

SAN Host Release Notes 1.0 for Fibre Channel Protocol on Solaris

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SAN host attach kit overview

The NetApp SAN Environment

The individual system components of the NetApp SAN environment are a Sun® Solaris® host and an attached NetApp filer running Data ONTAP™ 6.3 software. Filer and host are connected with either direct or fabric connection methods.

SAN host attach kit 1.0

The SAN host attach kit contains the software and hardware components you need to configure a Sun Solaris machine into the host component of a NetApp SAN environment.

HBA hardware and software kit components

The SAN host attach kit contains the following hardware and software components:

Step	Action
1	Open the host attach kit and check for the following items: ◆ In PCI attach kit: ❖ Emulex® LP9002L-F2 HBAs with standard PCI bracket, single port ❖ One low-profile PCI mounting bracket ◆ Open Me First envelope ❖ <i>SAN Setup Overview 1.0</i> ❖ <i>Host Bus Adapter Installation and Setup Guide 1.0 for Fibre Channel Protocol on Solaris</i> ◆ Media kit ❖ CD-ROM with ntap_solaris_fcp_1_0.tar.Z software driver and firmware package ❖ License agreement ❖ <i>SAN Host Release Notes 1.0 for Fibre Channel Protocol on Solaris</i>

Minimum system requirements

Sun SPARC system minimum requirements

The following table lists the minimum system requirements for installing the HBA and the NetApp Solaris Fibre Channel software package on the host at the time this book was printed.

Note

For the most current and complete system requirements, consult the online *NetApp SAN Support Matrix* <http://now.netapp.com>.

Component	Requirement
HBA	For the latest driver and firmware revision, you must consult the online <i>SAN Support Matrix</i> online version at http://now.netapp.com/NOW/knowledge/docs/docs.shtml
PCI slot for HBA	◆ One open 32-bit or 64-bit (recommended) PCI bus slot can be either 3.3V DC or 5.0V DC signaling interface ◆ PCI bus clock rate of 33 MHz or 66 MHz (recommended)
Hardware platforms	Sun SPARC PCI-based systems Note_____ The LP9002L-F2 HBA requires PCI slots providing 3V bus power. The Sun Ultra-2, Ultra-5, and Ultra-10 platforms do not provide the necessary voltages and are not supported. _____

Component	Requirement
Operating system and patch level	Solaris 8 with Maintenance Update 4 from Sun Microsystems Note Consult the <i>NetApp SAN Support Matrix</i> for the latest operating system and patch revisions. The following Solaris patches must be installed: ◆ 110380-04—Solaris 8 patch ◆ 110934-04— (or higher, up to 110934-08) Solaris patch for pkgadd program. The following Solaris 8 patches must be installed for the VERITAS Volume Manager (VxVM) and VERITAS File Systems (VxFS) products: ◆ 109529-06—Solaris 8 patch ◆ 111413-08—Solaris 8 patch ◆ SUNWsan:package ◆ 111909-06—(VRTSvxvm) VERITAS Volume Manager ◆ 111904-05—(VRTSvmsa) VERITAS Volume Manager Storage Administrator ◆ 110435-07—(VRTSvxfs) VERITAS File System Note You can obtain the Solaris patches from http://sunsolve.sun.com. ◆ Recommended Patches: Solaris Recommended Patch Cluster from July 17, 2002 108528-12 or later—Solaris 8 kernel patch

System Compatibility Issues

Use the HBA Driver provided by NetApp. The Emulex driver distributed by NetApp is a special driver that has been thoroughly tested with the NetApp filer. The configuration settings and driver version are certified to work correctly with this product. Drivers received directly from Emulex are not supported.

HBAs other than the LP9002L are not supported on the host

Fibre channel HBAs other than the Emulex LP9002L sold by NetApp are not supported on the same host as the NetApp HBAs. This includes Emulex HBAs other than the LP9002L. The only exception is the Sun native fibre channel HBA, which might have come installed in the system. Before installing this product, you must uninstall any drivers used by other fibre channel HBAs and remove the HBAs physically from the system.

VERITAS application requirements

See the *SAN Support Matrix* for the required versions of VERITAS application software.

For more information

For the most current and complete system requirements, see the online *SAN Support Matrix* at the NetApp NOW Web site. You can find an expanded list of system requirements in the *SAN Support Matrix* and the *SAN Configuration Guide*. Both of these guides can be found on the NetApp NOW site at the following locations:

- ◆ *SAN Support Matrix* online version at <http://now.netapp.com/NOW/knowledge/docs/docs.shtml>
- ◆ *System Configuration Guide* for Data ONTAP 6.3 online version at <http://now.netapp.com>

Check for the latest versions of HBA software

What you need

The SAN Host HBA media CD contains the latest HBA driver and firmware at time of shipment. However, there might be later versions of both the driver and firmware released after the media kit was shipped. Therefore, you should check the NetApp support web site for the later updates at the following location:

Obtaining the software from NOW

To download the software from the NOW site, complete the following steps.

Step	Action
1	Use a Web browser to log in to the NOW site at http://now.netapp.com . ◆ Type your user name and password. ◆ From the Select Start Page list box, click Service and Support. ◆ Click the Login button.
2	Click Download Software.
3	In the SAN Host Attach Kit product row of the Software Download table, select Solaris in the Select Platform list box.
4	Click Go!
5	Follow the prompts to reach the Software Download page.
6	Download the <code>ntap_solaris_fcp_1_0.tar.Z</code> software file to a local directory, for example, the <code>/tmp</code> directory.
7	For instructions on the unbundling and installing this file, see the <i>Host Bus Adapter Installation and Setup Guide 1.0 for Fibre Channel Protocol on Solaris</i> .

Limitations and Known Problems

About this section

This section lists known problems and limitations of the SAN Host Kit 1.0 for Solaris at the time of this release. For the most up-to-date listing of limitations and known problems, see the NetApp NOW web site.

Viewing known problems on the NOW site

From time to time, problems with the SAN host attach kit are listed in an on-line system called Bugs Online. For information about bugs fixed in this release, see “Bugs Online” on the NOW site at:

<http://now.netapp.com/NOW/cgi-bin/bol>

Enter the Bug Id into the “Search-by Specific Bug(s) Enter Bug ID(s)” text box. Then click “Go.”

As of the printing of this document, the following is the most up-to-date list of known bugs and limitations.

Bug Reference ID: 75992

Symptom: Unable to use `format unit` for disks larger than 65 GB

Workaround: At this time, the `format unit` command is not supported from Solaris hosts for LUNs larger than 80GB. The command runs for approximately two minutes and then fails. The LUN is still valid; it can be labeled and used, but this specific command does not work.

Bug reference ID: 70725 (filer-related)

Symptom: Filer shows up at two different target IDs on the same host HBA.

Example: There are two filers with one LUN each mapped to a single Solaris client as follows:

```
Filer (iop-3) - Target 3
Filer (iop-4) - Target 4
```

But after the LUNs are exported target 0 for Filer 'iop-3' displays. This is not the case for 'iop-4'. On the Solaris host `sanlun lun show` reports:

```
filer: lun-pathname device filename adapter lun size lun state
iop-f3: /vol/vol1/lun0 /dev/rdisk/c3t0d0s2 lpfc0 1024.0m (1073741312) GOOD
iop-f3: /vol/vol1/lun0 /dev/rdisk/c3t3d0s2 lpfc0 1024.0m (1073741312) GOOD
iop-f4: /vol/vol1/lun0 /dev/rdisk/c3t4d0s2 lpfc0 1024.0m (1073741312) GOOD
```

Workaround: This is the result of an incorrectly-cabled system. This behavior occurs if two different ports with the same nodename are visible to the same adapter on the Solaris host.

This is what would happen if you plugged in two "a" ports from the same head in a filer cluster into a single switch, or if you had a non-clustered filer and plugged both the "a" and "b" port into the same switch.

If your configuration is cabled this way, then it is absolutely crucial that zoning be used to prevent both ports from being visible to the Emulex HBA in the Solaris host simultaneously.

**Bug Reference ID:
76724**

Symptom: Install script fails to modify `lpfc.conf` and gives wrong values for time-outs

Workaround: If the install script fails to modify `lpfc.conf`, it prints the following message:

```
Failed to modify /kernel/drv/lpfc.conf:
```

Please change the following values in `/kernel/drv/lpfc.conf` as follows before rebooting.

```
linkdown-tmo=115;
nodev-tmo=115;
```

These values are incorrect -- they should be 120, not 115.

If the script does succeed in modifying `lpfc.conf`, it sets these values to 120, as it should.

Installing multipathing software on the host

Required multipathing software

Multipathing for the Solaris host requires the following software:

- ◆ VERITAS Volume Manager (VxVM) 3.2

Note

The VERITAS software must be purchased from VERITAS Software.

About upgrading VERITAS

If you are currently running an older version of VERITAS Volume Manager that is not supported with the NetApp product and you want to upgrade, see the *VERITAS Volume Manager Installation Guide*, VERITAS Document # 30-000395-011.

Preparing to install VERITAS Volume Manager

These instructions assume that you are doing a fresh install.

To prepare for the VERITAS Volume Manager installation, complete the following steps.

Note

Because of file conflicts, all files must be installed in a specified order to guarantee VERITAS Volume Manager functionality.

Step	Action
1	Ensure that you are logged in as root.
2	To verify whether the Sun Microsystems SUNWsan package is already installed, enter the following command on the command line: pkginfo grep SUNWsan Example: <pre># pkginfo grep SUNWsan system SUNWsan SAN Foundation Kit #</pre> In this example, the SUNWsan package is already installed.

Step	Action	
3	Check whether the following Solaris patches are present: ◆ 109529-06 ◆ 111413-08	
	If...	Then...
	The patches and packages are present	Go to the next section: “ Setting up the VERITAS software VM ” on page 10
	The patches are not present but the package is present	Go to the next section: “ Setting up the VERITAS software VM ” on page 10
	The patches are present but the package is not.	Remove the patches using the patchrm command. Example: <pre># patchrm 109529-06 111413-08</pre> Result: The patches are removed

Setting up the VERITAS software VM

To set up the VERITAS software VM, complete the following steps.

Step	Action
1	Ensure that you are logged in as root.
2	Obtain the VERITAS Foundation Suite CD-ROM and VERITAS documentation.

Step	Action	
3	If...	Then...
	You already have VERITAS VXVM 3.1 or VXFS 3.3 installed on your system	You must uninstall the software by following the procedures in the VERITAS documentation. Result: The older-version software is removed. Go to Step 4.
	You already have the currently supported versions of VERITAS Volume Manager, and you want to use multipathing with the NetApp filer	Go to “ Using VERITAS DMP ” on page 14.
4	If you have the SUNWsan package installed then continue on to step 5, otherwise obtain the SUNWsan software package. Note_____ The SUNWsan package is available for free on the Sun Microsystems Web site. _____	
5	Install the package on the host by entering the following command: pkgadd -d `pwd` SUNWsan Note_____ The pkginfo command must be run in the same directory where you downloaded and untarred the SUNWsan package. _____ Result: The SUNWsan software is installed.	
6	If you already have these patches installed then continue on to step 7, otherwise obtain the Solaris patches 109529-08 and 111413-06 from http://sunsolve.sun.com.	

Step	Action
7	Install the Solaris patch 109529-06 with the <code>patchadd</code> command. Example: <pre># patchadd tmp/109529-06 Checking installed patches... Verifying sufficient filesystem capacity (dry run method)... Installing patch packages... Patch number 109529-06 has been successfully installed. See /var/sadm/patch/109529-06/log for details Patch packages installed: SUNWluxop SUNWluxox</pre> Result: The patch is installed.
8	Install the Solaris patch 111413-08 with the <code>patchadd</code> command. Example: <pre># patchadd tmp/111413-08 Checking installed patches... Executing prepatch script... Verifying sufficient filesystem capacity (dry run method)... Installing patch packages... Patch number 111413-08 has been successfully installed. See /var/sadm/patch/111413-08/log for details Executing postpatch script... Patch packages installed: SUNWluxop SUNWluxox</pre> Result: The patch is installed.
9	Insert and mount the VERITAS Foundation Suite CD-ROM on the host.
10	Change to the <code>pkgs</code> directory on the CD-ROM: <pre>cd /cdrom/cdrom0/pkgs</pre>
11	Verify that you have your VERITAS license key before continuing with Step 12.

Step	Action
12	Install the VERITAS Volume Manager (VxVM) packages by entering the following command: <pre>pkgadd -d `pwd` VRTSlic VRTSvxvm VRTSvmsa VRTSvmdoc VRTSvmman VRTSvmdev</pre> Note The VERITAS Volume Replicator packages are not included here. They are included in the distribution. If you want to install this facility too, simply add the package names VRTSvras and VRTSvrdoc to the end of the pkgadd list. Result: The VERITAS Volume Manager script requires a Sun patch that you already installed; enter y to continue the installation. Example: Installing VxVM for Solaris 8 The following Sun patch(s) are required for Solaris 8. Sun patch(s): <pre>111413</pre> Continue installation? [y,n,q,?] (default: n): y <pre> . . . </pre> Installation of...was successful. Result: The packages are installed.
13	Install the VERITAS Volume Manager patch 111909-06 with the patchadd command.
14	Install the VERITAS Storage Administrator patch 111904-04 with the patchadd command.

Labeling the disk

If you have not labeled your disks, complete the following steps.

Step	Action
1	Ensure that you are logged in as root.
2	Go to <i>Host Bus Adapter Installation and Setup Guide 1.0 for Fibre Channel Protocol on Solaris</i> , Chapter 5, for instructions on how to label new LUNs as disks.

Adding the root disk controller number to the Veritas exclude list

To add the controller number of the root disk to Veritas exclude list, complete the following steps.

Step	Action
1	Ensure that you are logged in as root.
2	With a text editor, edit the <code>/etc/vx/cntrls.exclude</code> file and add the root disk to the file. An example of a root disk is <code>c0</code>. Note _____ This prevents VERITAS from trying to encapsulate your root partition and makes future deinstallations much easier. _____

Using VERITAS DMP

To use VERITAS Dynamic Multipathing (DMP), complete the following steps.

Step	Action
1	Ensure that you are logged in as root.

Step	Action
2	Enter the following command to add NETAPP to the VERITAS DDL layer as a jbod device: vxddladm addjbod vid=NETAPP Note————— You must do this before running vxinstall or VERITAS DMP will not recognize your filer LUNs as multi-path devices. Result: NETAPP is added to the VERITAS DDL layer as a jbod device.
3	Enter the following command to verify that NETAPP is a jbod device: vxddladm listjbod Result: The NETAPP device is listed. Example: <pre># vxddladm listjbod VID PID Opcode Page Code Page Offset SNO length ===== NETAPP ALL PIDs 18 -1 36 12</pre>

Labeling LUNs used with VxVM:

New LUNs must have a label written to them in order to be visible to VxVM. Use the format command to add a label to allow VxVM to see the LUN. If you do not label the LUN, the host can see the new LUN and VxVM will not.

Installing VERITAS software

Installation instructions

To install the VERITAS software for multipathing, complete the following steps.

Step	Action
1	Ensure that you are logged in as root.
2	Enter the following command to install the VERITAS software: vxinstall Note The install script dialog asks you questions that pertain to your configuration and system administrator’s preferences. For more information, see <i>VERITAS Volume Manager 3.2 Installation Guide for Solaris</i>, 30-000395-011. Result: The VERITAS software is installed.
3	Reboot the host by entering the following command: reboot -- -r Result: The VERITAS software installation becomes effective.
4	Enter the following command to verify that the filer LUNs that you chose are under VERITAS Volume Manager control: vxdisk list Result: A list of devices, type, disk, group, and status is displayed. Example: # vxdisk list DEVICE TYPE DISK GROUP STATUS c0t0d0s2 sliced - - error c1t0d0s2 sliced c1t0d0s2 rootdg online c1t1d0s2 sliced c1t1d0s2 rootdg online

Step	Action
5	Enter the following command for a multipath device to verify that the multipathing information is correct: <pre>vxdisk list <i>disk_name</i></pre> <i>disk_name</i> is the name of the disk. Result: A list of disk details is displayed, including the multipathing information at the end of the list.
Example: <pre># vxdisk list clt0d0s2 Device: clt0d0s2 devicetag: clt0d0 type: sliced hostid: elastica disk: name=clt0d0s2 id=1017952447.1033.elastica group: name=rootdg id=1017952438.1025.elastica flags: online ready private autoconfig autoimport imported pubpaths: block=/dev/vx/dmp/clt0d0s4 char=/dev/vx/rdmp/clt0d0s4 privpaths: block=/dev/vx/dmp/clt0d0s3 char=/dev/vx/rdmp/clt0d0s3 version: 2.2 iosize: min=512 (bytes) max=256 (blocks) public: slice=4 offset=0 len=10477568 private: slice=3 offset=1 len=2047 update: time=1017952655 seqno=0.9 headers: 0 248 configs: count=1 len=1486 logs: count=1 len=225 Defined regions: config priv 000017-000247[000231]: copy=01 offset=000000 enabled config priv 000249-001503[001255]: copy=01 offset=000231 enabled log priv 001504-001728[000225]: copy=01 offset=000000 enabled Multipathing information: numpaths: 2 clt0d0s2 state=enabled c2t0d0s2 state=enabled</pre>	

Step	Action
6	Check the multipathing information for the disk and verify that the number of paths (numpaths) is two and that the disk is enabled (or online). Result: The multipathing software is set up and functioning properly.

Troubleshooting

Troubleshooting topics

This section discusses the following topics:

- ◆ [“The Solaris HBA Configuration”](#) on page 20
- ◆ [“Error messages or warnings during installation”](#) on page 21
- ◆ [“Error Messages during I/O”](#) on page 25
- ◆ [“Link status check from LPUTIL”](#) on page 27
- ◆ [“Troubleshooting Tips”](#) on page 28

The Solaris HBA Configuration

NetApp modifications

The install script automatically sets all configuration values needed for the product. However, if the install script should fail, or if the HBA driver configuration file should have been changed for any reason, you may need to set these values manually.

The following table shows values that must be set in the HBA driver configuration file, `/kernel/drv/lpfc.conf`. If you are experiencing trouble with your setup, please make sure that these values are correctly set.

Setting in lpfc.conf	Default Emulex Setting	NetApp setting w/out Multipathing	NetApp setting with Multipathing	What the setting means
automap	2	0	0	Only assign target IDs to devices which have been mapped using persistent bindings.
linkdown-tmo	30	255	120	The time before the link from the HBA is deemed down and failed.
nodev-tmo	0	255	120	The time before a device, which is not returning any status, is taken off-line and that status is returned to the OS.
scan-down	2	0	0	
tgt-queue-depth	0	32	32	
lun-queue-depth	30	16	16	

Error messages or warnings during installation

About this section

This section explains some of the most-often seen errors messages that might display during the installation process.

Hardware warnings and errors

SunFire 280R or SunBlade 1000 Install Message:

If you are installing on a SunFire 280R or SunBlade 1000, the following message displays during installation:

```
WARNING: This platform has special PCI slot requirements for  
placement of the Fibre-channel HBA.
```

The SunFire 280R and the SunBlade 1000 have a known issue with PCI slot placement of the Emulex LP9002L and the video adapter. The two cards cannot share the same PCI bus. If they do, the system will not boot until the Emulex card is removed.

The work around is to install the LP9002L and the video HBA on separate PCI buses. The 1st PCI slot is a 33/66 Mhz PCI slot on its own BUS. PCI Slots 2,3, and 4 are located on a second BUS 33Mhz.

If using multiple HBAs (LP9002L), move the video adapter to the first PCI slot, and the LP9002L in PCI slots 2-4.

If one LP9002L, then either the video or LP9002L can be in the first PCI slot.

You can safely continue with installation if you have installed your HBAs in the correct PCI slots in your system.

HBA Incompatibility Message:

```
WARNING: This platform is incompatible with the Fibre-channel HBA  
in this product.
```

Please consult your Network Appliance customer support representative.

You will see this message if you are trying to install the HBA and software on an Ultra-2, 5, or 10. These systems are not compatible with this HBA. Please consult your sales representative.

After printing this message, the install script will exit.

System patch warning and error

You must have patch 110934-04 or higher installed in order to install this product.

IMPORTANT: Make sure you also install the correct revision of patch 110380, which is required BEFORE you install 110934.

Check <http://sunsolve.sun.com> for these patches and all their prerequisite patches.

After printing this message the install script will exit. You must have the above two patches in order to successfully install the product.

The following patches are required for Veritas installation:

109529-06 or higher - Solaris 8 patch NOT INSTALLED

111413-06 or higher - Solaris 8 patch NOT INSTALLED

111909-04 or higher - (VRTSvxvm) VERITAS Volume Manager Patch NOT INSTALLED

111904-04 or higher - (VRTSvmsa) VERITAS Volume Manager Storage Administrator
Patch NOT INSTALLED

110435-05 or higher - (VRTSvmsa) VERITAS File System Patch NOT INSTALLED

Always check the Veritas Support web site for the latest instructions:

<http://support.veritas.com>

Continue with install? [y,n,?,q]

You can safely continue with installing the product. These patches are only required if you intend to also install Veritas products.

System configuration warnings and errors

lpfc.conf file configuration error:

During installation, the lpfc driver configuration file, /kernel/drv/lpfc.conf, is modified to correctly configure the driver. If for any reason this step fails, you will need to edit the lpfc.conf file directly. The message displayed is similar to the following, although the actual variables and values to set may be different.

```
Failed to modify /kernel/drv/lpfc.conf:
Please change the following values in /kernel/drv/lpfc.conf as
follows:
```

```
linkdown-tmo=115;
nodev-tmo=115;
```

```
BEFORE rebooting.
```

Note

Although the install script recommends setting these variables to 115, the correct value is 120. Please see the “Known Problems” section for details.

/etc/system file configuration error:

During installation the /etc/system file is modified in order to set sd_io_time and sd_retry_count. If this step fails, you will see the following message:

```
Failed to modify /etc/system:
```

```
Please change the following values in /etc/system as follows:
```

```
sd_io_time=0x78
```

```
sd_retry_count=5
```

```
BEFORE rebooting.
```

You will need to edit the /etc/system file to add the following lines:

```
set sd:sd_io_time=0x78
set sd:sd_retry_count=5
```

Please make sure that the actual values used for setting these variables are the same as those recommended by the install script.

If your `/etc/system` file already has settings for either of these variables, you will see a message similar to the following at install time:

```
Your /etc/system file appears to set the following:
```

```
    set sd:sd_io_time=0x3C
    set sd:sd_retry_count=3
```

Please make sure `sd_io_time` is at least `0x78`
and `sd_retry_count` is at least `5` for optimal
performance.

The install script will not change existing values of `sd_io_time` and `sd_retry_count`. However, you should edit these lines in your `/etc/system` file to make sure that the minimum values given in the error message are met. In the above case, you should change these lines in your `/etc/system` file as follows:

```
set sd:sd_io_time=0x78
set sd:sd_retry_count=5
```

Error Messages during I/O

Errors appear on the console

During normal operation, you might see the following messages on the system console and in the system log:

```
Jul 21 11:04:48 solaris-host-A scsi:  
[ID 107833 kern.warning] WARNING: /pci@7,2000/lpfc@2/sd@1,1 (sd91):  
Jul 21 11:04:48 solaris-host-A  
SCSI transport failed: reason 'tran_err': retrying command
```

These messages are normal, and they indicate that the filer cluster might have failed-over from one filer to another. You might also see this sort of message if a cable connection was disrupted.

If you see this message you should check to ensure that no components in your configuration have failed. I/O should proceed normally, so long as you are using a configuration with no single point of failure.

Sanlun errors and warnings

Interpreting errors The `sanlun` utility checks the revision of the HBA firmware on each HBA. If the firmware revision is lower than the required minimum, the following error will be printed and `sanlun` will exit with an error (212):

sanlun lun show

Current firmware rev (3.60A3 (C2D3.60A3)) on adapter 0 is lower
than the minimum required
firmware rev (3.90A7 (C2D3.90A7))

If the firmware revision for the HBA is higher than any of the qualified revisions, a message is displayed but the `sanlun` command processing continues.

An example of the firmware revision being higher than currently qualified firmware revisions:

sanlun lun show

NOTE: Current firmware rev (3.91A1 (C2D3.91A1)) on adapter 0 is higher than most recently qualified firmware rev (3.90A7 (C2D3.90A7))

filer:	lun-pathname	device filename	adapter	lun size	lun state
filer-A:/vol/vol0/testlun		/dev/rdisk/c2t0d2s2	lpfc2	7.0g (7516192256)	GOOD
filer-A:/vol/vol0/bonitolun1		/dev/rdisk/c2t0d1s2	lpfc2	5.0g (5368708608)	GOOD
filer-A:/vol/vol0/lunbonito0		/dev/rdisk/c2t0d0s2	lpfc2	5.0g (5368708608)	GOOD

Link status check from LPUTIL

This procedure explains how to check the link from the Solaris host to the switch (or filer.)

```
Run sanlun fcp show adapter -v
# sanlun fcp show adapter -v
lpfc0                WWPN:1000000011223344
WWNN:                2000000011223344
driver name:         lpfc
model:               LP9002
model description:   Emulex LightPulse LP9002 2 Gigabit PCI Fibre Channel Adapter
serial number:       000011223344
hardware version:    2002606d
driver version:      5.00e; HBAAPI v1.3, 3-29-02
firmware version:    3.90A7 (C2D3.90A7)
Number of ports:     1
port type:           Fabric
port state:          Operational
supported speed:     2 GBit/sec
negotiated speed:    2 GBit/sec
OS device name:      /devices/pci@6,2000/lpfc@2
```

The following fields give useful information about the connection of the HBA:

- ◆ Port state: “Operational” indicates that the HBA is connected and functioning correctly.
- ◆ Supported speed: 2 Gbit/sec indicates that the HBA is capable of supporting up to 2Gbit/sec transfer rates
- ◆ Negotiated speed: 1 Gbit/sec indicates that this HBA is transferring data at a rate no greater than 1 Gbit/sec. This is most likely because it is connected to a switch that only supports 1 Gbit/sec. The supported NetApp switch, as well as the filer, support 2 Gbit/sec data transfer rate.

Troubleshooting Tips

Checking filer LUN and host drives mapping For your Solaris host, use the `sanlun` command:

```
# /opt/NTAPsanlun/bin/sanlun lun show
filer lun-pathname device filename adapter lun size lun state
FilerA:/vol/vol0/testlun/dev/rdisk/c2t0d2s2 lpfc2 7.0g (7516192256) GOOD
FilerA:/vol/vol0/bonitolun1/dev/rdisk/c2t0d1s2 lpfc2 5.0g (5368708608) GOOD
FilerA:/vol/vol0/lunbonito0/dev/rdisk/c2t0d0s2 lpfc2 5.0g (5368708608) GOOD
```

Note

The column titled, `lun-pathname`, is the pathname to the LUN on the filer.
The column titled `device filename` is the device name on the host.

Host reboot needed to remove deleted LUN listings in `sanlun`

A LUN is created and mounted on a host; then it is later removed. However, `sanlun` still reports the LUN, even after running `devfsadm` and `format` also see the LUN.

Example: `sanlun` and `format` output is shown below.

```
# sanlun lun show
```

```
May 31 11:16:15 shblade-ca1 scsi: WARNING: /pci@1f,0/pci@5/fibre-channel@0/sd@0,0 (sd1):  
May 31 11:16:15 solaris-host-1 Error for Command: test unit ready Error Level:  
Informational
```

```
May 31 11:16:15 solaris-host-1 scsi: Requested Block: 0 Error Block: 0  
May 31 11:16:15 solaris-host-1 scsi: Vendor: NETAPP Serial Number: 112233445566  
May 31 11:16:15 solaris-host-1 scsi: Sense Key: Illegal Request  
no filer LUNs available  
#format  
format> disk  
AVAILABLE DISK SELECTIONS:  
0. c0t0d0 <ST320011A cyl 38790 alt 2 hd 16 sec 63> /pci@1f,0/ide@d/dad@0,0  
1. c0t2d0 <ST320011A cyl 38790 alt 2 hd 16 sec 63> /pci@1f,0/ide@d/dad@2,0  
2. c1t0d0 <drive type unknown> /pci@1f,0/pci@5/fibre-channel@0/sd@0,0
```

Solution: devfsadm does not clean up this type of entry. The entry will remain until the system has been rebooted. A `devfsadm -C` might clean up these entries.

The `sanlun` output is there because there is still a `/dev/rdisk` listings and the output is what the filer always returns when queried for a LUN that isn't mapped to this initiator.

Newly created LUNs not visible on host

If you create new LUNs on the filer, map them to an igroup, run `devfsadm` but can not see them, you need to modify the `/kernel/drv/sd.conf` to scan for the new LUN numbers. In the example below, the filer is bound to target 0 and has four LUNs available. Please note that if you edit the `sd.conf` file you need to reboot with the configuration option, `reboot -- -r`, for the settings to take effect.

```
name="sd" parent="lpfc" target=0 lun=0;  
name="sd" parent="lpfc" target=0 lun=1;  
name="sd" parent="lpfc" target=0 lun=2;  
name="sd" parent="lpfc" target=0 lun=3;
```

Taking VERITAS software offline before scheduled filer maintenance

Take the VERITAS software offline

To take VERITAS File System software offline, complete the following steps. Please note that these are NetApp recommended steps only.

Step	Action
1	Before you start taking VERITAS software off-line, Snap and run a backup any data that is stored on the Veritas Volume(s) associated with LUNs on the filer or split a mirror with VM.
2	In the VERITAS File System (VxFS) perform the following command: Umount the file systems that are in use with the <code>umount /mountpoint</code> command. Result: The file system is unmounted.

Step	Action
3	In the VERITAS Volume Manager (VxVM) perform the following operations. Note All of these commands can be run in the CLI, through <code>vxdiskadm</code>, or through the VMSA GUI (on Solaris or Windows). 1. Stop the volume by first checking the status of volumes with the <code>vxdisk list</code> command. Select a single volume from the list and then run <code>vxvol stop vol_name</code>. Result: The volume is stopped. Note To stop all volumes, use the <code>vxvol stop all</code> command. 2. Deport the disk group with <code>vxdbg deport diskgroup</code> command. Note When doing a deport, you might find it helpful to specify the host name of the host that will import the disk group after the operation is completed. This avoids any host that you don't want to import the disk group from doing so and potentially overwriting any data. 3. Import the disk group with the <code>vxdbg import diskgroup</code> command. 4. Then do the normal start/mount operations to remount and start the volumes. Note If you are using VxFS with VxVM, then follow these in order.

Step	Action
4	With VERITAS Cluster Services 1. Check the status of the cluster with the <code>hastatus -sum</code> command. 2. Shut down all service groups (maintenance) with the <code>hastop -all</code> command to stop the engine and all services. 3. If you want to stop the application services as well as the cluster, use the <code>hastop -force</code> command. Note_____ If using VCS with Foundation Suite (VxVM and VxFS,) shut down VCS before shutting down VxVM and VxFS. Note that CVM (clustered volume manager) still functions if VCS is shutdown. The only issue is that CVM puts a lock on the volume and you need to force an import to clear the locks. _____ <code>vxdg -tC -n tempdg import newdg</code> These can be done through CLI or through the VCS GUI.

SAN host documentation changes

About this section

This section provides changes and updates to the *SAN Host Bus Adapter Installation and Setup Guide 1.0 for Fibre Channel Protocol on Solaris*.

Known problem

Manual page: 69
PDF file page: 77

The following Caution note has been rewritten.

Old Version:

Caution

Multi protocol access is not compatible with VERITAS Volume Manager. If you are using your disks with VERITAS Volume Manager (including VERITAS DMP), you cannot simultaneously access your LUN data as an NFS file.

New version:

Caution

If your LUN is part of a volume under VERITAS Volume Manager, the data within that LUN cannot be accessed as if it were an NFS file. Data on a LUN that has a VxFS file system on it is also inaccessible via NFS.

Data on LUNs that are not part of a VERITAS volume and that do not have a VERITAS file system on them can be accessed via NFS if the partition table conforms to the rules defined above.

Known problem

Manual page: 62
PDF file page: 70

The following output example in Step 1 of the table is incorrect.

Old Version:

Example:

```
filerX> lun show -v /vol/vol1/hostA
/vol/vol1/hostA_0      2.0g (2144337920) (r/w, online, mapped)

Serial#: OclNP1234ABC
Share: none
Space Reserved: yes <<<<<
Multiprotocol Type: image
Maps: hostA=0

filerX>
```

New Version:

Example:

```
filerX> lun show -v /vol/vol1/hostA
/vol/vol1/hostA_0      2.0g (2144337920) (r/w, online, mapped)

Serial#: OclNP1234ABC
Share: none
Multiprotocol Type: image
Maps: hostA=0

filerX>
```

Known problem

Manual page: 46, Step 10
PDF file page: 54

Following, "On the command line, reboot the host with the reconfigure option entering the following command:," there is an extra blank in the actual command. There should not be a blank between the first and second hyphens, it should read, reboot -- -r

The current description, - - - r , results in the error.

Where to find the information you need

About SAN documentation

This section provides you with a quick look at all NetApp SAN documentation for the Host HBA kits (Solaris and Windows), SAN filer components, and various interconnect methods.

Where to go for host and filer information

The following table describes documents on NetApp's NOW Web site with the most current information about host and filer system requirements, supported configurations, and cabling instructions.

If you need information about...	See the following NetApp product documentation...
The latest supported configurations	◆ <i>SAN Configuration Guide</i> at http://now.netapp.com ◆ <i>NetApp SAN Support Matrix</i> at http://now.netapp.com ◆ <i>System Configuration Guide</i> at http://now.netapp.com
Configuring the storage appliance	◆ <i>Best Practices for Reliability New System Installation</i> at http://now.netapp.com ◆ <i>Data ONTAP 6.3 Software Setup Guide</i>
Installing and configuring the HBA in your Windows host	◆ <i>Host Bus Adapter Installation and Setup Guide 1.0 for Fibre Channel Protocol on Windows</i>
Installing and configuring the HBA in your Solaris host	◆ <i>Host Bus Adapter Installation and Setup Guide 1.0 for Fibre Channel Protocol on Solaris</i>
Installing and configuring SnapDrive 2.0 for Windows hosts	◆ <i>SnapDrive 2.0 Installation and Administration Guide</i>
Managing SAN storage on the storage appliance	◆ <i>Command Reference</i> ◆ <i>Quick Reference Guide</i> ◆ <i>Data ONTAP 6.3 SAN System Administrator's Guide</i> ◆ <i>FilerView Online Help</i> ◆ <i>Best Practices for Reliability Maintenance</i> at http://now.netapp.com

If you need information about...	See the following NetApp product documentation...
Verifying compatibility of storage appliances with environmental requirements	◆ <i>Site Requirements Guide</i>