

Sun StorEdge™ SCSI Target Emulation (STE) 1.1 Release Notes



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Introduction

These Release Notes describe installation procedures and product considerations for the Sun StorEdge™ SCSI Target Emulation (STE) 1.1 software.

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Typographic Conventions

TABLE P-1 Typographic Conventions

Typeface	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% su Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type <code>rm filename</code> .

Related Documentation

Application	Title	Part Number
Man Pages	<code>steadm(1M)</code> <code>steconf(1M)</code> <code>stxprint(1M)</code> <code>ste.cf(4)</code> <code>ifptm(7D)</code> <code>sftm(7D)</code> <code>ste(7D)</code>	N/A
Hardware Installation	<i>Sun StorEdge PCI FC-100 Host Adapter Installation Manual</i>	805-3682
	<i>Sun StorEdge SBus FC-100 Host Adapter Installation and Service Manual</i>	802-7572

STE Overview

STE enables open systems hosts (currently Solaris or NT systems) to connect to a Solaris server or storage controller via Fibre Channel cables and access the attached storage as if it were one or more SCSI target devices.

What is STE?

STE consists of Target Emulation software (the STE driver plus one or more target mode drivers) and Fibre Channel Host Adapter Boards (FCAs), both of which are installed on the Solaris server; STE ships with and requires the following packages:

- Storage Product Unistat, SUNWspuni
- Storage Cache Management, SUNWscm

STE functionality:

- Enables open systems hosts to access Sun StorEdge Data Services, including Instant Image, Remote Dual Copy, and Fast Write Cache.
- Provides caching and read-ahead mechanisms for fast Read/Write access.
- Supports alternate pathing to the same logical drive.
- Provides a variable logical disk partition size.
- Allows multiple LUNs to be configured on a single Fibre Channel port.
- Permits multiple initiators to access the same partition on separate Fibre Channel loops.

Typical Applications

- STE used with Instant Image enables open systems hosts to access an Instant Image volume group (“point-in-time copy”) on a Fibre Channel disk array that is connected to a Solaris server.
- STE used with Remote Dual Copy provides open systems hosts with access to dual copy volume pairs.
- With the target server configured as a cache controller, STE enables the tape backup utility on a master server to backup the storage connected to the target.

STE Components

The STE driver is a target mode command processor module for handling SCSI commands and mapping front end “virtual” disks or volumes to actual back-end physical devices. The driver is user-configurable and executes in the kernel as lightweight threads.

The STE product includes several utilities for managing the STE software and its attached target devices.

Utility	Function
<code>steadm</code>	Provides a command line interface for enabling, monitoring, and disabling SCSI Target Emulation. Uses information in an STE configuration file to map a SCSI target (that is, a raw device entry) to a specified physical interface (controller and physical device), and assigns this virtual disk a SCSI Logical Unit Number (LUN).
<code>steconf</code>	Prints configuration information about Fibre Channel devices on the system.
<code>stxprint</code>	Decodes trace files generated by STE (either from asynchronous error events or by request from <code>steadm</code>).

Theory of Operation

FIGURE 1 shows how STE works.

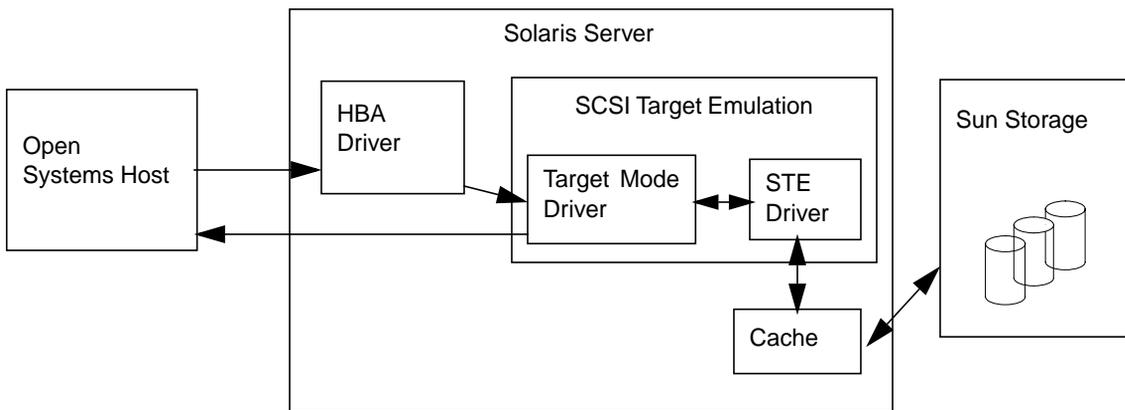


FIGURE 1 STE Model

The steps involved in processing SCSI requests are described in more detail below:

1. An open systems host (“initiator”) sends a SCSI request.
2. The Fibre Channel HBA driver on the target system fields the target interrupt and passes the request to the target mode driver.
3. The target mode driver decodes the request and sends it to the SCSI Target Emulation command processor.
4. STE processes the SCSI command; if the command is a Read or Write, STE calls the cache.
5. If necessary, the cache issues I/O to/from the back-end device.
6. STE returns the request to the target mode driver.
7. The target mode driver returns the status and data (if any) to the initiator.

Qualified Platforms

The STE product must be installed on one of the following (target) configurations:

Target Server	Operating Environment	Fibre Channel Host Adapter
Sun Enterprise™ 250 or 450	Solaris 2.6 or Solaris 7, or a subsequent compatible version	Qlogic 2100
Sun Enterprise 4500	Solaris 2.6 or Solaris 7, or a subsequent compatible version	SOC+

The open systems host (initiator) can be any of the following:

Qualified Initiators	Fibre Channel Host Adapter
Sun Enterprise 250 or 450	Qlogic 2100
Sun Enterprise 3000-10000	SOC+
NT-based hosts	Qlogic 2100

Installing STE

Installing STE on the target system consists of two processes:

- Installing the Fibre Channel Host Adapter — page 6
- Installing the STE Software Packages — page 7

Note – Before you install the STE software packages, make sure you have installed the prerequisite Fibre Channel Host Adapter software packages and Solaris operating environment patches described in “Required Software Packages and Patches” below.

Installing the Fibre Channel Host Adapter

For information on installing the Fibre Channel Host Adapter, refer to the *Sun StorEdge PCI FC-100 Host Adapter Installation Manual* or the *Sun StorEdge SBus FC-100 Host Adapter Installation and Service Manual*.

Note – Make a note of the slot in which you install the HBA; you will use it in “Configuring STE on the Target Server” on page 8.

Required Software Packages and Patches

Before installing the STE software packages, the following software packages and patches must be installed. For information on how to obtain the packages and patches, contact your Sun support service provider.

1. Install the software packages listed in TABLE 1.
2. Install the patches listed in TABLE 2.

TABLE 1 Required Software Packages

For Solaris 2.6	For Solaris 7
Sun StorEdge PCI FC-100 software packages, PCI systems only	none

TABLE 2 Minimum Required Patches

	For Solaris 2.6	For Solaris 7
PCI Systems Only	Patch-ID# 107280-03	Patch-ID# 107292-02
SBus Systems Only	Patch-ID# 105375-15	Patch-ID# 107469-02

Installing the STE Software Packages

Note – Before installing STE from the CD-ROM, read the `pkgadd(1M)` man page.

1. Become superuser (root) on your target system.
2. Insert the Data Services CD into the CD-ROM drive connected to your system.
 - If the CD is mounted automatically, proceed to Step 3.
 - If the CD is not mounted automatically, type:

```
# mount -F hsfs -o ro /dev/dsk/c0t6d0s0 /cdrom
```

3. Install STE.

- a. Start the Data Services package installation. You must install the packages in this order:
 - SUNWspuni – uniform status reporting driver
 - SUNWscm – the cache
 - SUNWte – the STE command processor
 - One or more of the following target mode HBA drivers:
 - SUNWifptm – QLogic ISP 2100 for PCI bus
 - SUNWsftm – Sun SOC+ for SBus

```
# pkgadd -d /cdrom/cdrom0/Product/Solaris_version SUNWspuni SUNWscm SUNWte tm_driver
```

where:

Solaris_version is `Solaris_2.6` or `Solaris_7`.

tm_driver is `SUNWifptm` (for the QLogic 2100 Fibre Channel Host Adapter) or `SUNWsftm` (for the SOC+ Fibre Channel Host Adapter).

- b. The packages begin to install. Reply yes to all prompts by typing **y**.
4. Remove the Data Services CD from the CD-ROM drive:

```
# eject cdrom
```

5. Update your **PATH** environment variable to include `/usr/opt/SUNWesm/sbin`.
6. Read the man pages.

The STE man pages provide syntax and configuration information for STE-related commands.

To read the STE man pages, make sure the `MANPATH` path on your target system includes the following:

- `/usr/opt/SUNWesm/man`

Configuring STE on the Target Server

Before you can use STE, you must add information about Target Mode Fibre Channel Ports, Virtual Disks, and any Phantom Partitions to the STE configuration file (see `ste.cf(4)`). Additionally, if you will be using STE with SOC+ cards, you must inform the `socal(7D)` driver about the Target Mode Ports by creating a `socal.conf` file.

Note – The default STE configuration file is `/etc/opt/SUNWte/ste.cf`; initially, it is identical to the sample STE configuration file delivered with STE and installed in `/usr/opt/SUNWesm/SUNWte/etc/ste.cf.sample`.

1. Use the `steconf(1M)` utility to determine the Driver and Device Name values required for STE configuration, based on the physical location (board and slot) of the Target Mode Fibre Channel Port from “Installing the Fibre Channel Host Adapter” on page 6. For examples, see “Sample `steconf` Output” on page 10.
2. Use a text editor to add the Target Mode Fibre Channel Ports, Virtual Disks, and any Phantom Partitions to the STE configuration file (`/etc/opt/SUNWte/ste.cf`). For a description of all parameters, see “`ste.cf` File Parameters” on page 11; for examples, see “Sample `ste.cf` Files” on page 13.

- 3. If you are using SOC+ cards, use a text editor to create or modify the file `/kernel/drv/socal.conf`. There must be one entry in the `/kernel/drv/socal.conf` file for each SOC+ card that you are using in Target Mode.**

For a description of all properties, see “`socal.conf` File Properties” on page 15; for examples, see “Sample `socal.conf` Files” on page 16.

- 4. Reboot your target server.**

Sample steconf Output

In the example below, `steconf` has detected a disk or tape on the Fibre Channel loop associated with slot 3; this loop should not be used in Target Mode. “Offline” indicates that Slot 0’s Fibre Channel loop is down.

# steconf				
<u>Brd</u>	<u>Slot</u>	<u>Driver</u>	<u>Device Name</u>	
SYS	3	ifptm	/devices/pci@1f,2000/scsi@2:devctl	(Initiator)
SYS	2	ifptm	/devices/pci@1f,4000/SUNW,ifp@4:devctl	
SYS	1	ifptm	/devices/pci@1f,4000/SUNW,ifp@5:devctl	
SYS	0	ifptm	/devices/pci@1f,2000/scsi@1:devctl	(Offline)

In the example below, `steconf` has detected a disk or tape on the Fibre Channel loop associated with port 1 (2nd port) of the SOC+ card in slot 2 of board 1; this loop should not be used in Target Mode. “Offline” indicates that those Fibre Channel loops are down.

# steconf				
<u>Brd</u>	<u>Slot</u>	<u>Driver</u>	<u>Device Name</u>	
1	0	sftm	/devices/sbus@3,0/SUNW,socal@0,0:1	(Offline)
		sftm	/devices/sbus@3,0/SUNW,socal@0,0:0	(Offline)
1	1	sftm	/devices/sbus@2,0/SUNW,socal@1,0:0	(Initiator)
		sftm	/devices/sbus@2,0/SUNW,socal@1,0:1	(Offline)
1	2	sftm	/devices/sbus@2,0/SUNW,socal@2,0:0	
		sftm	/devices/sbus@2,0/SUNW,socal@2,0:1	
1	13	sftm	/devices/sbus@2,0/SUNW,socal@d,10000:1	(Offline)
		sftm	/devices/sbus@2,0/SUNW,socal@d,10000:0	(Offline)
5	1	sftm	/devices/sbus@a,0/SUNW,socal@1,0:0	
		sftm	/devices/sbus@a,0/SUNW,socal@1,0:1	
5	13	sftm	/devices/sbus@a,0/SUNW,socal@d,10000:1	(Offline)
		sftm	/devices/sbus@a,0/SUNW,socal@d,10000:0	(Offline)

ste.cf File Parameters

This file includes three sections: one for configuring the Target Mode Fibre Channel Ports, one for configuring the Virtual Disks, and one for configuring Phantom Partitions (if needed).

- Port Configuration – The Target Mode Fibre Channel Port section contains one line per Target Mode Fibre Channel Port; each line consists of these 4 parameters:

Parameter	Description
Port Name	Consists of the keyword “tm” followed by a unique decimal number to define which port is being configured.
Driver	Is the name of the target mode driver used to control the Fibre Channel hardware.
Device Name	Is the path to the Target Mode Fibre Channel Port in the /devices tree.
Loop ID	Determines the Loop_ID that the Target Mode Fibre Channel Port will present on the Fibre Channel loop.

- Virtual Disk Configuration – The Virtual Disk section contains one line per Virtual Disk; each line consists of these 6 parameters, the last of which is optional:

Parameter	Description
Vdisk Name	Consists of the keyword “vdisk” followed by a unique decimal number to define which vdisk is being configured.
Partition Name	Is the path to the storage cache device (raw disk partition) that will be presented on the Target Mode Fibre Channel Port.
Port Name	Identifies the Target Mode Fibre Channel Port for this Virtual Disk. The Port Name must match one of the entries in the Port Configuration section of the ste.cf file.
SCSI LUN	Is the logical unit number to be presented on the Target Mode Fibre Channel Port. STE supports a maximum of 16 LUNs per port. Each port must have a LUN 0.
State	Allows the user to specify “online” or “offline” for Virtual Disks. If a Virtual Disk’s state is “offline”, it will be offline when STE starts and will only be enabled when the user issues an <code>steadm -e</code> command referencing that specific Virtual Disk as an argument.
Options	Allows the user to specify additional configuration options for the Virtual Disk. Available options are: <i>ph=phantomdevice</i> and/or <i>pt=phantomdevice</i> Phantom header and/or phantom tail. <i>phantomdevice</i> must match one of the Device Name entries in the Phantom Partition Configuration section of the ste.cf file. <i>qd=N</i> Queue Depth of SCSI commands from initiator to this Virtual Disk. If more than the specified number of commands become active concurrently, the extra commands are rejected and returned to the initiator with a status of “QUEUE FULL”. Valid values are 0 to 64, where 0 means accept all commands (that is, never reject a command unless memory cannot be allocated for it); the default value is 0. <i>ro</i> Read Only. The initiator cannot write to the virtual disk.

- Phantom Partition Configuration – Certain open systems initiators set aside space at the beginning and/or end of each disk for header information; the required size and location (at the beginning or end of the disk) are system-specific. To prevent these initiators from writing their header information over the contents of a shared device, you can prepend a phantom header and/or append a phantom tail to the initiator’s view of the contents of the disk and store the initiator’s header information there. If your initiator requires phantom headers and/or tail, you must complete this section of the STE configuration file.

The phantom headers and tails physically reside on a separate phantom partition but appear to the initiator to be part of the shared virtual disk. To protect against data loss, the phantom partition should be a mirrored or RAID 5 partition.

The Phantom Partition section of the STE configuration file contains one line per Phantom Header or Tail; each line consists of these 4 parameters:

Parameter	Description
Device Name	Consists of the keyword “dev” followed by a unique decimal number to define which phantom device is being configured.
Partition Name	Is the partition on which the phantom devices reside.
Start Block	Is the location of the start of the phantom device on the partition.
Size	Is the size (in blocks) of the phantom device.

Sample ste.cf Files

This example shows a simple STE configuration file for a target system with a QLogic ISP2100 card. The configuration consists of three Virtual Disks configured on a single Target Mode Fibre Channel Port:

```
# Target Mode Fibre Channel Ports
tm0  ifptm  /devices/pci@1f,4000/SUNW,ifp@4:devctl  7
#
# Virtual Disks
vdisk0 /dev/rdisk/c2t16d0s1  tm0    0    online
vdisk1 /dev/rdisk/c2t17d0s1  tm0    1    online
vdisk2 /dev/rdisk/c2t18d0s1  tm0    2    online
```

Similarly, this example shows a simple STE configuration file for a target system with a Sun SOC+ card. Again, the configuration consists of three Virtual Disks configured on a single Target Mode Fibre Channel Port:

```
# Target Mode Fibre Channel Ports
tm0  sftm   /devices/sbus@2,0/SUNW,socal@2,0:0  7
#
# Virtual Disks
vdisk0 /dev/rdisk/c2t16d0s1  tm0    0    online
vdisk1 /dev/rdisk/c2t17d0s1  tm0    1    online
vdisk2 /dev/rdisk/c2t18d0s1  tm0    2    online
```

In this next example, we've added two additional ports: tm1 (with three Virtual Disks) and tm2 (with 1 Virtual Disk). Note that each Target Mode Fibre Channel Port *must* have a LUN 0.

Here, vdisk1 and vdisk5 present the same partition; to ensure that operations from the two Virtual Disks cannot overwrite each other, vdisk5 is configured with the ro (Read Only) option.

```
# Target Mode Fibre Channel Ports
tm0    ifptm    /devices/pci@1f,4000/SUNW,ifp@4:devctl    7
tm1    ifptm    /devices/pci@1f,4000/SUNW,ifp@5:devctl    6
tm2    ifptm    /devices/pci@1f,2000/scsi@1:devctl    7
#
# Virtual Disks
vdisk0 /dev/rdisk/c2t16d0s1 tm0    0    online
vdisk1 /dev/rdisk/c2t17d0s1 tm0    1    online
vdisk2 /dev/rdisk/c2t18d0s1 tm0    2    online
vdisk4 /dev/rdisk/c2t20d0s1 tm1    0    online
vdisk5 /dev/rdisk/c2t17d0s1 tm1    1    online  ro
vdisk6 /dev/rdisk/c2t21d0s1 tm1    2    online
vdisk7 /dev/rdisk/c2t22d0s6 tm2    0    offline  qd=16
```

In the final example, we've added vdisk3 on tm0. This Virtual Disk requires a phantom header and a phantom tail, so we've also added Phantom Partition Configuration information:

```
# Target Mode Fibre Channel Ports
tm0    ifptm    /devices/pci@1f,4000/SUNW,ifp@4:devctl    7
tm1    ifptm    /devices/pci@1f,4000/SUNW,ifp@5:devctl    6
tm2    ifptm    /devices/pci@1f,2000/scsi@1:devctl    7
#
# Virtual Disks
vdisk0 /dev/rdisk/c2t16d0s1 tm0    0    online
vdisk1 /dev/rdisk/c2t17d0s1 tm0    1    online
vdisk2 /dev/rdisk/c2t18d0s1 tm0    2    online
vdisk3 /dev/rdisk/c2t18d0s6 tm0    3    online  ph=dev0 pt=dev1
vdisk4 /dev/rdisk/c2t20d0s1 tm1    0    online
vdisk5 /dev/rdisk/c2t17d0s1 tm1    1    online  ro
vdisk6 /dev/rdisk/c2t21d0s1 tm1    2    online
vdisk7 /dev/rdisk/c2t22d0s6 tm2    0    offline  qd=16

# Phantom Headers and Tails
dev0    /dev/rdisk/c0t1d0s5    0    16
dev1    /dev/rdisk/c0t1d0s5    16   16
```

socal.conf File Properties

The entries in this file conform to the standard `driver.conf(4)` and `sbus(4)` configuration file formats, as explained below:

Property	Description
<code>name</code>	Is the name of the SOC+ HBA. It should be set to <code>name="SUNW,socal"</code> .
<code>parent</code>	Is the full pathname of the parent bus. It should be set to <code>"/sbus@X,0"</code> , where <code>X</code> matches the SBus name for the SOC+ card as displayed by <code>steconf(1M)</code> .
<code>reg</code>	Is an arbitrary length array in which each element consists of a 3-tuple of integers describing the mappable resources on the SBus. It should be set to: <code>0xZ, 0x0, 0x10000, 0xZ, 0x10000, 0x10000, 0xZ, 0x20000, 0x18</code> , where <code>Z</code> matches the slot number for the SOC+ card as displayed by <code>steconf(1M)</code> .
<code>port0-loop-id</code>	Is the <code>Loop_ID</code> to be used by port 0 in Target Mode. It should be set to match the Loop ID value in the <code>ste.cf</code> file. Note that once you set this property, you can only use the port in Target Mode (that is, not as a SCSI Initiator).
<code>port1-loop-id</code>	Is the <code>Loop_ID</code> to be used by port 1 in Target Mode. See description for <code>port0-loop-id</code> , above.

Sample social.conf Files

The steconf output shown on page 10 indicates that the following four SOC+ ports are online and available for use in Target Mode:

Brd	Slot	Driver	Device Name
1	2	sftm	/devices/sbus@2,0/SUNW,socal@2,0:0
		sftm	/devices/sbus@2,0/SUNW,socal@2,0:1
5	1	sftm	/devices/sbus@a,0/SUNW,socal@1,0:0
		sftm	/devices/sbus@a,0/SUNW,socal@1,0:1

Assume that these ports are defined in the /etc/opt/SUNWte/ste.cf file as follows:

# Target Mode Fibre Channel Ports			
tm0	sftm	/devices/sbus@2,0/SUNW,socal@2,0:0	7
tm1	sftm	/devices/sbus@2,0/SUNW,socal@2,0:1	4
tm2	sftm	/devices/sbus@a,0/SUNW,socal@1,0:0	0
tm3	sftm	/devices/sbus@a,0/SUNW,socal@1,0:1	2

The corresponding entries in the /kernel/drv/social.conf file would then be:

name="SUNW,socal" parent="/sbus@2,0"
reg=0x2, 0x0, 0x10000, 0x2, 0x10000, 0x10000, 0x2, 0x20000, 0x18
port0-loop-id=7 port1-loop-id=4;
name="SUNW,socal" parent="/sbus@a,0"
reg=0x1, 0x0, 0x10000, 0x1, 0x10000, 0x10000, 0x1, 0x20000, 0x18
port0-loop-id=0 port1-loop-id=2;

By these entries, ports 0 and 1 of the SOC+ device at sbus@2,0/SUNW,socal@2,0 (board 1, slot 2) are reserved for Target Mode and are represented in the ste.cf file by tm0 and tm1, respectively. Similarly, ports 0 and 1 of the SOC+ device at sbus@a,0/SUNW,socal@1,0 (board 5, slot 1) are reserved for Target Mode and are represented in the ste.cf file by tm2 and tm3, respectively.

Disabling, Reconfiguring, and Enabling STE

Normally, STE is enabled at system startup, due to the initialization scripts that are created when STE is installed. If you later need to stop STE or change its configuration, you may do so manually with the `steadm(1M)` utility; refer to the man page for more information.

Disabling STE

- To disable STE entirely, issue the following command:

```
# steadm -d
```

- To disable only a specific Target Mode Fibre Channel Port or Virtual Disk, specify the Port Name or Vdisk Name as an argument. For example:

```
# steadm -d vdisk6
```

Note – Each port must have a LUN 0; therefore, you cannot disable a virtual disk that is being presented on LUN 0. If the virtual disk on LUN 0 is the only virtual disk on the port, you must use `steadm -d portname` to disable it.

Reconfiguring STE

Note – To reconfigure an existing Target Mode Fibre Channel Port or Virtual Disk, you must disable and then reenble it.

1. **Disable any existing Target Mode Fibre Channel Port(s) and/or Virtual Disk(s) that you want to reconfigure.**
2. **Using a text editor, modify the STE configuration file `/etc/opt/SUNWte/ste.cf` as desired.**
3. **Enable the new or modified Target Mode Fibre Channel Port(s) and/or Virtual Disk(s).**

Enabling STE

- To enable STE, use the following command:

```
# steadm -e
```

- To enable a disabled Target Mode Fibre Channel Port or Virtual Disk, specify the Port Name or Vdisk Name as an argument. For example:

```
# steadm -e tm0
```

Configuring the STE Virtual Disks on the Initiator

On a Solaris-based Initiator

Note – On the initiator system, make sure you have installed the prerequisite Fibre Channel Host Adapter software packages and Solaris operating environment patches described in “Required Software Packages and Patches” on page 6.

1. Add the STE virtual disks to `/devices`.

```
# drvconfig
```

2. Create `/dev` entries for the STE virtual disks.

```
# disks
```

3. Format, label, and partition the virtual disks.

```
# format disk_list
```

On an NT-based Initiator

1. **If you need to install the host bus adapter or QLogic NT driver, refer to the following:**
 - The QLogic web site at <http://www.qlogic.com>.
 - QLogic's *Hardware Installation Guide for the QLA2000/2000F/2100/2100F/2200/2200F*.
 - QLogic's *Software Installation Guide for the QLA2xxx*.

2. **Reboot the initiator.**

3. **Verify that your NT initiator can see the STE virtual disks.**

- a. **From the Windows Start menu, select Settings → Control Panel → SCSI Adapters.**
- b. **Click on the entry for the QLogic QLA2100 host bus adapter and then click on the (+) to the left of the Bus number to see the LUNs found.**

4. **Once the disks are recognized, use the Windows NT Disk Administrator to configure the logical disks as desired.**

For help with this task, refer to your documentation about Windows NT disk administration (for example, the *Microsoft Windows NT Technical Support* manual).

Note – You can configure multiple NT “drives” from a single STE LUN.

5. **Look in Windows Explorer to see the new disks.**

Removing STE

To remove STE from your target system, use the `pkgrm(1M)` utility.

1. **Become superuser (root).**
2. **Remove the STE and related packages:**

```
# pkgrm tm_driver SUNWte SUNWscm SUNWspuni
```

where:

`tm_driver` is `SUNWifptm` (for the QLogic 2100 Fibre Channel Host Adapter) or `SUNWsfm` (for the SOC+ Fibre Channel Host Adapter).

3. **If you will not be upgrading or reinstalling STE, cleanup residual files.**

`pkgrm(1M)` does *not* remove the STE configuration file or any trace files generated by STE; if you will not be upgrading or reinstalling STE, you may want to manually remove the `/etc/opt/SUNWte` and `/var/opt/SUNWte` directories and any files that they contain. If you were using SOC+ cards in Target Mode, you may also want to manually remove the Target Mode entries from the `/kernel/drv/socal.conf` file.

Upgrading or Reinstalling STE

1. **Remove the existing version of STE from your target system, as described in “Removing STE” on page 20.**

Multiple instances of the STE packages cannot coexist on a target system.

2. **Follow the procedures in “Installing STE” on page 6.**
3. **If you are upgrading from a previous version of STE, merge any configuration file changes into your existing STE configuration file.**

`pkgadd(1M)` does *not* overwrite an existing `/etc/opt/SUNWte/ste.cf` file; therefore, you should examine the new sample configuration file that was installed as part of the upgrade (`/usr/opt/SUNWesm/SUNWte/etc/ste.cf.sample`) and merge any changes into your existing STE configuration file.

Product Considerations

SOC+ Fibre Channel Host Adapter

The SOC+ Fibre Channel Host Adapter cannot be used in “dual mode.” That is, you cannot configure one port for Target Mode and use the other port of the same SOC+ card for an initiator.

Partition Usage

- The Solaris operating system sets aside space at the beginning of each disk for header information; STE will not allow you to write to the section of a partition that contains the Solaris header.
- When configuring the Fibre Channel Ports, each must have a LUN 0.
- STE does not support presenting the same back-end partition on multiple LUNs on the same Fibre Channel Port; however, you may elect to present the same partition on multiple ports, as shown below.

```
# Virtual Disks
vdisk1 /dev/rdisk/c2t17d0s1 tm0 1 online
vdisk5 /dev/rdisk/c2t17d0s1 tm1 1 online ro
```

Note – If you do not specify the `ro` option for at least one of the virtual disks, the initiator is responsible for ensuring that operations don’t overwrite each other.

STE and Sun StorEdge Instant Image

STE can not use the same back-end partition as SV; therefore, you must disable Instant Image for the desired partition before you can use it as an STE vdisk.

Open Issues

4216804, 4216809 - STE and Veritas Volume Manager

Veritas Dynamic Multipathing (DMP) does not support STE disks. In order to manage STE disks using Veritas Volume Manager on the initiator, you must disable the Veritas DMP:

1. **Unmount all file systems created on Volume Manager volumes.**

```
# umount
```

2. **Stop the Volume Manager.**

```
# vxdctl stop
```

3. **Remove the vxdmp driver from the /kernel/drv directory.**

```
# rm /kernel/drv/vxdmp
```

4. **Edit the /etc/system file and remove the following line:**

```
forceload: drv/vxdmp
```

5. **Remove the Volume Manager DMP files.**

```
# rm -rf /dev/vx/dmp /dev/vx/rdmp
```

6. **Symbolically link /dev/vx/dmp to /dev/dsk.**

```
# ln -s /dev/dsk /dev/vx/dmp
```

7. Symbolically link /dev/vx/rdmp to /dev/rdsk.

```
# ln -s /dev/rdsk /dev/vx/rdmp
```

8. Reboot the system to disable the DMP functionality.

```
# /usr/sbin/shutdown -i6
```

