



Sun StorageTek™ Availability Suite 4.0 Software Troubleshooting Guide

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Preface

The *Sun StorageTek Availability Suite Software Troubleshooting Guide* helps users solve common problems that might arise when using the Sun StorageTek™ Availability Suite software.

Before You Read This Book

To use the information in this document, you must have thorough knowledge of the topics discussed in these books:

- *Sun StorageTek Availability Suite 4.0 Point-in-Time Copy Software Administration Guide*
- *Sun StorageTek Availability Suite 4.0 Remote Mirror Software Administration Guide*

How This Book Is Organized

This book includes the following chapters:

[Chapter 1](#) discusses general installation and configuration issues.

[Chapter 2](#) discusses software utilities.

[Chapter 3](#) discusses troubleshooting issues with the Point-in-Time Copy software.

[Chapter 4](#) discusses troubleshooting issues with the Remote Mirror software.

[Chapter 5](#) discusses Point-in-Time Copy and Remote Mirror interoperability.

[Chapter 6](#) discusses SunCluster troubleshooting issues.

[Chapter 7](#) provides an alphabetical list of error messages from all sources associated with the Sun StorageTek Availability Suite software.

Appendix A provides information on safeguarding the Solaris VTOC (Volume Table of Contents).

Using UNIX Commands

This document might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at

<http://docs.sun.com>

Shell Prompts

Shell	Prompt
C shell	<i>machine-name%</i>
C shell superuser	<i>machine-name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

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. <code>% You have mail.</code>
AaBbCc123	What you type, when contrasted with on-screen computer output	<code>% su</code> Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	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. To delete a file, type <code>rm filename</code> .

* The settings on your browser might differ from these settings.

Related Documentation

Application	Title	Part Number
Man pages	sndradm iiadm dsstat kstat svadm	N/A
Latest release information	<i>Sun StorageTek Availability Suite 4.0 Software Release Notes</i>	819-6152
Installation and Configuration	<i>Sun StorageTek Availability Suite 4.0 Software Installation and Configuration Guide</i>	819-6147
System administration	<i>Sun StorageTek Availability Suite 4.0 Remote Mirror Software Administration Guide</i>	819-6148
	<i>Sun StorageTek Availability Suite 4.0 Point-in-Time Copy Software Administration Guide</i>	819-6149
Cluster	<i>Sun Cluster and Sun StorageTek Availability Suite 4.0 Software Integration Guide</i>	819-6150
Installation and user	<i>SunATM 3.0 Installation and User's Guide</i>	805-0331
	<i>SunATM 4.0 Installation and User's Guide</i>	805-6552
	<i>Sun Gigabit Ethernet FC-AL/P Combination Adapter Installation Guide</i>	806-2385
	<i>Sun Gigabit Ethernet/S 2.0 Adapter Installation and User's Guide</i>	805-2784
	<i>Sun Gigabit Ethernet/P 2.0 Adapter Installation and User's Guide</i>	805-2785
	<i>Sun Enterprise 10000 IDN User Guide</i>	806-4131
Configuration	<i>Sun Enterprise 10000 IDN Configuration Guide</i>	806-5230

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Sun StorageTek Availability Suite Troubleshooting Guide, part number 819-6151-10

General Installation and Configuration

This chapter discusses general installation and configuration troubleshooting issues for the Sun StorageTek Availability Suite software.

The following topics are included:

- [“Software Installation Status” on page 1](#)
- [“State of Services” on page 2](#)
- [“State of Daemons” on page 7](#)
- [“System Start-up” on page 8](#)
- [“Configuration Files” on page 9](#)
- [“Log Files” on page 10](#)

Software Installation Status

During installation, three types of package are installed: CORE, Remote Mirror, and Point-in-Time Copy. At any time, you can verify that the necessary packages have been installed and are running.

The installation process installs the following CORE packages:

- SUNWscmr Sun – StorageTek Availability Suite Cache Management (root)
- SUNWscmu Sun – StorageTek Availability Suite Cache Management (usr)
- SUNWspsvr Sun – StorageTek Availability Suite Volume Driver (root)
- SUNWspsvu Sun – StorageTek Availability Suite Volume Driver (usr)

The installation process installs the following Remote Mirror packages:

- SUNWrdcr – Sun StorageTek Availability Suite Remote Mirror software (root)

- SUNWrdcu – Sun StorageTek Availability Suite Remote Mirror software (usr)

The installation process installs the following Point-In-Time Copy packages:

- SUNWiir – Sun StorageTek Availability Suite Point-In-Time Copy software (root)
- SUNWiiu – Sun StorageTek Availability Suite Point-In-Time Copy software (usr)

The following commands will check and display the installation status of the Availability Suite product set.

```
# pkgchk SUNWscmr SUNWscmu SUNWspsvr SUNWspsvu SUNWrdr SUNWrdcu \
SUNWiir SUNWiiu
```

Alternatively, you may check each individual package name one at a time.

```
# pkginfo -l SUNWscmr SUNWscmu SUNWspsvr SUNWspsvu SUNWrdr \
SUNWrdcu SUNWiir SUNWiiu
```

State of Services

The Solaris Service Management Facility, *smf(5)*, provides the system support to start and stop the Availability Suite services. The following five services are added to the *smf* during the installation of the Availability Suite packages. Any service in the following list depends on the service or services above it in the list.

- `svc:/system/nws_scm:default` – Network Storage Core Init service
- `svc:/system/nws_sv:default` – Network Storage Storage Volume Init service
- `svc:/system/nws_ii:default` – Network Storage Instant Image Init service
- `svc:/system/nws_rdc:default` – Network Storage Remote Data Replication Init service
- `svc:/system/nws_rdcsyncd:default` – Network Storage Remote Data Replication Syncd service

Checking Status

To verify the status of Availability Suite services, run `dscfgadm -i`.

Verifying Service Status

When all services are running, you should see the following output:

```
# dscfgadm -i
SERVICE          STATE             ENABLED
nws_scm           online           true
nws_sv            online           true
nws_ii            online           true
nws_rdc           online           true
nws_rdcsyncd     online           true

Availability Suite Configuration:
Local configuration database: valid
```

If the services have never been started, or if they have been disabled by the administrator, `dscfgadm -i` should give the following output:

```
# dscfgadm -i
SERVICE          STATE             ENABLED
nws_scm           disabled         false
nws_sv            disabled         false
nws_ii            disabled         false
nws_rdc           disabled         false
nws_rdcsyncd     disabled         false

Availability Suite Configuration:
Local configuration database: valid
```

The following commands show the services upon which each Availability Suite service depends.

It is worth noting that the `nws_scm` service, upon which all other Availability Suite services depend, cannot start up until the Solaris milestones of `milestone/devices` and `milestone/single-user` have been reached.

Displaying Service Dependencies

The `nws_sv` dependency is correctly listed twice, since it is a dependency for both `nws_ii` and `nws_rdc`.

```
# svcs -d -o FMRI nws_scm
FMRI
svc:/milestone/devices:default
svc:/milestone/single-user:default
```

```
# svcs -d -o FMRI nws_sv
FMRI
svc:/system/nws_scm:default
```

```
# svcs -d -o FMRI nws_ii
FMRI
svc:/system/nws_sv:default
```

```
# svcs -d -o FMRI nws_rdc
FMRI
svc:/system/nws_sv:default
svc:/system/nws_ii:default
```

```
# svcs -d -o FMRI nws_rdcsyncd
FMRI
svc:/system/nws_rdc:default
svc:/milestone/multi-user:default
```

The following commands show the services which depend upon each Availability Suite service.

```
# svcs -D -o FMRI nws_scm
FMRI
svc:/system/nws_sv:default
svc:/system/filesystem/local:default
```

```
# svcs -D -o FMRI nws_sv
FMRI
svc:/system/nws_ii:default
svc:/system/nws_rdc:default
svc:/system/filesystem/local:default
```

```
# svcs -D -o FMRI nws_ii
FMRI
svc:/system/nws_rdc:default
svc:/system/filesystem/local:default
```

```
# svcs -D -o FMRI nws_rdc
FMRI
svc:/system/nws_rdcsyncd:default
svc:/system/filesystem/local:default
```

Displaying File System Dependencies

If the Availability Suite services are enabled, the Solaris service `filesystem/local` is dependent on all of the Availability Suite services. This dependency is required since any local file system (but not the `root (/)` file system) can be configured as a Point-in-Time Copy, Remote Mirror, or both. If the Availability Suite services are enabled (`dscfgadm -e`), the `filesystem/local` dependency is set to the type `require_all`. If the services are disabled (`dscfgadm -d`), the `filesystem/local` dependency is set to the type `optional_all`.

`dscfgadm -i` displays the following if the `filesystem/local` dependency is not correctly configured:

```
# dscfgadm -i
SERVICE          STATE             ENABLED
nws_scm***        online            true
nws_sv***         online            true
nws_ii***         online            true
nws_rdc           disabled          false
nws_rdcsyncd     disabled          false

Availability Suite Configuration:
Local configuration database: valid

*** Warning: The services above have an incorrect dependency. To
repair the problem, run "dscfgadm".
```

Running `dscfgadm` with no arguments will correct the dependency type:

```
# dscfgadm
Local configuration database is already initialized.
Warning: Fixing dependency for nws_scm.
Warning: Fixing dependency for nws_sv.
Warning: Fixing dependency for nws_ii.

The following Availability Suite services are enabled:
nws_scm nws_sv nws_ii
```

Starting and Stopping Services

The starting and stopping of Availability Suite services must be done using the `dscfgadm -e` (enable) and `-d` (disable) commands. See `dscfgadm(1M)` for more information. The use of `svcadm` to enable or disable Availability Suite services is not supported, since the service dependencies on `svc:/system/filesystem/local` will not be properly configured. See [“Checking Status” on page 3](#) for more information.

If you are in this situation, run `dscfgadm` with no arguments to allow it to correct the dependency types between Availability Suite services and `svc:/system/filesystem/local`.

Maintenance State

If checking the status of a service shows that a service is in the maintenance state, try the following:

1. Run `svcadm(1M)` to clear a service from the maintenance state.
2. If the service is still in the maintenance state, check the state of the local configuration database using `dscfadm -i`. If the state is not valid, run `dscfadm` with no arguments to reinitialize the configuration database. Try clearing the service, using the method detailed in step 1 above.
3. Check the logs for information that may indicate the source of the problem. See [“Log Files” on page 10](#) for more information about the logs.

Offline State

If checking the state of the services using `dscfadm -i` shows that a service is in the `offline` state, it is likely that a dependency has not been satisfied. You can try the following:

1. Use `svcs(1)` to check the status of a service's dependent services.
2. Refer to the logs for information, which may point to the cause of the problem.
Be sure to notice any errors originating from both the offline service and its dependent services. See [“Log Files” on page 10](#) for more information regarding the logs.

State of Daemons

This section provides information on starting, stopping, and checking the status of daemons.

Checking Daemon Status

Enabled Availability Suite services make use of several daemons. To verify that the daemons are running when the services are enabled, you may issue the following commands.

For the `nws_scm` service:

```
# ps -ef | grep nskernd
  root 14245      1   0 13:16:53 ?                0:02 /usr/lib/nskernd
# ps -ef | grep dscfglockd
  root 14222      1   0 13:16:51 ?                0:01 /usr/lib/dscfglockd
-f /etc/dscfg_lockdb
```

For Remote Mirror:

```
# ps -ef | grep sndr
  root 14330      1   0 13:17:02 ?                0:00 /usr/lib/sndrsyncd
  root 14322      1   0 13:17:02 ?                0:00 /usr/lib/sndrd
```

Starting and Stopping Daemons

Do not start or stop daemons manually. Enabling and disabling the services using `dscfgadm` will start and stop the daemons. See [“Starting and Stopping Services” on page 6](#) for more information.

Note – The `sndrd` and `sndrsyncd` daemons are started in the `nws_rdcsyncd` service, but are stopped in the `nws_rdc` service.

System Start-up

If the Availability Suite services are enabled but fail to come online during a reboot, the system boot will drop you into a minimal shell environment to rectify the problem before it continues booting up the system.

If this situation occurs, try the following steps:

1. Run `dscfgadm -i` to see the state of the services.
2. If a service is in maintenance mode, follow the steps detailed in [“Maintenance State” on page 7](#).
3. If a service is in offline mode, follow the steps detailed in [“Offline State” on page 7](#).

If these steps fail to rectify the problem, refer to the section on SMF (Solaris Service Management Facility) services in the *“System Administration Guide: Basic Administration”* from the Solaris 10 System Administrator Collection for more information regarding troubleshooting a failed boot.

Configuration Files

This section provides information on configuration files and the Sun™ Cluster configuration database.

`/etc/dscfg_local`

The `/etc/dscfg_local` file contains all the configuration information for volumes under Availability Suite control that are not highly-available as part of a Sun Cluster.

To check status of the local configuration database, run `dscfgadm -i`. Ensure that the status of the local configuration database is `valid`. If it is not `valid`, and you have backed up the local configuration database, you may choose to restore it using the steps in [“Non-Cluster Environments” on page 15](#). If you do not have a back up, run `dscfgadm` with no arguments to reinitialize the local `dscfg`.

`/etc/dscfg_cluster`

The `/etc/dscfg_cluster` file contains the Sun Cluster device ID (DID) device specification of a partition (slice) which is 5.5MB in size or larger. This full specified DID device specification (for example, `/dev/did/rdisk/d11s7`) must be identical on all Sun Cluster nodes supporting the Availability Suite services.

Cluster Configuration Database

The Sun Cluster-specific Availability Suite configuration file contains all the configuration information for volumes under Availability Suite control that are highly available as part of a Sun Cluster.

To check status of the cluster configuration database, run `dscfgadm -i` on all nodes of the Sun Cluster. Ensure that the status of the cluster configuration database is `valid`, and that the same database is used on all nodes of the Sun Cluster. If not, run `dscfgadm -s` on all nodes of the Sun Cluster to set and initialize the Sun

Cluster configuration. If you have backed up the cluster configuration database, you may choose to restore that backup. See [“Cluster Environments” on page 15](#) for more information.

`/etc/nsswitch.conf`

If entries in the `/etc/nsswitch.conf` are not configured correctly, you might encounter the following problems:

- If the `hosts:` entry is incorrect, volume sets might not resume after a reboot.
- If the `services:` entry is incorrect, the `rdc` service might not activate and no data is replicated.

Note – The services port number must be the same between all interconnected remote mirror host systems.

When the `hosts:` and `services:` entries are included in the `/etc/nsswitch.conf` file, ensure that `files` is placed before `nis`, `nisplus`, `ldap`, `dns`, or any other service the machine is using. For example, for systems using the network information system (NIS) naming service, the file must include:

```
hosts: files nis
services: files nis
```

If you need to edit the `/etc/nsswitch.conf(4)` file, use a text editor.

Log Files

`/var/adm/ds.log`

The `/var/adm/ds.log` file contains time-stamped messages about Availability Suite software, including both errors and information messages. For example:

```
Mar 05 15:56:16 scm: scmadm cache enable succeeded
Mar 05 15:56:16 ii: iiboot resume cluster tag <none>
```


Since the invocation of most Availability Suite commands is logged in this file, it is a useful place to determine what recent Availability Suite administration activity has occurred.

`/var/adm/messages`

Other errors and informational messages are also logged to the `/var/adm/messages` file. For example:

```
Mar 5 16:21:24 doubleplay pseudo: [ID 129642 kern.info] pseudo-  
device: ii0  
Mar 5 16:21:24 doubleplay genunix: [ID 936769 kern.info] ii0 is  
/pseudo/ii@0
```

SMF Service Logs

SMF services are logged in the `/var/svc/log` directory. Each service has its own log file. The logs pertaining to Availability Suite services are:

- `system-nws_scm:default.log`
- `system-nws_sv:default.log`
- `system-nws_ii:default.log`
- `system-nws_rdc:default.log`
- `system-nws_rdcsyncd:default.log`

Software Utilities

This chapter discusses software utility troubleshooting issues.

The following topics are included:

- [“dsbitmap – Data Services Bitmap Volume Sizing”](#) on page 14
- [“dscfg – Data Services Configuration Database”](#) on page 14
- [“dscfgadm – Data Services Configuration and Administration”](#) on page 17
- [“dsstat – Data Services I/O Statistics Reporting”](#) on page 17
- [“iiadm – Point-in-Time Copy Administration”](#) on page 18
- [“iiboot – Point-in-Time Copy Start and Stop”](#) on page 18
- [“iicpbmp – Point-in-Time Copy Bitmap Renaming”](#) on page 18
- [“iicpshd – Point-in-Time Copy Shadow Volume Renaming”](#) on page 19
- [“sndradm – Remote Mirror Administration”](#) on page 19
- [“sندرboot – Remote Mirror Start and Stop”](#) on page 19
- [“scmadm – StorageTek Cache Manager Administration”](#) on page 20
- [“nscadm – Network Storage Control Administration”](#) on page 20
- [“svadm – Storage Volume Administration”](#) on page 20
- [“svboot – Storage Volume Start and Stop”](#) on page 21

dsbitmap – Data Services Bitmap Volume Sizing

The `dsbitmap` utility is used by a system administrator in sizing an Availability Suite bitmap volume to be used with either the Point-in-Time Copy software or the Remote Mirror software. A bitmap volume is not only dependent on the size of the master or primary volume being configured, but it is also dependent on the configuration features used.

For Point-In-Time Copy, a different sized bitmap is needed if one is using an independent (`iiadm -e ind`) shadow, or a dependent shadow (`iiadm -e dep`), or a compact dependent shadow (one where the size of the shadow volume is smaller than the master volume).

For Remote Mirror, a different sized bitmap is needed if you are using a memory queue, a disk queue, or a disk queue needing 32-bit `refcount`.

The system administration guides for either the Point-in-Time Copy software or the Remote Mirror software contain details for bitmap volume sizing; the `dsbitmap` utility was provided as a convenience to assist in making the initial configuration process easier.

dscfg – Data Services Configuration Database

The `dscfg` utility is used to control the Availability Suite configuration database, the database used to persistently store configuration data. The `dscfg` database contains both metadata and data; therefore the only means to initialize, save, restore or view the records within the database is by using the `dscfg` utility.

Every Solaris node where the Availability Suite software has been enabled (`dscfgadm -e`) contains a `dscfg` database at `/etc/dscfg_local`.

Every Sun Cluster operating environment (OE) where the Availability Suite software has been enabled (`dscfgadm -e`), contains a shared `dscfg` database contained within a single partition (slice) on a Sun Cluster-controlled DID device. The location of the shared `dscfg` database is stored in the file `/etc/dscfg_cluster`. Therefore, in a Sun Cluster OE of four nodes, there is one shared `dscfg` cluster database, plus four (one per node), `dscfg` local databases.

Non-Cluster Environments

This section explains how to use `dscfg` in non-cluster environments.

To View the Contents of the Local Configuration Database

To view the contents of the local configuration database, run `dscfg -l`. You may wish to archive the output as a human-readable record of the Remote Mirror and Point-in-Time Copy sets in your configuration.

To Save a Backup Configuration Database

If you wish to save a backup version of the configuration database, do the following:

```
# cp /etc/dscfg_local /your/backup/file
```

To Restore a Backup Configuration Database

For information on backing up the local configuration database, refer to the *Sun StorageTek Availability Suite 4.0 Software Installation and Configuration Guide*.

Cluster Environments

This section explains how to use `dscfg` in cluster environments.

To View the Contents of the Cluster Configuration Database

To view the contents of the cluster configuration database, perform the following steps:

1. Run `dscfgadm -i` to obtain the path to the cluster configuration database.

```
# dscfgadm -i
SERVICE          STATE             ENABLED
nws_scm           online           true
nws_sv           online           true
nws_ii           online           true
nws_rdc          online           true
nws_rdcsyncd     online           true

Availability Suite Configuration:
Local configuration database: valid
cluster configuration database: valid
cluster configuration location: /dev/did/rdsk/d3s4
```

2. Run `dscfg -l -s` on the cluster configuration database.

```
# dscfg -l -s /dev/did/rdsk/d3s4 | grep -v "^#"
scm: 128 64 - - - - - 83185345
scm: 128 64 - - - - - 808a6171
scm: 128 64 - - - - - 808a3e55
```

To Save a Backup Cluster Configuration

If you wish to save a backup version of the Sun Cluster configuration database, do the following:

1. If you don't know the DID path to your cluster-specific configuration file, run `dscfgadm -i` to determine the path. See [“To View the Contents of the Cluster Configuration Database” on page 15](#) for an example.
2. Run `dd` to copy the contents of the cluster configuration file.

```
# dd if=<cluster-specific DID partition> \
of=/your/backup/cluster_file bs=512k count=11
```

To Restore a Backup Cluster Configuration

If you wish to restore a backup version of the Sun Cluster configuration database, do the following:

1. Run `dscfgadm -i` to determine the path, if you don't know the path to your cluster-specific configuration file.

See “[To View the Contents of the Cluster Configuration Database](#)” on page 15 for an example).

2. Run `dd` to overwrite the cluster configuration file.

```
# dd if=/your/backup/cluster_file of= \  
<cluster-specific DID partition> bs=512k count=11
```

For more information on backing up the cluster-specific configuration database, refer to the “*Sun StorageTek Availability Suite 4.0 Software Installation and Configuration Guide*.”

dscfgadm – Data Services Configuration and Administration

The `dscfgadm` utility controls both the setup of Availability Suite configuration database location or locations and associated data services. This single utility provides the means to enable or disable all Availability Suite data services on a single node. The `dscfgadm` utility provides a `-x` option, which enables verbose logging of the script as it is running.

dsstat – Data Services I/O Statistics Reporting

The `dsstat` utility collects and reports I/O statistics for the Availability Suite services. By collecting and coalescing relevant information as it pertains to one or more Point-in-Time Copy or Remote Mirror sets, a system administrator is better equipped to diagnose or monitor performance than with the `kstat(1M)` or `iostat(1M)` statistics.

`iiaadm` – Point-in-Time Copy Administration

The `iiaadm` utility is used to configure, control, and monitor the Point-in-Time Copy software. Please refer to the *Sun StorageTek Availability Suite 4.0 Point-In-Time Copy Software Administration Guide* for additional information.

`iiboot` – Point-in-Time Copy Start and Stop

The `iiboot` utility is used internally by the Availability Suite software's scripts for starting and stopping of the Point-in-Time Copy sets. Both the Solaris Service Management Facility, `smf(5)`, and the Sun Cluster Resource Group Manager, `scha_cmds(1HA)`, indirectly invoke the `iiboot` utility to suspend and resume individual or entire collections of Point-in-Time Copy sets.

`iicpbmp` – Point-in-Time Copy Bitmap Renaming

The `iicpbmp` is used to copy an Availability Suite Point-in-Time Copy bitmap volume, rewriting the bitmap header and Availability Suite `dscfg` configuration so that it is consistent with the new bitmap volume names. Usage of this command is required when the physical storage of associated with a bitmap volume needs to be changed, such as converting it from RAID-5 to RAID-1 storage, or from a raw device partition to a Solaris-supported volume manager.

`iicpshd` – Point-in-Time Copy Shadow Volume Renaming

The `iicpshd` utility is used to copy an Availability Suite Point-in-Time Copy shadow volume, updating the bitmap header and Availability Suite configuration to reflect the new shadow volume. Usage of this command is required when the physical storage associated with a bitmap volume changes, such as converting it from RAID-5 to RAID-1 storage or [“`iicpshd` – Point-in-Time Copy Shadow Volume Renaming” on page 19](#) from a raw device partition to a Solaris supported volume manager, or on exportable storage, for usage with the Export, Import, Join functionality.

`sndradm` – Remote Mirror Administration

The `sndradm` utility is used to configure, control, and monitor the Remote Mirror software. Please refer to the *Sun StorageTek Availability Suite 4.0 Remote Mirror Software Administration Guide* for further information.

`sndrboot` – Remote Mirror Start and Stop

The `sndrboot` utility is used internally by the Availability Suite software's scripts for suspending or resuming individual or entire collections of Point-in-Time Copy sets. Both the Solaris Service Management Facility, `smf(5)`, and the Sun Cluster Resource Group Manager, `scha_cmds(1HA)`, indirectly invoke the `sndrboot` utility to suspend and resume individual or entire collections of Point-in-Time Copy sets.

scmadm – StorageTek Cache Manager Administration

The `scmadm` utility is used internally by the Availability Suite software's scripts for starting and stopping of the device cache. The Solaris Service Management Facility, `smf(5)`, indirectly invoke the `scmadm` utility to enable and disable the cache. Additionally, the `scmadm` utility supports options for controlling and gathering information about a storage device cache.

nscadm – Network Storage Control Administration

The `nscadm` utility is used by system administrators to freeze, check if frozen, and unfreeze Availability Suite I/O access to configured volumes, without disabling the configured set, or shutting down the entire Solaris system.

svadm – Storage Volume Administration

The `svadm` utility controls the Storage Volume (SV) driver by providing options to enable and disable the SV driver for specified volumes. The `svadm` usage is no longer required by the Availability Suite services, as they are provided with an internal feature called `auto-sv`, which does the enabling and disabling of volumes as deemed necessary by the Point-in-Time Copy or Remote Mirror software.

svboot – Storage Volume Start and Stop

The `svboot` utility is used internally by the Availability Suite software's scripts for starting and stopping of the storage volumes configured on behalf of both the Point-in-Time Copy and Remote Mirror software. Both the Solaris Service Management Facility, `smf(5)`, and the Sun Cluster Resource Group Manager, `scha_cmds(1HA)`, indirectly invoke the `svboot` utility to suspend and resume individual or entire collections of volumes.

Point-in-Time Copy Software

This chapter discusses Point-in-Time Copy software troubleshooting issues.

The following topics are included:

- [“Common User Errors” on page 23](#)
- [“Configuration” on page 25](#)
- [“Export/Import/Join” on page 27](#)
- [“Server Performance Diagnosis” on page 29](#)
- [“InfoDoc Summary” on page 33](#)

Common User Errors

This section describes some common errors that you may encounter when using Point-in-Time Copy software.

Safeguarding the VTOC

For information on how to safeguard the volume table of contents (VTOC), refer to [“Safeguarding the Solaris VTOC” on page 103](#).

Accessibility Issues

The most common class of user errors when using the Point-in-Time Copy software is accessibility issues in the specification of the Master, Shadow, Bitmap, and optional overflow volumes, which are configured using the `iiadm` utility. The best means to resolve these types of errors is to use standard Solaris utilities to resolve these issues; specifically, `format(1M)`, `prtvtoc(1M)`, and `dd(1M)`.

A typical `iiadm enable` command using Solaris RAW devices is as follows:

```
iiadm -e ind /dev/rdisk/c0t1d0s0 /dev/rdisk/c0t2d0s0 \  
/dev/rdisk/c0t3d0s0
```

A failure of this command may be due to incorrect device specifications, incorrect partition sizing, or a failure to access the devices from this Solaris node. Resolving issues with the following ten commands should be the first step towards resolving accessibility problems.

```
# format /dev/rdisk/c0t1d0s0  
# format /dev/rdisk/c0t2d0s0  
# format /dev/rdisk/c0t3d0s0  
# prtvtoc /dev/rdisk/c0t1d0s0  
# prtvtoc /dev/rdisk/c0t2d0s0  
# prtvtoc /dev/rdisk/c0t3d0s0  
# dd if=/dev/rdisk/c0t1d0s0 of=/dev/null count=1  
# dd if=/dev/rdisk/c0t2d0s0 of=/dev/null count=1  
# dd if=/dev/rdisk/c0t3d0s0 of=/dev/null count=1  
# dsbitmap -p /dev/rdisk/c0t1d0s0
```

Functionality Issues

The next class of user errors when using the Point-in-Time Copy software is perceived functionality issues. The functionality of the Point-in-Time Copy software is to instantly copy all the data from the Master volume to the Shadow volume in a fraction of a second. Note the following two commands:

```
# iiadm -e ind /dev/rdisk/c0t1d0s0 /dev/rdisk/c0t2d0s0 \  
/dev/rdisk/c0t3d0s0
```

```
# dd if=/dev/rdisk/c0t1d0s0 of=/dev/rdisk/c0t2d0s0
```

These commands are essentially equivalent for the initial configuration of a Point-in-Time Copy set, except that the second command can take hours or days to complete, instead of a fraction of second. In addition, neither the master nor the shadow volume can be used during the entire duration of the second command, while they both can be used in the first. Therefore if functionality issues are not what they seem, use the second command with very small volumes to assure the functionality that is desired works in the configuration needed.

Data Integrity Issues

After an enable, copy, or update command, the contents of the master volume are instantly available on the shadow volume. In all cases, there is no need to wait for a background copy to complete (`iiadm -w <shadow-volume>`) except when next using Export (`iiadm -E`) or disable (`iiadm -d`). What this means is that the "backup window" is no longer than the time it takes to quiesce the volume, take a Point-in-Time Copy, and resume the volume. At this point, the master volume can be used instantly as it was just before the Point-in-Time Copy was taken, and the shadow volume can be used instantly for whatever purpose it was created.

During an enable, copy, or update command, it is highly recommended that the master volume be quiesced and all cached data blocks flushed to disk so that a Point-in-Time Copy that is taken does not capture an I/O operation in progress. Capturing an I/O operation in progress may result in shadow volume data that appears inconsistent, meaning that utilities like `fsck(1M)`, database recovery tools, or similar software may have to make indeterminate decisions about the validity of an incomplete I/O operation. The means by which the Point-in-Time Copy software instantly makes a copy of the master volume to the shadow volume provides the same I/O consistency issues as a Solaris node "panicking" while I/O is in progress.

Configuration

This section discusses configuration issues.

Set Status

For a brief status of Point-in-Time sets on the system, use `iiadm -e dep`:

```
# iiadm -e dep /dev/rdisk/c7t0d0s6 /dev/rdisk/c7t1d0s6 \  
/dev/rdisk/c7t2d0s6
```

For a detailed status, use `iiadm -i`:

```
# iiadm -i  
/dev/rdisk/c7t0d0s6: (master volume)  
/dev/rdisk/c7t1d0s6: (shadow volume)  
/dev/rdisk/c7t2d0s6: (bitmap volume)  
Dependent copy  
Latest modified time: Thu Nov  3 13:18:44 2005  
Volume size: 21470084458  
Shadow chunks total: 33547006 Shadow chunks used: 0  
Percent of bitmap set: 2  
      (bitmap dirty)
```

Volume Configuration

This section discusses volume configuration.

Raw Partition

The following command creates a Point-in-Time Copy set consisting of raw partitions, where the master is `/dev/rdisk/c7t0d0s6`, the shadow is `/dev/rdisk/c7t1d0s6`, and the bitmap is `/dev/rdisk/c7t2d0s6`.

```
# iiadm -e ind /dev/rdisk/c7t0d0s6 /dev/rdisk/c7t1d0s6 \  
/dev/rdisk/c7t2d0s6
```

Since this is an independent (`ind`) set, the shadow volume must be the same size or greater than the master volume. The bitmap volume must be sized according to the following command:

```
# dsbitmap -p /dev/rdisk/c7t0d0s6
```


Solaris Volume Manager

The following command creates a Point-in-Time Copy set consisting of Solaris Volume Manager volumes, where the master is `/dev/md/rdisk/d1`, the shadow is `/dev/md/rdisk/d2`, and the bitmap is `/dev/md/rdisk/d3`.

```
# iiadm -e dep /dev/md/rdisk/d1 /dev/md/rdisk/d2 /dev/md/rdisk/d3
```

Since this is a dependent (`dep`) set, the shadow volume can be either the same size or greater than the master volume, or, if smaller, the set becomes a compact dependent shadow set.

The bitmap volume must be sized according to the following command, making sure to select the correct sizing for either "Full size dependent shadow" or "Compact dependent shadow".

```
# dsbitmap -p /dev/md/rdisk/d1
```

Veritas Volume Manager

The following command creates a Point-in-Time Copy set consisting of VxVM volumes, where the master is `/dev/vx/rdisk/ii-dg/d21`, the shadow is `/dev/vx/rdisk/ii-dg/d22`, and the bitmap is `/dev/vx/rdisk/ii-dg/d23`.

```
# iiadm -e dep /dev/vx/rdisk/ii-dg/d21 /dev/vx/rdisk/ii-dg/d22  
/dev/vx/rdisk/ii-dg/d23
```

Export/Import/Join

This section provides basic information on using Export/Import/Join within a Sun Cluster. For more detailed information, refer to the *"Best Practice for using Export, Import, Join in a Sun Cluster OE 3.1"* (10/3).

Resource Group

Make sure that the device groups are in a Sun Cluster `SUNW.HAStoragePlus` resource within a Sun Cluster resource group. See the best practice guide for detailed steps.

Exporting

When using Export/Import Join within a Sun Cluster, the shadow volume must be on a different global device or volume manager controlled device group than its associated master and bitmap volumes. Doing so will allow the shadow volume's device group to be switched between various nodes in a Sun Cluster and to be used as an exportable shadow volume.

Note – Sun Cluster DID devices are not supported as a Master, Shadow, or Bitmap volume due to disk data fencing functionality when Sun Cluster failure events are active. Sun Cluster Global devices, which are symmetrical in name to the DID devices, are supported.

To create such a set, with the master and bitmap in one device group (`oracle`, in this example), and the shadow in another (`backup`, in this example), use the `-ne` flags to `iiadm`:

```
# iiadm -ne ind /dev/md/oracle/rdisk/d1 /dev/md/backup/rdisk/d1 \  
/dev/md/oracle/rdisk/d2
```

Make sure that the Point-in-Time Copy set is fully independent before exporting the shadow volume. This is confirmed by `wait (iiadm -w)` returning on the shadow volume:

```
# iiadm -w /dev/md/backup/rdisk/d1
```

Importing

If you would like to import the shadow on another Sun Cluster node, the second bitmap used for the import operation must be in the same global device or volume manager controlled device group as the exported shadow.

Note – The exportable shadow **MUST** be imported with the `-C local` tag, so that the system can differentiate between the highly available Point-in-Time Copy set and the locally accessible exportable shadow, which have the exact same name.

```
# iiadm -C local -I /dev/md/backup/rdisk/d1 /dev/md/backup/rdisk/d2
```

Export/Join With no Import

It is possible to perform an Export/Join sequence with no Import step. To perform a join operation, there is still the requirement for a secondary bitmap volume, but since this secondary bitmap volume was NOT used during a recent Import operation, it contains stale data or uninitialized data. Prior to performing a join operation, you must copy (using the Solaris `dd` utility) the current bitmap volume over the contents of the second bitmap volume, so that the second bitmap volume's data is in a known state. The failure to perform this manual initialization step may result in the join operation failing, or when stale data is used, it may cause an inconsistency between what is actually on the shadow volume and the current state as recorded in the bitmap.

Server Performance Diagnosis

This section discusses server performance diagnosis issues.

Variables and Configuration Files

If the Sun StorageTek Availability Suite software is used with a file system, tuning the number of SV threads might produce better performance.

When a file system flushes its cache, it generates many parallel write operations. The SV's default setting of 32 threads could produce a bottleneck. You can increase the number of SV threads. The maximum number of threads allowed is 1024.

Note – Each thread consumes 32k of memory.

The `sv_threads` value is in the `/usr/kernel/drv/sv.conf` file. Because the file is read when a module loads, changes to the `sv_threads` value do not take effect until you reboot the system.

dsstat Utility

The `dsstat(1M)` utility is useful for observing real-time read and write performance through volumes under Point-in-Time control. The `dsstat` tool is similar in usage to `iostat`, taking as arguments an interval length and iteration count.

```
# dsstat -m ii 1 2
name          t  s    pct role    kps   tps   svt
dsk/avsuite/vol0  I  -    0.00 mst      0     0     0
dsk/avsuite/vol1              shd      0     0     0
dsk/avsuite/vol2              bmp      0     0     0
                   ovr <<not attached>>
dsk/avsuite/vol0  I  -    0.00 mst      0     0     0
dsk/avsuite/vol1              shd      0     0     0
dsk/avsuite/vol2              bmp      0     0     0
                   ovr <<not attached>>
```

iostat Utility

The `iostat(1M)` utility may also be used to monitor Point-in-Time Copy performance. Besides being able to access performance data on the underlying storage volumes under Point-in-Time Copy control, Point-in-Time Copy sets also appear in `iostat` under the names `iib[n]`, `iim[n]`, and `iis[n]` for a bitmap, master, and shadow volume, respectively (where n is the set id).

```
# iostat -xncz
  cpu
us sy wt id
 4  1  0 95

      extended device statistics
r/s   w/s   kr/s   kw/s wait actv wsvc_t asvc_t  %w  %b device
0.0   0.0   0.0   0.0  0.0  0.0   0.0   0.3   0   0 iib0
0.0   0.0   0.2   0.0  0.0  0.0   0.0  15.3   0   0 iim0
0.0   0.0   0.0   0.2  0.0  0.0   0.0  12.6   0   0 iis0
0.1   0.1   1.2   0.5  0.0  0.0   0.0  20.3   0   0 c0t0d0
0.0   0.0   0.0   0.0  0.0  0.0   0.0   0.3   0   0 gsdbc
0.0   0.0   0.0   0.0  0.0  0.0   0.0   0.3   0   0 sdbc0
0.0   0.0   1.0   0.0  0.0  0.0   0.0   0.5   0   0 c4t50020F23000009DAd0
0.0   0.0   0.0   0.0  0.0  0.0   0.0   0.3   0   0 c4t50020F230000036EAd0
0.1   0.0   0.1   0.0  0.0  0.0   0.0   0.5   0   0 c4t50020F230000024Ed0
0.1   0.0   0.1   0.0  0.0  0.0   0.0   0.4   0   0 c4t50020F23000001C7d0
0.0   0.0   0.0   0.0  0.0  0.0   0.0   0.1   0   0 c4t50020F23000003DAd0
0.0   0.0   0.0   0.0  0.0  0.0   0.0   0.1   0   0 c4t50020F23000003EBd0
0.0   0.0   0.0   0.0  0.0  0.0   0.0   0.1   0   0 c4t50020F2300000A24d0
```

ptree Command

The `ptree(1)` command shows the parent processes for a given process id. It is particularly useful for troubleshooting hung processes, or processes that were invoked through Sun Cluster scripts.

For example, if a `ps` command shows that the `svboot` process is running:

```
# ps -ef | grep svboot
root  9829  9824   0 09:56:21 ?                0:00 /usr/sbin/svboot -
C avsuite -s
```

run `ptree` on the process id for `svboot` to see its parents:

```
359 /usr/cluster/lib/sc/clexecd
360 /usr/cluster/lib/sc/clexecd
12812 sh -c /usr/cluster/lib/sc/run_reserve -C SUNWvxvm -C SUNWvxvm -s avsu
12813 /usr/bin/ksh /usr/cluster/lib/sc/run_reserve -C SUNWvxvm -C SUNWvxv
12815 /usr/bin/ksh /usr/opt/SUNWesm/cluster/sbin/reconfig stop avsuite
12818 /usr/bin/ksh /usr/cluster/lib/dscfg/stop/10sv stop avsuite
12826 /usr/sbin/svboot -C avsuite -s
```

Configuration - Files

The file `/var/adm/ds.log` contains a record of Availability Suite configuration and control activity, including which Point-in-Time Copy sets have had the following operations by the `iiadm` and `iiboot` utilities:

- enabled
- disabled
- suspended
- resumed
- copied
- updated
- reset
- exported
- imported
- joined
- overflow volumes added or removed from compact dependent sets.

InfoDoc Summary

Below is a tabular summary of the SunSolve InfoDocs written to address common customer issues for Point-in-Time Copy software. If you believe you are experiencing one of these issues, contact your Sun Service Representative for a swift resolution.

TABLE 3-1 InfoDocs Addressing Point-in-Time Copy Software Issues

InfoDoc ID	Issue
71559	Cannot remove SVM, Veritas volumes, or DR LUNs under Availability Suite Software
77167	Booting either host causes entire sync in Remote Mirror or Point-in-Time Copy
77901	Cannot Enable Point-in-Time Copy devices within Sun Cluster
78723	II: Volume in use

Remote Mirror Software

This chapter discusses Remote Mirror software troubleshooting issues.

The following topics are included:

- [“Common User Errors” on page 35](#)
- [“Configuration” on page 39](#)
- [“Performance Diagnosis” on page 41](#)
- [“InfoDoc Summary” on page 47](#)

Common User Errors

This section describes some common errors that you may encounter when using Remote Mirror software.

Safeguarding the VTOC

For information on how to safeguard the VTOC, refer to [“Safeguarding the Solaris VTOC” on page 103](#).

Forgetting to Enable the Remote Mirror Set on the Secondary

If the secondary Remote Mirror set has not been enabled, the application gives the following error:

```
sndradm: warning: SNDR: Could not open file host:/dev/rdisk/xxxxx  
on remote node
```

Misentering the Remote Volume or Host Names

If the remote volume and host names do not match, both instances of SNDR will start, but they will not communicate with each other and replication will be unable to begin. The same message as when the secondary has not been enabled will be seen, but `sndradm` on the remote node will apparently show the set enabled. It is only on careful inspection that a difference in volume names can be seen to explain the failure.

Accessibility Issues

The most common class of user errors when using the Remote Mirror software is accessibility issues in the specification of the primary host volume and bitmap, secondary host volume and bitmap, or the primary and secondary host names, configured using the `sndradm` utility. The best means to resolve these types of errors is to use standard Solaris utilities, specifically `format(1M)`, `prtvtoc(1M)`, `dd(1M)`, and `telnet(1M)`.

A typical `sndradm enable` command using Solaris RAW devices is as follows:

```
sndradm -e hostA /dev/rdisk/c0t1d0s0 /dev/rdisk/c0t2d0s0 \  
hostB /dev/rdisk/c0t1d0s0 /dev/rdisk/c0t2d0s0 ip sync
```

A failure of this command may be due to incorrect device specifications, incorrect partition sizing, failure to access the device from this Solaris node, or Solaris host names. Resolving the issue using the following seven commands should be the first step towards resolving accessibility problems.

```
# telnet hostA
{login}
# format /dev/rdisk/c0t1d0s0
# format /dev/rdisk/c0t2d0s0
# prtvtoc /dev/rdisk/c0t1d0s0
# prtvtoc /dev/rdisk/c0t2d0s0
# dd if=/dev/rdisk/c0t1d0s0 of=/dev/null count=1
# dd if=/dev/rdisk/c0t2d0s0 of=/dev/null count=1
# dsbitmap -r /dev/rdisk/c0t1d0s0
# telnet hostB
{repeat sequence above}
```

There is no requirement that primary host volume names match the secondary host volume names, as long as the secondary volume is the same size or greater.

Functionality Issues

The next class of user errors when using the Remote Mirror software are perceived functionality issues. The functionality of the Remote Mirror software is to continuously copy all the data from the primary host's volume to the secondary host's volume, repeatedly, until either replication is stopped or the primary or secondary hosts are no longer available. The first command and the following six commands are essentially equivalent for the setup of a Remote Mirror replication set, except that the second set can take hours or days to complete, as it recopies already copied data.

```
# sndradm -e hostA /dev/rdisk/c0t1d0s0 /dev/rdisk/c0t2d0s0 \  
hostB /dev/rdisk/c0t1d0s0 /dev/rdisk/c0t2d0s0 ip sync
```

If the replication functionality of the first command listed above does not work as expected, use this set of commands with very small volumes to assure that the replication functionality that is desired works as expected for the configuration of volumes and hostname pertaining to your specific operating environment.

```
#!/bin/csh
# repeat:
# rsh hostA dd if=/dev/rdisk/c0t1d0s0 of=/tmp/hostA.tmp
# rsh hostA rcp /tmp/hostA.tmp hostB:/tmp/hostA.tmp
# rsh hostB dd of=/dev/rdisk/c0t1d0s0 if=/tmp/hostA.tmp
# goto repeat
```

Data Integrity Issues

When a Remote Mirror set is first enabled, the secondary volume may take hours or days to complete the initial synchronization, which is highly dependent on the volume size, network bandwidth and latency, and system resources on both the primary and secondary nodes. Review the *Sun StorageTek Availability Suite 4.0 Remote Mirror Software Administration Guide* for various methods which incorporate the use of `sndradm -E` for fast enable operations.

Once the initial full synchronization has completed, the Remote Mirror secondary volume is kept in write-order consistency, an operation which may lag the Remote Mirror primary volume. If at any time the replication process stops, logging mode is enabled, the network link does down, or there is a system failure, a replicated I/O operation may have been in progress. This state may result in a Remote Mirror secondary volume data set that appears inconsistent, meaning that utilities like `fsck(1M)`, database recovery tools, or similar software may have to make indeterminate decisions about the validity of an incomplete I/O operation. The means by which the Remote Mirror software keeps a primary and secondary replicated set in write-order consistency results in the same I/O consistency issues as a Solaris node “panicking” while I/O is in progress.

If you are manually placing a Remote Mirror primary volume in logging mode to use the secondary volume, it is highly recommended that the primary volume be quiesced and all cached data blocks flushed to disk, so that the Remote Mirror software finishes replicating a consistent volume to the secondary host.

Configuration

This section discusses configuration issues for the Remote Mirror software.

Set Status

Set status can be checked with the `sndradm -P` command. The percentage of the primary that needs to be transmitted to the secondary to complete a sync operation can be seen with the `dsstat -m sndr` command.

Files

The file `/var/adm/ds.log` contains a record of Availability Suite activity, including which remote replication sets have been enabled, resumed, and stopped by the `sndradm` and `sndrboot` utilities.

Volume Configuration

Raw Partition

The following command creates a Remote Mirror replicated set consisting of raw partitions, where the primary is `/dev/rdisk/c7t0d0s6` and the bitmap is `/dev/rdisk/c7t1d0s6`. Note the exact same command must be issued on both the primary and secondary host to complete a single Remote Mirror replicated set.

```
# sndradm -e hostA /dev/rdisk/c7t0d0s6 /dev/rdisk/c7t1d0s6 hostB \  
/dev/rdisk/c7t0d0s6 /dev/rdisk/c7t1d0s6 ip async
```

Since this is an asynchronous replicated set, the Remote Mirror software keeps the sets in synchronization with a memory queue, allowing for a small, finite lag between primary and secondary hosts.

The bitmap volume must be sized according to the following command:

```
# dsbitmap -r /dev/rdisk/c7t0d0s6
```

Solaris Volume Manager

The following command creates a Remote Mirror replicated set consisting of SVM volumes, where the primary is `/dev/md/rdisk/d1` and the bitmap is `/dev/md/rdisk/d2`.

```
# sndradm -E hostA /dev/md/rdisk/d1 /dev/md/rdisk/d2 hostB \  
/dev/md/rdisk/d1 /dev/md/rdisk/d2 ip async
```

Since this is a synchronous replicated set with a `-E` (fast enable), there is an assumption that both the primary and secondary volumes are equal. If both the primary and secondary volumes are uninitialized, meaning that there is no file system, database, or application on the volumes, then both volumes are considered the same (uninitialized equals uninitialized). When the primary volume has a file system, database, or application data placed on it, the Remote Mirror software replicates these changes to the secondary, and, by virtue of replication, both volumes will be identical.

Another means by which to accomplish this step is to enable the primary node as shown above, but leave the SNDR set in logging mode and then enable a Point-in-Time Copy using the primary volume as the master volume, thereby creating an instant copy of the set. The primary volume can then be used by the system, applications, or a file system. A backup of the shadow volume needs to be taken; when the backup is complete, the Point-In-Time Copy set on the primary can be disabled. The backup of the shadow volume can be delivered to the site of the remote mirror secondary and restored to disk as specified above. Then a fast enable (`-E`) must be done on the secondary. When placing the Remote Mirror set in replicating mode, any changes since the Point-in-Time Copy set was made are replicated to the secondary, vastly minimizing the amount of data that needs to be replicated over the network.

VERITAS Volume Manager

The following commands create a Remote Mirror set consisting of VxVM volumes, where the primary master volume is `/dev/vx/rdsk/sndr-dg/d21` and the bitmap volume is `/dev/vx/rdsk/sndr-dg/d22`.

```
# sndradm -e hostA /dev/vx/rdsk/sndr-dg/d21 \  
/dev/vx/rdsk/sndr-dg/d22 hostB /dev/vx/rdsk/sndr-dg/d23 \  
/dev/vx/rdsk/sndr-dg/d24 ip async  
# sndradm -q a /dev/vx/rdsk/sndr-dg/d30 \  
hostB:/dev/vx/rdsk/sndr-dg/d30
```

Since this is an asynchronous replicated set with an associated disk queue, the Remote Mirror software keeps the sets in synchronization with a disk queue, allowing for a large, somewhat infinite lag between primary and secondary hosts.

Performance Diagnosis

This section discusses how to diagnose performance issues for the Remote Mirror software.

Remote Mirror Set Variables

The following Remote Mirror set variables should be considered:

`sync` and `async`

Asynchronous modes give faster local write performance than synchronous. If you find that your performance suddenly changes, then there is likely to have been some event that moved the system into the other mode. Possible events include:

- going into logging mode
- local performance speeds up
- blocking `async` queue fills
- local response slows to synchronous

`queue` modes

Blocking and non-blocking affects the queue full performance.

`autosync`

When enabled (`sndradm -a on set`), the Remote Mirror `rdcsyncd` daemon automates update resynchronization after a network link or machine failure. If a Point-in-Time Copy set was added as an `ndr_ii` entry (see “[ndr_ii](#)” on page 49), the daemon creates a dependent shadow volume of the Remote Mirror secondary, to assure that there is always a valid replica on the secondary site. While a full or update `sync` is in progress, the Remote Mirror software replicates changed blocks, starting from block 1 to the end of the volume. This replication is block-order, not

write-order, so the volume is inconsistent until the synchronization operation completes. Having a `ndr_ii` Point-in-Copy on the secondary ensures that there is always a consistent, write-ordered volume on the secondary host.

`max q writes`

This affects how fast the queue fills up.

`max q fbas`

The maximum amount of data in the queue.

`async Threads`

Affects how fast the queue is sent across the network. More threads may lead to better network utilization.

Server Commands

The following server commands should be considered:

`dsstat`

The `dstat -m sndr` command show basic statistics on the remote replication network and bitmap volumes. Other and more detailed statistics are available with the display option `-d`.

`iostat`

The `iostat` command can be used to monitor I/O rates to all Remote Mirror volumes on the local machine in a manner similar to the normal usage of `iostat`.

Network Commands

The following network commands should be considered:

dsstat

The rate of remote I/O can be seen from the `dsstat` output.

ifconfig

Once you have determined that the `rdc` service is ready, you may want to check the integrity of the link. When configuring the Remote Mirror software, the name associated with the IP address of the interface that the Remote Mirror software will transfer data over will be used. This is true for entries added into the `/etc/hosts` file as well as when using `sndradm` commands to enable sets.

A simple test would verify that you can `telnet` or `rlogin` through the interfaces the Remote Mirror software will use. You may also want to use the `ifconfig` command to make sure the interface is plumbed, up, and at the IP address you have configured in the `/etc/hosts` file. The names and IP addresses of the interfaces being used for the Remote Mirror software on both systems should be in each system's `/etc/hosts` file.

```
# ifconfig -a
ba0: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 9180
index 1
    inet 10.9.9.1 netmask ffffffff broadcast 10.9.9.255
    ether 8:0:20:af:8e:d0
lo0: flags=1000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4> mtu 8232
index 2
    inet 127.0.0.1 netmask ff000000
hme0: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500
index 3
    inet 10.8.11.124 netmask ffffffff broadcast 10.8.11.255
    ether 8:0:20:8d:f7:2c
lo0: flags=2000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv6> mtu 8252
index 2
    inet6 ::1/128
hme0: flags=2000841<UP,RUNNING,MULTICAST,IPv6> mtu 1500
index 3
    ether 8:0:20:8d:f7:2c
    inet6 fe80::a00:20ff:fe8d:f72c/10
```

netstat

Network socket queue states can be monitored with `netstat`. The send and receive socket queues are displayed by the `-a` option's `Swind`, `Send-Q`, `Rwind`, and `Recv-Q` columns.

Another command that could be run to check the `rdc` service is as follows:

```
# netstat -a|grep rdc
*.rdc          *.*                0      0 65535      0 LISTEN
*.rdc          *.*                0      0 65535      0 LISTEN
*.rdc          *.*                0      0 65535      0 LISTEN
```

In the above example the `rdc` service is available.

ping

The `ping` command can be used to check that the interfaces can communicate and whether IPV4 or IPV6 addressing is being used.

```
# ping -s second.atm
PING second.atm: 56 data bytes
64 bytes from second.atm (10.9.9.2): icmp_seq=0. time=1. ms
64 bytes from second.atm (10.9.9.2): icmp_seq=1. time=0. ms
64 bytes from second.atm (10.9.9.2): icmp_seq=2. time=0. ms
64 bytes from second.atm (10.9.9.2): icmp_seq=3. time=0. ms
```

In the above example, packets are successfully being sent and IPV4 addressing is being used. That is confirmed by looking at the IP address "(10.9.9.2)", which has four values; IPV6 addressing would have six. The `ping` should be run in both directions (from primary to secondary and secondary to primary) to ensure connectivity in both directions. This is also a good way to verify that both systems are using the same protocol, IPV4 or IPV6.

`ping` also shows the latency within the network between the two SNDR nodes.

rpcinfo

The `rpcinfo` utility can be used to check a path to the remote Remote Mirror services, either primary or secondary. Two commands are used to check the `rdc` service:

```
# rpcinfo -T tcp node1 100143 4
program 100143 version 7 ready and waiting
```

In the prior example, the `rdc` service is clearly ready. In the next example, the system was booted with an incorrect entry for "services" in the `/etc/nsswitch.conf` file and is not ready. In both examples, `node1` is the system name. The commands should be run from all systems in the Remote Mirror config.

```
# rpcinfo -T tcp node1 100143 7
rpcinfo: RPC: Program not registered
```

snoop

The `snoop` utility can be used to see if SNDR is actually sending and receiving data during a copy or update command.

```
# snoop -d hme0 port rdc
Using device /dev/hme (promiscuous mode)
node2 -> node1 RPC C XID=3565514130 PROG=100143 (?) VERS=4 PROC=8
node1 -> node2 RPC R (#1) XID=3565514130 Success
node2 -> node1 TCP D=121 S=1018 Ack=1980057565 Seq=2524537885
Len=0 Win=33304 Options=<nop,nop,tstamp 1057486 843038>
node2 -> node1 RPC C XID=3565514131 PROG=100143 (?) VERS=4 PROC=8
node1 -> node2 RPC R (#4) XID=3565514131 Success
node2 -> node1 TCP D=121 S=1018 Ack=1980057597 Seq=2524538025
Len=0 Win=33304 Options=<nop,nop,tstamp 1057586 843138>
node2 -> node1 RPC C XID=3565514133 PROG=100143 (?) VERS=4 PROC=8
node1 -> node2 RPC R (#7) XID=3565514133 Success
node2 -> node1 TCP D=121 S=1018 Ack=1980057629 Seq=2524538165
Len=0 Win=33304 Options=<nop,nop,tstamp 1057686 843238>
node2 -> node1 RPC C XID=3565514134 PROG=100143 (?) VERS=4 PROC=8
```

In the example above, the `snoop` utility is being run from the primary side of the Remote Mirror set. The interface being used is `hme0` and the port to report on is the port used by `rdc`. The interface that is being used by the Remote Mirror software

can be determined by relating the name used when enabling with the `sndradm` command to the IP address in the `/etc/hosts` file to the interface listed in the `ifconfig -a` output.

If you are using an ATM interface, a special snoop command called `atmsnoop` must be used:

```
# /etc/opt/SUNWconn/atm/bin/atmsnoop -d ba0 port rdc
device ba0
Using device /dev/ba (promiscuous mode)
TRANSMIT : VC=32
TCP D=121 S=1011 Syn Seq=2333980324 Len=0 Win=36560
-----
RECEIVE : VC=32
TCP D=1011 S=121 Syn Ack=2333980325 Seq=2878301021 Len=0 Win=36512
-----
TRANSMIT : VC=32
TCP D=121 S=1011 Ack=2878301022 Seq=2333980325 Len=0 Win=41076
-----
TRANSMIT : VC=32
RPC C XID=1930565346 PROG=100143 (?) VERS=4 PROC=11
-----
RECEIVE : VC=32
TCP D=1011 S=121 Ack=2333980449 Seq=2878301022 Len=0 Win=36450
-----
RECEIVE : VC=32
RPC R (#4) XID=1930565346 Success
-----
TRANSMIT : VC=32
TCP D=121 S=1011 Ack=2878301054 Seq=2333980449 Len=0 Win=41076
```

InfoDoc Summary

Following is a summary of the SunSolve InfoDocs written to address common customer issues for Remote Mirror software. If you believe you are experiencing one of these issues, contact your Sun Service Representative for a swift resolution.

TABLE 4-1 InfoDocs Addressing Remote Mirror Software Issues

InfoDoc ID	Issue
45485	SNDR <code>wait</code> command (<code>sndradm -w</code> or <code>rdcadm -w</code>) may return prematurely when run in a script
70015	Unable to grow a ufs filesystem under SNDR
71559	Cannot remove SVM, Veritas volumes, or DR LUNs under Availability Suite Software
73827	"SNDR: Recovery bitmaps not allocated"
77167	Booting either host causes entire sync in Remote Mirror or Point-in-Time Copy
80100	Warning Message: "bitmap reference count maxed out"
80732	Missing Remote Mirror Sets After a Host Boot

Point-in-Time Copy and Remote Mirror Interoperability

This chapter describes Point-in-Time Copy and Remote Mirror software interoperability issues.

The following topics are included:

- [“ndr_ii” on page 49](#)

`ndr_ii`

The term `ndr_ii` is used to define a mechanism within the Remote Mirror product set to use a Point-in-Time Copy volume to assure that there is always a write-order consistent copy of a replicated volume on the secondary node.

During normal Remote Mirror replication, the secondary volume is kept write-order consistent with the primary volume, even under conditions of brief link failures or data link latency. As long as there is ample room to store the ordered write I/Os into either the memory-based or disk-based queues, write-order consistency is maintained. When there is no longer room to queue write I/Os (or through operator intervention), a Remote Mirror set will be placed into logging mode and the ability to maintain write-order consistency is lost. Note that even at this point, the secondary volume is still write-order consistent, although no new write I/Os are being replicated.

To resume write-order replication, either through operator intervention or by enabling auto-sync capability, an update synchronization operation must first be performed. It is during this period of time, update synchronization, that write-order would be lost if an `ndr_ii` pair is not enabled and used. Prior to the start of the update synchronization operation, an automatic Point-in-Time Copy of the write-order consistent secondary volume is taken. Then the sequentially-ordered update

synchronization is performed and, if successful, the Point-in-Time Copy is deleted, since the secondary volume is now write-order consistent. In the unlikely, though possible, event of a failure during the update synchronization operation, the Point-in-Time Copy shadow volume can be used to restore a write-order consistent volume back on the secondary node.

Assuring Correct Behavior of ndr_ii Pairs

Issues with ndr_ii pairs are most commonly seen when a system administrator has configured an ndr_ii pair, yet when it comes time to use the ndr_ii pair, the Point-in-Time Copy set fails to configure. To assure correct behavior:

- 1. Prior to configuring an ndr_ii pair, the system administrator should configure the Point-in-Time Copy set.**

Use the Remote Mirror secondary volume as the Point-in-Time Copy Master volume, along with a (compact) dependent shadow volume and correctly sized bitmap volume.

- 2. Configure the ndr_ii pair.**
- 3. Manually force the Remote Mirror set into logging mode and then back into replicating mode.**

The ndr_ii mechanism should recognize and use the already configured Point-in-Time Copy set.

- 4. After the Remote Mirror set has completed synchronization, check for errors on both the Remote Mirror and Point-in-Copy volumes.**

The command to complete synchronization is `sndradm -w [set]`.

- 5. If this test completes correctly without error, the Point-in-Time Copy set can be disabled, then the test where Remote Mirror is set into logging mode and then back into replicating mode can be repeated.**

During this test the Point-in-Time Copy set will be temporarily enabled and disabled automatically.

SunCluster

This chapter describes SunCluster troubleshooting issues.

The following topics are included:

- [“Point-in-Time Copy” on page 51](#)
- [“Remote Mirror” on page 52](#)
- [“Point-in-Time Copy and Remote Mirror Interoperability” on page 53](#)

Point-in-Time Copy

The Availability Suite product set is supported as a Highly Available Data Service in a Sun Cluster Operating Environment (OE). Since each unique instance of an Availability Suite configured data service, Point-in-Time Copy Set, or Remote Mirror set is active on one node of the Sun Cluster and inactive on all others, there is no limit to the number of Sun Cluster nodes in which Availability Suite volumes can be configured.

Through the configuration of `SUNW.HAStoragePlus` for Point-in-Time Copy volumes or the configuration of `SUNW.HAStoragePlus` and `SUNW.LogicalHostname` for Remote Mirror volumes, Sun Cluster resource groups can be configured with Availability Suite, Solaris Volume Manager, and a vast array of highly available applications to provided Highly-Available, failover data services.

The volumes of a Point-in-Time Copy Set or Remote Mirror Volume set can be raw global devices, named global devices, Solaris Volume Manager volumes, or VxVM volumes. A named global device is a special reconfiguration of two or more global devices under a system administrator specified device name.

Configuration

Point-in-Time Copy in a Sun Cluster operating environment differs from a Solaris operating system in that all constitute volumes in a single set must be created out of the same device group, with the exception of Export/Import/Join support. This requirement is due to the fact that in a Sun Cluster, only a single device group is switched between configured Sun Cluster nodes at the same time. Thus, when a set is disabled on one node and resumed on another node, the master, shadow, bitmap, and optional overflow volume must switch as a collection of 3 or 4 volumes.

Export/Import/Join

Within a Sun Cluster operating environment there exists the ability to configure an exportable shadow volume, a shadow volume that is not in the same device group as the other constitute volumes in a single set. This permits the use of the Export, Import, and Join command in a Sun Cluster operating environment, allowing the shadow volume to be deported from the current node in the Sun Cluster.

Due to current restrictions in a Sun Cluster OE, a volume in a device group under the control of Sun Cluster software, cannot be moved to a node outside of the Sun Cluster, limiting E/I/J support to nodes within the current Sun Cluster.

Remote Mirror

Remote Mirror in a Sun Cluster operating environment differs from in a Solaris operating system, in that all constitute volumes in a single set must be created out of the same device group. This requirement is due to the fact that in a Sun Cluster, only a single device group is switched between configured Sun Cluster nodes at the same time. Thus when a set is disabled on one node and resumed on another node, the primary or secondary volume, bitmap and optional disk queue must switch as a collection of 2 or 3 volumes.

Point-in-Time Copy and Remote Mirror Interoperability

A Remote Mirror set is the combination of a primary and secondary hostname along with a primary and secondary volume and bitmap pair. The primary or secondary nodes can be either Sun Cluster or Solaris nodes.

A Remote Mirror set in a Sun Cluster operating environment differs from one in a Solaris operating environment through the use of a global device or volume bound to “named” device group and “named” logical hostname, both of which are resource types, configured in a single resource group, that can switchover between configured nodes under Sun Cluster control.

A “named” Sun Cluster resource group must be created, containing at a minimum one `SUNW.HAStoragePlus` and one `SUNW.LogicalHostname` resource type. The “name” of the resource group is based on the “name” of the device group configured under `SUNW.HAStoragePlus`. For example, if the device group name is `production`, as in `/dev/md/production/rdisk/d100`, the resource group name might be `production-stor-rg`.

Error Messages

[Table 7-1 on page 56](#) lists Sun StorageTek Availability Suite error messages in alphabetical order. The software utilities associated with the error messages are described in [“Software Utilities” on page 13](#).

The error messages come from the following sources:

- Availability Suite CORE software – The common componentry of Point-in-Time Copy and Remote Mirror software.
 - `dsbitmap` – Data Services bitmap volume sizing
 - `dscfg` – Data Services configuration database
 - `dscfgadm` – Data Services configuration and administration
 - `dsstat` – Data Services I/O statistics reporting
 - `scmadm` – StorageTek Cache Manager administration
 - `nscadm` – Network Storage Control administration
 - `svadm` – Storage Volume administration
 - `svboot` – Storage Volume start and stop
- Remote Mirror software – This software used to be called “Sun StorEdge Network Data Replicator (SNDR)” software.
 - `sndradm` – Remote Mirror administration
 - `sndrboot` – Remote Mirror start and stop
- Point-in-Time Copy software – This software used to be called “Sun StorEdge Instant Image” software.
 - `iiadm` – Point-in-Time Copy administration
 - `iiboot` – Point-in-Time Copy start and stop
 - `iicpbmp` – Point-in-Time Copy bitmap renaming
 - `iicpshd` – Point-in-Time Copy shadow volume renaming

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software

Error Message and Description	Component
<code>%s ==> %s not already enabled</code> The user has tried to do an operation on a set that is not enabled. Verify that the proper set has been specified to <code>sndradm</code> and then verify that the set is enabled using <code>sndradm -i</code> .	Remote Mirror
<code>%s contains no matching Remote Mirror sets</code> The configuration file specified with the <code>-f</code> switch contains no valid remote mirror sets.	Remote Mirror
<code>%s get_addr failed for Ver 4</code> The TCP/IP address of the specified Remote Mirror set could not be obtained.	Remote Mirror
<code>%s gethost_byname failed for %s</code> The TCP/IP address of the specified Remote Mirror set could not be obtained.	Remote Mirror
<code>'%s' has already been configured as '%s'. Re-enter command with the latter name.</code> The specified device is already entered in the <code>dscfg</code> database.	CORE
<code>%s has Point-in-Time Copy bitmap magic number, but does not contain correct data.</code> An attempt to perform a Point-in-Time Copy bitmap operation against the current bitmap header has failed. Review current volume information to correct inconsistent volumes specified.	Point-in-Time Copy
<code>%s host %s is not local</code> For the Remote Mirror set listed, neither the primary or secondary Solaris hostname could be determined.	Remote Mirror
<code>%s is already configured as a Remote Mirror bitmap</code> The master, shadow, or bitmap volume in the <code>ndr_ii</code> entry is already configured as a remote mirror bitmap volume.	Remote Mirror
<code>%s is configured, but not in the config storage</code> The specified device is currently <code>SV</code> enabled, but does not exist in the <code>dscfg</code> database.	CORE
<code>%s is not a character device</code> The volume specifications for the bitmap volume must be a character <code>rdsk</code> device.	Point-in-Time Copy
<code>%s is not a character device</code> The volume specified is not a character device.	Remote Mirror
<code>%s is not a character device</code>	CORE

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
The specified device is not a Solaris character device <code>rdsk</code> , and therefore cannot be used.	
<code>%s is not a character device - ignored</code>	CORE
The specified device is not a Solaris character device <code>rdsk</code> , and therefore cannot be used.	
<code>%s is not a Point-in-Time Copy bitmap</code>	Point-in-Time Copy
An attempt to perform a Point-in-Time Copy bitmap operation against the current bitmap volume has failed, since the volume specified is not a valid bitmap volume.	
<code>%s is not a valid number</code> <code>iiadm</code> was expecting a number to be on the command line. This happens when the <code>copy parameters</code> option (<code>-P</code>) is used but the arguments for units and delay are not valid numbers.	Point-in-Time Copy
<code>%s is not an Point-in-Time Copy shadow.</code>	Point-in-Time Copy
An attempt to perform a Point-in-Time Copy bitmap operation against the current bitmap volume has failed, since the volume specified is not a valid bitmap volume.	
<code>%s Neither %s nor %s is local</code> For the Remote Mirror set listed, neither the primary nor secondary Solaris hostname could be determined.	Remote Mirror
<code>%s received signal %d</code> A Solaris <code>signal(3C)</code> , was detected during the processing of an <code>iiadm</code> command.	Point-in-Time Copy
<code>%s unable to determine IP addresses for hosts %s %s</code> The IP addresses for the host names specified for the primary or secondary hosts could not be determined. Verify that the host names are in the <code>/etc/hosts</code> file.	Remote Mirror
<code>%s unable to get maxsets value from kernel</code> An attempt to determine the maximum number of Remote Mirror allowed has failed. Check the status of the <code>/dev/rdc</code> pseudo device driver.	Remote Mirror
<code>%s was not found in the config storage</code> The specified device does not exist in the <code>dscfg</code> database.	CORE
<code>%s: unable to put %s into dsvol cfg</code> The specified device cannot be entered in the <code>dscfg</code> database.	CORE
<code>%s:%s ==> %s:%s already has a disk queue attached</code> A set cannot contain more than one disk queue. To add a new disk queue, remove the old disk queue first. The <code>disk queue replace</code> command can also be used to accomplish this task.	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
<code>%s:%s ==> %s:%s is already enabled</code> The user attempted to enable a remote mirror set using the same secondary volume and secondary host as a remote mirror set that is already enabled. Specify a different secondary volume or secondary host for the new set.	Remote Mirror
<code>%s:%s has invalid size (%s)..cannot proceed</code> An attempt to configure a Remote Mirror replica to a secondary volume that is incorrectly sized is not allowed so the operation cannot proceed.	Remote Mirror
<code>Abort failed</code> <code>iiadm</code> could not abort a copy or update operation on a set. Possible errors: <code>EFAULT</code> : The kernel module tried to read out-of-bounds. You may wish to alert Sun support personnel of this issue. <code>ENOMEM</code> : The kernel module ran out of memory. <code>DSW_EEMPTY</code> : No set was specified. <code>DSW_ENOTFOUND</code> : The specified set does not exist.	Point-in-Time Copy
<code>Add disk queue operation failed</code> An attempt to associate a disk queue with the current Remote Mirror set has failed. Review associated Solaris error messages for a possible cause and resolution.	Remote Mirror
<code>Allocation of bitmap device %s failed</code> Remote mirror could not use the bitmap requested to enable or resume a remote mirror set. This could happen for one of these reasons: <ul style="list-style-type: none">• The bitmap is not accessible. Verify that the specified bitmap volume exists and is accessible.• The volume requested for use as the bitmap is already in use. Verify that the volume is not already in use as a remote mirror data volume or bitmap volume, or as a Point-in-Time Copy master volume, shadow volume, or bitmap volume.	Remote Mirror
<code>Allocation of bitmap device %s failed, volume is too small</code> During the allocation of the bitmap volume, its present size is too small based on the sizing of the Remote Mirror primary or secondary volume. Use <code>dsbitmap(2)</code> to determine correct sizing.	Remote Mirror
<code>Another package would not allow target to be changed at this moment</code> The current Point-in-Time Copy operation could not be completed because the Remote Mirror set is not in a compatible state, often because it is in logging mode.	Point-in-Time Copy
<code>Arguments inconsistent with current bitmap</code> The current or previously specified bitmap volume contains references to another master, shadow or bitmap volume. Often this means that the bitmap volume is being used in another Point-in-Time Copy set.	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
<p>Atomic %s %s %s</p> <p>Informational message stating that one or more volumes in an I/O Consistency group was either updated or copied.</p>	Point-in-Time Copy
<p>Atomic update failed</p> <p>One or more volumes in a group copy or update command failed. Possible errors:</p> <ul style="list-style-type: none"> • EFAULT: The kernel module tried to read out-of-bounds. You may wish to alert Sun support personnel of this issue. • ENOMEM: The kernel module ran out of memory. • EINVAL: User is performing a shadow-to-master copy, but two or more shadows are of the same master. • DSW_EIO: The kernel had a problem reading or writing one of the volumes in the set. 	Point-in-Time Copy
<p>Atomic update of %s failed</p> <p>Same as update failed meaning, but for a specific volume.</p>	Point-in-Time Copy
<p>Bad dev_t in config structure</p> <p>The Solaris dev_t structure is uninitialized. Review the associated Solaris error message for specific reasons.</p>	CORE
<p>Bad host specified</p> <p>Bad set specified. A remote mirror command was issued referring to a set in abbreviated format, but a mistake was made. The format did not specify the set in the format: shost:svol.</p>	Remote Mirror
<p>Bad set specified</p> <p>Bad set specified. A remote mirror command was issued referring to a set in abbreviated format, but a mistake was made. The format did not specify the set in the format: shost:svol.</p>	Remote Mirror
<p>bitmap %s is already in use by StorEdge Network Data Replicator</p> <p>The volume requested as a bitmap for the remote mirror set is already configured to be used by the Remote Mirror software.</p>	Remote Mirror
<p>bitmap %s is in use by Point-in-Time Copy</p> <p>The volume requested as a remote mirror bitmap volume is already configured to be a volume used by the Point-in-Time copy software.</p>	Remote Mirror
<p>bitmap %s is not in disk group %s</p> <p>The user specified bitmap volume is not in the same Sun Cluster disk group as the Remote Mirror primary and secondary volume.</p>	Remote Mirror
<p>bitmap failed</p> <p>The current state of the Remote Mirror sets bitmap volume is failed.</p>	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
<code>bitmap filesystems are not allowed in a cluster</code> Bitmap file systems are no longer supported on any system, cluster, or non-cluster.	CORE
<code>Bitmap in use</code> The volume that was specified as the bitmap volume during an enable operation is already being used by another set.	Point-in-Time Copy
<code>Bitmap magic number is not valid</code> The current or previously specified bitmap volume no longer contains a valid bitmap header. Often this means that the bitmap volume is being used by another Solaris data service.	Point-in-Time Copy
<code>Bitmap reconfig failed %s:%s</code> A request to reconfigure the bitmap on the local host has failed. This can happen for two reasons: <ul style="list-style-type: none">• The old bitmap cannot be read from to obtain needed information.• The new bitmap cannot be reserved because the volume is not accessible or is already in use. Verify that the new bitmap volume is accessible and is not already in use.	Remote Mirror
<code>Bitmap too small</code> The currently specified bitmap volume is too small. See <code>dsbitmap(2)</code> for correct sizing options on a per volume and volume type basis.	Point-in-Time Copy
<code>Bitmap volume is already an overflow volume</code> The volume that was specified as the bitmap volume during an enable operation is already being used by another set as an overflow volume.	Point-in-Time Copy
<code>Bitmap volume is not a character device</code> The volume that was specified as the bitmap volume during an enable operation is a block device and not a character device.	Point-in-Time Copy
<code>Bitmap volume not in a disk group</code> The volume that was specified as the bitmap volume during an enable operation is a block device and not a character device.	Point-in-Time Copy
<code>both %s and %s are local</code> The set specifies the same host as both primary and secondary. The primary and secondary hosts must be different.	Remote Mirror
<code>Both old and new bitmap file names must begin with a /.</code> The volume specifications for the bitmap volume must begin with a "/" character.	Point-in-Time Copy
<code>Both old and new shadow file names must begin with a /.</code> The volume specifications for the bitmap volume must begin with a "/" character.	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
<p>-C (%s) does not match disk group name (%s) for %s</p> <p>The Sun Cluster device group for the current SV volume, does not match the -C tag specified.</p>	CORE
<p>-C (%s) does not match disk groupname (%s) for %s</p> <p>iiadm determined that the cluster resource group that contains the volumes does not match the cluster tag given as an argument to the -C option.</p>	Point-in-Time Copy
<p>-C is not valid when not in a cluster</p> <p>Usage of the -C option is not valid when not in a Sun Cluster operating environment.</p>	CORE
<p>-C specified multiple times</p> <p>iiboot only allows for one instance of the -C option qualifier to be specified.</p>	Point-in-Time Copy
<p>-C specified multiple times</p> <p>Specifying more the one -C option is not allowed.</p>	CORE
<p>-C specified multiple times</p> <p>Specifying more the one -C option is not allowed.</p>	CORE
<p>Cache deconfig failed. Not initialized</p> <p>An attempt to deconfigure the cache when it has already been deconfigured.</p>	CORE
<p>cache disable failed</p> <p>See error message.</p>	CORE
<p>cache enable failed</p> <p>See error message. This may be due to insufficient memory on the system.</p>	CORE
<p>Cache enable failed.</p> <p>Cache failed to configure. This may be due to insufficient memory resources on the system.</p>	CORE
<p>Cache enable failed. Already initialized.</p> <p>An attempt to issue this command while the cache is already configured.</p>	CORE
<p>Cache memory initialization error.</p> <p>Insufficient system memory was available. Please ensure that sufficient memory resources are available on the system.</p>	CORE
<p>Cache not deconfigured</p> <p>Cache failed to deconfigure.</p>	CORE

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
<code>cannot check volume against mount table</code> The <code>iiadm</code> operation attempted to determine whether a volume on the command line belongs to a mounted filesystem . The test for this has failed.	Point-in-Time Copy
<code>cannot determine status of Remote Mirror set %s:%s</code> An attempt to determine the status of the specified Remote Mirror set has failed.	Remote Mirror
<code>cannot start reverse sync as a file system is mounted on %s</code> The primary volume has a file system mounted on it. Unmount the file system on the primary volume and then issue the <code>reverse sync</code> command.	Remote Mirror
<code>cannot start sync as set %s:%s is not logging</code> A Remote Mirror set must currently be in logging mode before a Remote Mirror synchronization operation is allowed.	Remote Mirror
<code>cannot start synch Remote Mirror set %s:%s is not logging</code> An attempt to start synchronization on the specified Remote Mirror set has failed, since the Remote Mirror set is not in logging mode.	Remote Mirror
<code>cannot use current config for bitmap reconfiguration</code> A single set must be specified for bitmap operations. The default configuration cannot be used for these operations.	Remote Mirror
<code>cannot use current config for disk queue operations</code> An individual set or group must be specified when issuing disk queue operations. A single disk queue operation cannot operate on all sets configured or all sets in a file.	Remote Mirror
<code>cannot use current config for enable command</code> A set must be specified when issuing an <code>enable</code> command. An <code>enable</code> command cannot operate on the default configuration.	Remote Mirror
<code>Cannot add %s:%s ==> %s:%s to group %s</code> The set being added to a group cannot be added. Typically, this happens because the set being added is of a different type (<code>sync</code> or <code>async</code>) than the sets already in the group.	Remote Mirror
<code>Cannot allocate cache block structures</code> Insufficient system memory was available. Please ensure that sufficient memory resources are available on the system.	CORE
<code>Cannot allocate cctl sync structures</code> Insufficient system memory was available. Please ensure that sufficient memory resources are available on the system.	CORE

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
<p>Cannot change disk queue %s, all associated sets must be in logging mode</p> <p>A disk queue cannot be added to or removed from a set if it is not in logging mode. Place the set into logging mode and then attempt to add or remove the disk queue.</p>	Remote Mirror
<p>Cannot create hash table</p> <p>Insufficient system memory was available. Please ensure that sufficient memory resources are available on the system.</p>	CORE
<p>Cannot enable %s:%s ==> %s:%s, secondary in use in another set</p> <p>A set being enabled or resumed has a secondary volume that is already in use as a secondary volume for another Remote Mirror set. A volume cannot be enabled as a secondary volume if it is already in use as a secondary volume by another Remote Mirror set.</p>	Remote Mirror
<p>Cannot enable master volume</p> <p>iiadm attempted to put the master volume under SV control during an enable operation, but failed.</p>	Point-in-Time Copy
<p>cannot find Remote Mirror set %s:%s in config</p> <p>Remote mirror set cannot be found in the configuration database. The set is not configured. Check the entry for errors.</p>	Remote Mirror
<p>cannot read config file %s</p> <p>The dscfg database cannot be read. Review the associated Solaris error message for specific reasons.</p>	CORE
<p>Cannot reconfig %s:%s to %s:%s, Must be in logging mode</p> <p>An operation has been requested that requires the Remote Mirror set to be in logging mode. Put the Rremote Mirror set into logging mode and then request the reconfiguration.</p>	Remote Mirror
<p>Cannot reconfigure sync/async on members of a group</p> <p>The user attempted to reconfigure the mode of a set that is in a group. The set must be removed from the group before its mode can be reconfigured.</p>	Remote Mirror
<p>cannot reconfigure sync/async, Remote Mirror set not logging</p> <p>An attempt to reconfigure the specified Remote Mirror set to sync/async mode has failed, as the Remote Mirror set is not in logging mode.</p>	Remote Mirror
<p>cannot replace disk queue %s with %s</p> <p>Look at check_diskqueue(cfg, qvol, group_arg).</p>	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
Cannot reverse sync %s:%s <== %s:%s, set is in queuing mode A reverse sync has been requested on a set that is in queuing mode. Put the set into logging mode and then the issue the reverse sync command for the set.	Remote Mirror
Cannot use direct I/O on first leg of multi hop config When configuring a multi-hop configuration, the first Remote Mirror set configured cannot be configured as a multi-hop node. Only the second or subsequent nodes are allowed.	Remote Mirror
Can't export a mounted volume A volume cannot belong to a mounted file system before it is exported.	Point-in-Time Copy
Can't get memory for list inquiry iiadm ran out of memory.	Point-in-Time Copy
Can't get overflow list length iiadm failed to get list of overflow volumes.	Point-in-Time Copy
Can't import volume on same node An exported shadow volume cannot be imported on the same Solaris host as its original Point-in-Time Copy set.	Point-in-Time Copy
Can't open bitmap file An attempt to perform a Point-in-Time Copy bitmap operation failed because the bitmap specified cannot be opened.	Point-in-Time Copy
Can't open imported bitmap volume User-specified bitmap volume cannot be found to complete import operation.	Point-in-Time Copy
Can't open new bitmap file An attempt to perform a Point-in-Time Copy bitmap operation failed because the bitmap specified cannot be opened.	Point-in-Time Copy
Can't open new shadow file An attempt to perform a Point-in-Time Copy bitmap operation failed because the new shadow volume cannot be opened.	Point-in-Time Copy
Can't open old bitmap file An attempt to perform a Point-in-Time Copy bitmap operation failed because the old bitmap specified cannot be opened.	Point-in-Time Copy
Can't open old shadow file An attempt to perform a Point-in-Time Copy bitmap operation failed because the old shadow specified cannot be opened.	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
<code>Can't open sort program</code> The <code>iiadm</code> operation is attempting to sort output before displaying it but cannot find the sort utility. The utility is typically found in <code>/usr/bin/sort</code> .	Point-in-Time Copy
<code>Can't read bitmap file</code> An attempt to perform a Point-in-Time Copy bitmap operation failed because the bitmap specified cannot be read.	Point-in-Time Copy
<code>Can't read old bitmap file</code> An attempt to perform a Point-in-Time Copy bitmap operation failed because the old bitmap specified cannot be read.	Point-in-Time Copy
<code>Can't write new bitmap header</code> An attempt to perform a Point-in-Time Copy bitmap operation failed because the new bitmap specified cannot be written.	Point-in-Time Copy
<code>Can't write new bitmap header</code> An attempt to perform a Point-in-Time Copy bitmap operation failed because the new bitmap specified cannot be written.	Point-in-Time Copy
<code>cfg input error</code> The <code>dscfg</code> database is in error. Refer to the associated Solaris error message for additional information as to the reason for this error.	Remote Mirror
<code>cfg_lock: lock failed</code> Unable to lock the configuration database.	CORE
<code>Change request denied, don't understand request version</code> A request was sent from one Remote Mirror host to the other, and the version of the software was not understood by the receiving host. Verify that both hosts are running compatible versions of the Remote Mirror software.	Remote Mirror
<code>Change request denied, volume mirror is up</code> The user asked to <code>sync</code> a remote mirror set, and the secondary host has refused the <code>sync</code> event.	Remote Mirror
<code>changing queue parameters may only be done on a primary Remote Mirror host</code> The queue parameters for the <code>async</code> I/O queue, both memory-based and disk-based, can be changed only on the primary host.	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
Changing the primary Remote Mirror device %s:%s to become secondary and the secondary Remote Mirror device %s:%s to become primary is not allowed in advanced configs	Remote Mirror
In a one-to-many or multi-hop configuration, chaining the primary Remote Mirror device via role-reversal is not allowed.	
Chunks in map: %d used: %d	Point-in-Time Copy
Current amount of overflow volume chunks and chunks in use.	
Clean shutdown of volume sets associated with overflow volume did not occur. Overflow counters will be inconsistent until new point-in-time(s) are taken.	Point-in-Time Copy
A clean shutdown of one or more Point-in-Time Copy sets associated with a single overflow volume failed. New Point-in-Time Copy sets will be required.	
Cluster list access failure	Point-in-Time Copy
iiadm was unable to retrieve a list of cluster groups from the kernel. Possible errors: <ul style="list-style-type: none">• EFAULT: The kernel module tried to read out-of-bounds. You may wish to alert Sun support personnel of this issue.• ENOMEM: The kernel module ran out of memory.	
cluster name is longer than %d characters	Remote Mirror
The cluster resource tag is too long for the remote mirror software to accept.	
Cluster resource group not found	Point-in-Time Copy
The Sun Cluster resource group specified is not currently associated with any Point-in-Time Copy set	
commit failed on disk queue operation	Remote Mirror
An attempt to commit one or more configuration changes to the <code>dscfg</code> database has failed. Refer to the associated Solaris error message for additional information as to the reason for this error.	
commit on force disable failed	Remote Mirror
An attempt to commit a disk queue operation change to the <code>dscfg</code> database has failed. Refer to the associated Solaris error message for additional information as to the reason for this error.	
commit on role reversal failed	Remote Mirror
An attempt to commit a force disable change to the <code>dscfg</code> database has failed. Refer to the associated Solaris error message for additional information as to the reason for this error.	

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
<p>commit replace disk queue %s with %s failed</p> <p>An attempt to commit a replace disk queue change to the dscfg database has failed. Refer to the associated Solaris error message for additional information as to the reason for this error.</p>	Remote Mirror
<p>Config contains no dual copy sets</p> <p>The current dscfg database contains no configured Remote Mirror sets.</p>	Remote Mirror
<p>Config contains no Point-in-Time Copy sets</p> <p>An attempt to suspend or resume one or more Point-in-Time Copy sets has shown that no sets exist.</p>	Point-in-Time Copy
<p>config error: neither %s nor %s is localhost</p> <p>The current host is neither the primary nor secondary host for the Remote Mirror set. Verify that the hostname of the system has not been changed since the Remote Mirror set was enabled.</p>	Remote Mirror
<p>Copy already in progress</p> <p>An attempt to issue a new Point-in-Time Copy copy or update operation failed because a copy operation is already in progress.</p>	Point-in-Time Copy
<p>Copy operation aborted</p> <p>An active update or copy operation was aborted, often by the issuing of an abort command (iiaadm -a <shadow-volume>)</p>	Point-in-Time Copy
<p>Could not create rdc_config process</p> <p>The user has issued a sync for a Remote Mmirror set and the process could not be started for the set. The system is probably low on resources. Check the amount of memory and threads available.</p>	Remote Mirror
<p>Could not open file %s:%s on remote node</p> <p>The user issued a sync command and the primary host could not reach the secondary host. Verify that the link from the primary to the secondary host is operating and that none of the ports used by the Remote Mirror are blocked by a firewall or in use by another application.</p>	Remote Mirror
<p>Create overflow failed %s</p>	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
<p>An overflow volume couldn't be initialized. Possible errors:</p> <ul style="list-style-type: none"> • EFAULT: The kernel module tried to read out-of-bounds. You may wish to alert Sun support personnel of this issue. • ENOMEM: The kernel module ran out of memory. • DSW_EEMPTY: No overflow volume was specified. • DSW_EINUSE: The volume that was specified is already being used by the Point-in-Time Copy software in another capacity. • DSW_EIO: The kernel was unable to write to the volume. • DSW_ERSRVFAIL: The kernel was unable to access the volume. 	
<p>ctag %s does not match disk group name %s of bitmap %s</p>	Remote Mirror
<p>The Sun Cluster resource tag given for a set is different from the configured Sun Cluster resource tag.</p>	
<p>ctags %s and %s do not match, proceeding with operation based on existing set information</p>	Remote Mirror
<p>The specified tags versus Sun Cluster derived ctags (device groups) do not match.</p>	
<p>Currently configured resource groups</p>	Point-in-Time Copy
<p>An informational header shown prior to listing all Point-in-Time Copy sets that are currently configured in a resource group.</p>	
<p>desired cache size (%d) set to system max (%d)</p>	CORE
<p>Due to an attempt to configure the cache size larger than the system maximum, the cache size has been lowered to the system maximum.</p>	
<p>Detach of overflow %s failed</p>	Point-in-Time Copy
<p>An overflow volume couldn't be detached from the current Point-in-Time Copy set, often because the overflow volume contains Point-in-Time Copy data. Taking a new Point-in-Time Copy copy or update will clear this condition.</p>	
<p>Device already enabled</p>	CORE
<p>The specified SV volume is already configured in the Solaris kernel. Review potential misuse of all devices configured in Remote Mirror, Point-in-Time Copy, and SV.</p>	
<p>Device already present in kernel</p>	CORE
<p>The specified SV volume is already configured in the Solaris kernel. Review potential misuse of all devices configured in Remote Mirror, Point-in-Time Copy, and SV.</p>	
<p>device name is longer than %d characters</p>	Remote Mirror
<p>The user-specified device name is longer than the current length supported.</p>	
<p>Device not enabled</p>	CORE
<p>A previously configured Remote Mirror, Point-in-Time Copy, or SV device is no longer enabled. Review the associated Solaris error message for specific the reasons.</p>	

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
Device not present in kernel configuration	CORE
The specified SV volume is not configured in the Solaris kernel. Review potential misuse of all devices configured in Remote Mirror, Point-in-Time Copy, and SV.	
device or cd %s not found	CORE
The device or cache descriptor specified was not found enabled in the sdbc kernel module.	
did not find matching ndr_ii entry for %s %s %s	Remote Mirror
An attempt to locate a previously configured ndr_ii set has failed.	
Disable pending on diskq %s, try again later	Remote Mirror
A request to disable the disk queue is already in progress. Verify that the previous request has completed successfully. If it has, this request is no longer valid. If it has not, wait for it to complete unsuccessfully before attempting to disable the disk queue.	
disk queue %s does not match %s skipping set	Remote Mirror
The user tried to enable a set into a group that has a disk queue, but the user specified a disk queue that does not match the group's disk queue.	
Disk queue %s is already in use	Remote Mirror
The volume for the disk queue being added to the set or group is already in use as a data volume, bitmap volume, or disk queue. Use a different volume for the disk queue.	
disk queue %s is incompatible with existing queue	Remote Mirror
The user tried to enable a set into a group that has a disk queue, but the user specified a disk queue that does not match the group's disk queue.	
disk queue %s is not in disk group %s	Remote Mirror
The user tried to enable a disk queue that does not reside in the same cluster resource group in which the volume and bitmap reside.	
Disk queue %s operation not possible, set is in replicating mode	Remote Mirror
The user attempted to perform disk queue maintenance on a set while the set is replicating.	
Disk queue does not exist for set %s:%s ==> %s:%s	Remote Mirror
The user attempted to perform disk queue maintenance on a set that does not have a disk queue.	
disk queue failed	Remote Mirror
The current processing state of the list disk queue is failed.	

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
Disk queue operations on synchronous sets not allowed An attempt to enable a sync set with a disk queue, or to add a disk queue to a sync set, has been made. Sync sets cannot have disk queues attached to them.	Remote Mirror
disk queue volume %s must not match any primary Remote Mirror volume or bitmap The disk queue volume specified for the reconfiguration operation is already in use by the remote mirror software as a data volume or bitmap volume.	Remote Mirror
disk service, %s, is active on node %s Please re-issue the command on that node An attempt to perform a Point-in-Time Copy operation against a set not on the current Sun Cluster node is not possible. Reissue the operation on the specified Sun Cluster node.	Point-in-Time Copy
disk service, %s, is active on node %s Please re-issue the command on that node The Remote Mirror set being operated on is not active on the current node in the cluster.	Remote Mirror
disk service, %s, is active on node \"%s\" Please re-issue the command on that node The <code>iiadm</code> command must be issued on the other node of the cluster. The disk group that the user is attempting to operate on is not active on the node where the <code>iiadm</code> command was issued.	CORE
diskq name is longer than %d characters The device specified for the disk queue volume is too long for Remote Mirror to accept.	Remote Mirror
diskqueue %s is incompatible The user tried to enable a set into a group that has a disk queue, but the user specified a disk queue that does not match the group's disk queue.	Remote Mirror
diskqueue set to blocking for %s:%s and any members of its group See message.	Remote Mirror
diskqueue set to non blocking for %s:%s and any members of its group See message.	Remote Mirror
don't understand shadow type The <code>iiadm -e</code> command expected <code>dep</code> or <code>ind</code> .	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
dscfg -s is only allowed in Sun Cluster OE See error message.	CORE
dscfg: %d is not a valid response See error message.	CORE
dscfg: cannot load parser configuration file See error message.	CORE
dscfg: cluster config not set: %s The Sun Cluster configuration location must be set when using the -C option.	CORE
dscfg: failure to access %s configuration database: %s See error message.	CORE
dscfg: -p option must be used in conjunction with -i See error message.	CORE
dscfg: seek error Unable to skip over the VTOC.	CORE
dscfg: unable to create new config See error message.	CORE
dscfg: unable to open parser configuration (%s): %s Unable to open the parser configuration file. The standard location for this file is /etc/dscfg_format.	CORE
dscfg: unable to read vtoc on (%s) See error message.	CORE
dscfg: upgrade failed Unable to upgrade the lock on the configuration database from a read lock to a write lock.	CORE
Dual copy failed, offset:%s	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
<p>A <code>sync</code> or <code>reverse sync</code> was started but could not complete, for one of the following reasons:</p> <ul style="list-style-type: none">• The user issued a logging request manually, causing the <code>sync</code> or <code>reverse sync</code> to abort.• The network link between the primary and the secondary host failed, causing the <code>sync</code> or <code>reverse sync</code> to stop.• The primary or secondary volume encountered an error and the remote mirror software was unable to read or write to the volume.• In a Sun Cluster environment, a failover of the resource group might have been issued, causing the <code>sync</code> or <code>reverse sync</code> to be stopped.	
<p>Duplicate volume specified</p>	Point-in-Time Copy
<p>A command that can take multiple shadow volume names (like <code>update</code> or <code>copy</code>) detected that a shadow volume was specified more than once.</p>	
<p>either <code>%s:%s</code> or <code>%s:%s</code> is not local</p>	Remote Mirror
<p>The command was issued on a system that is not the primary or secondary host for the specified set. Verify the command is being issued on the proper system.</p>	
<p>Empty string</p>	Point-in-Time Copy
<p>An <code>enable</code> or <code>resume</code> request for a Remote Mirror set was issued but a required field was not filled in when the request was received in the kernel. This is not something the user can control.</p>	
<p>Empty string</p>	Remote Mirror
<p>One or more configuration parameters are either missing or are empty (" ") strings.</p>	
<p>Enable failed</p>	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
<p>Could not enable volume. Possible errors:</p> <ul style="list-style-type: none"> • EFAULT: The kernel module tried to read out-of-bounds. You may wish to alert Sun support personnel of this issue. • ENOMEM: The kernel module ran out of memory. • DSW_ESHUTDOWN: The kernel module is in the process of shutting down the Point-in-Time copy software. No new sets can be enabled. • DSW_EEMPTY: One of the volumes' names (master, shadow, bitmap) is blank. You may wish to alert Sun support personnel of this issue. • DSW_EINUSE: One of the volumes (master, shadow, bitmap) is already being used by another set. • DSW_EOPEN: Failed to open one of the volumes (master, shadow, or bitmap). • DSW_EHDRBMP: Could not read bitmap header. Bitmap volume might be inaccessible or bad. • DSW_EOFFLINE: One of the volumes (master, shadow, bitmap) is offline and cannot be made part of a set. • DSW_ERSRVFAIL: Could not get access to the underlying volume (master, shadow, bitmap). 	
<p>Enable failed %s %s %s (%s)</p>	Point-in-Time Copy
<p>Error message stating that a Point-in-Time Copy enable operation failed. The message is associated with one or more Solaris error messages, depicting the reason the operation failed.</p>	
<p>Enable failed, can't tidy up cfg</p>	Point-in-Time Copy
<p>Could not enable volume and could not remove new entry from configuration file.</p>	
<p>enabling a disk queue on a Remote Mirror secondary is not allowed.</p>	Remote Mirror
<p>See message.</p>	
<p>enabling disk queue on a Remote Mirror secondary is not allowed (%s)</p>	Remote Mirror
<p>A disk queue can be added only to a set on the primary site.</p>	
<p>Error from nsc_open()</p>	CORE
<p>The previously configured Remote Mirror, Point-in-Time Copy, or SV device is no longer available.</p>	
<p>Error getting scrgadm output</p>	Remote Mirror
<p>An attempt to query the Sun Cluster Resource Group Manager for a stor-rg resource type has failed.</p>	
<p>Error locking config</p>	Point-in-Time Copy
<p>An attempt to lock the dscfg database has failed. Review the associated Solaris error message for specific reasons.</p>	

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
Error locking config An attempt to lock the <code>dscfg</code> configuration database has failed. Review the associated Solaris error message for specific details.	Point-in-Time Copy
error locking config An attempt to lock the <code>dscfg</code> database has failed. Review the associated Solaris error message for specific reasons.	Remote Mirror
Error locking config: %s Unable to lock the <code>dscfg</code> database for exclusive access.	CORE
Error opening config An attempt to open the <code>dscfg</code> database has failed. Review the associated Solaris error message for specific reasons.	Point-in-Time Copy
error opening config An attempt to open the <code>dscfg</code> data has failed. Review the associated Solaris error message for specific reasons.	Remote Mirror
Error opening config: %s Unable to open the <code>dscfg</code> database. Review the associated Solaris error message for specific reasons.	CORE
Export failed Could not export the shadow of the specified set. Possible errors: <ul style="list-style-type: none"> • EFAULT: The kernel module tried to read out-of-bounds. You may wish to alert Sun support personnel of this issue. • ENOMEM: The kernel module ran out of memory. • DSW_EEMPTY: No set was specified for an export. • DSW_ENOTFOUND: The specified set does not exist in the kernel. • DSW_EDEPENDENCY: The set is not independent. • DSW_ERSRVFAIL: Could not access the bitmap header to record the export operation. 	Point-in-Time Copy
Fail reset %s An attempt to perform a reset operation against the specified master, shadow, or bitmap volume of a Point-in-Time Copy set failed.	Point-in-Time Copy
Failed to add new disk queue An attempt to associate a disk queue with the current Remote Mirror set has failed. Review associated Solaris error messages for a possible cause and resolution.	Remote Mirror
Failed to allocate memory <code>iiadm</code> ran out of memory.	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
Failed to allocate memory An attempt to allocate memory for the current <code>iiboot</code> operation has failed.	Point-in-Time Copy
Failed to delete Imported shadow %s As part of implicit join processing in a Sun Cluster, the deletion of the import shadow volume has failed.	Point-in-Time Copy
Failed to detach overflow volume <code>iiadm</code> had a problem detaching the overflow volume from a set. Possible errors: <ul style="list-style-type: none"> • EFAULT: The kernel module tried to read out-of-bounds. You may wish to alert Sun support personnel of this issue. • ENOMEM: The kernel module ran out of memory. • DSW_EEMPTY: No set was specified to detach from. • DSW_ENOTFOUND: The set to detach from does not exist. • DSW_EDEPENDENCY: The overflow volume is still in use by the set that the user attempted to detach it from. • DSW_ERSRVFAIL: Could not access the bitmap header to record the overflow detach. • DSW_EHDRBMP: Could write the bitmap header to record the overflow detach. 	Point-in-Time Copy
Failed to device group for shadow %s An attempt to determine the disk group name of a Sun Cluster controlled volume has failed for unspecified reasons.	Point-in-Time Copy
Failed to get LIST of Point-in-Time sets An attempt to get the current list of configured Point-in-Time Copy sets has failed.	Point-in-Time Copy
Failed to move group in kernel Could not move the set from one group to another. Possible errors: <ul style="list-style-type: none"> • EFAULT: The kernel module tried to read out-of-bounds. You may wish to alert Sun support personnel of this issue. • ENOMEM: The kernel module ran out of memory. • DSW_EEMPTY: <code>iiadm</code> failed to fill in the group name. This is a bug. 	Point-in-Time Copy
Failed to open <code>dscfg</code> An attempt to access the <code>dscfg</code> configuration database has failed. Review the associated Solaris error message for specific details.	Point-in-Time Copy
Failed to open Point-in-Time Copy control device An attempt to access the <code>/dev/ii</code> pseudo device driver has failed.	Point-in-Time Copy
Failed to remove bitmap [%s] from configuration See error message.	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
Failed to remove data volume [%s] from configuration See error message.	Remote Mirror
Failed to remove disk queue [%s] from configuration See error message.	Remote Mirror
failed to update autosync for Remote Mirror set %s:%s Autosync could not be activated for the set when going from logging mode to replicating mode.	Remote Mirror
Failed to update dscfg An attempt to update the dscfg configuration database has failed. Review the associated Solaris error message for specific details.	Point-in-Time Copy
fcsl failed An attempt to use FCAL verses TCP/IP has failed. Review the associated Solaris error message for specific reasons.	Remote Mirror
Flush threads create failure. Insufficient system memory was available. Please ensure that sufficient memory resources are available on the system.	CORE
found matching ndr_ii entry for %s There is already an ndr_ii entry for this Remote Mirror set.	Remote Mirror
get cd(%d) hint failed This suggests that the fundamental communication between scmadm and the sdbc module does not function properly. The sdbc module may not be loaded.	CORE
Get cluster data operation failed. Cache not initialized An attempt to issue this command while the cache is deconfigured.	CORE
Get cluster size operation failed. Cache not initialized An attempt to issue this command while the cache is deconfigured.	CORE
Get global info operation failed. Cache not initialized An attempt to issue this command while the cache is deconfigured.	CORE
Get global size operation failed. Cache not initialized An attempt to issue this command while the cache is deconfigured.	CORE
get maxfiles failed This usually indicates that the configuration database is not accessible.	CORE

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
get system options failed	CORE
This suggests that the fundamental communication between <code>scmadm</code> and the <code>sdbc</code> module is not functioning properly. The <code>sdbc</code> module may not be loaded.	
Group config does not match kernel	Point-in-Time Copy
The groups in <code>dscfg</code> are different from the groups in the kernel.	
Group contains sets not in the same cluster resource	Point-in-Time Copy
An attempt to add the current Point-in-Time Copy set to the I/O consistency group specified failed, because constituent volumes from other cluster resource groups are not the same.	
Group does not exist or has no members	Point-in-Time Copy
An invalid group was specified for a group-based command. For example: <code>copy</code> , <code>update</code> , and <code>abort</code> .	
Group list access failure	Point-in-Time Copy
Could not retrieve the list of sets belonging to a group from the kernel. Possible errors:	
<ul style="list-style-type: none"> • EFAULT: The kernel module tried to read out-of-bounds. You may wish to alert Sun support personnel of this issue. • ENOMEM: The kernel module ran out of memory. 	
group name cannot contain a space	Point-in-Time Copy
iiadm I/O consistency group names cannot contain a space.	
group name cannot contain a space	Remote Mirror
Remote Mirror I/O consistency group names cannot contain a space.	
group name cannot start with a -	Remote Mirror
Remote Mirror I/O consistency group names cannot contain a dash.	
group name cannot start with a '-	Point-in-Time Copy
iiadm I/O consistency group names cannot contain a dash.	
group name is longer than %d characters	Remote Mirror
The group name specified is too long for the Remote Mirror software to accept.	
Host %s is not local	Remote Mirror
For the Remote Mirror set listed, neither the primary nor secondary Solaris host name could be determined.	
hostname is longer than %d characters	Remote Mirror
The host name specified is too long for the Remote Mirror software.	

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
I/O error copying data During an update or copy operation, the associated master or shadow volume returned an I/O error.	Point-in-Time Copy
Illegal access mode An attempt to configure a Remote Mirror, Point-in-Time Copy, or SV device is not allowed due to access issues. Review the associated Solaris error message for specific reasons.	CORE
Imported shadow not disabled An attempt to disable a Point-in-Time Copy set while the shadow volume is exported not allowed.	Point-in-Time Copy
Improper Remote Mirror resource group state The current Sun Cluster Resource Group Manager's state for one or more Remote Mirror sets is inconsistent.	Remote Mirror
Improper resource group status for Remote Mirror The current Sun Cluster Resource Group Manager's status for one or more Remote Mirror sets is inconsistent.	Remote Mirror
Incorrect number of arguments Based on the <code>iiadm</code> option specified, an incorrect number of arguments is given.	Point-in-Time Copy
incorrect Solaris release (requires %s) The Solaris version that the software is trying to run on is not supported.	Remote Mirror
incorrect Solaris release (requires %s) See error message.	Remote Mirror
Initialization of disk queue %s failed An attempt to initialize a disk queue associated with the current Remote Mirror set has failed. Review the associated Solaris error messages for a possible reason.	Remote Mirror
Insufficient memory for cache. Insufficient system memory was available. Please ensure that sufficient memory resources are available on the system.	CORE
Invalid count specified. The count specified was invalid. The count must be an integer greater than 0.	CORE
Invalid display-flags for CACHE Invalid flags specified to <code>-d</code> option. Valid flags are: <code>rwdspf</code> .	CORE

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
Invalid display-flags for Point-in-Time Copy Invalid flags specified to -d option. Valid flags are: rwtspf.	CORE
Invalid display-flags for RemoteMirror Invalid flags specified to -d option. Valid flags are: rwtspf.	CORE
Invalid display-flags set See error message.	CORE
Invalid flag %s The set that the software trying to enable has not passed the proper options to the kernel. The sync or async value, primary or secondary value, or enable map set or clear map set value is not valid. This is not something the user can control.	Remote Mirror
Invalid interval specified. The interval specified was invalid. The interval must be an integer greater than 0.	CORE
Invalid kstat format detected. One or more kstat fields is missing from the kstat structure.	CORE
Invalid mode specified The mode specified was invalid. The only valid modes are ii, sndr, and cache.	CORE
Invalid report-flags for CACHE The -r option is not applicable in cache mode.	CORE
Invalid report-flags for Point-in-Time Copy Invalid flags specified to -r option. Valid flags are: msbo.	CORE
Invalid report-flags for Remote Mirror Invalid flags specified to -r option. Valid flags are: bn.	CORE
Invalid report-flags set See error message.	CORE
ip specification missing The current Remote Mirror configuration entry is missing the TCP/IP replication type (async or sync)	Remote Mirror
ip/fcal specification missing The current Remote Mirror configuration entry is missing the TCP/IP or FCAL replication type (async or sync)	Remote Mirror
line %d: invalid format The sv: records in the dscfg database are incorrectly formatted.	CORE

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
line %d: line too long -- should be less than %d characters The sv: records in the dscfg database are too long.	CORE
line %d: raw device name (%s) longer than %d characters The sv: devices in the dscfg database are too long.	CORE
malloc bitmap An attempt to allocate memory for the current iiadm bitmap operation has failed.	Point-in-Time Copy
Master and bitmap are the same device During an enable operation, iiadm discovered that the master volume and the bitmap volume are the same.	Point-in-Time Copy
Master and shadow are the same device During an enable operation, iiadm discovered that the master volume and the shadow volume are the same.	Point-in-Time Copy
Master volume is already an overflow volume During an enable operation, iiadm discovered that the volume specified as the master is already in use as an overflow volume.	Point-in-Time Copy
Master volume is not a character device During an enable operation, iiadm discovered that the master volume is a block device and not a character or raw device.	Point-in-Time Copy
Memory allocation failure iiadm ran out of memory.	Point-in-Time Copy
Mismatched versions of scmadm and sdbc module. The versions of scmadm and sdbc are not consistent. Ensure that the SUNWscmu and SUNWscmr packages are completely and successfully installed. You may have to reinstall these packages.	CORE
Missing Enabled HASToragePlus in resource group <\$rgname> for Remote Mirror See error message.	Remote Mirror
Missing Enabled Logical Host in resource group <\$rgname> for Remote Mirror See error message.	Remote Mirror
Must be super-user to execute The user issued a Remote Mirror command but does not have superuser privileges. All remote mirror commands require superuser privileges.	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
<p><code>must specify full set details for enable command</code></p> <p>The user attempted to enable a set using the <code>shost:svol</code> format. All parameters for a set must be specified.</p>	Remote Mirror
<p><code>ndr_ii set %s %s %s has been deconfigured</code></p> <p>Informational message stating the a preconfigured <code>ndr_ii</code> entry is no longer being used.</p>	Remote Mirror
<p><code>ndr_ii set %s %s %s not deconfigured</code></p> <p>Warning message stating the a pre-configured <code>ndr_ii</code> entry cannot be deconfigured.</p>	Remote Mirror
<p><code>need reverse sync</code></p> <p>An active reverse update failed to complete correctly, requiring that the Remote Mirror set needs a <code>reverse sync</code> operation before being used.</p>	Remote Mirror
<p><code>need sync</code></p> <p>An active update failed to complete correctly, requiring that the Remote Mirror set needs a <code>sync</code> operation before being used.</p>	Remote Mirror
<p><code>New bitmap name is to long.</code></p> <p>An attempt to perform a Point-in-Time Copy bitmap operation failed because the new bitmap name is too long.</p>	Point-in-Time Copy
<p><code>New shadow name is to long.</code></p> <p>An attempt to perform a Point-in-Time Copy bitmap operation failed because the new shadow name is too long.</p>	Point-in-Time Copy
<p><code>No memory for buffer handles.</code></p> <p>Insufficient system memory was available. Please ensure that sufficient memory resources are available on the system.</p>	CORE
<p><code>No memory for iobuf hooks.</code></p> <p>Insufficient system memory was available. Please ensure that sufficient memory resources are available on the system.</p>	CORE
<p><code>No more SVs available</code></p> <p>The maximum number of SV devices as specified in <code>/usr/kernel/drv/nsctl.config</code>, using the parameter <code>nsc_max_devices</code>, has been exceeded.</p>	CORE
<p><code>No resources in Remote Mirror resource group <\$rgname></code></p> <p>See error message.</p>	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
<p>No statistics available for the specified mode(s).</p> <p>This message suggests either that the specified mode is not enabled or present on the system, or that no volumes are configured in that mode on the system. To see the status of each mode, use <code>dscfgadm -i</code>.</p>	CORE
<p>No such group defined</p> <p>The I/O consistency group specified is not currently associated with any Point-in-Time Copy set.</p>	Point-in-Time Copy
<p>Not a compact dependent shadow</p> <p>The user attempted to attach an overflow volume to a set that is not a compact dependent set. Possible errors:</p> <ul style="list-style-type: none"> • EFAULT: The kernel module tried to read out-of-bounds. You may wish to alert Sun support personnel of this issue. • ENOMEM: The kernel module ran out of memory. • DSW_EEMPTY: No volume name was specified. • DSW_ENOTFOUND: The set could not be found in the kernel. 	Point-in-Time Copy
<p>Not all Point-in-Time Copy volumes are in a disk group</p> <p>All volumes (master, shadow, and bitmap) must be in the same cluster device group.</p>	Point-in-Time Copy
<p>Not primary, cannot sync %s:%s and %s:%s</p> <p>An update, full sync, or reverse sync command was issued on the secondary host. These commands can be issued only on the primary host. Log in to the primary host and issue the request.</p>	Remote Mirror
<p>Not running on either host %s or host %s</p> <p>Remote Mirror is unable to ascertain if it is running on either the primary or secondary node of a configured replicated set.</p>	Remote Mirror
<p>nsc_open failed</p> <p>A current or previously specified Availability Suite volume is no longer available.</p>	Point-in-Time Copy
<p>nsc_partsize failed</p> <p>A current or previously specified Availability Suite volume size cannot be determined.</p>	Point-in-Time Copy
<p>nsc_reserve failed</p> <p>A current or previously specified Availability Suite volume size cannot be exclusively accessed. Often the volume in question is in use by another Solaris data service.</p>	Point-in-Time Copy
<p>NULL struct knetconfig passed down from user program</p> <p>The Remote Mirror software could not get network information for the Remote Mirror set.</p>	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
<p>NULL struct netbuf passed down from user program for %s</p> <p>The Remote Mirror software could not get network information for the Remote Mirror set.</p>	Remote Mirror
<p>number of Remote Mirror sets exceeds %d</p> <p>The current number of configured Remote Mirror sets exceeds the value specified in the configuration file /usr/kernel/drv/rdc.conf.</p>	Remote Mirror
<p>Obsolete sdbc ioctl used</p> <p>See error message.</p>	CORE
<p>Old bitmap not in existing cfg</p> <p>An attempt to read the dscfg configuration database for the bitmap volume specified has failed. Review the associated Solaris error message for specific details.</p>	Point-in-Time Copy
<p>Old shadow not in existing cfg</p> <p>An attempt to read the dscfg configuration database for the shadow volume specified has failed. Review the associated Solaris error message for specific details.</p>	Point-in-Time Copy
<p>One of the sets is not enabled</p> <p>An attempt to resume Remote Mirror operations has found that one of the sets is not enabled.</p>	Remote Mirror
<p>One of the sets is not logging</p> <p>An attempt to resume Remote Mirror operations has found that one of the sets is not logging.</p>	Remote Mirror
<p>One or more sets failed to be disabled</p> <p>The disable of one or more Point-in-Time Copy sets in a single I/O consistency group failed to be set to disable.</p>	Point-in-Time Copy
<p>Operation already successfully performed</p> <p>The current Point-in-Time Copy set already has an associated overflow volume.</p>	Point-in-Time Copy
<p>Operation not possible, disk queue %s is not empty.</p> <p>Disk queue was not empty when the current operation was attempted. This usually occurs when the user attempts to disable.</p>	Remote Mirror
<p>Operation not possible. Disk queue %s is flushing, try again later</p> <p>While a Remote Mirror shared disk queue is flushing, it is not possible to reinitialize the disk queue for the current Remote Mirror set.</p>	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
Out of memory creating lookup table iiadm ran out of memory.	Point-in-Time Copy
Overflow list access failure iiadm could not get a list of overflow volumes from the kernel. Possible errors: <ul style="list-style-type: none"> • EFAULT: The kernel module tried to read out-ofbound. You may wish to alert Sun support personnel of this issue. • ENOMEM: The kernel module ran out of memory. 	Point-in-Time Copy
Overflow volume magic number or name does not match The current or previously specified overflow volume no longer contains a valid overflow header. Often this means that the overflow volume is being used by another Solaris data service.	Point-in-Time Copy
Overflow volume not in a disk group The user attempted to attach a volume to a set, but the set's volumes are part of a cluster device group and the overflow volume is not.	Point-in-Time Copy
parser config file (%s) not found Unable to find the parser configuration file. The standard location for this file is /etc/dscfg_format.	CORE
Percent of bitmap set: %u Informational message showing the percentage of bits set in the associated bitmap volume, a value which is the amount of change between the master and shadow volume.	Point-in-Time Copy
Point-in-Time Copy set %s %s %s is not already configured. Remote Mirror will attempt to configure this set when a sync is issued to it. The results of that operation will be in /var/adm/ds.log An ndr_ii pair has been associated with the current Remote Mirror set, yet it will not be put into use or validate that it is correctly configure until such a time as it is needed.	Remote Mirror
Point-in-Time Copy volumes, that are not in a device group which has been registered with SunCluster require usage of -C An attempt to use a non-Sun Cluster device without specifying the -C local tag, is not allowed.	Point-in-Time Copy
raw device name (%s) longer than %d characters The specified device name is too long.	CORE
rdc config alloc failed %s An attempt to create a new Remote Mirror configuration has failed. Review the associated Solaris error message for specific reasons.	Remote Mirror
Recovery bitmaps not allocated	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
A full copy, update, sync, or reverse sync operation has been requested but the bitmap on the primary host cannot be accessed. Verify that the bitmap volume is a valid volume and is not in an error state.	
Recursive strategy functions	CORE
An attempt to interpose the SV pseudo device driver on the specified device, has shown that this device is already SV enabled.	
Remote Mirror async. queue statistics cannot be displayed with multiple modes.	CORE
See error message.	
Remote Mirror set already has a disk queue	Remote Mirror
An attempt to add a disk queue to the current Remote Mirror set has failed, since there is already a disk queue associated with the set.	
Remote Mirror set does not have a disk queue	Remote Mirror
Set does not have a disk queue attached when attempting either a queue remove operation or a queue replace operation.	
Remote Mirror: %s and %s refer to the same device	Remote Mirror
A physical device cannot be used for more than one volume in the Remote Mmirror set.	
Remote Mirror: %s: already configured as %s	Remote Mirror
An attempt to configure a Remote Mirror replica failed because the specified set is already configured.	
Remote Mirror: can't stat %s	Remote Mirror
The volume specified cannot be accessed by the system.	
Remote Mirror: forcibly removed diskqueue from set %s:%s and its group	Remote Mirror
A forced delete of a Remote Mirror node and its group has completed even though this node is neither the Remote Mirror primary or Remote Mirror secondary.	
Remote Mirror: The volume '%s' has been configured previously as %s. Re-enter command with the latter name.	Remote Mirror
The user attempted to enable a set in which the volume was already enabled, but with a different name. Re-enter the command with the latter name.	
Remote Mirror: unable to parse config file	Remote Mirror
Failed to find specified Remote Mirror sets in configuration file.	
Replace disk queue operation failed	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
An attempt to replace a Remote Mirror disk queue has failed. Please refer to the associated Solaris error messages for additional information as to the reason for this failure.	
Request not serviced, %s is currently being synced.	Remote Mirror
The user attempted to <code>sync</code> the Remote Mirror set, or put the Remote Mirror set into logging mode, while a previous <code>sync</code> request was being set up.	
<ul style="list-style-type: none"> • If the user issued a second <code>sync</code> request, the user must first put the Remote Mirror set into logging mode and then issue the <code>sync</code>. • If the user issued a <code>logging</code> request, the user must first wait for the <code>sync</code> request to finish setting up and then issue the <code>logging</code> request. This stops the <code>sync</code> and places the Remote Mirror set into logging mode. 	
Reset shadow failed	Point-in-Time Copy
Possible errors:	
<ul style="list-style-type: none"> • EFAULT: The kernel module tried to read out-of-bounds. You may want to alert Sun support personnel of this issue. • ENOMEM: The kernel module ran out of memory. • DSW_EEMPTY: No set was specified to reset. • DSW_ENOTFOUND: The specified set could not be found in the kernel. • EINVAL: Bitmap volume is invalid. • DSW_ERSRVFAIL: The kernel could not access one of the volumes. • DSW_EHDRBMP: Could not set up bitmap header. 	
Resume realloc failed	Point-in-Time Copy
An attempt to reallocate memory for the current <code>iiboot</code> operation has failed.	
Reverse sync needed, cannot sync %s:%s ==> %s:%s	Remote Mirror
The user requested a <code>forward sync</code> operation for a Remote Mirror set which needs a <code>reverse sync</code> . This occurs when a previous <code>reverse sync</code> does not complete successfully or because the primary volume was damaged and had to be replaced. Issue a <code>reverse sync</code> for the set.	
set %s:%s neither sync nor async	Remote Mirror
The mode of the set specified in the configuration file is incorrect. This occurs when the user inserts a set into the configuration manually, using <code>dsconfig</code> with an incorrect mode tag.	
Set %s:%s neither sync nor async	Remote Mirror
The current Remote Mirror configuration entry is missing the TCP/IP or FCAL replication type (<code>async</code> or <code>sync</code>).	
set %s:%s not enabled in kernel	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
The specified Remote Mirror set is not currently configured in the Solaris kernel. Check the validity of user supplied arguments for correctness.	Remote Mirror
set %s:%s not found in config	Remote Mirror
The specified set is not in the current configuration. Use <code>sndradm -i</code> to verify that the set is in the current configuration.	Point-in-Time Copy
Set Copy Parameters failed iiadm could not modify the copy units and delay values for the specified set. Possible errors: <ul style="list-style-type: none"> • EFAULT: The kernel module tried to read out-of-bounds. You may wish to alert Sun support personnel of this issue. • ENOMEM: The kernel module ran out of memory. • DSW_EEMPTY: No set was specified for the parameters • DSW_ENOTFOUND: The specified set was not found in the kernel. • EINVAL: The delay or units value is out of range. 	Point-in-Time Copy
Set not offline, will not reset	Point-in-Time Copy
An attempt to reset a Point-in-Time Copy set volume that is not currently offline is not allowed.	Point-in-Time Copy
Set not pid-locked	Point-in-Time Copy
The current Point-in-Time Copy set is not currently PID locked.	CORE
set option failed	CORE
This suggests that the fundamental communication between <code>scmadm</code> and the <code>sdbc</code> module does not function properly. The <code>sdbc</code> module may not be loaded.	CORE
set system option failed: %s	CORE
This suggests that the fundamental communication between <code>scmadm</code> and the <code>sdbc</code> module does not function properly. The <code>sdbc</code> module may not be loaded.	Remote Mirror
set_autosync called with improper value	Remote Mirror
An attempt to alter the Remote Mirror autosync value has failed, as the option was passed an incorrect value (should be Yes or No).	Point-in-Time Copy
Sets in cluster resource group %s:	Point-in-Time Copy
Informational message showing the current Sun Cluster resource group that contains this Point-in-Time Copy set.	Remote Mirror
Setting bitmap ioctl failed for set %s:%s	Remote Mirror
An attempt to manipulate one or more specified Remote Mirror bitmaps has failed. Please refer to the associated Solaris error messages for additional information as to the reason for this failure.	Point-in-Time Copy
Shadow and bitmap are the same device	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
During an enable operation, iiadm discovered that the shadow volume and the bitmap volume are the same.	
Shadow group %s is suspended	Point-in-Time Copy
The user attempted to perform a copy or update operation on a group with one or more suspended sets. The %s parameter identifies the first set found in the group that is suspended.	
Shadow group suspended	Point-in-Time Copy
The user attempted to perform a copy or update operation on a suspended set.	
Shadow shutting down	Point-in-Time Copy
Error message stating that a Point-in-Time Copy set operation is being performed while one or more shadow sets are being suspended.	
Shadow too small	Point-in-Time Copy
For an independent Point-in-Time Copy set, the shadow volume size must be equal to, or greater than, the master volume size.	
Shadow volume is already an overflow volume	Point-in-Time Copy
During an enable operation, iiadm discovered that the volume specified as the shadow volume is already in use as an attached overflow volume.	
Shadow volume is already configured	Point-in-Time Copy
During an enable operation, iiadm discovered that the volume specified as the shadow volume is already in use as a shadow for a different master volume.	
Shadow Volume is currently mounted	Point-in-Time Copy
An attempt to update or copy a Point-in-Time Copy set is not allowed if the shadow volume is currently mounted.	
Shadow volume is mounted, unmount it first	Point-in-Time Copy
During an enable operation, iiadm discovered that the volume specified as the shadow volume is currently mounted.	
Shadow volume is not a character device	Point-in-Time Copy
During an enable operation, iiadm discovered that the shadow volume is a block device and not a character or a raw device.	
Shadow volume is not exported	Point-in-Time Copy
Invocation of the Point-in-Time Copy Join option requires the shadow volume to be currently exported.	
Shadow volume not in a disk group	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
<p>During an attach operation, <code>iiadm</code> determined that the set to which the user is attaching an overflow volume is neither in a cluster device group nor in a local (<code>l.hostname</code>) group.</p>	
<p><code>SHUTDOWN ioctl error</code></p>	Point-in-Time Copy
<p>An attempt to suspend one or more Point-in-Time Copy sets has failed. Review the associated Solaris error message for specific details.</p>	
<p>Size of Primary <code>%s:%s(%s)</code> must be less than or equal to size of Secondary <code>%s:%s(%s)</code></p>	Remote Mirror
<p>The user set up a Remote Mirror set in which the secondary volume is smaller than the primary volume. The secondary volume must be equal to or larger than the primary volume, but the size is not checked until a <code>sync</code> is issued for the Remote Mirror set. The user must either disable the remote mirror set on the primary host and decrease the size of the primary volume so that it is equal to or smaller than the secondary volume, or disable the remote mirror set on the secondary host and increase the size of the secondary volume so that it is equal to or larger than the primary volume.</p>	
<p><code>sndrboot: Failed to commit logical host name</code></p>	Remote Mirror
<p>An attempt to change the Sun Cluster Resource Group Manager <code>LogicalHostname</code> for one or most Remote Mirror sets has failed.</p>	
<p><code>sndrboot: Failed to commit setids</code></p>	Remote Mirror
<p>An attempt to change one or more Remote Mirror <code>setids</code> has failed.</p>	
<p><code>sndrboot: Unable to store logical host name in configuration database</code></p>	Remote Mirror
<p>An attempt to change the Sun Cluster Resource Group Manager <code>LogicalHostname</code> for one or most Remote Mirror sets has failed.</p>	
<p><code>sndrboot: Unable to store new setid</code></p>	Remote Mirror
<p>An attempt to change one or more Remote Mirror <code>setids</code> has failed.</p>	
<p><code>sndrboot: Unable to store unique setid</code></p>	Remote Mirror
<p>An attempt to set a unique Remote Mirror <code>setid</code> has failed.</p>	
<p>Some sets in the group failed to disable</p>	Point-in-Time Copy
<p>An attempt to perform a <code>disable</code> of all Point-in-Time Copy sets in a single I/O consistency group has failed. See associated Solaris error message.</p>	
<p>Source shadow volume is not complete due to earlier overflow</p>	Point-in-Time Copy
<p>Prior problems with associated overflow volume, often overflow full, prevent the current Point-in-Time Copy operation from being completed.</p>	
<p>Start reset <code>%s</code></p>	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
Informational messages indicating that a Point-in-Time Copy set reset operation has started.	
Stat failed	Point-in-Time Copy
An attempt to get Point-in-Time Copy set status failed. Review the associated Solaris error message for additional information.	
statistics error	Remote Mirror
An attempt to retrieve a Remote Mirror set's status value has failed. Review the associated Solaris error message for specific reasons.	
stats ioctl failed	CORE
This suggests that the fundamental communication between <code>scmadm</code> and the <code>sdbc</code> module does not function properly. The <code>sdbc</code> module may not be loaded.	
still has active devices or threads	CORE
One or more of the configured <code>SV</code> volumes is still active or has I/O threads in progress.	
Suspend realloc failed	Point-in-Time Copy
An attempt to reallocate memory for the current <code>iiboot</code> operation has failed.	
Suspend the Point-in-Time Copy set first	Point-in-Time Copy
An attempt to perform a Point-in-Time Copy bitmap operation failed because the set is still in use.	
Suspend the Point-in-Time Copy set first	Point-in-Time Copy
An attempt to perform a Point-in-Time Copy bitmap operation failed because the set is still in use.	
Suspended on this node, active on %s	Point-in-Time Copy
Informational messages stating that the current Point-in-Time Copy set is suspended on this Sun Cluster node and active on another Sun Cluster node.	
Suspended on this node, not active elsewhere	Point-in-Time Copy
Informational messages stating that the current Point-in-Time Copy set is suspended on this Sun Cluster node and not active elsewhere.	
SV disable of master failed	Point-in-Time Copy
Auto-SV disable of a Point-in-Time Copy master volume failed. See related Solaris error message.	
SV disable of master failed	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
An attempt to <code>SV disable</code> the master volume has failed. Review the associated Solaris error message for specific details.	
<code>SV disable of shadow failed</code>	Point-in-Time Copy
Auto- <code>SV disable</code> of a Point-in-Time Copy shadow volume failed. See related Solaris error message.	
<code>SV disable of shadow failed</code>	Point-in-Time Copy
An attempt to <code>SV disable</code> the shadow volume has failed. Review the associated Solaris error message for specific details.	
<code>SV-disable failed</code>	Point-in-Time Copy
<code>iiadm</code> tried to perform <code>svadm -d</code> on a volume. See the <code>ds.log</code> file for more information.	
<code>sync/async</code> specification missing	Remote Mirror
The current Remote Mirror configuration entry is missing the TCP/IP or FCAL replication type (<code>async</code> or <code>sync</code>).	
<code>Target of copy/update is mounted, unmount it first</code>	Point-in-Time Copy
If the shadow in a master-to-shadow copy or update operation or the master in a shadow-to-master copy or update operation is mounted, it cannot be copied to.	
<code>The bitmap %s is already in use</code>	Remote Mirror
The bitmap requested for the Remote Mirror set being enabled is already in use as a bitmap for another set. Enable the set and specify a different volume for the bitmap.	
The cache size of <code>%ld</code> is larger than the system maximum of <code>%ld</code> . Use " <code>scmadm -C <size></code> " to set the size to a proper value.	CORE
An attempt to configure the cache to be larger than the system maximum value.	
<code>The remote state of %s:%s ==> %s:%s prevents this operation</code>	Remote Mirror
The user attempted to do a <code>sync</code> or <code>reverse sync</code> while the secondary volume is mounted. First unmount the secondary volume and then issue the <code>sync</code> or <code>reverse sync</code> request.	
<code>The state of %s:%s ==> %s:%s prevents this operation</code>	Remote Mirror
The set the user is attempting to <code>sync</code> is part of an advanced configuration. The state of one of the other sets in the configuration prevents this <code>sync</code> from occurring for one of the following reasons:	
<ul style="list-style-type: none"> • Another set in a one-to-many configuration is currently doing a reverse sync. • A reverse sync is being requested for a set in a one-to-many configuration and at least one of the other sets is not in logging mode. • A set is already syncing. 	

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
<p>the value specified for the %s field is not the same as that contained within the configuration storage file for this set. You specified %s Expected %s</p> <p>See error message.</p>	Remote Mirror
<p>The volume %s is already in use</p> <p>The data volume in the Remote Mirror set is already in use as a bitmap volume or a disk queue volume. Use a different data volume.</p>	Remote Mirror
<p>Too Many Enabled HAStoragePlus in resource group <\$rgname> for Remote Mirror</p> <p>See error message.</p>	Remote Mirror
<p>Too Many Enabled Logical Host in resource group <\$rgname> for Remote Mirror</p> <p>See error message.</p>	Remote Mirror
<p>Too many parameters specified.</p> <p>See error message.</p>	CORE
<p>Too many volumes given for update</p> <p>iiadm ran out of memory.</p>	Point-in-Time Copy
<p>unable to access %s: %s</p> <p>Unable to access the Solaris device specified. Review the associated Solaris error message for specific reasons.</p>	CORE
<p>Unable to access bitmap</p> <p>During an enable operation, iiadm tried to validate the bitmap device but could not get access to it.</p>	Point-in-Time Copy
<p>unable to access configuration: %s</p> <p>The configuration file is not accessible.</p>	CORE
<p>Unable to access master volume</p> <p>During an enable operation, iiadm tried to validate the master device, but could not get access to it.</p>	Point-in-Time Copy
<p>Unable to access shadow volume</p> <p>During an enable operation, iiadm tried to validate the shadow device, but could not get access to it.</p>	Point-in-Time Copy
<p>unable to access the configuration</p> <p>The dscfg database cannot be accessed. Review the associated Solaris error message for specific reasons.</p>	CORE

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
unable to add %s to configuration storage: %s An error has occurred preventing Remote Mirror from accessing the configuration storage while trying to update the options field.	Remote Mirror
unable to add %s to configuration storage: %s An error has occurred that prevents the Remote Mmirror software from accessing the configuration storage database when trying to enable <i>set</i> .	CORE
unable to add entry to hash table The ability to generate a unique hash table entry for the most recent <i>SV</i> entry has failed.	CORE
Unable to add interface %s to %s The Remote Mirror software was unable to add host information to its configuration. Verify that the system is not running low on memory.	Remote Mirror
Unable to allocate %d bytes for bitmap file %s An attempt to allocate memory for the current <i>iiadm</i> bitmap operation has failed.	Remote Mirror
unable to allocate %ld bytes An attempt to allocate memory for the current Remote Mirror <i>set</i> operation has failed.	Remote Mirror
unable to allocate memory for cluster tag System is running low on available memory.	CORE
unable to allocate <i>pair_list</i> array for %d sets An attempt to allocate memory for the current Remote Mirror <i>set</i> operation has failed.	Remote Mirror
unable to ascertain environment An attempt to determine if the current Solaris node is a Sun Cluster node has failed for unspecified reasons.	Point-in-Time Copy
unable to ascertain environment The Remote Mirror software was not able to determine if the system is part of a Sun Cluster configuration.	Remote Mirror
unable to ascertain environment The system is unable to determine whether or not it is part of a Sun Cluster.	CORE
unable to ascertain environment <i>iiadm</i> tried to determine whether the host is part of a Sun Cluster, but was unable to do so.	CORE

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
unable to change cluster tag for %s An attempt to change the Sun Cluster device group name ctag for the specified device has failed.	CORE
unable to clear autosync value in config for Remote Mirror set %s:%s Autosync could not be turned off for the Remote Mirror set in the configuration file because of an error writing to the configuration database.	Remote Mirror
Unable to connect to %s: local disable complete, remote disable aborted An attempt to disable a Remote Mirror replica failed to connect to the secondary host, leaving the secondary side of the replica in an inconsistent state.	Remote Mirror
unable to create hash table The ability to generate a hash table entry for the most recent SV entry has failed.	CORE
unable to determine ctag for Remote Mirror set %s:%s The Sun Cluster device group for the current Remote Mirror set cannot be determined.	Remote Mirror
unable to determine disk group name for %s An attempt to determine the disk group name of a Sun Cluster controlled volume has failed for unspecified reasons.	Point-in-Time Copy
unable to determine disk group name for %s Tried to find out to which cluster device group a volume belonged, but was unable to do so.	CORE
unable to determine IP addresses for either host %s or host %s The IP address for either the primary host or the secondary host could not be determined.	Remote Mirror
unable to determine IP addresses for hosts %s, %s The TCP/IP address of the specified Remote Mirror set could not be obtained.	Remote Mirror
unable to determine network information for %s Network information for the secondary host could not be determined. Verify the settings in the /etc/nsswitch.conf file.	Remote Mirror
unable to determine the current Solaris release: %s Use rdc_check_release() to determine the current Solaris release.	Remote Mirror
Unable to determine whether current node is primary or secondary An attempt to determine if the current Solaris node is a Remote Mirror primary or Remote Mirror secondary has failed.	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
unable to disable %s	CORE
An attempt to disable the specified <i>SV</i> volume has failed. Review the associated Solaris error message for specific reasons.	
Unable to disable device - device in use	CORE
The previously configured Remote Mirror, Point-in-Time Copy, or <i>SV</i> device is currently in use and therefore cannot be disabled.	
unable to enable %s	CORE
An attempt to enable the specified <i>SV</i> volume has failed. Review the associated Solaris error message for specific reasons.	
Unable to enable disk queue %s	Remote Mirror
An attempt to associate a pre-existing disk queue with the current Remote Mirror set has failed. Review the associated Solaris error messages for a possible reason.	
unable to fetch data for key %s	Remote Mirror
Unable to obtain the specified key from the <i>dscfg</i> database.	
Unable to find %s in config	Remote Mirror
The specified set is not in the current configuration. Use <i>snradm -i</i> to verify that the set is in the current configuration.	
Unable to find %s:%s in "configuration storage	Remote Mirror
The specified set is not in the current configuration. Use <i>snradm -i</i> to verify that the set is in the current configuration.	
unable to find disk service, %s: %s	Remote Mirror
Sun Cluster could not find the specified disk service.	
unable to find disk service, %s: %s	CORE
svadm could not determine whether a cluster device group is active on the current host.	
Unable to find disk service:%s	Point-in-Time Copy
iiadm could not determine whether a cluster device group is active on the current host.	
Unable to find group %s in configuration storage	Remote Mirror
Could not find Remote Mirror group in configuration database while trying to do a <i>diskq</i> operation.	
unable to find Remote Mirror set %s:%s: in config	Remote Mirror

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
The Remote Mirror set is not configured while trying to set <code>autosync</code> for one of the following reasons: <ul style="list-style-type: none">• The set could not be found in the configuration.• The set is not configured in the configuration database. Verify that the set is entered properly and matches a set returned by the <code>sndradm -i</code> command.	
<code>unable to find set %s:%s</code>	Remote Mirror
The user-specified Remote Mirror set cannot be found in the current set of all configured sets.	
<code>unable to get controller info from partition, %s: %s</code>	CORE
See error message.	
<code>unable to get list</code>	CORE
Unable to obtain the list of all <code>SV</code> enabled devices from the <code>dscfg</code> database.	
Unable to get logical host	Remote Mirror
An attempt to query the Sun Cluster Resource Group Manager for an associated <code>LogicalHostname</code> has failed.	
<code>unable to get max devs</code>	CORE
Failed to obtain the maximum number of <code>SV</code> devices as specified in <code>/usr/kernel/drv/nsctl.config</code> .	
<code>unable to get maxsets value from kernel</code>	Remote Mirror
The Remote Mirror software failed to read the <code>sndr_max_sets</code> value from the <code>/usr/kernel/drv/rdc.conf</code> file.	
<code>unable to get options field for Remote Mirror set %s:%s</code>	Remote Mirror
The <code>dscfg</code> database does not contain the <code>options</code> field for the Remote Mirror set specified.	
Unable to get set info from config	Remote Mirror
The current <code>dscfg</code> database contains no configured Remote Mirror sets.	
<code>unable to get set status before reconfig operation</code>	Remote Mirror
The Remote Mirror software could not get the kernel configuration.	
Unable to initialize the kernel thread set	Remote Mirror
The Remote Mirror software could not initialize a kernel thread. Verify that the system is not running low on memory.	
Unable to load/hold underlying disk driver	CORE
The layering of one or more pseudo device drivers has failed. Review the associated Solaris error message for specific reasons.	

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
unable to lock configuration: %s Unable to obtain a lock on the configuration file. This suggests another process may be currently accessing the configuration.	CORE
unable to lock the configuration Unable to lock the dscfg database for exclusive access.	CORE
unable to move set An attempt to move the current local Point-in-Time Copy set into the I/O consistency group failed.	Point-in-Time Copy
Unable to obtain subsystem ID: %s Unable to obtain the system ID on this machine.	CORE
unable to obtain unique set id for %s:%s: %s Lookup of the set ID in the configuration database for this set has failed.	Remote Mirror
unable to open %s: %s The data volume for the set on the local host cannot be opened by the Remote Mirror software for one of the following reasons: <ul style="list-style-type: none"> • The volume requested does not exist or is inaccessible. • The volume is already in use as a Remote Mirror or Point-in-Time Ccopy bitmap. 	CORE
unable to open %s: %s Unable to open the Solaris device specified. Review the associated Solaris error message for specific reasons.	CORE
Unable to open %s:%s The Remote Mirror primary or secondary host:dev pair cannot be opened.	Remote Mirror
Unable to open bitmap file %s The volume specified for the bitmap could not be opened. The volume might not exist or is already in use by another program.	Remote Mirror
unable to open config file %s: %s Unable to open the dscfg database. Review the associated Solaris error message for specific reasons.	CORE
Unable to open kstat device for reading. The /dev/kstat device could not be opened for reading.	CORE
unable to open partition, %s: %s Please ensure that the partition is readable.	CORE

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
Unable to open text config %s	CORE
Unable to open the parser configuration file. The standard location for this file is /etc/dscfg_format.	
Unable to parse config file	Point-in-Time Copy
iiadm attempted to access the configuration file dscfg, but could not do so. This indicates a problem with the configuration and might require either restoring the configuration file or reinstalling the Sun StorageTek Availability Suite software.	
Unable to parse config file	CORE
The dscfg database cannot be accessed. Review the associated Solaris error message for specific reasons.	
Unable to put set into -C local and specified group	Point-in-Time Copy
An attempt to move the current local Point-in-Time Copy set into the I/O consistency group failed, often due to the inability to mix local and Sun Cluster device groups.	
unable to read configuration:	CORE
The configuration file is accessible, but an error was found when attempting to read from it.	
unable to read EFI label from partition, %s: %s	CORE
See error message.	
Unable to read or write bitmap header	Point-in-Time Copy
The current or previously specified bitmap volume is no longer accessible for read or write operations. Associated errors are often in /var/adm/messages.	
Unable to read the bitmap file, read returned %d instead of %d	Remote Mirror
Bitmap could not be read correctly.	
unable to read the vtoc from partition, %s: %s	CORE
Please ensure that the partition is readable and has a valid VTOC.	
Unable to register %s	Remote Mirror
The Remote Mirror software could not use the volume requested. Verify that the volume exists, is accessible, and is not in an error state.	
unable to relock configuration: %s	CORE
Unable to obtain a lock on the configuration file. This suggests another process may be currently accessing the configuration.	
unable to remove %s from config storage: %s	CORE
The specified SV device cannot be removed from the dscfg database.	

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
<p>unable to remove %s from configuration storage: %s</p> <p>An error has occurred that prevents the Remote Mirror software from removing the set from the configuration database.</p>	Remote Mirror
<p>unable to remove %s from dsvol</p> <p>The specified SV device cannot be removed from the auto-SV section (dsvol) of the dscfg database.</p>	CORE
<p>unable to resume %s</p> <p>Unable to resume the specified SV device. Review the associated Solaris error message for specific reasons.</p>	CORE
<p>unable to retrieve set from configuration database</p> <p>The dscfg database does not contain the Remote Mirror set specified.</p>	Remote Mirror
<p>Unable to set locking on the configuration iiadm needs to lock the configuration file for reading or writing, but was unable to do so.</p>	Point-in-Time Copy
<p>unable to store unique set id for %s:%s: %s</p> <p>The set ID for the set being enabled could not be added to the configuration database.</p>	Remote Mirror
<p>unable to suspend %s</p> <p>Unable to suspend the specified SV device. Review the associated Solaris error message for specific reasons.</p>	CORE
<p>unable to unload</p> <p>Unable to unload the Solaris device specified. Review the associated Solaris error message for specific reasons.</p>	CORE
<p>unable to update autosync value in config for Remote Mirror set %s:%s</p> <p>Autosync could not be turned on for the Remote Mirror set in the configuration database because of an error writing to the configuration database.</p>	Remote Mirror
<p>unable to write configuration: %s</p> <p>The configuration file is accessible, but an error was found when attempting to write to it.</p>	CORE
<p>Unexpected return from check_cluster()</p> <p>An attempt to determine if this Solaris node is also a Sun Cluster node has returned inconsistent information.</p>	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (Continued)

Error Message and Description	Component
<p>Update of %s failed</p> <p>An attempt to update or copy a Point-in-Time Copy set failed. Review the associated Solaris error message for possible reasons why.</p>	Point-in-Time Copy
<p>update parser config rc %d key %s</p> <p>Error parsing the parser configuration file. Ensure that a <code>dscfg -i</code> command is executed before <code>dscfg -i -p</code>.</p>	CORE
<p>update text config failed rc %d key %s</p> <p>Unable to add an entry to the configuration file. This message suggests that the configuration file is full. Ensure that <code>dscfg -i</code> and <code>dscfg -i -p</code> are executed before <code>dscfg -a</code>. The <code>dscfg -a</code> command does not check if the entries it is importing are duplicates of entries already present in the configuration.</p>	CORE
<p>Version failed</p> <p><code>iiadm</code> queried the kernel for the version of the code it was running, but failed. Possible errors: EFAULT: The kernel module tried to read out-of-bounds. You may want to alert Sun support personnel of this issue.</p>	Point-in-Time Copy
<p>volume %s is not part of a disk group, please specify resource ctag</p> <p>The volume <code>vol</code> is not being managed by SunCluster.</p>	Remote Mirror
<p>Volume copy in progress</p> <p>A prior update or copy operation is currently in progress.</p>	Point-in-Time Copy
<p>volume failed</p> <p>The previously configured Remote Mirror set has one or more associated volumes in error. Review the associated Solaris error message for specific reasons.</p>	Remote Mirror
<p>Volume in use</p> <p>A current or previously specified Availability Suite volume is in use elsewhere.</p>	Point-in-Time Copy
<p>Volume is not in a Point-in-Time Copy group</p> <p>A volume specified on the command line does not belong to a Point-in-Time copy set.</p>	Point-in-Time Copy
<p>Volume is not in configuration file</p> <p>An attempt to perform the current Point-in-Time Copy operation has failed because the currently specified shadow volume is not in the <code>dscfg</code> configuration database.</p>	Point-in-Time Copy
<p>Volume not enabled</p> <p>The current or previously specified bitmap volume is not currently enabled.</p>	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software (*Continued*)

Error Message and Description	Component
<p>Volume offline</p> <p>One or more volumes in a Point-in-Time Copy set went offline. Associated errors are often in <code>/var/adm/messages</code>.</p>	Point-in-Time Copy
<p>volumes and bitmaps must not match</p> <p>The same volume has been specified for both the data volume and the bitmap volume.</p>	Remote Mirror
<p>Volumes are currently dependent on overflow volume</p> <p>The current Point-in-Time Copy set is dependent on the contents of the associated overflow volume.</p>	Point-in-Time Copy
<p>Volumes are not currently independent</p> <p>An operation (<code>export</code> or <code>disable</code>) of an independent Point-in-Time Copy set failed because the set is not fully independent. See <code>iiadm -w shadow_volume</code>.</p>	Point-in-Time Copy
<p>Volumes are not in same disk group</p> <p><code>iiadm</code> detected that the master, shadow, and bitmap volumes are not all in the same Sun Cluster device group, as required by the Point-in-Time copy software.</p>	Point-in-Time Copy
<p>Wait failed</p> <p>Possible errors:</p> <ul style="list-style-type: none"> • EFAULT: The kernel module tried to read out-of-bounds. You may want to alert Sun support personnel of this issue. • ENOMEM: The kernel module ran out of memory. • EINTR: The user interrupted the wait process. • DSW_EEMPTY: No set was specified to wait for. • DSW_ENOTFOUND: The specified set could not be found in the kernel. • DSW_ENOTLOCKED: User tried to remove the PIDlock, but the set is not locked. • DSW_EINUSE: The user tried to remove the PIDlock, but the set is locked by someone else. 	Point-in-Time Copy
<p>Warning: multiple cluster resource groups defined within a single I/O group</p> <p>During Solaris or Sun Cluster startup of one or more Point-in-Time Copy sets on the current node, it has been determined that multiple cluster resource groups are defined within a single I/O consistency group. Please review the current configuration and make sure that a single I/O consistency group only contains volumes from a single Sun Cluster resource group.</p>	Point-in-Time Copy
<p>Write new bitmap failed</p> <p>An attempt to perform a Point-in-Time Copy bitmap operation failed because the new bitmap specified cannot be written.</p>	Point-in-Time Copy

TABLE 7-1 Error Messages for the Sun StorageTek Availability Suite Software *(Continued)*

Error Message and Description	Component
Write new shadow failed	Point-in-Time Copy
An attempt to perform a Point-in-Time Copy bitmap operation failed because the new bitmap specified cannot be written.	
Wrong type of shadow group	Point-in-Time Copy
Only compact dependent shadow sets can have an associated overflow volume.	

Safeguarding the Solaris VTOC

This appendix provides information on how to protect the Solaris Volume Table of Contents (VTOC).

The following topics are included:

- [“Overview” on page 103](#)
 - [“Volume Details” on page 104](#)
 - [“Solaris Volume Manager” on page 104](#)
 - [“Solaris VTOC Errors” on page 105](#)
 - [“Availability Suite” on page 105](#)
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Overview

A Solaris raw disk or LUN, when initialized by the utility `format(1M)`, contains one or more partitions (slices) with information on the physical layout of the volume. This information is stored in cylinder 0 in the VTOC. The VTOC is located on each formatted disk and, in most cases, mapped in partition 2 (the backup partition), which often includes every block on the raw device. A physical backup of partition 2 to an identical disk's partition 2 copies the data in every single block, including the volume's VTOC.

It is recommended that the **ONLY** time any partition containing a VTOC be used is when identical disks are configured and one is attempting to do a physical backup of one disk's partition 2 to partition 2 of another disk of the same size. Other scenarios of using a partition containing a VTOC are often problematic.

Volume Details

For optimal use of almost every block on a raw disk or LUN, Solaris' supported volume managers, file systems, and databases (and many other applications that can use individual partitions on a disk for storage) have knowledge of a volume's VTOC and have incorporated software to exclude writing any data to, or on top of, the volume's VTOC.

By using the Solaris `prtvtoc(1M)`, `format(1M)`, or `metastat(1M)` utilities, a system administrator can determine if any source or destination device has partitions or metadvice containing cylinder 0. If the partitions or volumes are used for backup, mirroring, replication, or snapshots, it must be understood that the VTOC of the source device will be copied to the destination device, possibly changing the destination device's VTOC.

If the volumes contained in raw device partitions or volumes do not contain cylinder 0, there would be no change in the disk format, since the VTOC will not be overwritten. If source and destination raw devices or metadvice are identically formatted, and include cylinder 0, the VTOCs will be identical, and there will be no perceived change in the raw device's layout when the volume slice containing the VTOC is overwritten.

Solaris Volume Manager

When using the Solaris Volume Manager, during `metainit` processing, if a raw disk partition contains cylinder 0, the associated metadvice may contain cylinder 0. When a Solaris Volume Manager volume is created out of that metadvice, it too may contain cylinder 0, meaning that it contains the raw device's VTOC. In some cases (for example, raw image backup of a disk or metadvice) it is normal for applications to use disk partitions containing cylinder 0.

Under the Solaris Volume Manager, writing to cylinder 0 is seen as a write I/O error and reported to the system console and `/var/adm/messages` as follows:

```
md:[kern.notice] NOTICE: md: d1: write to label.
```

When using a volume manager like Veritas Volume Manager (VxVM), copying between individual volumes created under this volume manager is safe, as VxVM avoids the VTOC issue by always excluding these blocks from any volumes created by the volume manager. This is not true for Solaris Volume Manager.

Solaris VTOC Errors

Depending on how the overwriting of the VTOC occurs, the destination volume will appear to have a corrupted VTOC or be incorrectly formatted, which may manifest as Solaris I/O errors, `fsck(1M)` errors, missing volumes (`/dev/dsk/c?t?d?s?`), or console or `/var/adm/messages` with the error: `Corrupt label; wrong magic number.`

Availability Suite

Both the Remote Mirror and Point-in-Time Copy software are volume-based data services, not file system data services. The software has no knowledge of VTOCs, file systems, or metadata. This is a good thing, since it allows both the Remote Mirror and Point-In-Time Copy software to work with all Solaris supported volume managers, file systems, and databases and to be independent of the various RAID levels, multi-pathing software, or Sun Cluster devices.

Therefore, it is the responsibility of the system administrator to know if a replicated or snapped volume contains a VTOC or not, and if, in the movement of the VTOC from the source to the destination volume, it will incorrectly overwrite a VTOC.

As you can see, this is a somewhat “hidden” problem, which can be best avoided by always excluding cylinder 0 (the VTOC) when using raw devices for either partitions or components of Solaris Volume Manager volumes.

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