage
HP XP256/512 disk arrays	BusinessCopy

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.

Disk Array Snapshot Dependencies

Snapshot method	Required Library and Version
TimeFinder (EMC)	• SYMAPI Library release 4.2-154 or higher or WideSky Library 5.0 or higher, for Solaris or HP-UX. Note: The SYMAPI (or WideSky) Library is installed on the host but the TimeFinder firmware is installed on the EMC Symmetrix disk array—NOT on the host where NetBackup is installed.
ShadowImage (Hitachi)	• RAID Manager Library version 01-03-03/01 or higher; ShadowImage release for Solaris or HP-UX. Note: 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.

Disk Array Snapshot Dependencies

Snapshot method	Required Library and Version
BusinessCopy (HP)	• **RAID Manager Library version 01-03-03/01 or higher; BusinessCopy release for Solaris or HP-UX.** **Note: 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 with VxVM Volumes

When using an array-specific snapshot method, configuration of client data over VERITAS Volume Manager (VxVM) volumes is supported only on certain combinations of disk arrays and platforms.

If client data is not configured over VxVM volumes, all disk arrays in the table "Snapshot Methods for Particular Arrays" on page 15 are supported (no restrictions).

Note As an alternative, the vxvm snapshot method can be used in backing up any of the disk arrays in "Snapshot Methods for Particular Arrays" (on either Solaris or HP-UX), if the client data is configured over VxVM volumes.

The following table lists the disk arrays supported when client data is configured over VxVM volumes.

Disk Arrays Supported for VxVM (when using an array-specific snapshot method)

With VxVM on this platform:	EMC Symmetrix /DMX	Hitachi 9200/9900/9900V	Hitachi 7700	HP XP256	HP XP48/512
Solaris 7 and above	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
HP-UX 11i and above	**Yes**	**Not officially supported by VxVM.**	**Not officially supported by VxVM.**	**Yes**	**Yes**

Matrix of Client OS and Advanced Client Features

This table shows Advanced Client features available for each client operating system. It also shows the snapshot methods available for each feature on each OS.

Note For the software requirements for each snapshot method, see the "Matrix of Snapshot Methods and Requirements" on page 18.

Advanced Client Features and Snapshot Methods by Client OS							
OS	**Local snapshot**	**FlashBackup**	**Instant Recovery**	**BLIB[a]**	**Offhost: Alternate Client**	**Offhost: Media Server, Third Party Copy**	**Offhost: Network Attached Storage**
Solaris 7, 8, 9	Yes: nbu_snap, VxFS_Checkpoint, vxvm, TimeFinder, ShadowImage, BusinessCopy	Yes: nbu_snap, VxFS_Snapshot, vxvm, VVR[b], FlashSnap[b], TimeFinder, ShadowImage, BusinessCopy	Yes: VxFS_Checkpoint, vxvm, VVR, NAS_Snapshot	Yes: snapshot method not configurable	Yes: FlashSnap, VVR, TimeFinder, ShadowImage, BusinessCopy	Yes: nbu_snap, VxFS_Checkpoint, vxvm, TimeFinder, ShadowImage, BusinessCopy	Yes: NAS_Snapshot
HP-UX 11.00	No[c]	Yes: VxFS_Snapshot	No[c]	Yes: snapshot method not configurable	No[c]	No[c]	Future release
HP-UX 11i	Yes: VxFS_Checkpoint, vxvm, TimeFinder, ShadowImage, BusinessCopy	Yes: VxFS_Snapshot, vxvm, VVR[b], FlashSnap[b], TimeFinder, ShadowImage, BusinessCopy	Yes: VxFS_Checkpoint, vxvm, VVR	Yes: snapshot method not configurable	Yes: FlashSnap, VVR, TimeFinder, ShadowImage, BusinessCopy	Yes: VxFS_Checkpoint, vxvm, TimeFinder, ShadowImage, BusinessCopy	Future release
Windows NT	Use VSP snapshot in base NetBackup (not included in Advanced Client)	No[c]	No[c]	No[c]	No[c]	No[c]	No[c]
Windows 2000	Yes: vxvm, VSP	Yes: vxvm, FlashSnap[b], VSP	Yes: vxvm, NAS_Snapshot	Not applicable	Yes: FlashSnap	Future release	Yes: NAS_Snapshot
Windows 2003	Yes: VSP, VSS	Yes: vxvm[d], FlashSnap[bd], VSP, VSS	Yes: vxvm[d], NAS_Snapshot[d]	Not applicable	Yes: FlashSnap[d]	Future release	Yes: NAS_Snapshot[d]
AIX	Future release	Future release	Future release	Yes: snapshot method not configurable	Future release	Future release	Future release
Linux	Future release	Future release	Future release	Future release	Future release	Future release	Future release

a. Block level incremental backup with Advanced Client is supported for Oracle database clients only.

b. The VVR and FlashSnap methods require an alternate client.

c. There are no plans to support this feature on this OS version.

d. Not supported on Intel Itanium machines.

Matrix of Snapshot Methods and Requirements

The following table describes each snapshot method and its requirements.

For a list of Advanced Client features and snapshot methods available for each client operating system, see "Matrix of Client OS and Advanced Client Features" on page 17.

Please read the following note:

Note Advanced Client snapshot methods and offhost backup methods perform mapping of the underlying file system and volume structure. This mapping has been verified for the I/O system components listed in this table under "Data Type Supported." The use of other components in the I/O system, such as other volume managers or storage replicators, may result in an unreliable backup. Such configurations are not supported.

Snapshot Methods and Requirements

Snapshot Method	Type	Data Type Supported (for Backup Selections list)	Requirements and Restrictions	Where to Obtain Required Software
nbu_snap (Solaris only)	Copy-on-write	File systems: ◆ UFS (Solaris) ◆ VxFS Raw partitions: ◆ VxVM volumes ◆ raw disks[a]	◆ Advanced Client ◆ Does not support clustered file systems	www.veritas.com
VxFS_Checkpoint (Solaris or HP) Supports Instant Recovery	Copy-on-write (Storage Checkpoint)	File systems: ◆ VxFS ◆ Online JFS (HP) **Note**: Does not support raw-partition type backups (whether FlashBackup or Standard policy).	◆ Advanced Client ◆ VxFS 3.4 or later (for HP, VxFS 3.5), with Storage Checkpoint license.	VxFS 3.4 is part of VERITAS Database Edition for Oracle 2.2: www.veritas.com

Snapshot Methods and Requirements

Snapshot Method	Type	Data Type Supported (for Backup Selections list)	Requirements and Restrictions	Where to Obtain Required Software
VxFS_Snapshot (Solaris or HP; local hosts only) (*For FlashBackup policies only*)	Copy-on-write	File systems: ◆ UFS (Solaris) ◆ Online JFS (HP) ◆ VxFS Raw partitions: ◆ VxVM volumes ◆ LVM volumes (HP hosts only) ◆ raw disks[a]	◆ Advanced Client ◆ VxFS 3.4 or later (for HP, VxFS 3.3.2 or later)	www.veritas.com
vxvm (Solaris, HP, Windows 2000/2003) Supports Instant Recovery	Snapshot mirror	File systems: ◆ NTFS (Windows) ◆ UFS (Solaris) ◆ VxFS ◆ Online JFS (HP) Raw partitions: ◆ VxVM volumes	◆ Advanced Client ◆ VxVM 3.1 or later[b] **Note**: vxvm cannot be used with VxVM volumes configured as RAID-5. **Note**: The snapshot source must be configured with a VxVM 3.1 or later[b] snapshot mirror.	www.veritas.com
FlashSnap (Solaris, HP, Windows 2000/2003)	Snapshot mirror for alternate client	File systems: ◆ NTFS (Windows) ◆ UFS (Solaris) ◆ VxFS ◆ Online JFS (HP) Raw partitions: ◆ VxVM volumes	◆ Advanced Client ◆ VxVM 3.2 or later with additional FlashSnap license. (For Windows, VxVM 3.1 or later[b].)	www.veritas.com
VVR (Solaris, HP) Supports Instant Recovery	Snapshot mirror for alternate client	File systems: ◆ UFS (Solaris) ◆ VxFS ◆ Online JFS (HP) Raw partitions: ◆ VxVM volumes	◆ Advanced Client ◆ VxVM 3.2 or later, with additional VVR license.	www.veritas.com

Snapshot Methods and Requirements

Snapshot Method	Type	Data Type Supported (for Backup Selections list)	Requirements and Restrictions	Where to Obtain Required Software
TimeFinder (Solaris, HP)	Mirror	File systems: ◆ UFS (Solaris) ◆ VxFS ◆ Online JFS (HP) Raw partitions: ◆ VxVM volumes ◆ raw disks[a]	◆ Advanced Client ◆ EMC TimeFinder Symapi **Note**: TimeFinder snapshot method is for EMC Symmetrix disk arrays only.	www.veritas.com Contact EMC for Symapi
ShadowImage (Solaris, HP)	Mirror	File systems: ◆ UFS (Solaris) ◆ VxFS ◆ Online JFS (HP) Raw partitions: ◆ VxVM volumes ◆ raw disks[a]	◆ Advanced Client ◆ ShadowImage (HOMRCF) **Note**: ShadowImage snapshot method is for Hitachi Data Systems disk arrays only.	www.veritas.com Contact Hitachi Data Systems for Hitachi Raid Manager
BusinessCopy (Solaris, HP)	Mirror	File systems: ◆ UFS (Solaris) ◆ VxFS ◆ Online JFS (HP) Raw partitions: ◆ VxVM volumes ◆ raw disks[a]	◆ Advanced Client ◆ Business Copy Services - ShadowImage (HOMRCF) **Note**: BusinessCopy snapshot method is for HP XP series disk arrays only.	www.veritas.com Contact Hewlett Packard for Business Copy Services
NAS_Snapshot	NAS vendor specific	File systems: NAS vendor specific	◆ Advanced Client ◆ NetBackup for NDMP	www.veritas.com

a. Supported raw disks are SCSI (local or fibre channel attached), with sd, dad, and ssd drivers (Solaris) or sdisk drivers (HP).

b. For Windows 2000 clients, Storage Foundation for Windows 4.1 or Volume Manager 3.1 HF03 or later is required. For Windows 2003 clients, Storage Foundation for Windows 4.0 or 4.1 is required.

Note The VSP and VSS snapshot types, for Windows Open File Backup, are included with the base NetBackup product, not Advanced Client.

Note on vxvm and FlashSnap methods (Windows)

When using either the vxvm or FlashSnap snapshot methods *on Windows clients*, please note that the FlashSnap option of VERITAS Volume Manager for Windows (or of Storage Foundation for Windows) must be licensed.

SAN Configuration Assistance

This section covers switches, host-bus adapters, and third-party copy devices, as a supplement to the *NetBackup Advanced Client System Administrator's Guide.* For installation and configuration of NetBackup, please refer to that guide.

Switches

This section provides troubleshooting tips for the fibre channel switches supported by NetBackup Advanced 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.

  As an alternative, you may be able to use the bpSALinfo command; see "Obtaining World-Wide Names (bpSALinfo)" on page 23, and its note.

- 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 Advanced Client backup, note the following:

- **For backups using the NetBackup Media Server method:** both the tape libraries and the client disks used for the backup must be accessible to the NetBackup media server.
- **For backups using the Third-Party Copy Device method:** 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).

If Media Server Cannot Access Client Disks

For the Third-Party Copy Device backup method: if the switch fabric is partitioned in zones, and the third-party copy device can access the client disk but the media server cannot, enter the following 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. This command updates the `3pc.conf` file with information about the client disks (LUN and identification descriptor), allowing the media server to issue third-party copy commands to the third-party copy device. This information may have to be edited by adding the world-wide name of each device to the 3pc.conf file, as explained in the "SAN Configuration for Advanced Client" chapter of the *NetBackup Advanced Client System Administrator's Guide*.

Note The third-party copy device must have access to (be in the same zone as) the client disks.

What to Avoid During an Advanced Client Backup

- 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.

Obtaining World-Wide Names (bpSALinfo)

In the following procedures, an important step is locating world-wide names. Each procedure describes how to use the device to determine world-wide names. As an alternative, you can use NetBackup's `bpSALinfo` command to look up world-wide names if you have VERITAS CommandCentral Storage (formerly SANPoint Control).

To use `bpSALinfo`, enter the following on the NetBackup media server:

```
/usr/openv/netbackup/bin/admincmd/bpSALinfo -S SPC_server
```

where -S *SPC_server* identifies the host where CommandCentral Storage/SANPoint Control is running. `bpSALinfo` adds world-wide name and lun values to device entries in the NetBackup `3pc.conf` file. For additional `bpSALinfo` options, refer to its man page or to the *NetBackup Commands for UNIX* guide.

Note *If all devices required for the backup support identification descriptors (E4 target)*, you do not need to run `bpSALinfo` or 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.

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 Advanced Client.

Note For tips that apply to all supported switches, see under "Switches" on page 22.

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.

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

Obtain the world-wide port name of the devices connected to the Brocade 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
```

- For the Advanced 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 step 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 Advanced 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`

   See example output for `nsShow` under "To obtain world-wide port names for the 3pc.conf file" on page 25.

   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" on page 22 for access requirements according to the Advanced 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:

`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 Advanced Client.

Note For tips that apply to all supported switches, see under "Switches" on page 22.

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.

▼ To obtain 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   Local   Local                    Remote  Remote                   Unique
Number Type    PortWWN                  Type    NodeWWN                  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 Advanced 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.

▼ 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 step 3).

3. Make sure the QLogic SANbox ports are online and initialized correctly by entering the following.

   show port

   Example output:

```
Port   Admin       Operational Login       Config Running     Link     Link
Number State       State       Status      Type   Type        State    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 Advanced 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" on page 22 for access requirements according to the Advanced 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 Advanced Client.

Note For tips that apply to all supported switches, see under "Switches" on page 22.

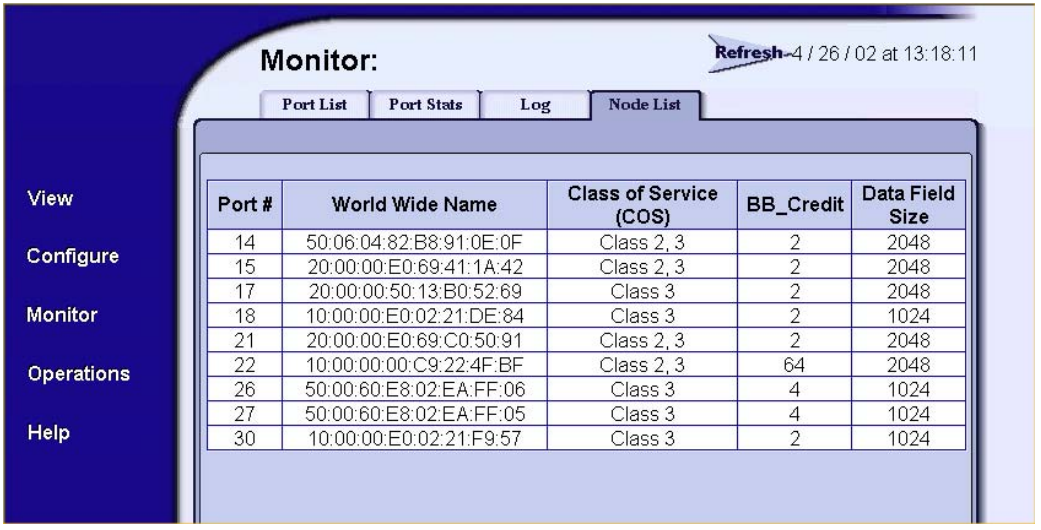
Note The McDATA supports point-to-point mode only (does not support loop mode).

▼ 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:



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.

   a. Log into the McDATA switch using a web browser.

   b. 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.

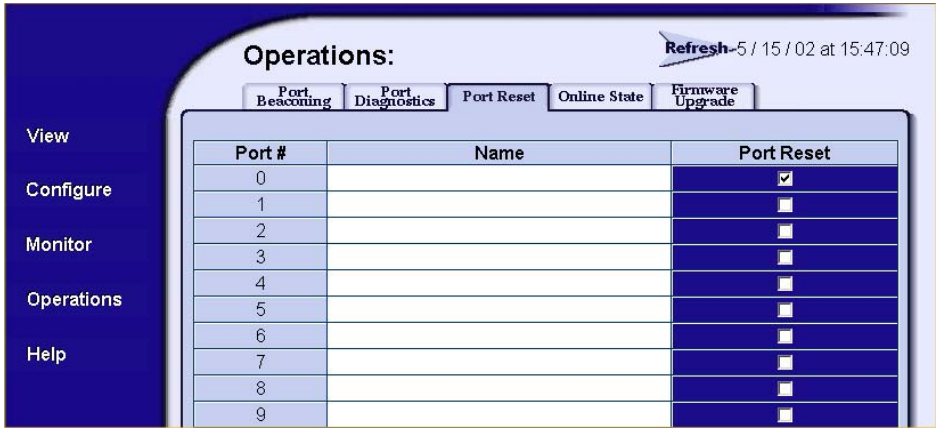
3. Use **Configure** > **Zoning** to determine whether the zone configuration allows the media server and third-party copy device to access the devices needed for the backup.

Note Refer to "Device Accessibility" on page 22 for access requirements according to the Advanced 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 step 2 on page 32 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:

a. Click the **Operations** > **Port Reset** tab and place a Port Reset check mark for the appropriate port.

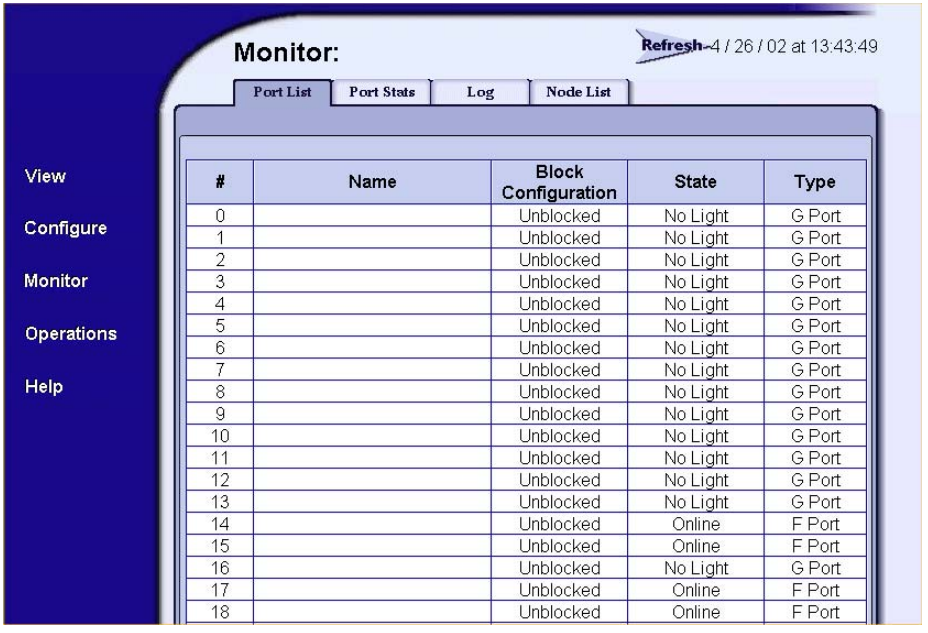


b. Click the **Activate** button at the bottom of the Port Reset display.

c. 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.

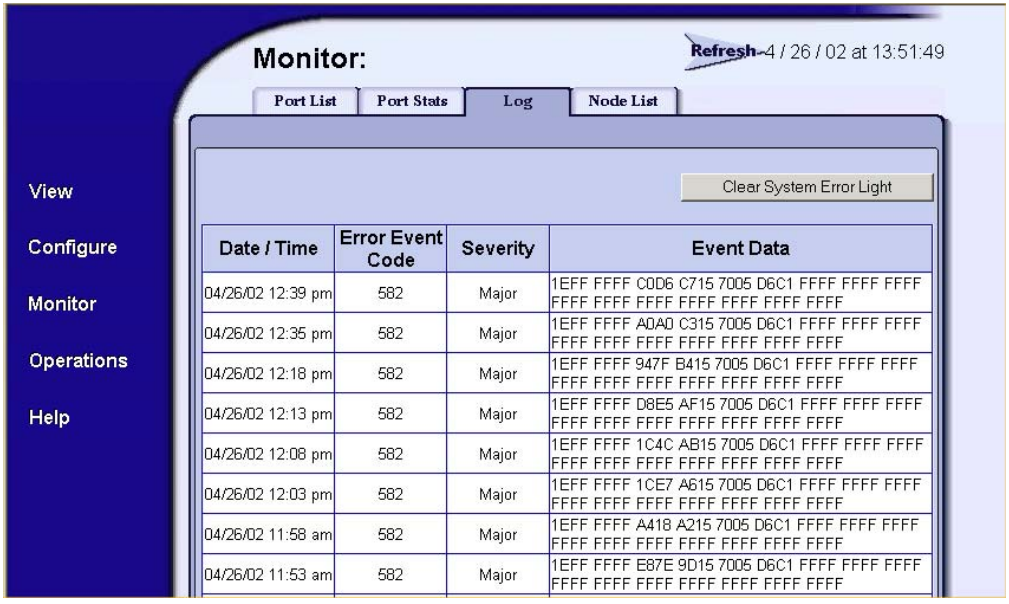
Example:



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 Advanced Client. Look for a bad connection or a malfunction in the connected device.

6. 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 Advanced Client.

For a list of supported HBAs, refer to "Peripherals and SAN Equipment" on page 10.

How to Display System Information

On Solaris

You can display device information with the dmesg command.

```
/usr/sbin/dmesg | more
```

The dmesg output is displayed as messages on the system console and identifies which devices are connected to the system as of the last reboot. The following edited dmesg output was displayed on a SPARC system.

```
Fri Oct 13 15:30:25 CDT 2000
Oct 13 15:04:03 alvin genunix: [ID 540533 kern.notice] SunOS Release 5.8 Version Generic 64-bit
Oct 13 15:04:03 alvin genunix: [ID 784649 kern.notice] Copyright 1983-2000 Sun Microsystems,
Inc. All
rights reserved.
Oct 13 15:04:03 alvin genunix: [ID 678236 kern.notice] Ethernet address = 8:0:20:f0:e7:38
Oct 13 15:04:03 alvin unix: [ID 389951 kern.notice] mem = 524288K (0x20000000)
Oct 13 15:04:03 alvin unix: [ID 930857 kern.notice] avail mem = 511541248
```

** (text omitted)

**

```
Oct 13 15:17:04 alvin fca-pci: [ID 451854 kern.notice] fca-pci0: JNI Fibre Channel Adapter
model FCI-1063
Oct 13 15:17:04 alvin fca-pci: [ID 451854 kern.notice] fca-pci0: SCSI ID 125 / AL_PA 0x1
Oct 13 15:17:04 alvin fca-pci: [ID 451854 kern.notice] fca-pci0: Fibre Channel WWNN:
100000E069C01351 WWPN:200000E069C01351
Oct 13 15:17:04 alvin fca-pci: [ID 451854 kern.notice] fca-pci0: FCA SCSI/IP Driver Version
2.5.9,
August 22, 2000 for Solaris 7
Oct 13 15:17:04 alvin fca-pci: [ID 451854 kern.notice] fca-pci0: All Rights Reserved.
```

** (text omitted)

**

```
Oct 13 15:27:31 alvin genunix: [ID 936769 kern.info] sd0 is /pci@1f,0/pci@1,1/ide@3/sd@2,0
Oct 13 15:27:33 alvin ebus: [ID 521012 kern.info] fd0 at ebus0: offset 14,3023f0
Oct 13 15:27:33 alvin genunix: [ID 936769 kern.info] fd0 is
/pci@1f,0/pci@1,1/ebus@1/fdthree@14,3023f0
Oct 13 15:27:33 alvin pseudo: [ID 129642 kern.info] pseudo-device: winlock0
Oct 13 15:27:33 alvin genunix: [ID 936769 kern.info] winlock0 is /pseudo/winlock@0
```

```
Oct 13 15:27:33 alvin pseudo: [ID 129642 kern.info] pseudo-device: lockstat0
Oct 13 15:27:33 alvin genunix: [ID 936769 kern.info] lockstat0 is /pseudo#
```

On HP-UX

You can display device information with the ioscan command.

```
/etc/ioscan
```

Example output:

```
Class       I  H/W Path      Driver    S/W State   H/W Type     Description
============================================================================
** (text omitted)
**
**
ba          4  0/4           lba       CLAIMED     BUS_NEXUS    Local PCI Bus Adapter (782)
fc          0  0/4/0/0       td        CLAIMED     INTERFACE    HP Tachyon TL/TS Fibre Channel
Mass Storage Adapter
                           /dev/td0
fcp         0  0/4/0/0.1     fcp       CLAIMED     INTERFACE    FCP Domain
ext_bus     6  0/4/0/0.1.16.255.0       fcpdev    CLAIMED     INTERFACE    FCP Device Interface
target     25  0/4/0/0.1.16.255.0.0      tgt       CLAIMED     DEVICE
disk        3  0/4/0/0.1.16.255.0.0.0    sdisk     CLAIMED     DEVICE       IBM     DNES-318350W
                           /dev/dsk/c6t0d0   /dev/rdsk/c6t0d0
ctl         6  0/4/0/0.1.16.255.0.0.1    sctl      CLAIMED     DEVICE       Crossrds4450 Router
                           /dev/rscsi/c6t0d1  /dev/sctl/c6t0d1
ctl        25  0/4/0/0.1.16.255.0.0.2    sctl      CLAIMED     DEVICE       Crossrds4450 Router
                           /dev/rscsi/c6t0d2  /dev/sctl/c6t0d2
ctl        26  0/4/0/0.1.16.255.0.0.3    sctl      CLAIMED     DEVICE       Crossrds4450 Router
                           /dev/rscsi/c6t0d3  /dev/sctl/c6t0d3
ctl        27  0/4/0/0.1.16.255.0.0.4    sctl      CLAIMED     DEVICE       Crossrds4450 Router
                           /dev/rscsi/c6t0d4  /dev/sctl/c6t0d4
ext_bus     7  0/4/0/0.1.17.255.12       fcpdev    CLAIMED     INTERFACE    FCP Device Interface
target     26  0/4/0/0.1.17.255.12.11    tgt       CLAIMED     DEVICE
disk        4  0/4/0/0.1.17.255.12.11.0  sdisk     CLAIMED     DEVICE       HITACHI OPEN-9
                           /dev/dsk/c7t11d0   /dev/rdsk/c7t11d0
disk        5  0/4/0/0.1.17.255.12.11.1  sdisk     CLAIMED     DEVICE       HITACHI OPEN-9
                           /dev/dsk/c7t11d1   /dev/rdsk/c7t11d1
disk        6  0/4/0/0.1.17.255.12.11.2  sdisk     CLAIMED     DEVICE       HITACHI OPEN-9
                           /dev/dsk/c7t11d2   /dev/rdsk/c7t11d2
disk        7  0/4/0/0.1.17.255.12.11.3  sdisk     CLAIMED     DEVICE       HITACHI OPEN-9
                           /dev/dsk/c7t11d3   /dev/rdsk/c7t11d3
disk        8  0/4/0/0.1.17.255.12.11.4  sdisk     CLAIMED     DEVICE       HITACHI OPEN-9-CM
```

Checking the HBA Configuration File

- Setting the mode of operation

  There are variables specific to each HBA vendor for setting the mode of operation. VERITAS recommends using public loop or fabric mode.

- Setting 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 binding is not used, the target ID may change after a reboot, causing an Advanced 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.

To help ensure completeness, place the binding information in the vendor's HBA configuration files rather than in the st.conf or sd.conf files. The HBA files are described in the following sections, as needed.

JNI Host Bus Adapter

Using EZFibre

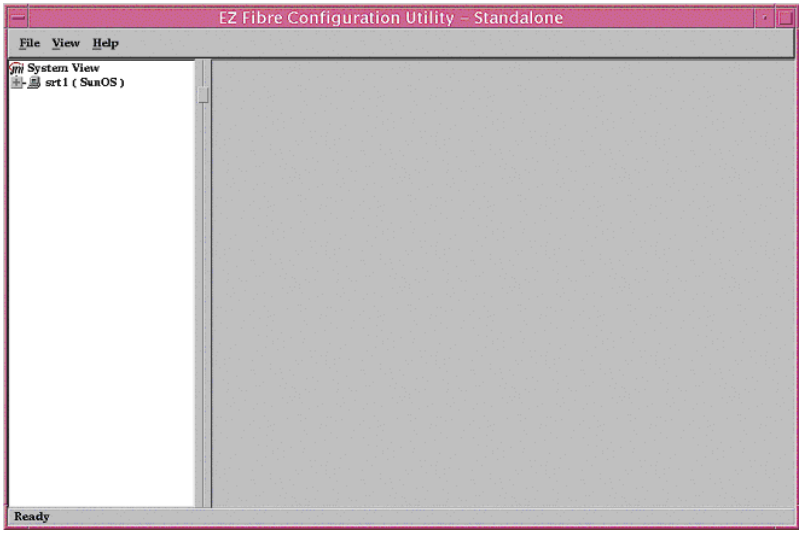
You can use the EZFibre interface to configure the JNI host bus adapter (HBA). Make sure that the correct HBA driver version is installed. The installation directory contains an EZFibre Readme file; refer to that file for detailed information about installing and uninstalling, patch information, how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

Starting EZFibre

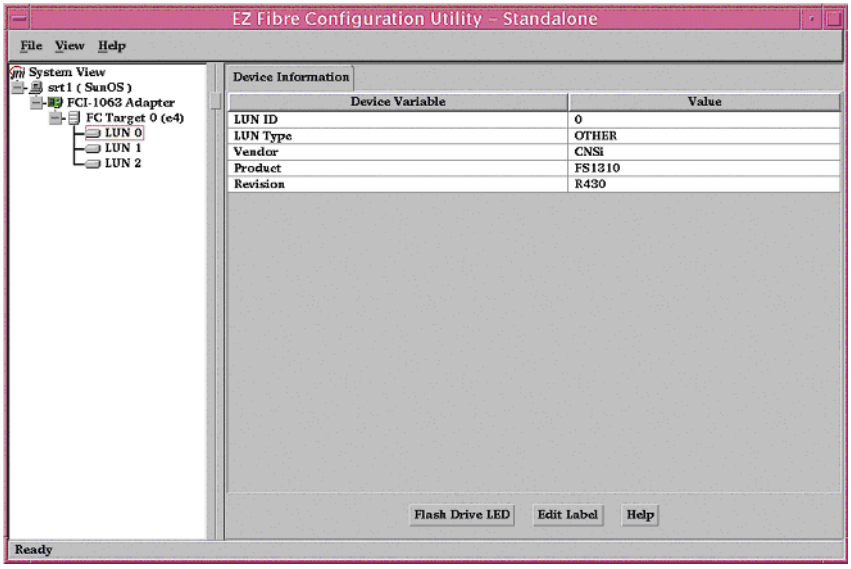
Once the installation of the EZFibre software has completed, go to the installation target directory and launch EZFibre by executing:

```
./ezf
```

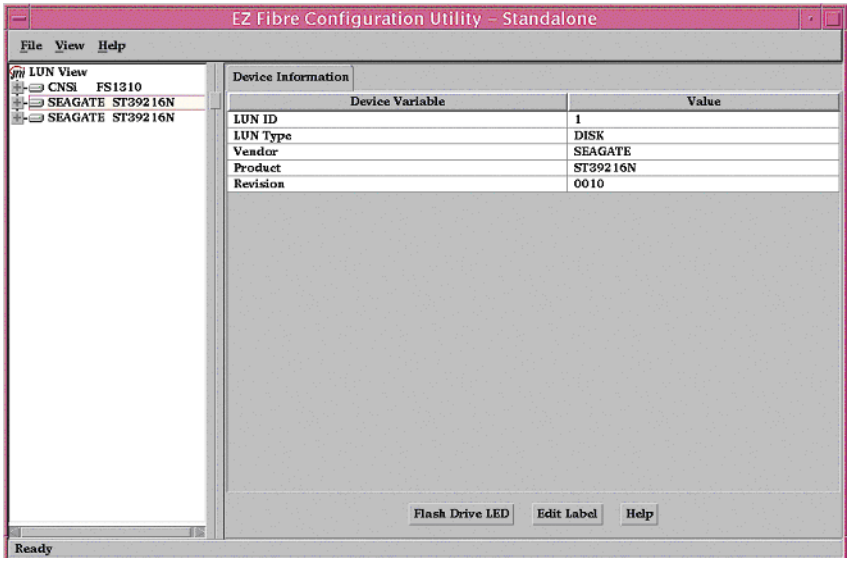
When the EZFibre display first appears, you are in a Systems View mode. To view additional components, expand the tree by clicking on the "+".



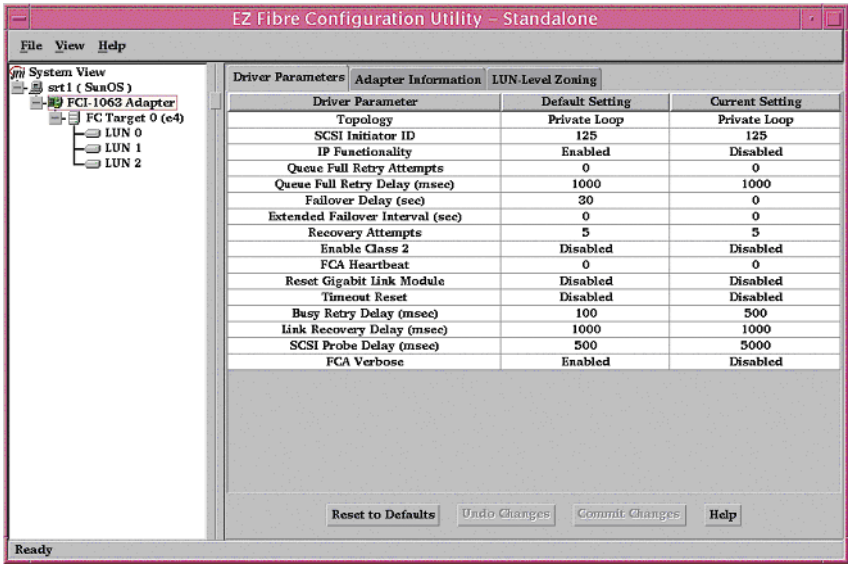
Expanding the tree shows the host bus adapter(s) on your system and the targets and LUNs associated with the JNI HBA. Highlighting any item from the adapter down in the tree should present additional information about the item that you select.



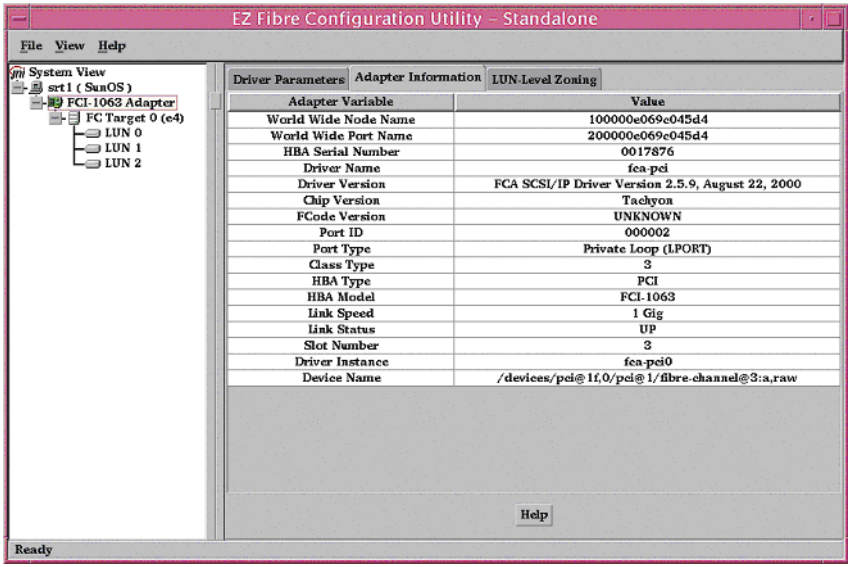
An alternate way of viewing information is by selecting the **LUN View** option in the **View** menu. This gives a clearer view of the LUNs.



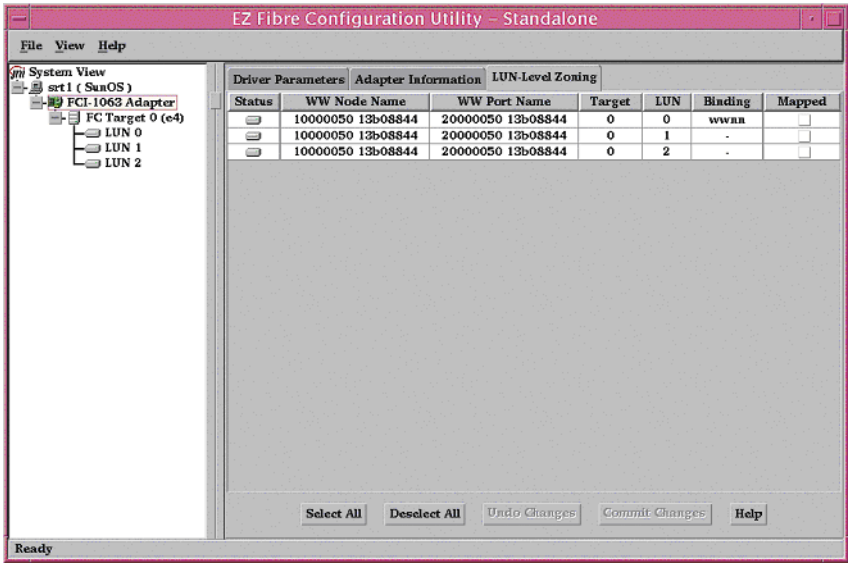
If you return to the **System View** (from the View menu) and select the adapter, you see parameters for the driver as well as default settings for other configuration-related items.



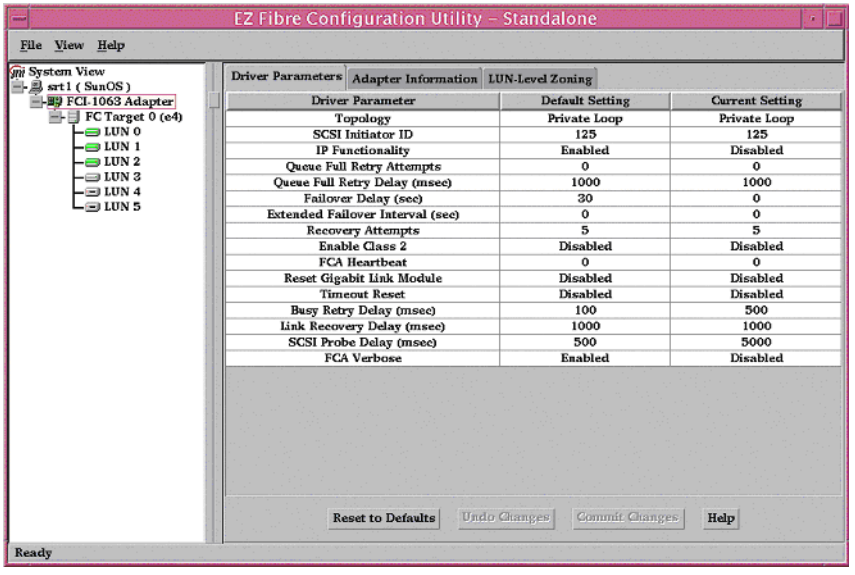
The **Adapter Information** tab displays information about the world-wide node name (WWNN) and world-wide port name (WWPN) for the HBA.



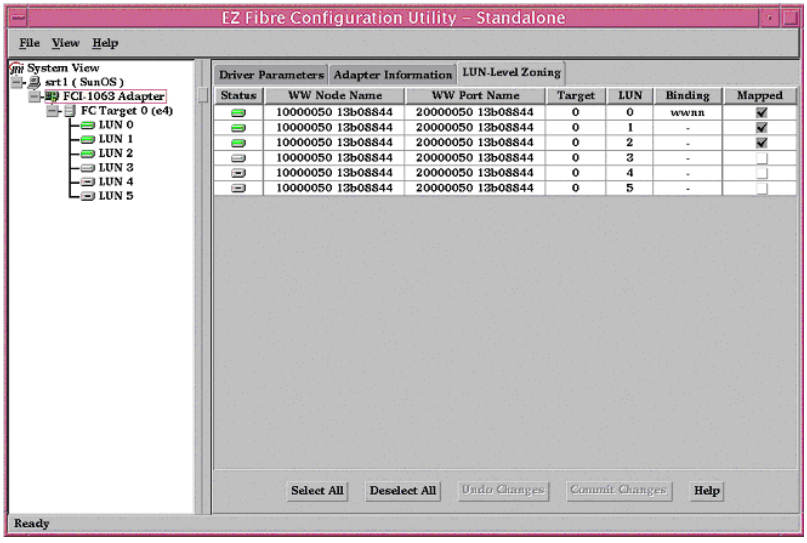
The **LUN-Level Zoning** tab displays information necessary for setting the persistent bindings for this HBA.



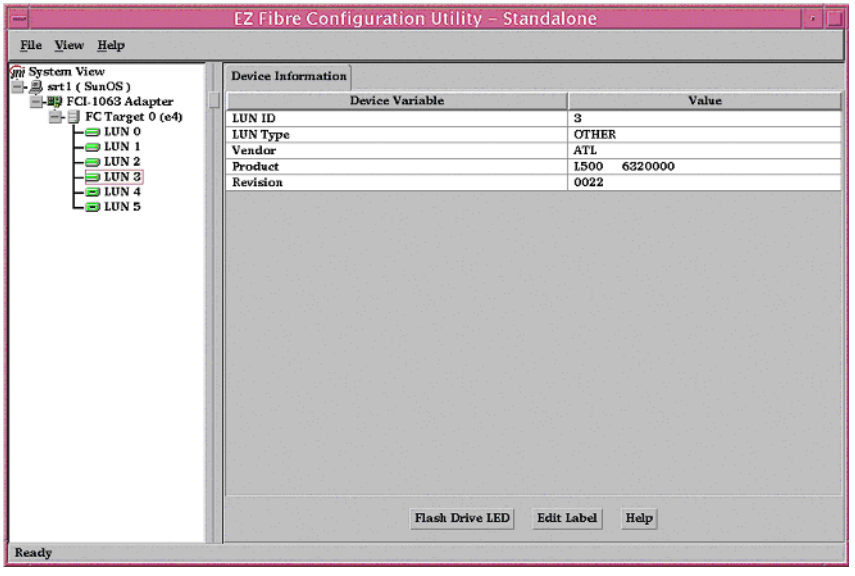
Assuming you now attach a tape robot to your third-party copy device, the following additional LUNS would be displayed. You should review the information found in all of the tabs and make sure it is correct.



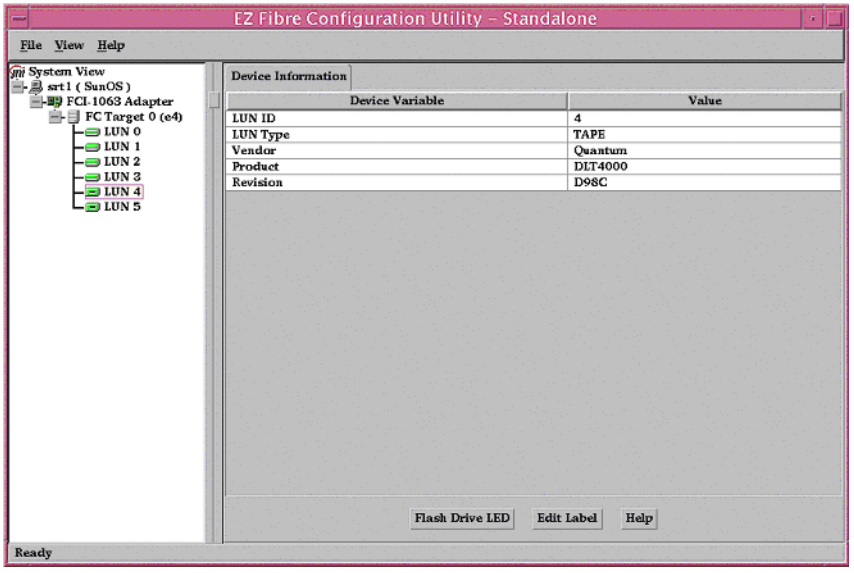
To set the bindings for any new tape devices, you can click on the check boxes individually, or click on the **Select All** button. Once you select the LUNs, the **Commit Changes** button activates. Clicking that button will prompt you to reboot the host, which will edit the appropriate system files.



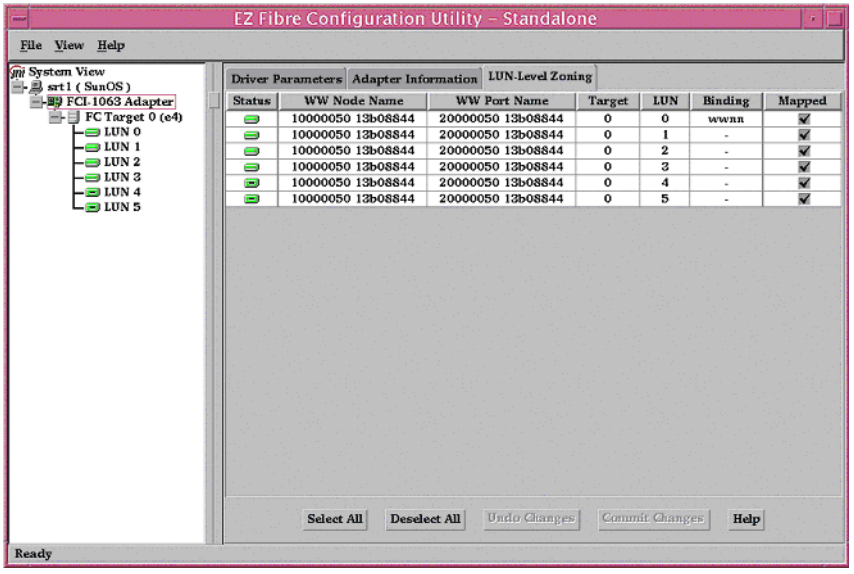
Highlighting each individual LUN will display device-specific information for that LUN.



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 and rebooted your host, you should rerun EZFibre and make sure the mapping is set.



Emulex Host Bus Adapter

This section highlights variables in your Emulex driver configuration file that are important for using NetBackup Advanced Client on a SAN. You must verify that these variables are correct, and if necessary modify them as described below.

1. In the `/kernel/drv/lpfc.conf` file, set the mode of operation as follows:

   To set *public loop* mode, enter the following:

   ```
   topology=0;
   ```

   To set *fabric* mode, enter the following:

   ```
   topology=2
   ```

   Example from the `/kernel/drv/lpfc.conf` file:

```
# topology:  link topology for initializing the Fibre Channel connection.
#            0 = attempt loop mode, if it fails attempt point-to-point mode
#            2 = attempt point-to-point mode only
#            4 = attempt loop mode only
#            6 = attempt point-to-point mode, if it fails attempt loop mode
# Set point-to-point mode if you want to run as an N_Port.
# Set loop mode if you want to run as an NL_Port.
topology=2;
```

2. In the `/kernel/drv/lpfc.conf` file, set persistent target binding as follows:

   Example entry:

   ```
   fcp-bind-WWPN="21000090a50001c8:lpfc0t0",
   ```

   where `21000090a50001c8` is the world wide port name of the disk array or third-party copy device you want to bind to, `lpfc0` is the Emulex HBA instance to bind to, and `t0` designates the target number for the binding.

   Example from the `/kernel/drv/lpfc.conf` file:

```
# Setup FCP persistent bindings,
# fcp-bind-WWPN binds a specific WorldWide PortName to a target id,
# fcp-bind-WWNN binds a specific WorldWide NodeName to a target id,
# fcp-bind-DID binds a specific DID to a target id.
# Only one binding method can be used.
# The SCSI ID to bind to consists of two parts, the lpfc interface
# to bind to, and the target number for that interface.
# NOTE: Target ids, with all luns supported, must also be in sd.conf.
#
# BEGIN: LPUTIL-managed Persistent Bindings
fcp-bind-WWPN="21000090a50001c8:lpfc0t0",
   "22000090a50001c8:lpfc0t1";
```

QLogic Host Bus Adapter

This section highlights variables in your QLogic driver configuration file that are important for using NetBackup Advanced Client on a SAN. You must verify that these variables are correct, and if necessary modify them as described below.

1. In the `/kernel/drv/qla2300.conf` file, set the mode of operation:

   To set *public loop* mode, enter the following:

   ```
   hba0-connection-options=0;
   ```

   To set *fabric* mode, enter the following:

   ```
   hba0-connection-options=1;
   ```

   Example from the `/kernel/drv/qla2300.conf` file:

   ```
   # Connection options
   #     0 = loop only
   #     1 = point-to-point only
   #     2 = loop preferred, otherwise point-to-point
   hba0-connection-options=1;
   ```

Note NetBackup supports the QLogic 2200 in fabric mode only (do not use loop mode).

2. In the `/kernel/drv/qla2300.conf` file, set persistent target binding, as follows:

   Example entry:

   ```
   hba0-SCSI-target-id-0-fibre-channel-name="100000e0020214fa";
   ```

   where `100000e0020214fa` is the world wide port name of the disk array or third-party copy device you want to bind to, `hba0` is the QLogic instance to bind to, and `0` is the target number for the binding.

   Example from the `/kernel/drv/qla2300.conf` file:

   ```
   # The Persistent Name Binding support for target devices associates a
   # SCSI target ID to a specified device World Wide Name.  To enable it,
   # lines of the following format should be added in the qla2300.conf
   # file:
   #
   #     hba<#>-SCSI-target-id-<#>-fibre-channel-name="<device WWN>";
   #
   #
   hba0-SCSI-target-id-0-fibre-channel-name="100000e0020214fa";
   ```

Third-Party Copy Devices

This section provides configuration assistance for the third-party copy devices (in routers, bridges, and other devices) supported by NetBackup Advanced Client.

Note For a list of supported third-party copy devices, refer to "Peripherals and SAN Equipment" on page 10.

For tested firmware levels, refer to the table "Peripherals and SAN Equipment Used in Test Configurations," and look under "Third Party Copy Devices in FC Routers, Tape Libraries, Disk Arrays" on page 14.

Obtaining World-Wide Names (bpSALinfo)

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. As an alternative, you can use NetBackup's `bpSALinfo` command to look up world-wide names if you have VERITAS CommandCentral Storage (formerly SANPoint Control). Refer to "Obtaining World-Wide Names (bpSALinfo)" on page 23 for more information on the `bpSALinfo` command.

Note *If all devices required for the backup support identification descriptors (E4 target)*, you do not need to run `bpSALinfo` or 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 *copy manager* 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 router/bridge 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.

Chaparral Router

After you have installed the Chaparral, the following procedure may be helpful in setting up the router for Advanced Client.

Note Supports both T10 and SNIA 143 versions of the SCSI Extended Copy command. Does not currently support the identification descriptor (E4 target).

Checking the Chaparral

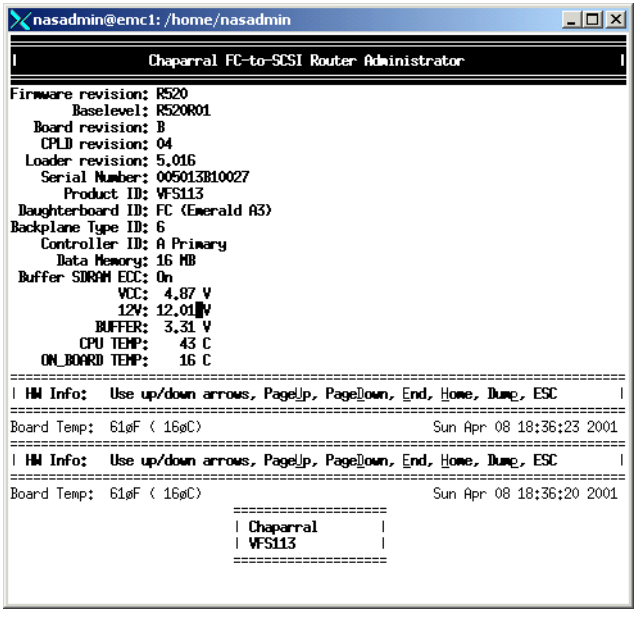
1. Telnet into the Chaparral. For example:

```
telnet chap
```

2. Check the firmware level by pressing Ctrl-E repeatedly until you see the following display.

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 "Peripherals and SAN Equipment Used in Test Configurations," under "Third Party Copy Devices in FC Routers, Tape Libraries, Disk Arrays" on page 14.

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

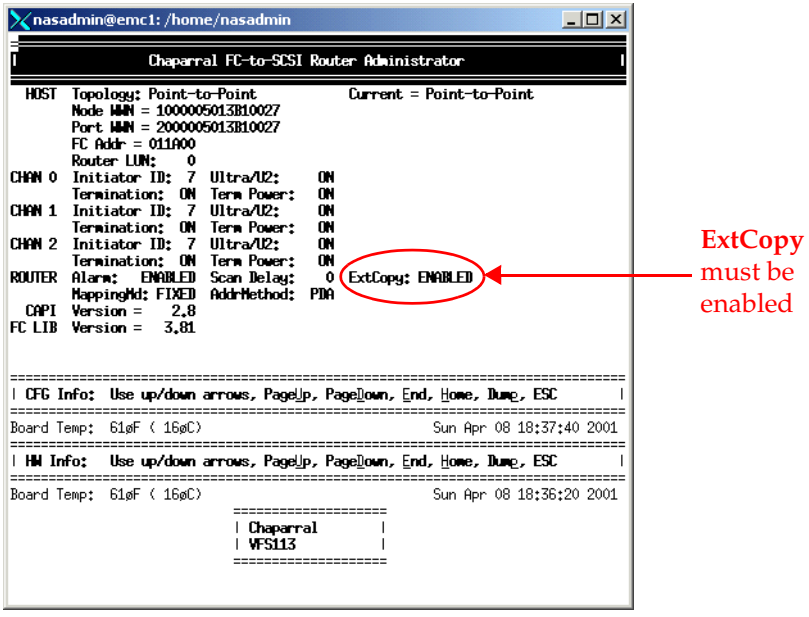


3. Obtain the world-wide node and port names of the router.

Get the world-wide names from the Chaparral Administrator display shown under step 4.

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 Advanced Client System Administrator's Guide*).

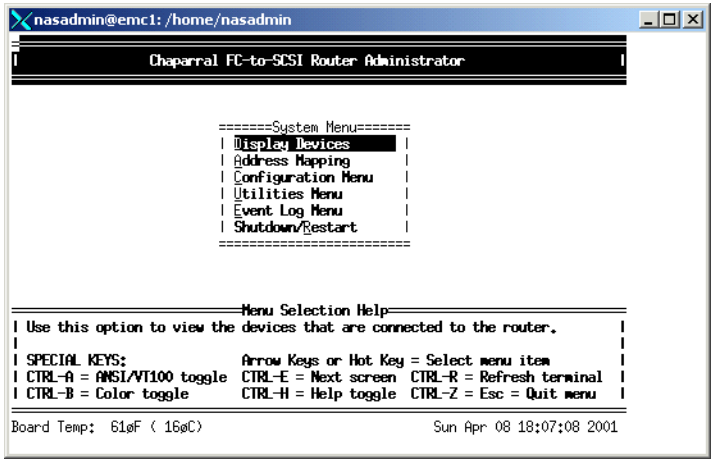
4. Make sure the router supports third-party copy (**ExtCopy**) capability, by pressing Ctrl-E again to verify that **ExtCopy** is ENABLED.



Note If **ExtCopy** is not enabled, you will not be able to perform third-party copy backups.

5. Press Enter or Esc to bring up the System menu.

The System Menu can always be accessed by pressing the Escape key to back up when you are in any sub-menu. Use the arrow keys on your keyboard to navigate through the options, selecting the items as shown in the following pages.



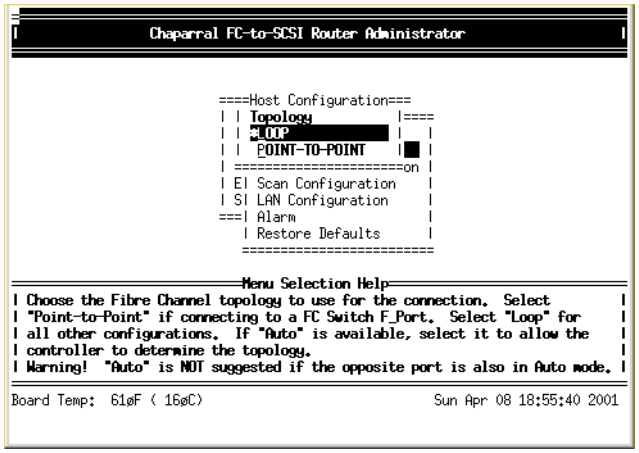
6. Check the host configuration of the Chaparral router and ensure that the correct mode is enabled (LOOP or POINT-TO-POINT).

Note If the Chaparral is connected to a Brocade switch, and the Brocade is in fabric mode, the Chaparral can use either LOOP or POINT-TO-POINT mode. If the Brocade switch is in quick loop mode, the Chaparral must use LOOP mode.

   a. From the System Menu, select **Configuration Menu**.

   b. Select **Host Configuration**.

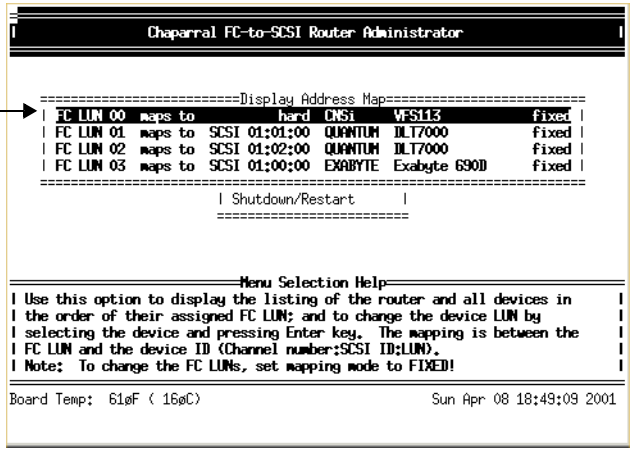
Make sure your Chaparral topology (connection type) is set to the correct mode.



7. Display the router LUN (control LUN).

From the System Menu, select **Address Mapping**.

Router LUN

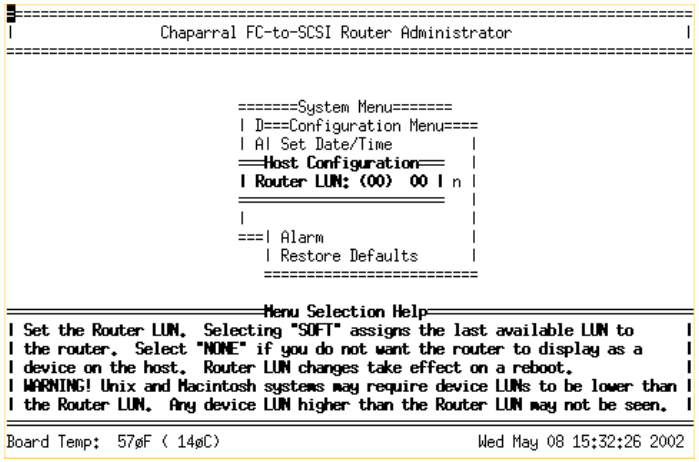


Note The Chaparral can intercept Extended Copy commands that are sent to the tape device. If you have a tape storage device behind the Chaparral, you can use the tape device path to identify the third-party copy device in the NetBackup mover.conf file. In this case, a router (control) LUN is not needed.

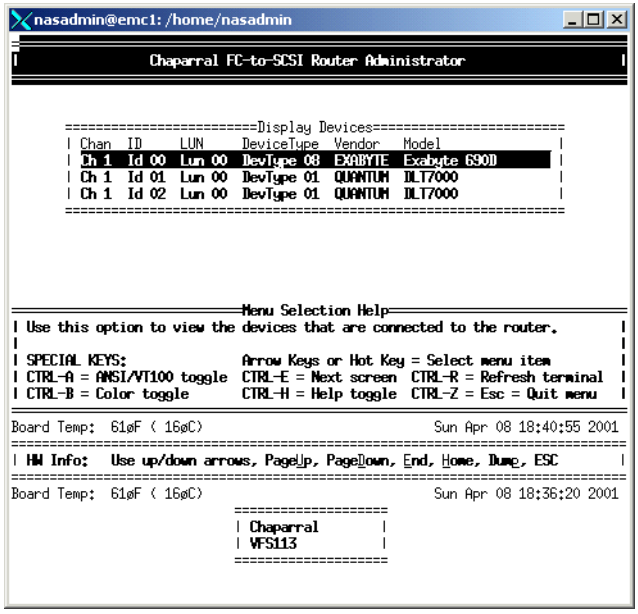
8. If needed, change the router LUN (control LUN).

Select **Configuration**, **Host Configuration**, and then select **LOOP** or **POINT-TO-POINT**. Then you can set the router LUN (0 to 63).

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



9. To see if all of the devices are visible, select **Display Devices** on the System Menu.

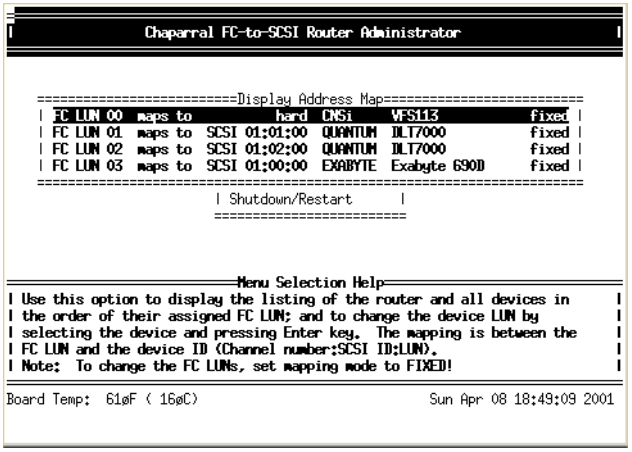


10. Display the FC LUN-to-SCSI bus, target, LUN mapping.

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

a. From the System Menu, select **Address Mapping**.

b. Select **Display Address Map**.

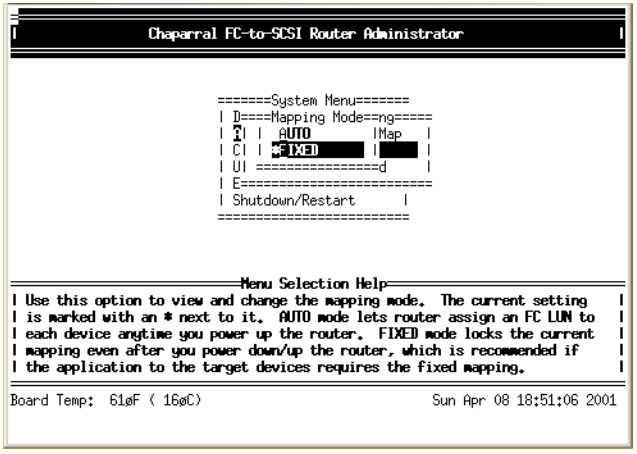


11. Confirm that the mapping mode is set to FIXED.

a. From the System Menu, select **Address Mapping**.

b. Select **Mapping Mode**.

Make sure that FIXED is selected, not AUTO. If set to AUTO, change it to FIXED. This provides persistent binding, so that luns and possible targets will not be changed on the hosts.



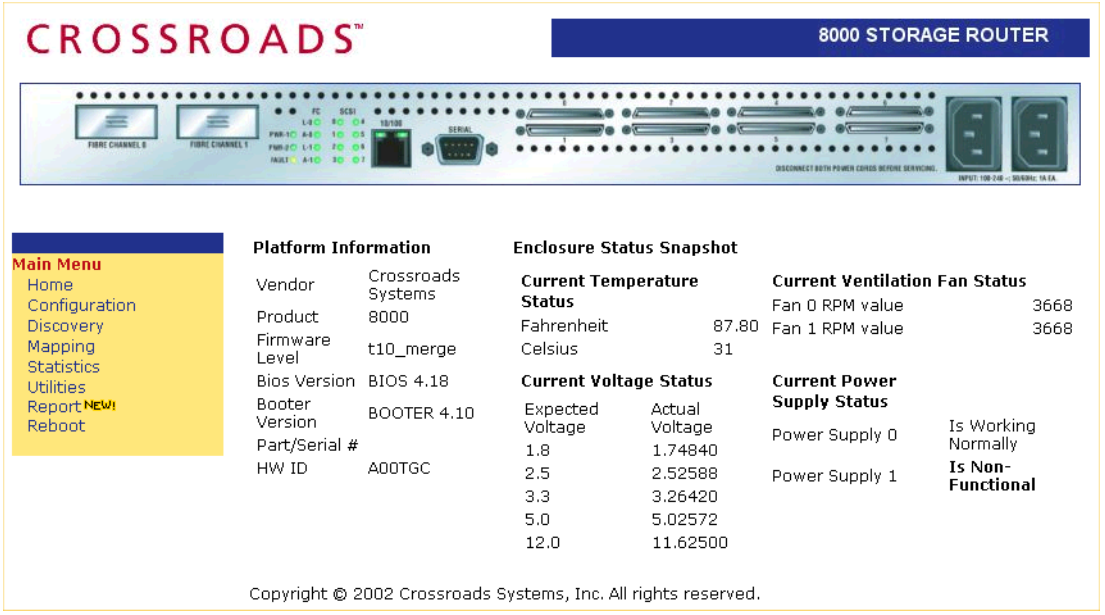
12. From the System Menu, select **Shutdown/Restart**. When the router has restarted, use the above displays to confirm that your changes have been saved.

Crossroads/Compaq Storage Router

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

Note The Crossroads 8000 supports both T10 and SNIA 143 versions of the SCSI Extended Copy command. It does not currently support the identification descriptor (E4 target).

1. Initiate the Crossroads Visual Manager (CVM) by entering the host name or IP address of the Crossroads router in a web browser.

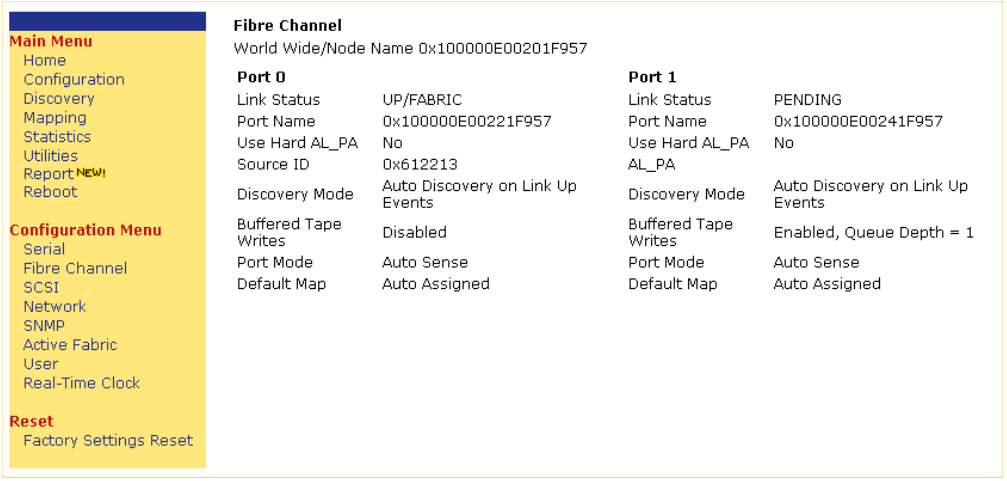


2. Check the firmware level on your Crossroads display.

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 "Peripherals and SAN Equipment Used in Test Configurations," under "Third Party Copy Devices in FC Routers, Tape Libraries, Disk Arrays" on page 14.

3. Obtain the world-wide node and port names of the Crossroads, as follows.

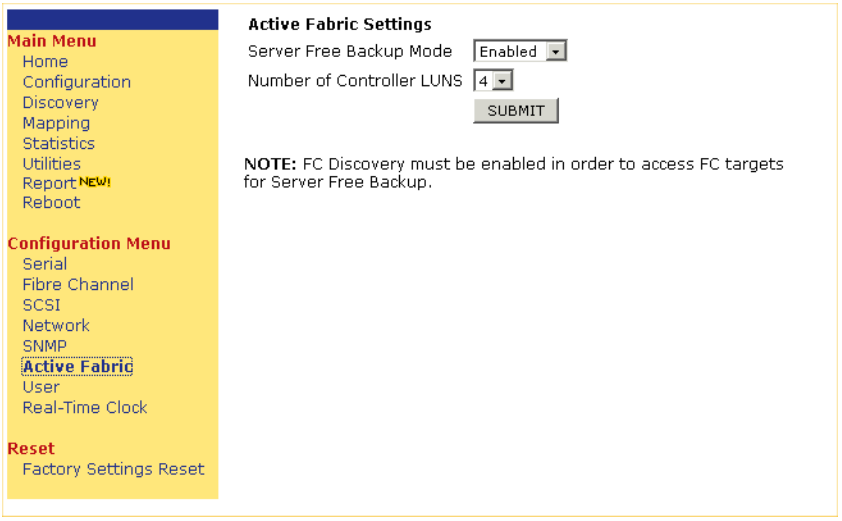
From the **Main Menu**, select **Configuration**.



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 Advanced Client System Administrator's Guide*).

4. Make sure the router's third-party copy functionality is enabled, as follows.

a. From the **Configuration Menu**, select **Active Fabric**.



b. Set **Server Free Backup Mode** to Enabled. This enables the router to accept Extended Copy commands (for third-party copy).

▼ **Configure the controller LUN(s) to enable the media server to communicate with the router's copy manager through the sg driver (next two steps)**

Note The Crossroads can intercept Extended Copy commands that are sent to the tape device. If you have a tape storage device behind the Crossroads, you can use the tape device path to identify the third-party copy device in the NetBackup mover.conf file.

5. Select the number of **Controller LUNs** from the drop-down list.

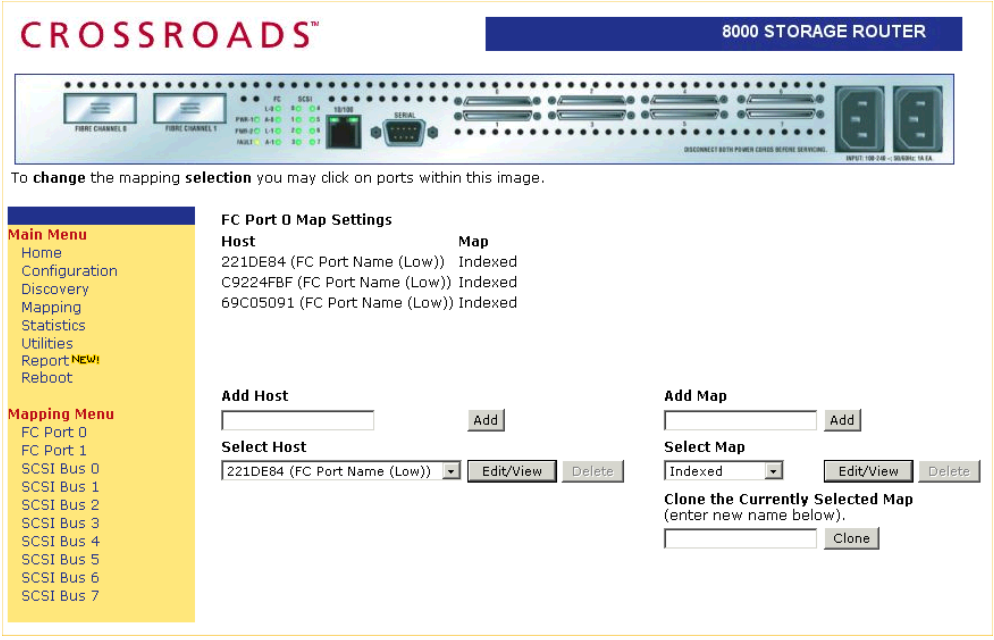
This sets the number of controller LUNs reported by the router. For third-party copy device backups (Server Free Backup Mode), you must enable at least one controller LUN.

Click **Submit**. You will be asked to reboot the router for the configuration changes to take effect.

From the Main Menu, select **Reboot**. Select **Yes** and **Submit**.

6. Display the assignment of the FC LUNs for each controller LUN.

a. From the **Main Menu**, select **Mapping**.



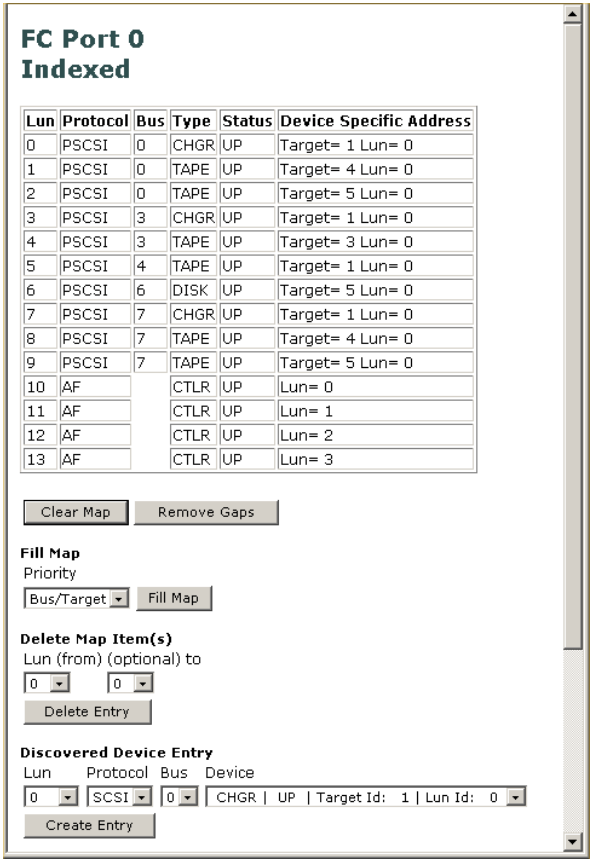
b. From the **Select Host** drop down menu, select the host where the NetBackup media server is running, based on the HBA world-wide port name of the host.

c. For that host, select **Indexed** from the **Select Map** menu, then click the **Edit/View** button to the right of the **Select Map** menu.

d. In the resulting FC Port Indexed display, click the **Fill Map** button to fill out the map.

Look for the entries of the CTLR type to find the FC LUN assigned to the controller LUN. In the following example, the CTLR LUNs 0, 1, 2, 3 are assigned FC LUNs 10, 11, 12, 13.

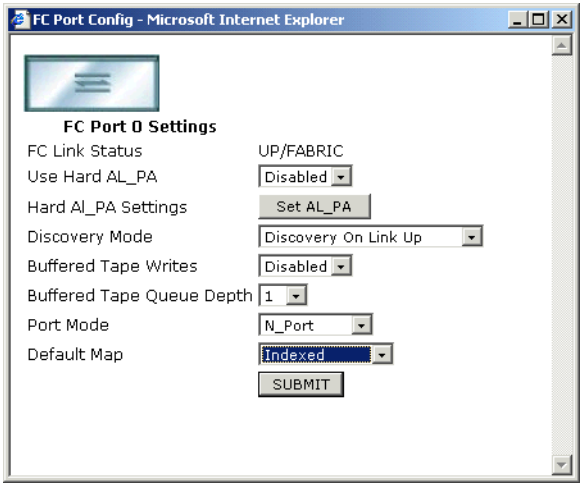
You can use this information to configure your media server to access the Crossroad's copy manager (by making entries in the sg.conf file). Refer to "Solaris only: Example for sg.links, sg.conf, and st.conf files" in the *NetBackup Advanced Client Sytem Administrator's Guide*.



7. Set the discovery mode, fibre channel port connection type, and default map as follows.

   a. From the **Configuration Menu**, select **Fibre Channel**.

b. Select the port to configure. The following appears.



c. Set **Discovery Mode**.

Discovery On Link Up is recommended. For third-party copy device backup (server free backup), you must select either **Discovery On Link Up** or **Auto Discovery on Reboot**.

d. For fibre channel port connection type:

- If the router is connected in private loop mode, set **Use Hard AL_PA** to **Enabled** and then click the **Set AL_PA** button. If you are not using private loop mode, this value should be set to **Disabled**.
- For a point-to-point connection, set **Port Mode** to **N_Port**. Otherwise, set **Port Mode** to **Auto Sense**.

e. Set **Default Map** to **Indexed**.

f. Save the configuration (click **SUBMIT**), and then reboot.

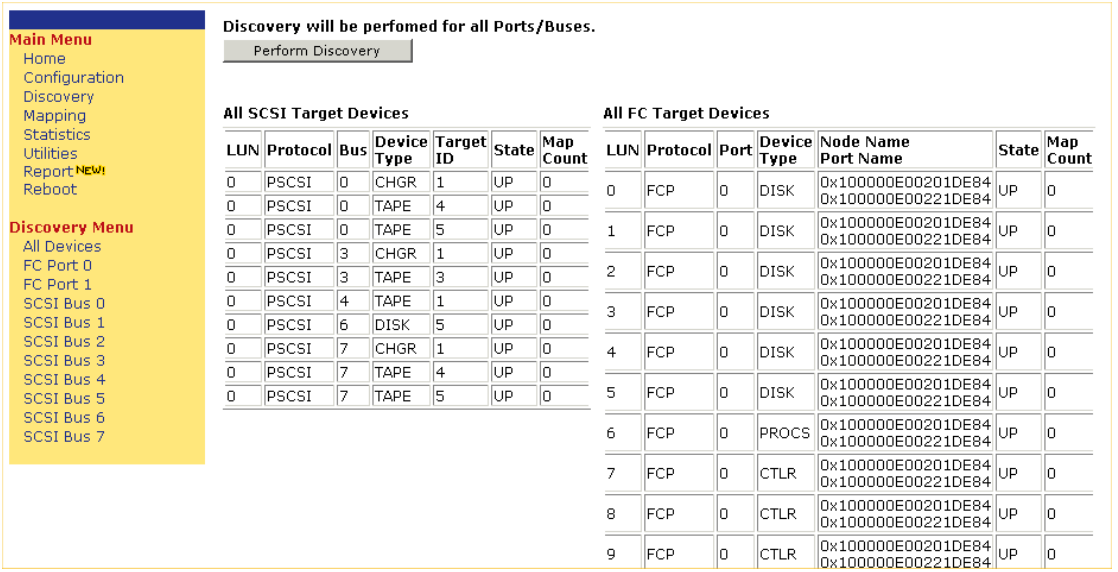
8. Display the FC LUN-to-SCSI bus, target, LUN mapping.

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

From the **Main Menu**, select **Mapping**, and follow the instructions under step b on page 59. You can view the FC LUN-to-SCSI bus, target, LUN mapping on the FC Port display. The FC LUNs are shown in the left **Lun** column, and the SCSI information is shown in the **Bus** and **Device Specific Address** columns.

9. Make sure the devices used for third-party copy backup (server free backup) are visible to the Crossroads' copy manager.

   a. From the Main Menu, select **Discovery**.



Main Menu
Home
Configuration
Discovery
Mapping
Statistics
Utilities
Report NEW!
Reboot

Discovery Menu
All Devices
FC Port 0
FC Port 1
SCSI Bus 0
SCSI Bus 1
SCSI Bus 2
SCSI Bus 3
SCSI Bus 4
SCSI Bus 5
SCSI Bus 6
SCSI Bus 7

Discovery will be perfomed for all Ports/Buses.

Perform Discovery

All SCSI Target Devices

LUN	Protocol	Bus	Device Type	Target ID	State	Map Count
0	PSCSI	0	CHGR	1	UP	0
0	PSCSI	0	TAPE	4	UP	0
0	PSCSI	0	TAPE	5	UP	0
0	PSCSI	3	CHGR	1	UP	0
0	PSCSI	3	TAPE	3	UP	0
0	PSCSI	4	TAPE	1	UP	0
0	PSCSI	6	DISK	5	UP	0
0	PSCSI	7	CHGR	1	UP	0
0	PSCSI	7	TAPE	4	UP	0
0	PSCSI	7	TAPE	5	UP	0

All FC Target Devices

LUN	Protocol	Port	Device Type	Node Name Port Name	State	Map Count
0	FCP	0	DISK	0x100000E00201DE84 0x100000E00221DE84	UP	0
1	FCP	0	DISK	0x100000E00201DE84 0x100000E00221DE84	UP	0
2	FCP	0	DISK	0x100000E00201DE84 0x100000E00221DE84	UP	0
3	FCP	0	DISK	0x100000E00201DE84 0x100000E00221DE84	UP	0
4	FCP	0	DISK	0x100000E00201DE84 0x100000E00221DE84	UP	0
5	FCP	0	DISK	0x100000E00201DE84 0x100000E00221DE84	UP	0
6	FCP	0	PROCS	0x100000E00201DE84 0x100000E00221DE84	UP	0
7	FCP	0	CTLR	0x100000E00201DE84 0x100000E00221DE84	UP	0
8	FCP	0	CTLR	0x100000E00201DE84 0x100000E00221DE84	UP	0
9	FCP	0	CTLR	0x100000E00201DE84 0x100000E00221DE84	UP	0

   b. Verify the **Device Type** and world-wide name (**Node Name Port Name**) for each device that will be used for third-party copy backups.

ADIC/Pathlight Gateway

After you have installed the ADIC/Pathlight, the following procedure may be helpful in setting it up for Advanced 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 "Peripherals and SAN Equipment Used in Test Configurations," under "Third Party Copy Devices in FC Routers, Tape Libraries, Disk Arrays" on page 14.

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 Advanced Client System Administrator's Guide*).

4. Make sure that third-party copy functionality (data mover) is enabled, as follows:

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

a. 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
```

b. 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).

Note 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.

Note 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: 0.60.45.16.8.22
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: 0.60.45.16.8.22
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. 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).

a. 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.

b. 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  PATHLGHT 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. Make sure the devices used for third-party copy backup are visible to the ADIC/Pathlight's copy manager.

a. 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

Note 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
```

b. To display the fibre channel devices, enter the following command:

```
targets
```

Example output:

```
Idx Tdev       Vendor   Product          Rev | Type Specific
-------------------------------------------|---------------------------------
 0 0xc1029780 PATHLGHT SAN 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  ST39204LCSUN9.0G 8507 | Disk 17689266 blks of 512 bytes RCE
 7 0xc0c1a010 SEAGATE  ST39204LCSUN9.0G 8507 | Disk 17689266 blks of 512 bytes RCE
 8 0xc0c3de90 SEAGATE  ST39204LCSUN9.0G 8590 | Disk 17689266 blks of 512 bytes RCE
 9 0xc0bea010 SEAGATE  ST39204LCSUN9.0G 8590 | Disk 17689266 blks of 512 bytes RCE
10 0xc0bc8210 SEAGATE  ST39204LCSUN9.0G 8590 | Disk 17689266 blks of 512 bytes RCE
11 0xc0bc7c10 SEAGATE  ST39204LCSUN9.0G 8590 | 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 Advanced 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.

1. Telnet into the ATTO.

   For example:

   ```
   telnet atto
   ```

2. Check firmware level by entering the Info command:

Note 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
```

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 "Peripherals and SAN Equipment Used in Test Configurations," under "Third Party Copy Devices in FC Routers, Tape Libraries, Disk Arrays" on page 14.

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, and the world-wide port name is useful when editing the 3pc.conf file (described in the *NetBackup Advanced Client System Administrator's Guide*).

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

Note 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]
```

Note 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. 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).

a. 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
```

b. 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]
```

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 | PATHLGHT | SAN Gateway     | 32b* | RAID
1000006045160822 |    0 | PATHLGHT | SAN Gateway     | 32b* | RAID
200000203742595A |    0 | SEAGATE  | ST336605FC      | 0002 | Disk
20000020374259B5 |    0 | SEAGATE  | ST336605FC      | 0002 | Disk
```

SpectraLogic TreeFrog

After you have installed the TreeFrog, the following procedure may be helpful in setting it up for Advanced Client. Note:

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

Note Has no control LUNs. The TreeFrog accepts Extended Copy commands to robotic changer or drives.

Note Certain changes may require a reboot.

1. Use a browser to access the TreeFrog.
2. Check firmware level by clicking on **Status** > **Version**.

   Example display:

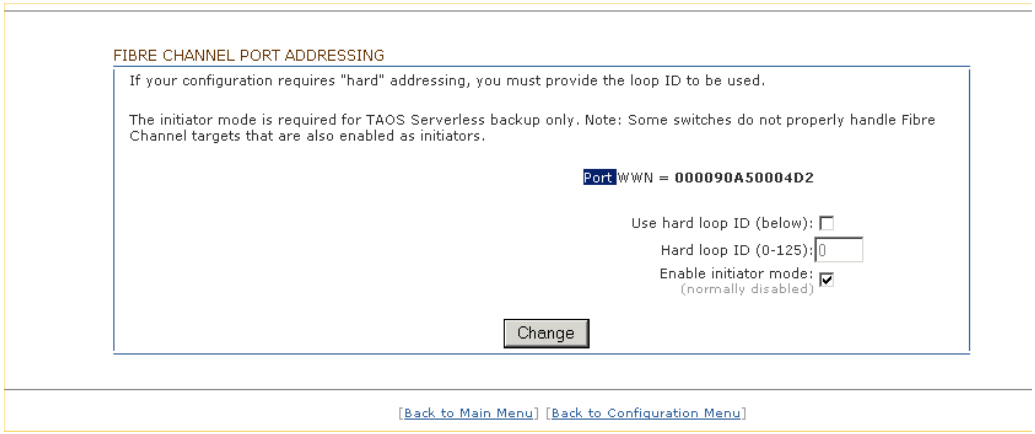
```
SpectraLogic Bridge Controller
  Boot code 2.1.0.0
  Appl code 4.1.28.0 Mar 20 2002 8:57:41
  ISP1080 chip 0 9.11.06
  ISP2200 chip 0 2.01.27
  PortName:Tg:LUN  Type RMB SV Vendor   Product ID       Rev
  SC0     :02:0000 chng RMB 02 SPECTRA  215              1010
  SC0     :00:0000 tape RMB 02 SONY     SDX-300C         04c7
  PON time 712802995 msec
```

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 "Peripherals and SAN Equipment Used in Test Configurations," under "Third Party Copy Devices in FC Routers, Tape Libraries, Disk Arrays" on page 14.

3. Obtain the world-wide node and port names of the TreeFrog.

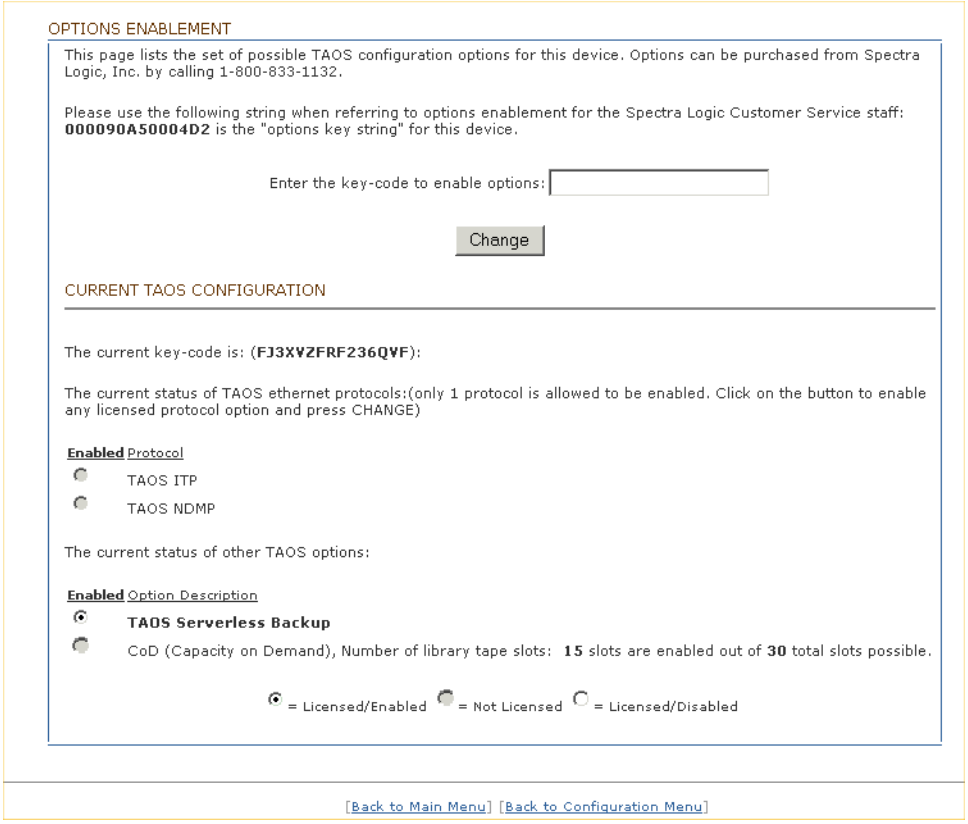
   Click **Configure** > **FibreChannel port 0 addressing**.

Note The node and port world-wide names are the same.



4. Make sure that third-party copy functionality (Serverless backup) is enabled, by clicking **Configure** > **Options Enablement**:

Note To perform a third-party copy device backup, you must install the TAOS Serverless Backup license and then enable it.



- If a license (key-code) is not displayed, enter the license and click **Change**.
- If TAOS Serverless Backup is not licensed/enabled, take the appropriate action.

Note The robotic library SCSI ID default setting is 2. Do not change this or the robotics will not be recognized.

5. If needed, configure fibre channel port addressing.

The TreeFrog supports arbitrated loop topology with various methods of connectivity. The three methods are: Private loop, Public loop, and Fabric. When the TreeFrog is connected through private or public loop, you can use an addressing mode of either Soft or Hard. To change addressing mode, use the Fibre Channel Port Addressing display (see example under step 3).

6. Note the following about the FC LUN-to-SCSI bus, target, LUN mapping.

- The mapping mode is always fixed on the TreeFrog, as follows.

```
LUN 0: Spectra 215      (changer)
LUN 1: Sony SDX-300C or SDX-500C     (tape 1)
LUN 2: Sony SDX-300C or SDX-500C     (tape 2)
```

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

7. Make sure initiator mode is enabled (click **Configure** > **FibreChannel port 0 addressing**). See screen capture under step 3.

Hitachi/HP/SUN Disk Arrays

Please note the following:

- Third-party copy functionality (ECopy) 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, the following steps may be helpful in setting it up for Advanced 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 ECopy functionality is enabled by the firmware, a proper version of the firmware must be installed.

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 "Peripherals and SAN Equipment Used in Test Configurations," under "Third Party Copy Devices in FC Routers, Tape Libraries, Disk Arrays" on page 14.

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

   The ECopy 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.