Sun StorageTek™ 2500 Series Array Release Notes

Release 1.3

Sun Microsystems, Inc.
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Sun StorageTek 2500 Series Array Release Notes, Release 1.3

This document contains important release information about the Sun StorageTek™ 2500 Series Arrays and information that was not available at the time the product documentation was published. These release notes cover the Sun StorageTek 2500 Series Array, Release 1.3 and 06.70.42.10 firmware, and related hardware issues. Read this document so that you are aware of issues or requirements that can affect the installation and operation of the Sun StorageTek 2500 Arrays.

A firmware patch for the Sun StorageTek Common Array Manager Software, Release 6.0.1, adds support for a third expansion tray and 48 drives. Refer to "Installing the 6.70.54.10 Patch for 48 Drive Support" on page 15.

For information on management software requirements, operations, and issues, see the *Sun StorageTek Common Array Manager Software Release Notes, Release 6.0.1*.

The release notes consist of the following sections:

Features in This Release

This section describes the main features of the Sun StorageTek 2500 Array 1.3 release, including the following:

Sun StorageTek 2500 Array Features

The Sun StorageTek 2540 Array, the Sun StorageTek 2530 Array, the Sun StorageTek 2510 Array, the Sun StorageTek 2501 Expansion Module, are a family of storage products.

The Sun StorageTek 2500 Arrays contains disk drives for storing data and controllers that provide the interface between a data host and the disk drives. The Sun StorageTek 2540 Array provides a Fibre Channel connection from the data host to the controller. The Sun StorageTek 2530 Array provides a Serial Attached SCSI (SAS) connection from the data host to the controller. The new Sun StorageTek 2510 Array supports Internet Small Computer Systems Interface (iSCSI) over Ethernet networks.

The Sun StorageTek 2501 Expansion Module provides additional storage. You can attach the drive expansion tray to the Sun StorageTek 2540, 2530, and 2510 Arrays.

New Features

- Three Expansion Tray (48 Drive) Support (requires patch)
- The Sun StorageTek 2510 Array with iSCSI Support

Release 1.3 supports iSCSI on the Sun StorageTek 2510 Array. iSCSI uses the Small Computer Systems Interface (SCSI) protocol over Ethernet networks to communicate between client initiators and target storage devices.

Consult the Sun StorageTek 2500 Series Array Hardware Installation Guide for initial information about configuring iSCSI and the online help in the management software for additional information and procedures.

Array Features

Common features:

- One drive expansion tray Serial Attached SCSI (SAS) connector per controller with 3 Gb/s drive expansion tray connection speed
- Maximum connection of 48 disk drives (one controller tray and three drive expansion trays)
- Dual redundant controllers
- Serial Attached SCSI (SAS) disk drives
- SATA 500 GB Drive
- 512-MB cache per controller or 1 GB mirrored cache

Sun StorageTek 2540 features:

- Fibre Channel (FC) controller tray
- Two data host ports per controller that support a fiber-optic interface with 1, 2, or 4 Gb/s data host connection speed

Sun StorageTek 2530 features:

- SAS controller tray
- Three SAS host ports with 3 Gb/s host connection speed per controller
- SAS Multipath support

Sun StorageTek 2510 features:

- SAS controller tray
- Two iSCSI Ethernet host ports with 1 Gigabit per second host connection speed

Auto Service Request Feature

Auto Service Request (ASR) is a feature of the array management software that monitors the array system health and performance and automatically notifies the Sun Technical Support Center when critical events occur. Critical alarms generate an automatic Service Request case. The notifications enable Sun Service to respond faster and more accurately to critical on-site issues.

You enable the Auto Service Request capability by using the Sun StorageTek Common Array Manager software to register devices to participate in the ASR service. Refer to the *Sun StorageTek Common Array Manager Release Notes, Release 6.0.1* or higher, for more information.

Premium Features

Premium features require licenses which must be ordered separately. The following premium features are available for 2500 Series Arrays:

- 4 storage domains
- 8 storage domains
- 16 storage domains
- Data Snapshot (4 per volume and 128 per array)

Note – The 2500 Series Arrays provide two free storage domains. Storage domain licenses are required to map additional initiators on data hosts to volumes.

2500 Series Array Ship Kit Contents

The Sun StorageTek 2500 Series Array controller and expansion trays are shipped separately. The AC power cords are ordered separately. The following is a list of the contents in the tray ship kits. There may also be Read Me first notices.

Array Controller Kits

Common contents:

- One pair left and right end caps (plastic bezels)
- Two 6-meter RJ45-RJ45 Ethernet cables (one per controller module)
- One RJ45-DIN9 cable
- One RJ45-DB9 adapter
- One RJ45-DB9 adapter (with null modem)
- Sun StorageTek Common Array Manager Software CD
- *Sun StorageTek Common Array Manager Software Installation Guide*
- *Common Array Manager sscs CLI Quick Reference Card*
- *Sun StorageTek 2500 Series Array Hardware Installation Guide*
- *Accessing Documentation* card
- One Sun Safety Document

Content for the 2540 controller tray only:

- Four 4 Gbps FC SFPs (2 per FC Controller module)

Sun StorageTek 2501 Array Expansion Kit

Ship kit for each 2501 expansion tray:

- Two copper SAS cables (one per I/O module)
- One pair left and right end caps (plastic bezels)
- *Accessing Documentation* guide

Note – .5 meter SAS cables are being replaced with 1 meter SAS cables. The .5 meter cable will ship for a period of time. The 1 meter SAS cable can be ordered separately.

Management Software

The Sun StorageTek Common Array Manager software (6.0.1 and above) provides an easy-to-use interface from which you configure, manage, and monitor Sun StorageTek storage systems, including the Sun StorageTek 2500 Series Array. You can also use the Common Array Manager software to diagnose problems, view events, and monitor the health of your array. Each release of the Common Array Manager provides the latest firmware updates for all the arrays it supports and provides the means to upload the firmware to them.

The Common Array Manager is the only supported management software for the 2500 Series Array. Refer to the Release Notes and other Sun StorageTek Common Array Manager documentation described in "Release Documentation" on page 35.

System Requirements

The software and hardware products that have been tested and qualified to work with the Sun StorageTek 2500 Series Array are described in the following sections:

Array Firmware Version Information

The following table describes 2500 Series array controller firmware versions, how they were delivered and their pre-requisites.

TABLE 1 Controller Firmware Versions

Firmware	Delivered in Release or Patch	Pre-requisites
06.70.00.11	CAM 5.1.3 or 6.0.0 -03 patch	CAM 5.1.3 or 6.0.0.
06.70.00.14	CAM 6.00 -04 and -05 patch	CAM 6.0.0
06.70.42.10	CAM 6.0.1 firmware baseline	For 2540 and 2530 arrays, the 06.70.00.11 patch must be installed first.
06.70.54.10	CAM 6.0.1 patch for 48 drive support	CAM 6.0.1 must be installed. Refer to "Installing the 6.70.54.10 Patch for 48 Drive Support" on page 15 for instructions. You can install the 06.70.54.10 firmware from 06.70.00.11 or 06.70.42.10.

The following section lists the firmware baseline files to work with this 2500 Series Array Release 1.3 and delivered with the Sun StorageTek Common Array Manager software, Release 6.0.1.

For the latest patches available for your system, check SunSolve at: http://www.sunsolve.sun.com.

In the following tables, the file path listed in the Firmware File column (for example, nge/RC_0670xxxx_desperado.dlp) is the relative path to the `/images` subdirectory where the firmware files are located.

TABLE 2 lists the controller information for the Sun StorageTek 2500 arrays.

TABLE 2 Sun StorageTek 2500 Series Array Controller Information for 6.0.1

Controller	Version	Firmware File
2510	06.70.42.10	nge/RC_06704210_desperado_apollo_1532.dlp
2530	06.70.42.10	nge/RC_06704210_desperado_apollo_133x.dlp
2540	06.70.42.10	nge/RC_06704210_desperado_apollo_1932.dlpp

TABLE 3 lists the NVSRAM information for the Sun StorageTek 2500 arrays.

TABLE 3 Sun StorageTek 2500 Series Array NVSRAM Information

NVSRAM	Version	Firmware File
2510	N1532-670843-001	nge/N1532-670843-001.dlp
2510-Simplex	N1532-670843-901	nge/N1532-670843-901.dlp
2530	N133X-670843-001	nge/N133X-670843-001.dlp
2530-Simplex	N133X-670843-901	nge/N133X-670843-901.dlp
2540	N1932-670843-001	nge/N1932-670843-001.dlp
2540-Simplex	N1932-670843-901	nge/N1932-670843-901.dlp

TABLE 4 lists the IOM information for the 2500 Series Arrays

TABLE 4 Sun StorageTek 2500 Series Array IOM Information

IOM	Version	Firmware File
2500 SAS	0186	nge/esm0186.esm

Disk Drives and Tray Capacity

TABLE 5 lists the size, speed, and tray capacity for the supported disk drives in the Sun StorageTek 2500 Series Array.

TABLE 5 Supported Disk Drives

Drive	Description
ST373455SSUN72G - 0892	72-GB, 15,000-RPM, SAS drives (3 Gbps); 876 GB per tray
ST314655SSUN146G - 0892	146-GB, 15,000-RPM, SAS drives (3 Gbps); 1752 GB per tray
ST330055SSUN300G - 0892	300-GB, 15,000-RPM, SAS drives (3 Gbps); 3600 GB per tray
HUS1573SBSUN72G - SA02	72-GB, 15,000-RPM, SAS drives, 876 GB per tray
HUS1514SBSUN146G - SA02	146-GB, 15,000-RPM, SAS drives, 1752 GB per tray

TABLE 5 Supported Disk Drives

Drive	Description
HUS1530SBSUN300G - SA02	300-GB, 15,000-RPM, SAS drives, 3600 GB per tray
HDS7250SASUN500G - AJ0A	500-GB, 7200-RPM, SATA II drives; 6 TB or 6000 GB per tray
HUA7210SASUN1.0T - A90A	1-TB (1000-GB), 12 TB or 12000 GB per tray
HUA7250SBSUN500G - A90A	500-GB, 7200 RPM, Serial ATA, 6 TB or 6000 GB per tray
HUA7275SASUN750G - A90A	750-GB, 7200 RPM Serial ATA drives, (3 Gbps), 9000 GB per tray
ST37500NSSUN750G - 3AZK	750-GB, 7200-RPM, Serial ATA drives (3 Gbps), 9000 GB per tray
ST340008SSUN0.4T - 0543	400-GB, 10000-RPM, Serial Attached SCSI drives (3 Gbps), 4.8 TB or 4800 GB per tray

Data Host Requirements

This section provides the data host requirements of the 2500 Series Array at the time this document was produced. These requirements can change; for complete up-to-date compatibility requirements, contact your Sun sales or support representative.

Data host requirements for 2540 arrays, which support Fibre Channel connections to the data host, are different from 2530 arrays, which use SAS connections to the data host, and the 2510 array, which uses Ethernet connections.

Supported HBAs and Switches

For supported HBAs and switches, refer to:

https://extranet.stortek.com/interop/interop

2540 Array Data Host Requirements

The 2540 Array supports Fibre Channel-only connections to the data host. The information in this section applies only to data hosts with Fibre Channel connections.

TABLE 6 lists the supported host Operating Systems (OSs) and multipathing availability. HBAs must be ordered separately, from Sun or their respective manufacturers. Sun HBAs can be ordered from the following site:
`http://www.sun.com/storagetek/networking.jsp`

You can download HBA drivers and other host software from the Sun Downloads, `http://www.sun.com/download/index.jsp`. Download operating system updates from the web site of the operating system company.

The data hosts require software for multipath or single path support. Follow the instructions in the *Sun StorageTek 2500 Series Array Hardware Installation Guide* to download and install the software from the Sun Download Center.

Solaris patches can be downloaded from:
`http://www.sun.com/software/download/`

or

`http://sunsolve.sun.com/show.do?target=patchpage`

TABLE 6 Supported Data Host Platforms for 2540 Arrays

Host OS	Multipathing Support	Cluster Support
Solaris 9	SAN 4.4.12 and higher	Sun Cluster 3.1
Solaris 10 SPARC	included in OS	Sun Cluster versions SC 3.1, SC 3.2 (2, 3, or 4 nodes)
Solaris 10 x64	included in OS	Sun Cluster versions SC 3.1, SC 3.2 (2, 3, or 4 nodes)
Windows 2003	MPIO	Microsoft Cluster Server
Linux Red Hat 4/5; SUSE 9/10 SP1	RDAC	Linux Cluster

TABLE 7 lists the required patches for Solaris data hosts.

TABLE 7 Required Solaris Patches for 2540 Data Host Platforms

Solaris Version	Required Patch (Minimum)
Solaris 9	SAN 4.4.12 113039 patch
Solaris 10 SPARC	120011-14 125081-14
Solaris 10 x64	120012-14 125082-14

2530 Data Host Requirements

The 2530 Array supports SAS-only connections to data hosts. The information in this section applies only to data hosts with SAS connections.

TABLE 8 lists supported 2530 data host platforms and indicates the kind of support they have for SAS connections.

TABLE 8 Data Host Platform Support for 2530 Arrays

Host OS	SAS Support	Multipathing Support	Cluster Support
Solaris 10, SPARC	yes	Included in OS with patch 125081-10. See TABLE 9.	Not supported
Solaris 10, x64	yes	Included in OS with patch 125081-10. See TABLE 9.	Not supported
Windows 2003	yes	MPIO	Microsoft Cluster Server
Red Hat 4/5; SUSE 9/10 SP1	yes	RDAC	Linux Cluster

TABLE 9 Required Solaris Patches for Data Host Platforms for the 2530 Arrays

Solaris Version	Required Patch (Minimum)
Solaris 10 SPARC	Solaris 10 Update 4 or equivalent kernal and patches 118833-36 patch (required by 120011-14) 120011-14 (minimum for single path) 119042-01 126538-01 127111-07* 125081-14 (minimum for multipath)
Solaris 10 x64	Solaris 10 Update 4 or equivalent kernal and patches 118855-36 (required by 120012-14) 120012-14 patch (minimum for single path) 119043-01 126539-01 125082-14. (minimum for multipath)

* 12111-07 is a pre-requisite patch and must be installed prior to 125081-14 only if a system administrator wishes to have a per-HBA mpxio-disable setting for an UltraSPARC host where the SAS HBA is connected with the PCI-e interface.

This issue does not occur if there is no per-hba mpxio-disable setting. This issue does not occur on PCI-X attached SAS HBAS. This issue does not occur on x86/x64 hosts.

2510 Array Data Host Requirements

The 2510 Array supports iSCSI with Ethernet connections to Network Interface Cards (NICs) on the data host.

TABLE 10 lists the supported host Operating Systems (OSs) and multipathing availability. You can download host software from the Sun Downloads, `http://www.sun.com/download/index.jsp`. Download operating system updates from the web site of the operating system company.

TABLE 10 Supported Data Host Platforms for 2510 Arrays

Host OS	Multipathing Support	Cluster Support
Solaris 10 SPARC	included in OS	Not yet supported
Solaris 10 x64	included in OS	Not yet supported
Windows 2003	MPIO	Microsoft Cluster Server
Linux Red Hat 4/5; SUSE 9/10 SP1	RDAC	Linux Cluster

TABLE 11 lists the required patches for 2510 Solaris data hosts.

TABLE 11 Required Solaris Patches for 2510 Data Host Platforms

Solaris Version	Required Patch (Minimum)
Solaris 10 SPARC	Solaris 10 Update 1, Build 6 or later 118833-36 119090-25
Solaris 10 x64	Solaris 10 Update 1, Build 6 or later 118855-36 119091-26

Installing Array Baseline Firmware

This section describes release-specific steps for installing the firmware baseline for this release.

Note – For 2540 or 2530 arrays only. You can install the 06.70.42.10 firmware baseline only if your array already runs the 06.70.00.11 firmware which is included in Table 12 on page 13. The patches are based on the installed version of Sun StorageTek Common Array Manager software: 5.1.3 or 6.0. If you need to install the patch, perform the off-line upgrade in "Installing the 06.70.00.11 Firmware Patch" on page 13 before installing the Release 1.3 firmware baseline.
ST 2510 arrays do not need this patch. For ST 2510 arrays, proceed to "Installing Release 6.0.1 Firmware Baseline" on page 15.

Installing the 06.70.00.11 Firmware Patch

This release requires that you have 06.70.00.11 firmware installed before upgrading to the baseline firmware. The 06.70.00.11 firmware was delivered with firmware patches based on the installed version of Sun StorageTek Common Array Manager software: 5.1.3 or 6.0.0 You must have one of the patches installed before proceeding with the Release 1.3 (CAM v6.0.1) firmware baseline installation.

TABLE 12 Required 06.70.00.11 Firmware Patches

	Sun StorageTek Common Array Manager 5.1.3	Sun StorageTek Common Array Manager 6.0
Solaris	127486	128269
Windows	127487	128270
Linux	127488	128271

The patches are available from the Sun Download Center:
`http://www.sun.com/software/download/`

or

`http://sunsolve.sun.com/show.do?target=patchpage`

▼ To Install the 06.70.00.11 Firmware Patch

1. **Download the patch listed in "Required 06.70.00.11 Firmware Patches" on page 13 from the Sun download center.**
2. **Stop all IO from all of the connected data hosts.**

Note – This patch must be applied offline. Switches that are set up to use WWPN zoning especially require that this array firmware upgrade be performed off line as there is a potential loss of access to the controllers if the WWPNs change. Switches that use port zoning do not have the loss of access potential.

3. **Unmount any file systems associated with the volumes on the array.**

   Use system administration commands for your operating system CLI to unmount the volumes.

4. **Login to the management host as root.**
5. **Follow the instructions in the README in the patch to:**

   a. **Download or copy the patch to the software installation directory**

   b. **Untar and/or unzip the patch**

   c. **Apply the patch**

6. **Use Sun StorageTek Common Array Manager software to upgrade the firmware.**

   a. **On the Java Web Console page, click Sun StorageTek Common Array Manager.**

   b. **Go to the Storage System Summary page and select the arrays to be upgraded.**

   c. **Click the Upgrade Firmware button.**

   d. **Follow the prompts.**

7. **When the management software indicates that the firmware upgrade is complete, restart each array controller one at a time.**

   a. **Turn on the power switch on the controller.**

8. **When the controllers are back online, use the management software to verify that the volumes are assigned to the active controller.**

   The Volume Details page allows you to select the owning controller.

9. **For switches that use WWPN zoning, updating firmware in this patch will update the existing WWPNs. You will need to correct all zoning to match these new WWPNs.**
10. **Restart the I/O from the data hosts.**
11. **Remount any file systems associated with the volumes on the array.**

    Use system administration commands in your Operating System CLI to mount the volumes.

Installing Release 6.0.1 Firmware Baseline

Once you have installed the required patch noted in the last section, you can use the Common Array Manager software to install the current 6.70.42.10 firmware baseline required for this release. The Common Array Manager software and baseline firmware is included on the Sun StorageTek 2500 Series Array CD, or in the package you obtain from the Sun Download Center:
http://www.sun.com/software/download.

▼ To Install Firmware Baseline on the Array

1. **Install the current management software and register the array, as described in Sun StorageTek Common Array Manager Software Installation Guide, Release 6.0.1 or higher.**
2. **Install the firmware baseline on the array using the Common Array Manager interface.**

   You can upgrade the firmware on the 2540 Array without stopping I/O. For firmware for expansion modules, disk drives, and IOMs, it is recommended that a maintenance period of low activity be scheduled in order to execute the upgrade process.

   a. **On the Java Web Console page, click Sun StorageTek Common Array Manager.**

   b. **Go to the Storage System Summary page and select the arrays to be upgraded.**

   c. **Click the Install Firmware Baseline button.**

   d. **Follow the prompts to install the baseline.**

Installing the 6.70.54.10 Patch for 48 Drive Support

After you install the Sun StorageTek Common Array Manager software, v6.0.1, you can apply the 06.70.54.10 patch. That patch adds support for a third expansion tray and 48 drives. The patch numbers are:

- Solaris 137294
- Windows 137295
- Linux 137296

The patches are available from the Sun Download Center:
`http://www.sun.com/software/download/`

or

http://sunsolve.sun.com/show.do?target=patchpage

Known Issues

The following sections provide information about known issues and bugs filed against this product release:

If a recommended workaround is available for a bug, it follows the bug description.

iSCSI Issues

NEBS Compliance of ST 2510 Array

The ST 2510 array is not currently NEBS Level 3 compliant. It will become compliant approximately 8 weeks post-RR. Customers relying on this NEBS certification should check with their Sun representatives before acquiring this array for NEBS-specific applications to verify that the ST 2510 is certified.

Out-of-Band Management May Lose Connectivity

Bug 6615356 – SYMbol task `ServsymRpcHandle` periodically dies, causing the management software to lose communication with the array.

The cause has been identified and will be corrected in future releases.

Workaround – Rebooting the array corrects the problem.

Negative Values Returned for iSCSI Statistics Counters

Bug 6611655 – Negative counter values display for iSCSI Statistics large counter values. The values should be unsigned.

Workaround – Resetting the baseline under Administration->Performance in the management software resets the values.

Initiator with the Same Name as a Host Creates an Error

Bug 6624755 – For iSCSI on the 2510 Array only, creating an initiator with the same name as a host returns error message 57: `"The operation cannot complete because the identifier or name you provided already exists. Please provide another identifier or name and then retry the operation."`

Workaround – Do not create an initiator with the same name as a host.

2510 Array Shows as Host Board Type "Unknown".

Bug 6620100 – For the 2510 Array, the Controller Summary page of the management software shows the Host Board Type as `UNKNOWN`. For example:

```
public static final int HB_TYPE_UNKNOWN 1
```

Workaround – Keep a manual record of iSCSI host boards.

IPv6 Statistics Display on iSCSI TCP/IP Page

Bug 6651908 – IPv6 performance statistics display on the iSCSI Performance - Ethernet - TCP/IP page in the management software. They should not.

Workaround – Ignore the IPv6 performance statistics on this page.

SAS Issues

SAS Ports Link Status May Be Incorrect

Bug 6560293 and **6650124**– The SAS port link status in the management software may be incorrect.

Workaround – None.

Removing a SAS Controller Results in False Status

Bug 6522947 – Removing a SAS controller results in outdated information on the Controller Details page in the management software. The status correctly reports the controller as removed. Replacing the controller corrects the state.

For SAS, Creating New Volumes During Heavy Input-Output Can Result In Errors

Bug 6522938 – For SAS, using the CLI to create a new volume on an array with high data input and output returns in a timeout and an error code of 4.

Workaround – Verify if the new volume was created and if not try the operation when there is less I/O traffic.

Hardware and Firmware Issues

This section describes general issues related to the Sun StorageTek 2500 Series Array hardware and firmware.

World Wide Port Names Cannot be used as Initiators

Bug 6527155 – Do not use World Wide Port Names as names for initiators. Doing so will result in serious problems in array operations. The Common Array Manager software will prevent you from doing this.

Service Required LED Lights After Data Host Power On

Bug 6587720– The Array Service Required LED will light after powering down a data host, connecting FC cables between the HBA and controllers, and powering up the host server.

This is working as designed. Under a Direct Connect environment, rebooting the connected data host will cause a FC link down alarm. This is an expected alarm and the Amber Service Required LED is expected to illuminate. As soon as the link is back up, the Alarm should clear and the LED should turn off. The same behavior would be expected if a cable were unplugged form the HBA, or if there was a error with the HBA port or the HBA itself.

Under a switch environment, this will not occur unless a cable is unplugged from the switch, the switch is rebooted, or is having errors. Rebooting the host will not cause the link to go down because the link from the controller SFP to the switch will remain 'up'.

Plugging Cable into Wrong Port on a Hot System Can Cause a Panic

Bug 6541881 – A cable pull returned to the wrong HBA port can cause a panic. The cause is known and a fix is being worked on.

Workaround – Try to ensure that you plug the cable back into the port it was originally in if your system is running. If you need to move the cable to a different port, try to do so when the system is not online.

Disabled Snapshot can be Re-enabled after a Firmware Update

Bug 6529172 – A snapshot volume that is disabled can be automatically re-enabled after a firmware update occurs. If the snapshot volume is full, it can start generating warning events.

Workaround – Disable the snapshot again after the firmware update.

Adding Expansion Unit with Existing Storage Domain Info can Cause Event

Bug 6550702 and 6547615 – If you migrate an expansion module with licensed storage domains into an array that has a different number of licenses, an alarm will be generated.

Workaround –For a mismatch of license numbers, disable the licenses on the expansion module. Then disable the storage domains on the expansion module. The array will return to the licenses for the array (which is compliant), and the alarm will clear. Add any new licenses, if needed.

Port Speed should be "Unknown" for a Link that is in a Down State

Bug 6560279 – When a FC port is not connected to a Fabric or FC-AL topology, the Port Summary table reports the speed as 4Gbps. The port speed should read "Unknown" in the Summary page.

Array Returns Drive Type as "All" if One of the Removed Disk is Configured as a Hotspare

Bug 6581396 – The `sscs list fru` command displays Disk Type and Description as "All" and "All disk drive" respectively for a removed disk drive which was configured as a hotspare.

It should display "Unknown" as a drive type and "Unknown disk drive" in the Description field.

Upgrading IOM Firmware Can Result In Failback Failure

Bug 6509762 - After a firmware upgrade to an Input-Output Module (IOM), the array will display a Check Condition - Microcode Changed message on all hosts.

After a firmware upgrade, an automatic failback was generated. When the switch port connecting the data host was enabled, the auto failback failed, indicating that it did not process the MICROCODE_CHANGED message.

Workaround – There are two workarounds:

1) Perform a manual failover. The issue will not happen.

2) After updating the IOM firmware, manually forcing a failover and failback of all effected LUNs on any mapped Solaris host will clear out the condition.

Failover May Generate False Error Messages

Bug 6509331 – In Solaris, under heavy data traffic, host-initiated failover may generate error messages in /var/adm/messages even though the failover is successful.

Workaround – In the CLI, use the Solaris `luxadm` command to verify that the failover was successful.

1. **View the controller:**

```
$ luxadm di /dev/rdsk/c9t600A0B8000245D4C0000310A458A852Bd0s2
DEVICE PROPERTIES for disk:
/dev/rdsk/c9t600A0B8000245D4C0000310A458A852Bd0s2
  Vendor:               SUN
  Product ID:           LCSM100_F
  Revision:             0617
  Serial Num:           1T60325953
  Unformatted capacity: 3072.000 MBytes
```

```
  Write Cache:          Enabled
  Read Cache:           Enabled
    Minimum prefetch:   0x3
    Maximum prefetch:   0x3
  Device Type:          Disk device
  Path(s):

  /dev/rdsk/c9t600A0B8000245D4C0000310A458A852Bd0s2
  /devices/scsi_vhci/ssd@g600a0b8000245d4c0000310a458a852b:c,raw
   Controller
/devices/ssm@0,0/pci@18,600000/SUNW,qlc@1/fp@0,0
    Device Address              202400a0b8245db7,5
    Host controller port WWN    210000e08b883b2e
    Class                       secondary
    State                       STANDBY
   Controller
/devices/ssm@0,0/pci@18,600000/SUNW,qlc@1,1/fp@0,0
    Device Address              202500a0b8245db7,5
    Host controller port WWN    210100e08ba83b2e
    Class                       primary
    State                       ONLINE
```

Note that the primary controller is online.

2. **Issue the failover command.**

   An error message is generated indicating failure.

```
$ luxadm failover secondary
/dev/rdsk/c9t600A0B8000245D4C0000310A458A852Bd0s2
 Error: Unable to perform failover, standby path unavailable
```

3. **Verify the path characteristics.**

```
$ luxadm di /dev/rdsk/c9t600A0B8000245D4C0000310A458A852Bd0s2
DEVICE PROPERTIES for disk:
/dev/rdsk/c9t600A0B8000245D4C0000310A458A852Bd0s2
  Vendor:               SUN
  Product ID:           LCSM100_F
  Revision:             0617
  Serial Num:           1T60326060
  Unformatted capacity: 3072.000 MBytes
```

```
  Write Cache:          Enabled
  Read Cache:           Enabled
    Minimum prefetch:   0x3
    Maximum prefetch:   0x3
  Device Type:          Disk device
  Path(s):

  /dev/rdsk/c9t600A0B8000245D4C0000310A458A852Bd0s2
  /devices/scsi_vhci/ssd@g600a0b8000245d4c0000310a458a852b:c,raw
   Controller
/devices/ssm@0,0/pci@18,600000/SUNW,qlc@1/fp@0,0
    Device Address              202400a0b8245db7,5
    Host controller port WWN    210000e08b883b2e
    Class                       secondary
    State                       ONLINE
   Controller
/devices/ssm@0,0/pci@18,600000/SUNW,qlc@1,1/fp@0,0
    Device Address              202500a0b8245db7,5
    Host controller port WWN    210100e08ba83b2e
    Class                       primary
    State                       STANDBY
```

Note that the secondary controller is now online, indicating that the failover occurred.

Pushing Drive Housing Too Far Unseats Drive

Bug 6514411 – Inserting a disk drive into a tray by pushing on its housing until it is all the way in causes the drive to stop without being fully inserted and with the drive handle protruding.

Workaround – The correct way to insert a disk drive into the tray is as follows:

▼ Remove and Replace a Disk Drive

1. **Push the release button next to the disk drive to release the latch handle.**

FIGURE 1 Releasing the Latch Handle

Caution – Potential loss of data access - Data might be lost if an active disk drive is removed. If you remove an active disk drive accidentally, wait at least 30 seconds before reinserting it.

---

2. **Use the latch handle to slowly pull the failed disk drive out of the tray.**

Caution – Use care when handling any disk drive. Make sure all ESD precautions are being followed.

---

3. **When the drive is removed push the latch handle in to protect the failed disk drive from damage.**
4. **Unpack the new disk drive and do one of the following:**
   - Place the failed disk drive in the packing materials so that you can return it to Sun for proper disposal.
   - Properly dispose of the failed disk drive.
5. **Wait 30 seconds after the failed disk drive has been removed.**
6. **On the new disk drive, push the release button to release the latch handle.**

7. **Partially insert the drive into desired slot location. See** FIGURE 2**.**

Caution – In some drive bays, full insertion at this point without controlling the motion of the lever may cause the lever to bind.

FIGURE 2 Inserting the Drive.

8. **Grasp the lever and continue inserting the drive until you can easily rotate the lever toward the closed or latched position. See** FIGURE 3**.**

FIGURE 3 Pushing the Disk Drive Latch.

9. **Press firmly on the lever until it latches and the drive is fully inserted. See** FIGURE 4**.**

Note – Pressing harder should not cause additional inward motion of the drive.

The latch handle will click into place when the drive is fully inserted.

FIGURE 4 Fully Inserting the Drive.

10. **After the disk drive is fully inserted, the green Ready/Active LED will flash and then remain on to indicate a ready state.**

    A flashing Ready/Active LED indicates that data is being restored to the new disk drive.

Note – Depending on your configuration, the array might automatically reconstruct data to the new disk drive. If the array uses hot spares, it might need to complete reconstruction on the hot spare before it copies the data to the new disk drive. This could increase the time required to complete this procedure.

▼ Verify and Complete the Disk Replacement

1. **Access the Service Advisor software and verify that the State value is `Enable` and Status value is `OK` for the new disk drive**

   If the State and Status values are not `Enable` and `OK`, contact your Sun Service provider or your next level of technical support.

2. **From the Service Advisor software, do the following:**
   - Generate a new CRU inventory.
   - Release the array from maintenance.
   - Validate the disk firmware revision level.

On x86 Platform, `luxadm probe` *Command Displays Entries of UTM (Management) LUNs*

Bug 6482519 – The `luxadm probe` command displays UTM LUNs on x86 platforms. The UTM (Management) LUN is a reserved space, normally hidden, where the specific configuration settings for your array are stored.

Recharging a Battery in a Controller Results in a Failed Battery Event

Bug 6502673 – A battery replaced in a controller reports a failed battery event, while it is recharging. After the battery is fully recharged, this alarm will go away.

Battery Events Do Not Identify the Battery's Controller Location

Bug 6503171 – Battery event messages do not specify which of the two controllers the referenced battery is in.

For battery events, the array only reports the tray where it occurs, not the slot.

Workaround – For non-critical events, collect the support data and find the corresponding event in the MEL log. For critical events, the third amber LED lights on the front of the controller with the failed battery.

A Bad SFP May Not Generate a Fault Indicator

Bug 6514739 – If a bad SFP is inserted in the FC port of a 2540 array, there may not an indication in the fault list that it is bad.

Certain failure modes of an SFP may not be detected by the array firmware immediately upon insertion and the management software could report the link state as optimal.

However, when you initiate I/O on the channel with the damaged SFP, it will be reported as failed.

Workaround – Check the fault LED and link LED for link failure. Check the event log for a failure event at the time of the SFP insertion and when you initiate I/O.

Insufficient Reserve Space Fails Resnap

Bug 6523608 – Refreshing a snapshot does not update the filesystem if there is insufficient reserve space, yet a message displays indicating success. The array's event log says the resnap completed successfully.

Workaround – In the snapshot feature of the management software, configure snapshots to fail if sufficient reserve space is not available. The fail message will prompt you to increase the reserve space.

Array Does Not Timeout and Clear Pending Firmware Download Session of Previous Failure

Bug 6523624 – If a firmware upgrade to an expansion module fails, the array may not clear the failed session automatically.

Workaround – After 20 minutes, retry the upgrade. If the upgrade fails again, power cycle the array to clear the failure.

Increased Common Array Manager Response Time

A busy array can increase the management software's response time.

Service Advisor Does Not Verify Disk is Ready to be Removed

Bug 6501029 – When the management software lists a disk as failed and the Service Advisor procedure for replacing drives is followed, the step to verify that the disk is ready to remove may not list the failed disk.

Workaround – Use an alternative menu option, Array Troubleshooting and Recovery, to view the status of the disk.

Documentation Issues

This section describes known issues and bugs related to the Sun StorageTek 2500 Series Array release documentation.

Third Expansion Tray (48 Drive) Cabling

A patch is available for Release 6.0.1 that adds support for a third expansion tray and 48 drives. Cabling instructions for the third expansion tray has not yet been added to Sun StorageTek 2500 Series Array Hardware Installation Guide or Service Advisor.

Array Configuration Naming Convention

The configuration naming convention is “controllers x trays” where the first number is the controller tray and the second is the sum of the controller tray and the number of expansion trays. For example, 1x1 is a standalone controller tray, 1x2 is the controller tray and one expansion tray, 1x3 is the controller tray and 2 expansion trays, 1x4 is the controller tray and 3 expansion trays (TABLE 13).

TABLE 13 Controller and Expansion Tray Configurations

Configuration Identifier	Controller Tray	Number of Expansion Trays
1x1	1	0
1x2	1	1
1x3	1	2
1x4	1	3

Note – Do not add more expansion trays than the array supports.

Use the following instructions to connect the dual-RAID controller tray to one or more expansion trays.

Connecting Expansion Trays

Keep the following points in mind when adding expansion trays to your storage array:

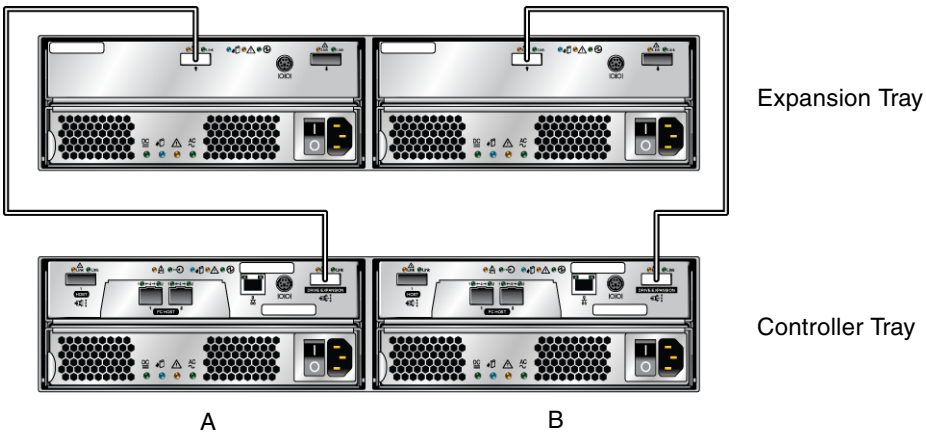
- Expansion trays should be added with the power to the array on. Limiting I/O traffic is recommended for the duration of the reconfiguration.
- Controller and expansion trays may be shipped with protective plastic plugs in the SAS expansion ports. Remove these before connecting cables.
- Expansion trays are added serially, in two chains (channel one through the A-side controller and modules, and channel two through the B-side controller and modules). The SAS cable from the expansion port on a controller connects to the In port (Up arrow) on an expansion tray drive module. The SAS cable from a drive module on expansion tray 1 to a corresponding drive module on expansion tray 2 connects from the Out port on expansion tray 1 to the corresponding In port on expansion tray 2. This pattern repeats for each additional drive module on a channel. See TABLE 15 for an illustration of this reverse cabling pattern.

- To connect cables for maximum redundancy, *controller* B must be cabled to the expansion tray B-side modules in the opposite order as the expansion tray A-side modules. That means the last drive module in the A-side chain from *controller* A must be the first drive module in the B-side chain from *controller* B. See TABLE 15 for an illustration of cabling for maximum tray level redundancy.
- On all SAS cables, affix a label to each end of the cable.

Cabling an Expansion Tray to a Controller Tray

A Controller tray has two expansion ports, one on the Controller A module and one on the Controller B module. To connect an expansion tray, connect an SAS cable from each expansion port on the controller to each In port on the expansion tray. TABLE 14 shows a 1x2 array configuration consisting of one controller tray and one expansion tray. Two SAS cables are required.

TABLE 14 1x2 Array Configuration Cabling Example



To cable a 1x2 array configuration:

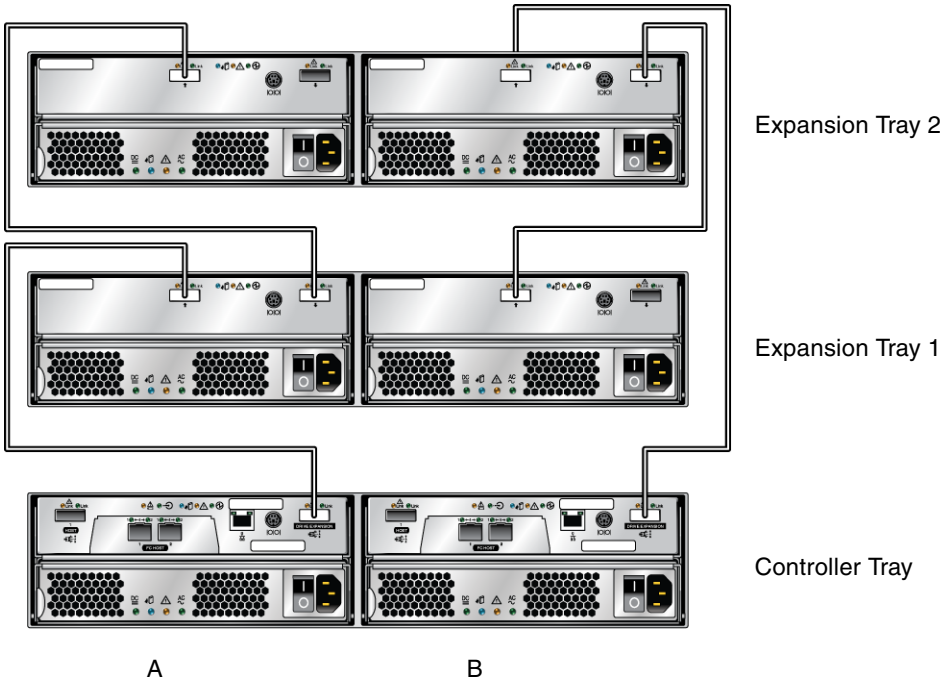
1. **Locate the Controller A and Controller B expansion ports at the back of the controller tray (TABLE 14).**
2. **Locate the In and Out expansion ports at the A-side and B-side back of the expansion tray (TABLE 14).**
3. **Connect one SAS cable between the Controller A expansion port and the A-side In port on the expansion tray (TABLE 14).**

4. **Connect one SAS cable between the Controller B expansion port and the B-side In port on the expansion tray (TABLE 14).**

Cabling Additional Expansion Trays

Each additional expansion tray is added to the preceding expansion tray by connecting SAS cables from the Out ports of the first tray to the In ports of the next tray. TABLE 15 illustrates a 1x3 array configuration consisting of one controller tray and two expansion trays. The cable connections on the B-side are reversed (the cable from the controller A expansion port goes to the In port of expansion tray 1; the cable from the controller B expansion port goes to the In port on expansion tray 2) for maximum redundancy. This pattern continues for each additional tray you add. Two more SAS cables are required for each additional tray.

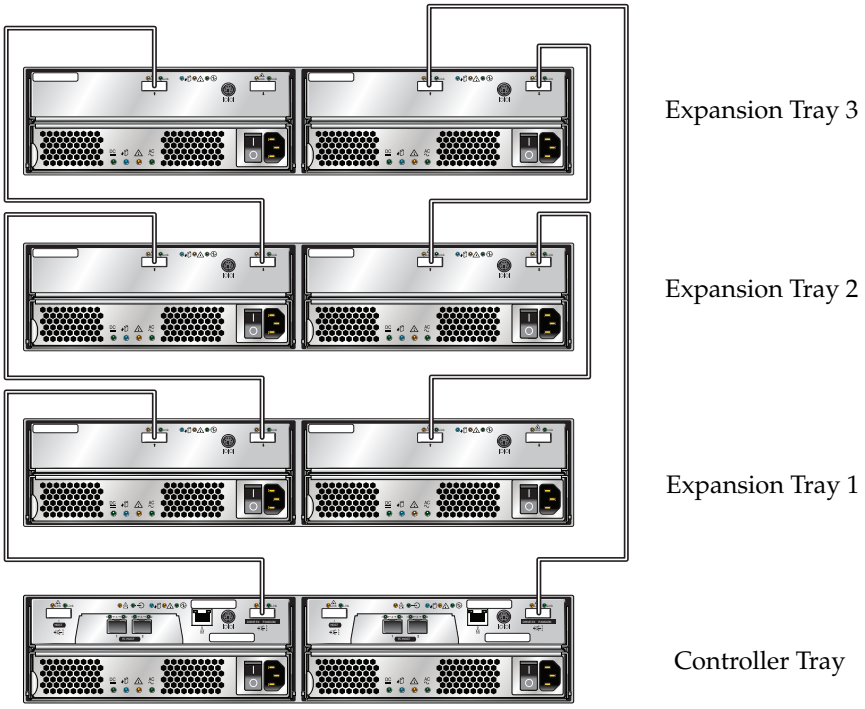
TABLE 15 1x3 Array Configuration Cabling



To cable a 1x3 array configuration for maximum redundancy:

1. **Locate the Controller A and Controller B expansion ports at the back of the controller tray (**TABLE 15**).**
2. **Locate In and Out expansion ports at the A-side and B-side back of the expansion tray (**TABLE 15**).**
3. **Connect one SAS cable between the Controller A expansion port and the A-side expansion In port of expansion tray 1 (**TABLE 15**).**
4. **Connect one SAS cable between the Controller B expansion Out port and the B-side expansion In port of expansion tray 2 (**TABLE 15**).**
5. **Connect one SAS cable between the expansion tray 1 Out port and the A-side expansion In port of expansion tray 2 (**TABLE 15**).**
6. **Connect one SAS cable between the expansion tray 2 B-side Out port and the B-side In port of expansion tray 1 (**TABLE 15**).**

TABLE 16 1x4 Array Configuration Cabling



To cable a 1x4 array configuration for maximum redundancy:

1. **Locate the Controller A and Controller B expansion ports at the back of the controller tray (**TABLE 16**).**
2. **Locate In and Out expansion ports at the A-side and B-side back of the expansion tray (**TABLE 16**).**
3. **Connect one SAS cable between the Controller A expansion port and the A-side expansion In port of expansion tray 1 (**TABLE 16**).**
4. **Connect one SAS cable between the Controller B expansion Out port and the B-side expansion In port of expansion tray 3 (**TABLE 16**).**
5. **Connect one SAS cable between the expansion tray 1 Out port and the A-side expansion In port of expansion tray 2 (**TABLE 16**).**
6. **Connect one SAS cable between the expansion tray 3 B-side Out port and the B-side In port of expansion tray 2 (**TABLE 16**).**

7. **Connect one SAS cable between the expansion tray 2 Out port and the A-side expansion In port of expansion tray 3 (**TABLE 15**).**

8. **Connect one SAS cable between the expansion tray 2 B-side Out port and the B-side In port of expansion tray 1 (**TABLE 15**).**

Solaris 8 Not Supported For Data Hosts

The Sun StorageTek 2500 Series Array Hardware Installation Guide, part number 820-0015-10, lists Solaris 8 as supported for data hosts. Only Solaris 9 and/or 10 are supported, depending on the application.

Add Expansion Modules with Array Power On.

Bug 6538943 - The *Sun StorageTek 2500 Series Array Hardware Installation Guide,* Part No. 820-0015-10, states in Chapter 2:

"Expansion trays must be added with the power to the array and I/O data transfer turned off."

This is incorrect. It is best to add an expansion tray to a running array instead of one that is powered off. Limiting I/O traffic is recommended for the duration of the reconfiguration.

1x3 Cabling Procedure Error

Step 6 on page 51 of *Sun StorageTek 2500 Series Array Hardware Installation Guide* states, "Connect one SAS cable between the expansion tray 2 B-side Out port and the B-side In port of expansion tray 2." This is incorrect. You should connect the cable between the expansion tray 2 B-side Out port and the B-side In port of expansion tray 1.

Corresponding Figure 19 is correct.

Default IP Address Netmasks

The *Sun StorageTek 2500 Array Hardware Installation Guide* documents the default IP addresses (Configuring IP Address of the Array Controllers), but does not include the netmask. The netmask for the default addresses is 255.255.255.0.

Flathead Screwdriver Required

Bug 6515249 – In Chapter 2 of the *Sun StorageTek 2500 Array Hardware Installation Guide* the list of tools needed for the array installation in a rack does not list a flathead screwdriver, which is required if you need to loosen the rail extension screws.

Service Life of Battery is Three Years

The service life of the battery pack is three years, at the end of which the battery pack must be replaced. The *Sun StorageTek 2500 Array Hardware Installation Guide* incorrectly lists the life as two years.

Operational Information

This section provides useful operational information not documented elsewhere.

In-band Requirements for Linux

In-band for Linux requires Linux Red Hat Enterprise v5.1.

Wait 60 Seconds Before Replacing Drives

When a drive fails, wait 60 seconds after removing the failed drive before you put in a new drive.

License Required for Storage Domains

The 2500 Series array includes two storage domains. You must purchase a premium license to use additional storage domains.

When Performing an Array Import, Do Not Modify Configuration

Configure management objects while an `import array` job is running might interfere with the import. Be sure that everyone who uses the destination array does not configure any objects (including volumes, initiators, mappings, etc.) while the import is in progress.

Using a Volume Before It Is Fully Initialized

When you create a volume and label it, you can start using the volume before it is fully initialized.

Controller Tray Battery Information

During boot-up, the battery light might flash for an extended period. The battery charger performs a series of battery qualification tests before starting a battery charge cycle. This series of tests occurs at subsystem power-up. The tests are automatically reinitialized approximately every 25 hours by a timer.

Each controller tray contains a user-replaceable lithium ion battery pack for cache backup in case of power loss. The on-board battery is capable of holding a 2-gigabyte cache for three days (72 hours). The service life of the battery pack is three years, at the end of which the battery pack must be replaced (it is field-replaceable).

Release Documentation

Following is a list of documents related to the Sun StorageTek 2500 Series Array. For any document number with *nn* as a version suffix, use the most current version available.

You can search for this documentation online at:
`http://www.sun.com/documentation/`

Application	Title	Part Number
Site planning information	*Sun StorageTek 2500 Series Array Site Preparation Guide*	820-0024-*nn*
Regulatory and safety information	*Sun StorageTek 2500 Series Array Regulatory and Safety Compliance Manual*	820-0025-*nn*
Array hardware installation instructions	*Sun StorageTek 2500 Series Array Hardware Installation Guide*	820-0015-*nn*
Release-specific information for the Sun StorageTek Common Array Manager	*Sun StorageTek Common Array Manager Release Notes*	820-3997-*nn*
Management software installation and basic configuration information	*Sun StorageTek Common Array Manager Software Installation Guide*	820-2934-*nn*

Application	Title	Part Number
Quick-reference information for the Common Array Manager CLI	*Sun StorageTek Common Array Manager CLI Quick Reference Card*	820-2932-*nn*
Instructions for installing the Sun StorEdge Expansion cabinet	*Sun StorEdge Expansion Cabinet Installation and Service Manual*	805-3067-*nn*
Instructions for installing the Sun Rack 900/1000 cabinets	*Sun Rack Installation Guide*	816-6386-*nn*
Instructions for installing the Sun Fire cabinet	*Sun Fire Cabinet Installation and Reference Manual*	806-2942-*nn*

In addition, the Sun StorageTek 2500 Series Array includes the following online documentation:

- Sun StorageTek Common Array Manager online help

  Contains system overview and configuration information.

- Service Advisor

  Provides guided FRU replacement procedures with system feedback. You can access Service Advisor from the Sun StorageTek Common Array Manager software.

- sscs man page commands for the CLI

  Provides help on man page commands available on a management host or on a remote CLI client.

Service Contact Information

If you need help installing or using this product, go to:

`http://www.sun.com/service/contacting`

Third-Party Web Sites

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APPENDIX **A**

SAS Single Path Configuration

This appendix describes special instructions to configure SAS single path connections between a data host running Solaris 10 operating system and a Sun StorageTek 2530 Array.

Note – Multipath and single path configurations are supported for all Sun StorageTek 2500 Series Arrays. Sun recommends multipath configurations for data protection.

This appendix consists of the following sections:

Planning for SAS Single Path Connections

Key requirements to configuring Solaris SAS single path are:

- Configuring one host per initiator
- Following the suggested file naming conventions
- Editing the **sd.conf** file

Before configuring single path, you need to collect host, initiator, and topology information, review the naming conventions, and prepare a table of configuration information as outlined in the following sections.

Follow the procedures in the following order to ensure smooth operations:

SAS OS and Patch Requirements

The Sun StorageTek 2530 arrays supports single path connections with the operating systems and patches listed in "2530 Data Host Requirements" on page 10.

Note – Solaris 9 and Sun Cluster 3.x are not supported.

Solaris 10 Restrictions

- Solaris 10 OS does not dynamically discover volumes.
- You might have to edit the **sd.conf** file to recognize the new or undiscovered volumes as documented in this chapter.

- On Solaris 10 OS, the target id is generated from the World Wide Names (WWNs) of both the HBA initiators and the controller ports. Replacing controllers can change the target id. Review the file naming after changing controllers to make sure the naming conventions for single path in this document are still met.

▼ To Collect Host Information

1. Issue the `hostname` command to collect the host information.

```
# hostname
 csqa221-163

 # hostname
 csqa221-168
```

This example uses two data hosts running Solaris 10 OS.

▼ To Collect Initiator Information

1. Issue the `dmesg` command to collect initiator information. (The initiator of data on the HBA.)

```
# dmesg | grep WWN
 Apr  9 17:02:26 csqa221-163     mpt1: Port 0/PHYs 0-3 (wide-port)
WWN: 0x500605b000253410
 Apr  9 17:02:26 csqa221-163     mpt1: Port 1/PHYs 4-7 (wide-port)
WWN: 0x500605b000253414
# dmesg | grep WWN
 Apr  9 17:00:38 csqa221-168     mpt3: Port 0/PHYs 0-3 (wide-port)
WWN: 0x500605b0000db020
 Apr  9 17:00:38 csqa221-168     mpt3: Port 1/PHYs 4-7 (wide-port)
WWN: 0x500605b0000db024
```

In each of the above lines in the output is embedded valuable information as shown in the following example:

```
mpt3: Port 0/PHYs 0-3 (wide-port) WWN: 0x500605b0000d b020
```

- mpt3 - HBA
- Port 0 - Port 0 or 1. Both PCI-X and PCIe HBAs are dual ported.
- PHYs 0-3 - Each physical port has 4 channels (numbered 0 – 3) and is called PHY in SAS terminology
- WWN: 0x500605b0000d**b020** - the World Wide Name. Note the last four digits.

Note – The initiator information is printed at boot-up time. If the dmesg command does not return any output, the same information can be obtaining by searching on the WWN string in the `/var/adm/messages` files.

▼ To Collect Controller and Target ID Information

Use the cfgadm -al command to collect information about the controllers and the Target ID. The scsi-bus code identifies the SAS controller.

```
# cfgadm -al
Ap_Id                       Type         Receptacle   Occupant   Condition
c0                          scsi-bus      connected    configured unknown
c0::dsk/c0t0d0               disk         connected    configured unknown
c0::dsk/c0t1d0               disk         connected    configured unknown
c5                          scsi-bus      connected    configured unknown
c5::dsk/c5t9d0               disk         connected    configured unknown
c5::es/ses2                  disk         connected    configured unknown
c6                          scsi-bus      connected    configured unknown
c6::dsk/c6t9d0               disk         connected    configured unknown
c6::es/ses3                  disk         connected    configured unknown
unconfigured ok
```

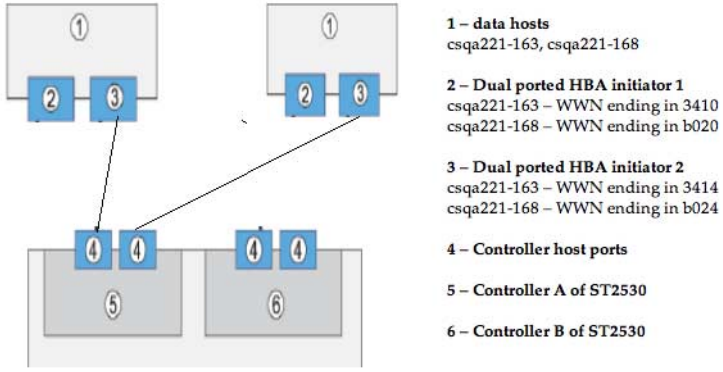
Planning the Cabling Topology

The Sun StorageTek 2540 Array, with a Fibre Channel data path, has built-in drivers with dynamic discovery and multipathing capabilities.

The Sun StorageTek 2530 Array, if configured for SAS single path, does not have these capabilities. There is no utility to correlate the connections between initiators, HBA ports and controller ports. You have to plan the topology prior to configuring single path connections.

In the examples that follow, the topology is listed in FIGURE A-1

FIGURE A-1 Topology of the 2530 array when connected to data hosts.



Suggested Naming Convention in the Sun StorageTek Common Array Manager Software

The following suggests an optional naming convention to assure that the initiators are mapped correctly to the volumes. You can use the naming modifications listed in TABLE A-1 in the Sun StorageTek Common Array Manager software to improve the operations.

TABLE A-1 Naming Modifications to Make in the Sun StorageTek Common Array Manager Software

CAM Components	Solaris Single Path Configuration	Naming Modification	Comments
Initiator names	Naming modifications 1. Start with the letter i- to denote that this is an initiator 2. Add data host name (example - csqa221-163) 3. Add the HBA controller information (example - mpt1) 4. Add the last 4 characters of the WWN (example - 3410)	Start with i- Add naming of associated components.	**Example –** i-csqa221-163-mpt1-3410 i-csqa221-163-mpt1-3414 and i-csqa221-168-mpt3-b020 i-csqa221-168-mpt3-b024
Hosts	The initiator is associated with a particular: * Data host (example - csqa221-163) * HBA controller (example - mpt1) * Initiator Port WWN (last four letters, example - 3410)	Start with vh- (for virtual host) Add naming of associated components.	**Example –** vh-csqa221-163-mpt1-3410 vh-csqa221-163-mpt1-3414 and vh-csqa221-168-mpt3-b020 vh-csqa221-168-mpt3-b024
Host Groups	In CAM, create one host (virtual host) per initiator The host is associated with a particular: * Data host (example - csqa221-163) * HBA controller (example - mpt1) * Initiator Port WWN (last four letters, example - 3410)	Start with hg- (for host group) Add data host name	**Example -** **hg**-csqa221-163 hg-csqa221-168

TABLE A-1 Naming Modifications to Make in the Sun StorageTek Common Array Manager Software

Host Group Restrictions	Include all hosts in the host group with the corresponding data host name.	Naming modifications Start the volume name with either **A-** or **B-** to denote which controller is the preferred controller.	Example - `hg-csqa221-163 contains vh-csqa221-163-mpt1-3410 and vh-csqa221-163-mpt1-3414 hosts and hg-csqa221-168 contains vh-csqa221-168-mpt3-b020 and vh-csqa221-168-mpt3-b024 hosts.`
Volumes		Ensure that all volumes beginning with A- are owned by Controller A and all volumes beginning with B- are owned by Controller B.	**Example** - **A**-vol1, A-vol2 and so on to denote that these volume's preferred owner is Controller A.
Mapping Volumes to Hosts	Map volumes to a **host group**, not to a host. (This maps the volume to all hosts in the host group.) Note - it is especially important with single path that ownership be correct as failover will not occur as it does with multipath.	Naming modifications Start the volume name with either **A-** or **B-** to denote which controller is the preferred controller.	**Example -** Map `A-vol1` to `hg-csqa221-163` instead of to `vh-csqa221-163-mpt1-3410`

Completing the Configuration Worksheet

Whether you use the suggested naming strategy or not, you can use the following table as a guideline when collecting all information prior to configuring single path connections.

TABLE A-2 Collect Configuration Information

Component Type	Component Name	Your Value	Example	Result to Add to CAMC
Data host	# hosts		2	This information translates to the host groups
	Data host1		csqa221-163	Host group 1 = `hg-csqa221-163`
	Data host2		csqa221-168	Host group 2 = hg-csqa221-168
Initiators	# of HBAs in data host1		1	This information translates into initiator names and virtual host names. See Figure A-3.
	Initiator 0 WWN, last 4 characters, HBA controller		0x500605b000253410, 3410, mpt1	**Initiator 1 =** i-csqa221-163-mpt1-3410 **Virtual host 1 =** vh-csqa221-163-mpt1-3410
	Initiator 0 WWN, last 4 characters		0x500605b000253414, 3414, mpt1	**Initiator 2 =** i-csqa221-163-mpt1-3414 **Virtual host 2 =** vh-csqa221-163-mpt1-3414
	# of HBAs in data host2		1	-
	Initiator 0 WWN, last 4 characters		0x500605b0000db020, b020, mpt3	**Initiator 3 =** i-csqa221-168-mpt3-b020 **Virtual host 3 =** vh-csqa221-168-mpt3-b020
	Initiator 0 WWN, last 4 characters		0x500605b0000db024, b024, mpt3	**Initiator 4 =** i-csqa221-168-mpt3-b024 **Virtual host 4 =** vh-csqa221-168-mpt3-b024

TABLE A-2 Collect Configuration Information *(Continued)*

Volumes to be owned by Controller A	# of volumes		3	Ensure that during mapping to a particular host group, the volumes are owned by Controller A. See Figure A-4.
	Volume 1 name		A-vol1	
	Volume 2 name		A-vol2	
	Volume 3 name		A-vol3	
Volumes to be owned by Controller B	# of volumes		2	Ensure that during mapping to a particular host group, the volumes are owned by Controller B.
	Volume 4 name		B-vol1	
	Volume 5 name		B-vol2	
	Volume 6 name			

Configuring Single Path Connections

With the information collected, you can now proceed to make the connections and configure the software for single path connections as documented in the following sections:

- "To Connect the Host and Array" on page 47
- "Configuring Storage in the Sun StorageTek Common Array Manager Software " on page 49
- "To Identify the Target ID" on page 51
- "Adding More Devices" on page 50

▼ To Connect the Host and Array

1. Establish a hand shake between the host and the array

   a. Physically connect the cables for your specific topology.

   In the steps to follow, it is assumed that connections have been made as per the topology depicted in Figure 1.

   b. Issue the following command once from each of the data hosts:

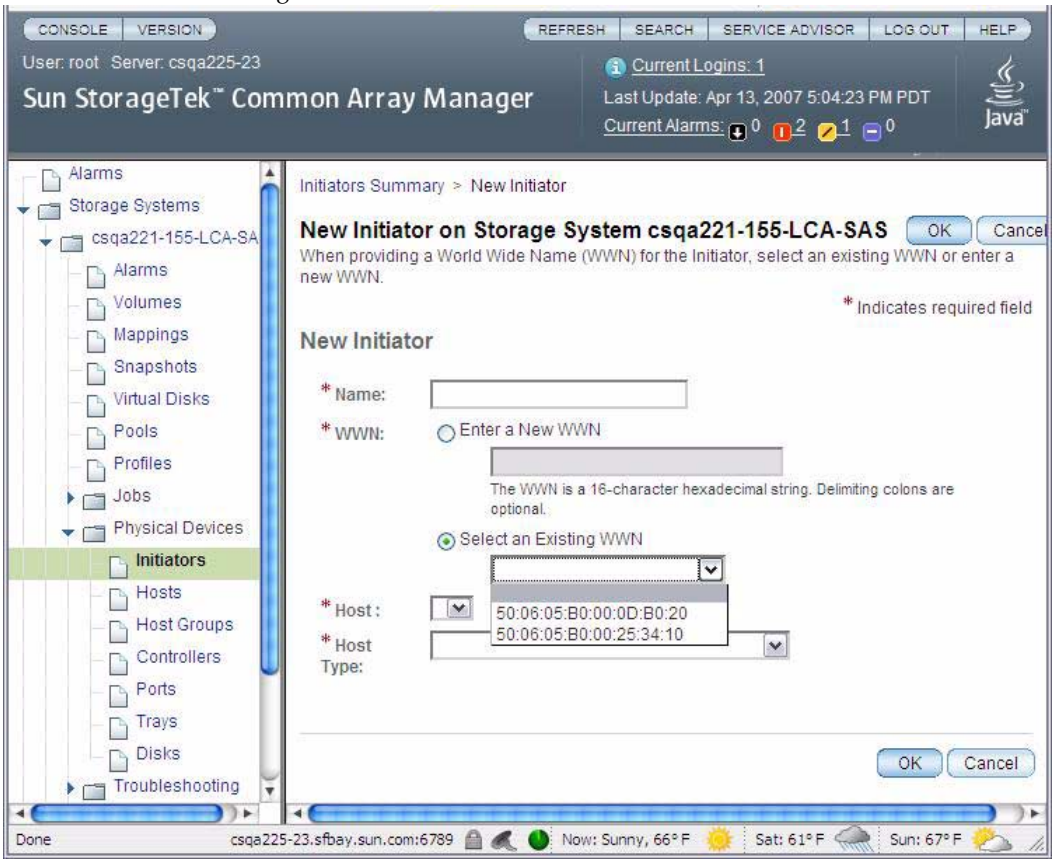
   ```
   # /usr/sbin/devfsadm
   #
   ```

If no output displays, the command ran successfully. By executing the above command, a hand shake is established between the data host and the ST2530 array.

2. Log into the Sun StorageTek Common Array Manager software as outlined in the `Sun StorageTek Common Array Manager Software Installation Guide`.

3. On the New Initiator page, view existing WWNs of initiators in Sun StorageTek Common Array Manager software as shown in FIGURE A-2.

FIGURE A-2 WWN after Using the `devised` Command.



Configuring Storage in the Sun StorageTek Common Array Manager Software

Follow the usual steps to configure storage in the Sun StorageTek Common Array Manager software. You can use the suggested naming conventions as you configure.

Before you begin, review the following configuration notes:

- Do not map volumes to the hosts you created. Map the volumes only to host groups. If you map to hosts, you will have to change the mappings if you switch to a multipath configuration.
- When mapping multiple volumes, assign the first volume LUN number 0. A Solaris 10 data host does not need any changes to recognize LUN 0 of a target. The procedure to identify the targeted depends on this step.
- LUN 31 (named Access) is the UTM LUN and cannot be used. The UTM LUN is reserved for in-band RAID management.
- Ensure that volumes are on the preferred controllers. Example - set all volumes named with the prefix A- to be owned by Controller A.
- FIGURE A-3 shows an example of creating initiators using the naming convention outlined in "Naming Modifications to Make in the Sun StorageTek Common Array Manager Software" on page 44 using the New Initiator page.

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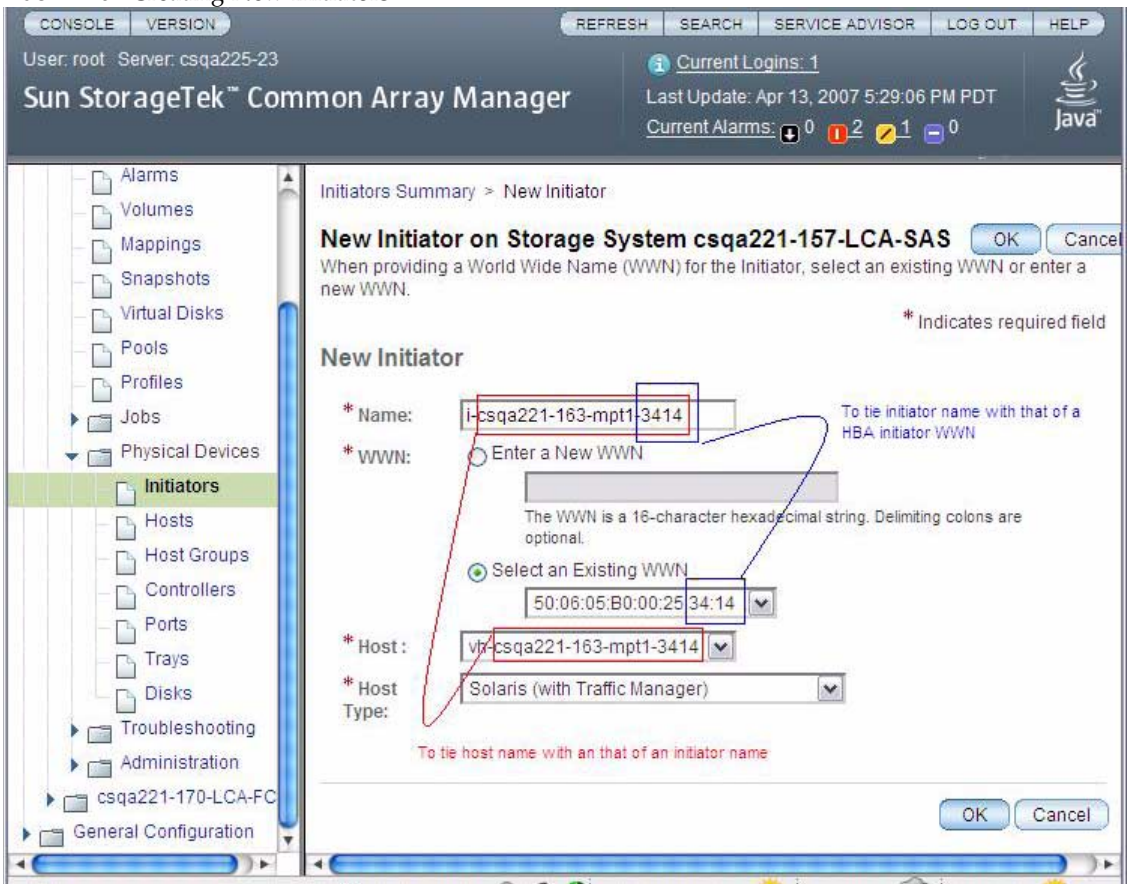
▼ To Configure Storage in the Management Software

Use the Sun StorageTek Common Array Manager software to configure the following:

- Host Groups
- Creating one host for every initiator
- Adding Hosts to Host Groups
- Creating volumes and associated objects using the Volume Creation Wizard.
- Mapping the Volumes to Host Groups

For more information, review the online help, especially the "Planning for Volume Creation" topic.

FIGURE A-3 Creating New Initiators



Adding More Devices

Before the host can see more devices, identify the target ID and update the /kernel/drive/sd.conf file as noted in the following sections:

- "To Identify the Target ID" on page 51
- "To Update the `/kernel/drv/sd.conf` File" on page 51

▼ To Identify the Target ID

1. **Ensure that LUN ID 0 is mapped to a data host correctly as requested in** "Configuring Single Path Connections" on page 47**.**

2. **Identify the controllers and target ID using the cfgadm command, noting which elements have the proper bus.**

```
# cfgadm -al
Ap_Id              Type         Receptacle   Occupant    Condition
c0                 scci-bus     connected    configured   unknown
c0::dsk/c0t0d0     disk         connected    configured   unknown
c0::dsk/c0t1d0     disk         connected    configured   unknown
c5                 scci-bus     connected    configured   unknown
c5::dsk/c5t9d0     disk         connected    configured   unknown
c5::es/ses2        disk         connected    configured   unknown
c6                 scci-bus     connected    configured   unknown
c6::dsk/c6t9d0     disk         connected    configured   unknown
c6::es/ses3        disk         connected    configured   unknown
unconfigured ok
```

▼ To Update the `/kernel/drv/sd.conf` File

1. **Edit the `/kernel/drv/sd.conf` file. Add any additional luns for the Target ID.**

Note – Add lun entries to the targets for each of your configured volumes. Adding unnecessary lun entries to this file will increase boot time.

```
#
 name="sd" parent="mpt" target=9 lun=0;
 name="sd" parent="mpt" target=9 lun=1;
 name="sd" parent="mpt" target=9 lun=2;
 name="sd" parent="mpt" target=9 lun=3;
  [ .. ]

 name="sd" parent="mpt" target=9 lun=30;
```

Note – LUN 31 (the UTM LUN) cannot be used. Do not add it to the sd.conf file.

---

2. **Reboot the array to place the changes to sd.conf file into effect.**
 # reboot -- -r

After reboot, you should be able to see the volumes.

3. **Review devices using the format command.**

In the `format` command output, for each controller, you should be able to see the Target ID and the lun. In the example below, for controller 5 (c5t9d0), the target id is 9 and the lun is 0.

```
# format
Searching for disks...done


c3t9d0: configured with capacity of 40.00GB
AVAILABLE DISK SELECTIONS:
0. c0t0d0 <SUN72G cyl 14087 alt 2 hd 24 sec 424>
/pci@1f,700000/pci@0/pci@2/pci@0/pci@8/LSILogic,sas@1/sd@0,0
1. c0t1d0 <SUN72G cyl 14087 alt 2 hd 24 sec 424>
/pci@1f,700000/pci@0/pci@2/pci@0/pci@8/LSILogic,sas@1/sd@1,0
2. c5t9d0 <SUN-LCSM100_S-0617 cyl 20478 alt 2 hd 64 sec 64>
/pci@1f,700000/pci@0/pci@9/LSILogic,sas@0/sd@9,0
...
```

4. **Before using the volumes, you must label the disks using the `format` command.**
5. **After labeling the disk, verify the labels by looking at the detailed partition table using the `format verify` option.**

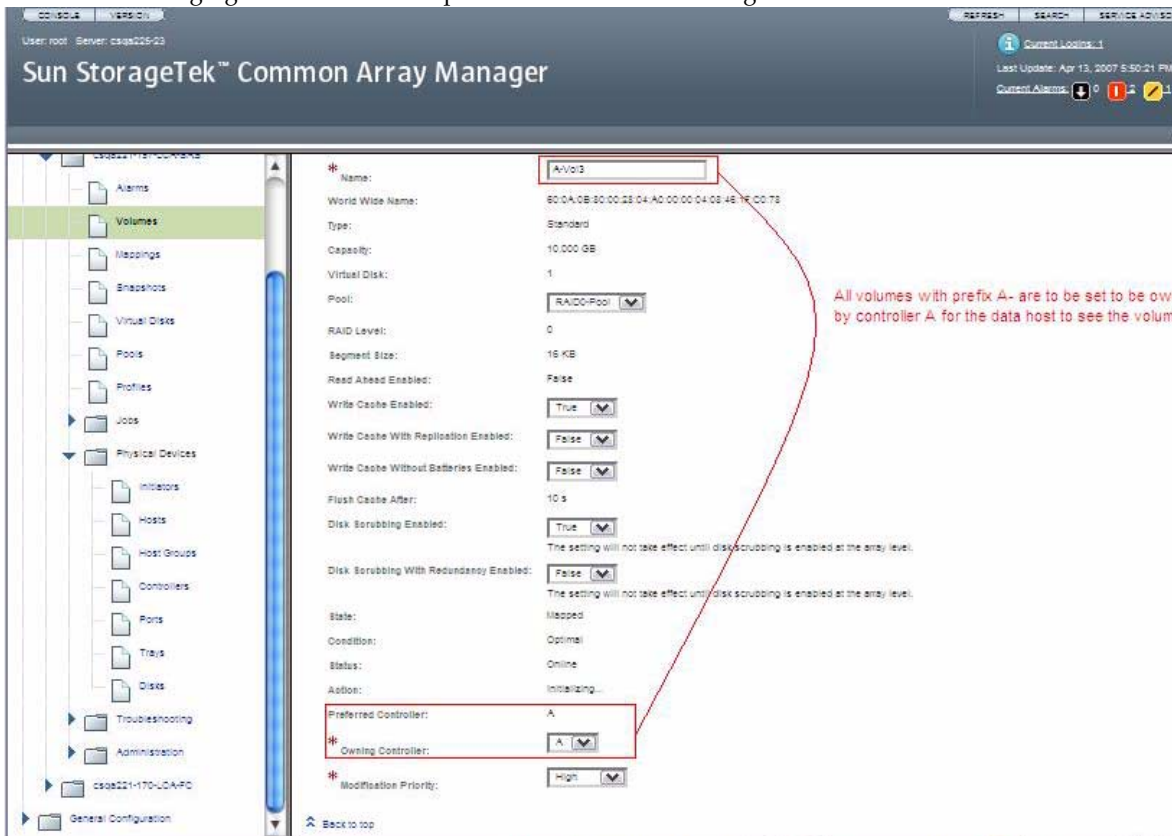
Troubleshooting

Errors When Trying to Establish Communication

If you get an error when attempting to write the label and/or when you are trying to write to a device specifically in a dual controller configuration, it is likely that the LUN is currently owned by the controller that the host is not connected to.

If this happens, go to the Volume Details Page for the volume associated with this LUN and change the owner as noted in FIGURE A-4.

FIGURE A-4 Changing Volume Ownership on the Volume Details Page.



Verifying Single Path Information After Replacing Controllers

Take the following steps to ensure smooth continuation of operations when replacing controllers.

On Solaris 10 OS, the `Target ID` is generated by using the World Wide Names of both the HBA initiators and the controller ports. When replacing controllers, there is a very high possibility that the target id will change. Therefore, caution must be exercised when replacing controllers.

Prior to replacing the controller, note how and where the devices are being used. Typically, a system administrator will either use the devices as raw devices or create file systems on them. When a file system is created, the mount point information is typically placed in the `/etc/vfstab` file.

▼ To Update Single Path Information After Replacing Controllers

1. **After replacing the controller, follow the steps to identify the new `target id` in** "To Identify the Target ID" on page 51 **and** "To Update the `/kernel/drv/sd.conf` File" on page 51**.**
2. **Make changes to `/etc/vfstab` and any other places to reflect the change in the `target id`.**