Sun StorEdge™ Network Data Replicator 3.0.1 Installation Guide

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Preface

This document describes installation requirements, considerations, and procedures for the Sun StorEdge™ Network Data Replicator (Sun SNDR) Version 3.0.1 software. The intended audience includes Sun support engineers and customer system administrators.

How This Book Is Organized

Chapter 1 describes the requirements, considerations, and preparation for the Sun SNDR software installation.

Chapter 2 describes the installation steps.

Chapter 3 describes the post-installation steps and configuration procedures.

Chapter 4 describes how to upgrade from the Sun SNDR version 2.0 software to version 3.0.1.

Chapter 5 provides installation troubleshooting tips.

Appendix A describes how to remove the Sun StorEdge Fast Write Cache 2.0 software and install the `SUNWnvm` 3.0 package.

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.

See one or more of the following for this information:

- *Solaris Handbook for Sun Peripherals*
- AnswerBook2™ online documentation for the Solaris™ operating environment
- Other software documentation that you received with your system

Typographic Conventions

Typeface or Symbol	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output.	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output.	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Command-line variable; replace with a real name or value.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be `root` to do this. To delete a file, type `rm` *filename*.
[ ]	In syntax, brackets indicate that an argument is optional.	`scmadm` [`–d` *sec*] [`–r` *n*[:*n*][,*n*]...] [`–z`]
{ *arg* | *arg*}	In syntax, braces and pipes indicate that one of the arguments must be specified.	`sndradm -R b {p | s}`

\	At the end of a command line, the backslash (\) indicates that the command continues on the next line.	`atm90 /dev/md/rdsk/d5 \`
		`/dev/md/rdsk/d1` `atm89 \`
		`/dev/md/rdsk/d5 /bitmaps/map2 \`
		`ip sync`

Shell Prompts

Shell	Prompt
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Documentation

Note – You can use the *Sun StorEdge Network Data Replicator 3.0 System Administrator's Guide, Sun Cluster 3.0 U1 and Sun StorEdge 3.0 Software Integration Guide,* and *Sun StorEdge Network Data Replicator 3.0 Configuration Guide* with the Sun SNDR Version 3.0.1 software.

For the latest version of storage software documentation, go to:

`http://www.sun.com/products-n-solutions/hardware/docs/Software/`

Application	Title	Part Number
Man pages	`sndradm`(1M) `dscfg`(1M) `file`(1M) `fwcadm`(1M) `pkgadd`(1M) `pkgrm`(1M) `scmadm`(1M) `svadm`(1M)	N/A
Release	*Sun StorEdge Network Data Replicator 3.0.1 Release Notes*	806-7513
	Sun Cluster 3.0 U1 and Sun StorEdge Software 3.0 Release Note Supplement	816-2136
	Sun StorEdge Instant Image 3.0.1 Release Notes	806-7678
Sun Cluster with Sun StorEdge software	*Sun Cluster 3.0 U1 and Sun StorEdge Software 3.0 Integration Guide*	816-1544
Installation and user	*Sun StorEdge Instant Image 3.0.1 Installation Guide*	806-7675
	SunATM 3.0 Installation and User's Guide	805-0331
	SunATM 4.0 Installation and User's Guide	805-6552
	Sun Gigabit Ethernet FC-AL/P Combination Adapter Installation Guide	806-2385
	Sun Gigabit Ethernet/S 2.0 Adapter Installation and User's Guide	805-2784
	Sun Gigabit Ethernet/P 2.0 Adapter Installation and User's Guide	805-2785

Application	Title	Part Number
	Sun Enterprise 10000 InterDomain Networks User Guide	806-4131
System administration	*Sun StorEdge Network Data Replicator 3.0 System Administrator's Guide*	806-7512
	Sun StorEdge Instant Image 3.0 System Administrator's Guide	806-7677
	TCP/IP and Data Communications Administration Guide	805-4003
	System Administration Guide, Volume 3 (for the Solaris 8 operating environment)	806-0916
	Sun StorEdge Fast Write Cache 2.0 System Administrator's Guide	806-2064
Configuration	*Sun StorEdge Network Data Replicator 3.0 Configuration Guide*	806-7550
	Sun StorEdge Instant Image 3.0 Configuration Guide	806-7676
	Sun Enterprise 10000 InterDomain Network Configuration Guide	806-5230

Accessing Sun Documentation Online

A broad selection of Sun system documentation is located at:

`http://www.sun.com/products-n-solutions/hardware/docs`

A complete set of Solaris documentation and many other titles are located at:

`http://docs.sun.com`

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`http://www.fatbrain.com/documentation/sun`

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CHAPTER 1

Installation Requirements and Considerations

This document describes installation requirements, considerations, and procedures for the Sun StorEdge Network Data Replicator (Sun SNDR) Version 3.0.1 software.

Note – If you have already installed the Sun SNDR 3.0 software with the patches listed in TABLE 1-2, you do not need to install the version 3.0.1 software.

The topics described in this chapter are as follows:

Summary of All Installation Steps

TABLE 1-1 shows all the installation steps required to successfully install the Sun SNDR 3.0.1 software. To upgrade from Version 2.0, see Chapter 4.

TABLE 1-1 All Pre-installation, Installation, and Post-Installation Steps

Pre-installation Steps	
1. Determine your data replication requirements. 2. Set up the replicating TCP/IP network link. 3. Allocate storage for the Sun SNDR volumes and bitmap volumes for the primary and secondary hosts.	
Installation Steps	**See This Section**
1. Set up a configuration location.	"Specifying the Configuration Location During the Sun StorEdge Installation Process" on page 8
2. Run the `probe_script` validation script located on the core services CD.	"Running the probe_script Validation Script" on page 13
If you have older versions of the Sun StorEdge software installed on your machine, remove them and shut down and restart your machine.	"To Remove the Sun SNDR 2.0 Software" on page 49
3. Install the Sun StorEdge core and Sun SNDR services software on the primary and secondary host machines. (*Install on the primary host first.*)	"Installing the Sun SNDR Software" on page 15
4. Install other Sun StorEdge services software, if applicable.	Appendix A "Installing the Sun StorEdge Software at Different Times" on page 37 *Sun StorEdge Instant Image 3.0.1 Installation Guide*
Post-installation Steps	**See This Section**
1. Edit the following files: • `/etc/hosts` • `/etc/nsswitch.conf` • `/etc/system` (Solaris 2.6 systems only) • (Optional) `/usr/kernel/drv/rdc.conf`	"Configuring System Files Required for Successful Sun SNDR Operation" on page 21
2. Shut down and restart your machine.	"Shutting Down and Restarting Your System" on page 28
3. Set up the bitmap volumes.	"Setting Up Bitmap Volumes" on page 29
4. (Optional) Set up an optional Sun SNDR volume configuration file.	"Creating an Optional Sun SNDR Configuration File" on page 33

Supported Hardware and Software In a Nonclustered Environment

TABLE 1-2 shows the supported software in a nonclustered environment.

TABLE 1-3 shows the supported hardware in a nonclustered environment.

If you have a SunSolve service subscription, patches are available at `http://sunsolve.sun.com/`

TABLE 1-2 Supported Software, Noncluster Environments

Operating Environment and Software	Patches Required
Solaris 2.6 05/98	105181-28 - kernel super patch 106639-06 - rpcmod
Solaris 7 8/99 (also known as Update 3) Solaris 7 11/99 (Update 4)	None
Solaris 8 Solaris 8 6/00 (also known as Update 1) Solaris 8 10/00 (Update 2) Solaris 8 01/01 (Update 3) Solaris 8 04/01 (Update 4)	None
Sun StorEdge Version 3.0.1 software, including the Sun StorEdge core services.	111945-nn - Storage Cache Manager 111946-nn - Storage Volume Driver 111948-nn - Sun SNDR software
TCP/IP network transport software such as SunATM™ or Gigabit Ethernet transports	None
Sun StorEdge Instant Image software is an optional software component. Install this package for additional point-in-time capability	111945-nn - Storage Cache Manager 111946-nn - Storage Volume Driver 111947-nn - Sun StorEdge Instant Image

TABLE 1-3 Supported Hardware, Noncluster Environments

Hardware	A CD-ROM drive connected to the host server where the Sun SNDR software is to be installed. The Sun SNDR software is supported on server hosts using the Solaris operating environment and any network interface card supported by Sun. Hosts include but are not limited to: • Sun Enterprise™ server models 2x0 through 4x0 • Sun Enterprise server models 3x00 through 10000 • Sun Fire™ server models, 3800, 4800, 4810, and 6800
Disk Space	The Sun SNDR software requires approximately 1.4 Mbytes. The Sun StorEdge configuration location requires 4.5 Mbytes (see "Specifying the Configuration Location During the Sun StorEdge Installation Process" on page 8). Supporting packages require approximately 3 Mbytes.
Supported Attached Storage	The Sun SNDR software is storage-hardware independent.

Supported Hardware and Software In a Sun Cluster 3.0 Update 1 Environment

If you are using the Sun StorEdge services software in a Sun Cluster 3.0 Update 1 environment, see the *Sun Cluster 3.0 U1 and Sun StorEdge Software 3.0 Integration Guide* for more information. Sun Cluster 3.0 Update 1 is also known as the Sun Cluster 3.0 07/01 release.

Note – You cannot use the Sun StorEdge Fast Write Cache (FWC) product (all versions, including the `SUNWnvm` Version 3.0 software) in any Sun Cluster environment because cached data is inaccessible from other machines in a cluster. To compensate, you can use a Sun caching array.

Important Product Information

This section describes the following important product considerations.

Bitmap Files Are Not Supported in the Sun SNDR Version 3.0.1 Software

The Sun SNDR Version 3.0.1 software does not support bitmap files.

If you used files as bitmaps in the Sun SNDR Version 2.0 software, you must convert them to volumes after you upgrade from Version 2.0 to Version 3.0.1. See "Converting Bitmap Files to Bitmap Volumes" on page 52.

Installing This Software in a Sun Cluster 3.0 Environment

Caution – Do not install or try to use the Sun StorEdge Version 3.0.1 core and services software on servers in an environment containing the initial release of the Sun Cluster 3.0 software. **The Version 3.0.1 software is not cluster-aware or coexistent with the initial release of the Sun Cluster 3.0 software.**

The Version 3.0 software with patches and Version 3.0.1 software are cluster-aware in the Sun Cluster 3.0 Update 1 environment and provide high availability for the Sun StorEdge software.

See the *Sun Cluster 3.0 U1 and Sun StorEdge Software 3.0 Integration Guide* for information about installation and configuration. Sun Cluster 3.0 Update 1 is also known as the Sun Cluster 3.0 07/01 release. TABLE 1-4 describes the cluster terminology.

TABLE 1-4 Cluster Terminology and Status

Term	Definition	Sun StorEdge Services Status
Cluster aware	A software product is Sun Cluster aware if it can coexist with the Sun Cluster environment and fails over and fails back as the logical host containing the software product fails over and fails back. A Sun Cluster aware product can then be made highly available by utilizing the High Availability framework that Sun Cluster provides.	The Sun StorEdge Version 3.0 services software with patches is cluster aware in a two-node, Sun Cluster 3.0 Update 1 software environment. The Sun StorEdge Version 3.0.1 services software is cluster aware in a two-node, Sun Cluster 3.0 Update 1 software environment.
Cluster tolerant or coexistent	A software product is Sun Cluster tolerant if it can coexist with the Sun Cluster environment and does not interfere with the Sun Cluster software and applications running in this environment. A product that is cluster tolerant is not expected to fail over or fail back when a Sun Cluster logical host fails over and fails back.	The Sun StorEdge Versions 3.0 and 3.0.1 services software *is not cluster tolerant* in the initial release of the Sun Cluster 3.0 software.

The Sun StorEdge 3.0.1 Services Software is Not Compatible With Previous Versions

Caution – Do not attempt to mix Sun SNDR software versions on primary and secondary hosts. For example, do not run the Sun SNDR 2.0 software on a primary host and attempt to enable volumes on a secondary host running the Sun SNDR 3.0.1 software. This configuration is not supported. Upgrade all hosts to the Version 3.0.1 software.

The Sun StorEdge 3.0.1 services software is binary incompatible with the Sun StorEdge software Versions 1.x, 2.0, and 2.0.1. When you plan to install or upgrade to a Version 3.0.1 service, you must remove all Version 1.X, 2.0, and 2.0.1 services first.

If your system includes Versions 1.x and 2.0 of the Sun StorEdge Instant Image software (including Instant Image 2.0.1 with the Sun target emulation utility version 1.2) and the Sun SNDR software, you must remove them before installing the Version 3.0.1 services. For example, you cannot use the Sun StorEdge Instant Image software Version 2.0 with the Sun SNDR software Version 3.0.1.

Note – However, the Sun StorEdge core services Version 3.0.1 CD contains the Sun StorEdge `SUNWnvm` Version 3.0 software package. This package is intended for those users whose systems include Version 2.0 of the Sun FWC hardware and software product and who wish to continue using the Sun FWC product. See Appendix A for details.

Preparing for Installation

The preinstallation requirements and procedures include the following topics:

Order of Installation for the Sun StorEdge Software

Install the core services software first, followed by the Sun StorEdge services software. The order of installation for the Sun StorEdge services software does not matter. You can install the Sun SNDR or Sun StorEdge Instant Image software in any order after you install the core services software.

Specifying the Configuration Location During the Sun StorEdge Installation Process

Caution – When selecting a volume to be used as the configuration location, ensure that volume does not contain disk label private areas (for example, slice 2 on a Solaris operating environment-formatted volume). The disk label region is contained in the first sectors of cylinder 0 of a disk. The safest method is to ensure that cylinder 0 is not part of any logical volume that is replicated (except for volumes under VERITAS Volume Manager control, where cylinder 0 can be part of a logical volume that is replicated).

Note – When you specify a configuration location as prompted by the Sun StorEdge services installation process, the location must be writable by the superuser user.

When you install the Sun StorEdge core services software, the installation process asks you to specify a block device for the single configuration location used by all Sun StorEdge services software you plan to install. Configure RAID (such as mirrored partitions) for the location and ensure that the mirrored members are not stored on the same disk as the data.

- The configuration location requires 4.5 Mbytes of disk space. If you specify a file for the configuration location, the file of the appropriate size is automatically created.
- The configuration location must be a file name or block device for the single configuration location used by all Sun StorEdge data service software you plan to install. For example, `/dev/dsk/c1t1d0s7` or `/config`
- If you select a file name, its file system *must* be the root (`/`) or `/usr` file system. If you select a volume manager-controlled volume, it must be available when the Sun StorEdge services software is started.

Configuring a Link Interface

Although the Sun SNDR software is most likely to be used with SunATM™ link-level interfaces, the Sun SNDR software can be used with any link-level interface supported by Sun that is TCP/IP-capable, such as Gigabit Ethernet, Gigabit Ethernet Fibre Channel, and others.

When using ATM, ensure that the configuration supports TCP/IP by using either Classical IP or LAN Emulation. For more information on configuring the SunATM interface for these protocols, see the SunATM documentation listed in "Related Documentation" on page xii.

See the network protocol manuals listed in "Related Documentation" on page xii for more information about other protocols.

See "Configuring the IP Stack (IPv4 and IPv6)" on page 22 for information about configuring the Internet Protocol Version 6 (IPv6) transport protocol.

CHAPTER 2

Installing the Software

This chapter describes the following topics:

Installation Steps Summary

TABLE 2-1 shows the installation steps summary for this chapter.

TABLE 2-1 Installation Steps Summary

Installation Steps	See This Section
1. Set up a configuration location.	"Specifying the Configuration Location During the Sun StorEdge Installation Process" on page 8
2. Run the `probe_script` validation script on the core services CD.	"Running the probe_script Validation Script" on page 13
If you have older versions of the Sun StorEdge software installed on your machine, remove them and shut down and restart your machine.	"Upgrading the Sun SNDR 2.0 Software" on page 51
3. Install the Sun StorEdge core and Sun SNDR services software on the primary and secondary host machines. *Install the software on the primary host first.*	"Installing the Sun SNDR Software" on page 15
4. Install other Sun StorEdge services software, if applicable.	Appendix A "Installing the Sun StorEdge Software at Different Times" on page 37 *Sun StorEdge Instant Image 3.0.1 Installation Guide*
5. Go to Chapter 3 to complete the installation.	After you successfully install the Sun SNDR software and before you shut down and restart your system, you must configure certain files to help ensure that the Sun SNDR software is operating.

Running the `probe_script` Validation Script

Caution – Do not execute the `probe_script` script *after* you have installed Version 3.0.1 of the Sun SNDR, Instant Image, and `SUNWnvm` software.

Run the `probe_script` validation script before you install the Sun StorEdge Version 3.0.1 software. The script does the following:

- Verifies that you are logged in as the superuser (root) user
- Checks that you have the correct minimum required version of the Solaris OE installed
- Lists any installed Version 2.0 packages that you must remove and the order to remove them. Use the `pkgrm`(1M) program to remove these packages. See "Upgrading the Sun SNDR 2.0 Software" on page 51.

▼ To Run the Validation Script

1. **Log on as the superuser user.**
2. **Insert the Sun StorEdge core services software CD into the CD-ROM drive that is connected to your system.**
3. **Start the Volume Manager daemon `vold`(1M) (if needed) and run the validation script.**

```
# /etc/init.d/volmgt start
# cd /cdrom/cdrom0
# ./probe_script
```

If you are not the superuser user or are not running the minimum required Solaris OE version, the script displays messages stating:

```
WARNING : You're currently not the root user
You must be root when you execute the installation scripts.

WARNING: The version of Solaris currently running is not among
the supported versions for this product.
Supported versions are: Solaris 2.6, Solaris 7, and Solaris 8.
```

If the script detects that the Sun SNDR software Version 2.0 is currently installed on your system, perform the procedures described in "Upgrading the Sun SNDR 2.0 Software" on page 51.

After the script executes successfully, the system displays a ready-to-install message and exits.

4. **To install the software, go to "Installing the Sun SNDR Software" on page 15.**

Installing the Sun SNDR Software

Install the Sun SNDR software on the primary and secondary host machines.

Note – Install the software on the primary host first.

To install Sun SNDR software requires two CDs:

- Sun StorEdge core services software CD
- Sun SNDR software CD

▼ To Install the Sun SNDR Software

1. **Log on as the superuser user.**

   You can install this software in single-user or multiuser state.
   Install it on the pimary host first.

2. **Insert the Sun StorEdge core services software CD into the CD-ROM drive that is connected to your system.**

   It might already be in your drive if you ran the `probe_script` script.

3. **Start the Volume Manager daemon `vold`(1M) (if needed) and install the Sun StorEdge core services software by typing the following:**

Note – If you are installing more than one Sun StorEdge data service, you only need to start the Volume Manager daemon and install the core services software once. Do not start the daemon and install the core services software more than once.

```
# /etc/init.d/volmgt start
# cd /cdrom/cdrom0
# ./install_core
```

The core services software package installation starts.

```
Do you want to specify the Sun StorEdge services configuration
location? [y,n,?]
```

4. **For a first-time installation, respond by typing `y`.**

   The core services software prompts you as follows:

```
Where should the Sun StorEdge data service configuration be
located?
```

5. **Type a file name or block device for the single configuration location used by all Sun StorEdge data service software you plan to install.**

   For example, `/dev/dsk/c1t1d0s7` or `/config`

Note – If you select a file name, its file system *must* be the root (`/`) or `/usr` file system. See "Specifying the Configuration Location During the Sun StorEdge Installation Process" on page 8.

---

6. **Eject the Sun StorEdge core services software CD from the drive:**

```
# cd /
# eject cdrom
```

7. **Insert the Sun SNDR CD and install the Sun SNDR software.**
   - To install Sun SNDR software using the installation script, type:

```
# cd /cdrom/cdrom0
# ./install_sndr
```

   The package installation starts.

8. **Eject the Sun SNDR CD.**

```
# cd /
# eject cdrom
```

9. **Install other Sun StorEdge services software.**
   - If you are installing the `SUNWnvm` 3.0 package, see Appendix A.
   - If you are installing the Sun StorEdge Instant Image software, see the *Sun StorEdge Instant Image 3.0.1 Installation Guide.*

10. **Go to Chapter 3 to complete the installation.**

    See "Post-Installation Steps Summary" on page 20.

Note – After you successfully install the Sun SNDR software *and before you shut down and restart your system*, you must configure certain files to help ensure that the Sun SNDR software is operating.

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11. **When you finish the steps in Chapter 3, shut down and restart your server.**

    See "Shutting Down and Restarting Your System" on page 28.

Caution – Do not use the `reboot` command. Always use the `shutdown` command. The `shutdown` command also ensures that any shutdown scripts in the `/etc/init.d` directory are executed.

CHAPTER 3

Post-Installation Configuration Procedures

After you successfully install the Sun SNDR software *and before you shut down and restart your system*, you must configure certain files to help ensure that the Sun SNDR software is operating. See "Post-Installation Steps Summary" on page 20.

This chapter also describes the following required post-installation topics and procedures:

This chapter also describes the following topics that are not required but provided for your information:

Post-Installation Steps Summary

TABLE 3-1 shows the post-installation steps summary.

TABLE 3-1 Post-Installation Steps Summary

Post-installation Steps	See This Section
1. Edit the following files: • `/etc/hosts` • `/etc/nsswitch.conf` • (Solaris 2.6 systems only) `/etc/system/` • (Optional) `/usr/kernel/drv/rdc.conf`	"Configuring System Files Required for Successful Sun SNDR Operation" on page 21
2. Shut down and restart your machine.	"Shutting Down and Restarting Your System" on page 28
3. Set up the bitmap volumes.	"Setting Up Bitmap Volumes" on page 29
4. Add the Sun SNDR paths to your environment.	"Adding the sndradm Command PATH and Man Page MANPATH to Your Shell Environment" on page 30
5. (Optional) Set up an optional Sun SNDR volume configuration file.	"Creating an Optional Sun SNDR Configuration File" on page 33

Configuring System Files Required for Successful Sun SNDR Operation

This section includes important system file information. After you complete the steps in this section, go to "Shutting Down and Restarting Your System" on page 28.

Editing the `/etc/system` File

- **On a system running the Solaris 2.6 operating environment, add this line to the `/etc/system` file:**

```
set kobj_map_space_len=0x200000
```

Editing the `/etc/hosts` File

- **Add the names and IP addresses of all machines you plan to use with the Sun SNDR software to the `/etc/hosts` file.**

  Edit this file on each machine where you are installing and running the Sun SNDR software. See also "Configuring the IP Stack (IPv4 and IPv6)" on page 22.

Configuring the IP Stack (IPv4 and IPv6)

If you use the Internet Protocol version 6 (IPv6) transport protocol for replication, configure the IPv4 and IPv6 stack concurrently on the host for the interface where the Sun SNDR software is used. See the *System Administration Guide, Volume 3* for the Solaris 8 operating environment for more information about IPv6.

To use the IPv6 protocol, ensure that you define the IPv4 and IPv6 interfaces with the same name. You must define the primary and secondary hosts such that the same transport protocol is used by both machines. See "Example: Setting Up IPv6 Addresses" on page 22.

Example: Setting Up IPv6 Addresses

The following procedure is a brief example showing how to set your network interface to use IPv6 addresses. Use this procedure to test your Sun SNDR hosts connection. The *System Administration Guide, Volume 3* for the Solaris 8 operating environment contains more complete information about the IPv6 interface.

The following example configures the `hme1` network interface to use the primary host interface name `sndrpri`. The secondary host interface is named `sndrsec`.

▼ To Set Up an IPv6 Address

Note – Perform these procedures on the primary and secondary hosts. You must define the primary and secondary hosts so that the same transport protocol is used by both machines.

---

1. **Create the `/etc/hostname6.hme1` file using a text editor and add the interface name `sndrpri` to the file on the primary host and the interface name `sndrsec` to the file on the secondary host.**

   Check the file contexts after saving it and exiting.

```
primary-host# more /etc/hostname6.hme1
sndrpri
secondary-host# more /etc/hostname6.hme1
sndrsec
```

2. **Shut down and restart both machines.**

```
# /etc/shutdown -y -g 0 -i 6
```

3. **After the reboot finishes, get the IPv6 `inet` address for the `hme1` interface address.**

   In this example, the address is `fe80::a00:20ff:febd:c33f/128`

```
# ifconfig -a
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 192.9.200.125 netmask ffffff00 broadcast 192.9.200.255
        ether 8:0:20:ae:85:fa
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:ae:85:fa
        inet6 fe80::a00:20ff:feae:85fa/10
hme1: flags=2000841<UP,RUNNING,MULTICAST,IPv6> mtu 1500 index 4
       ether 8:0:20:bd:c3:3f
        inet6 fe80::a00:20ff:febd:c33f/128
```

4. **Edit the `/etc/inet/ipnodes` file and insert the address from Step 3, assigning it the primary host address to `sndrpri` and the secondary host address to `sndrsec`.**

   - Do not use the `/128` portion of the address.

Note – Make sure the `/etc/inet/ipnodes` file on each system running the Sun SNDR software contains the IPv6 `inet` numbers and names of each system.

---

5. **Check the file contents after saving the file and exiting.**

   Here, `sndrsec` is the secondary host interface name.

```
primary-host# more /etc/inet/ipnodes
#
# Internet host table
#
::1             localhost
127.0.0.1       localhost
fe80::a00:20ff:febd:c33f     sndrpri
fe80::a00:20ff:fee1:195e     sndrsec
```

6. **Edit the `/etc/nsswitch.conf` file to make sure `ipnodes:` points to `files`.**

   Look for the following text in the file and make sure the `ipnodes:` line is uncommented.

```
# consult /etc "files" only if nis is down.
hosts: files nis [NOTFOUND=return] files
ipnodes: files
```

7. **Add the host names and IPv4 `inet` primary addresses of all machines you plan to use with the Sun SNDR software to the `/etc/hosts` file on each machine.**

   Edit this file on each machine where you are installing and running the Sun SNDR software. For example, check the file contents after editing:

```
primary-host# cat /etc/hosts
#
# Internet host table
#
192.9.200.125      ricky1      loghost
192.9.200.135      lucy1
192.9.200.125      sndrpri
192.9.200.135      sndrsec
```

Caution – If you fail to perform this step (as described in "Editing the /etc/hosts File" on page 21), the following error message displays when you enable the Sun SNDR software:

```
sndradm: Error: neither sndrpri nor sndrsec is local
```

8. **Make sure you can ping from one system to another and that these systems are using the IPv6 protocol.**

   To check that the address types are defined correctly, use the `ping`(1M) command.

   - From the primary host:

```
# ping -s sndrsec
PING sndrsec: 56 data bytes
64 bytes from sndrsec (fe80::a00:20ff:fee1:195e): icmp_seq=0. time=0. ms
64 bytes from sndrsec (fe80::a00:20ff:fee1:195e): icmp_seq=1. time=0. ms
64 bytes from sndrsec (fe80::a00:20ff:fee1:195e): icmp_seq=2. time=0. ms
```

- From the secondary host:

```
# ping -s sndrpri
PING sndrpri: 56 data bytes
64 bytes from sndrpri (fe80::a00:20ff:febd:c33f): icmp_seq=0. time=0. ms
64 bytes from sndrpri (fe80::a00:20ff:febd:c33f): icmp_seq=1. time=0. ms
64 bytes from sndrpri (fe80::a00:20ff:febd:c33f): icmp_seq=2. time=0. ms
```

9. **Use the** `netstat`**(1M) command to verify that the interface has the correct IPv6 address and IPv6 name.**

   Use this command on the `sndrpri` and `sndrsec` hosts. For example:

```
# netstat -in
Name  Mtu  Net/Dest      Address        Ipkts  Ierrs Opkts  Oerrs Collis Queue
lo0   8232 127.0.0.0     127.0.0.1      3844   0     3844   0     0      0
hme0  1500 192.0.0.0      192.9.200.225 22007  0     1054   0     0      0

Name  Mtu  Net/Dest      Address        Ipkts  Ierrs Opkts  Oerrs Collis Queue
lo0   8252 ::1        ::1                      3844   0     3844   0     0
hme1  1500 fe80::a00:20ff:febd:c33f   fe80::a00:20ff:febd:c33f   43    0 65 0 0
```

```
# netstat -i
Name  Mtu  Net/Dest      Address        Ipkts  Ierrs Opkts  Oerrs Collis Queue
lo0   8232 loopback      localhost      3844   0     3844   0     0      0
hme0  1500 arpanet        rick1          22038  0     1067   0     0      0

Name  Mtu  Net/Dest   Address                 Ipkts  Ierrs Opkts  Oerrs Collis
lo0   8252 localhost localhost                 3844   0     3844   0     0
hme1  1500 sndrpri    sndrpri                   43     0     65     0     0
```

Making Sure that the /etc/nsswitch.conf File is Correct

This installation step helps ensure that the host names in the /etc/hosts file are read and known by machines running the Sun StorEdge 3.0.1 services software. In the section, you will edit the /etc/nsswitch.conf(4) file using a text editor.

▼ To Add the Correct Entries to the /etc/nsswitch.conf File

1. **Include the following** hosts: **and** services: **entries in the** /etc/nsswitch.conf **file.**

   Ensure that files is placed before nis or nisplus.

   - For systems using the NIS naming service:

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

   - For systems using the NIS+ naming service:

```
hosts: files nisplus
services: files nisplus
```

Editing the rdc.conf File

A bitmap maintained on disk can persist across a system crash, depending on the setting of rdc_bitmap_mode in /usr/kernel/drv/rdc.conf. If your server is configured in a clustered environment, set the bitmap mode to 1. If your server is not configured in a clustered environment, you might also choose the bitmap mode setting of 1 to improve error or disaster recovery. The default setting is 0.

For example:

```
# rdc_bitmap_mode
# - Sets the mode of the RDC bitmap operation, acceptable values are:
#   0 - autodetect bitmap mode depending on the state of SDBC (default).
#   1 - force bitmap writes for every write operation, so an update resync
#       can be performed after a crash or reboot.
#   2 - only write the bitmap on shutdown, so a full resync is
#       required after a crash, but an update resync is required after
#       a reboot.
#
rdc_bitmap_mode=0;
```

Shutting Down and Restarting Your System

Note – You only need to shut down and restart your system once, after you have installed all Sun StorEdge software and performed the post-installation procedures.

- **After you have performed the installation and post-installation procedures, eject the Sun SNDR CD and then shut down and restart each system where the software is installed.**

```
# cd /
# eject cdrom
# /etc/shutdown -y -g 0 -i 6
```

Caution – Do not use the `reboot` **command.** Always use the `shutdown` command. The `shutdown` command also ensures that any shutdown scripts in the `/etc/init.d` directory are executed.

Setting Up Bitmap Volumes

The Sun SNDR Version 3.0.1 software does not support bitmap files. The Sun SNDR software uses regular raw devices to store bitmaps. These raw devices should be stored on a disk separate from the disk that contains the data. Configure RAID (such as mirrored partitions) for these bitmap devices and ensure that the mirrored members are not stored on the same disk as the data.

In a clustered environment, a bitmap must reside only on a volume. The bitmap volume in this case must be part of the same disk group or cluster resource group as the corresponding primary or secondary data volume.

Bitmap Size Requirements

The bitmap size can be calculated using the following formula:

- 1 Kbyte + 4 Kbytes per Gbyte of device storage space

For example, a 2-Gbyte data device requires a bitmap size of 9 Kbytes. (You can create bitmaps that are larger than the calculated size.)

▼ To Set Up a Bitmap Volume

1. **Use a volume manager to create a disk volume.**
2. **Clear the volume using the** `dd`**(1M) command on** `/dev/zero`**.**

```
# dd if=/dev/zero of=raw-device count=xx skip=yy
```

where:

`of=`*raw-device*	the bitmap volume block device, such as `/dev/rdsk/c0t0d0s3`
`count=`*xx*	the number of blocks to clear
`skip=`*yy*	the number of blocks to skip from the start of the partition before starting the bitmap clearing operation

Adding the sndradm Command PATH and Man Page MANPATH to Your Shell Environment

This section describes how to add the Sun SNDR command and man page paths to your environment.

▼ To Add the Paths to Your Bourne or Korn Shell

1. **Add** /usr/opt/SUNWesm/sbin **to your** PATH **statement in your** .profile **file.**

   This path enables you to access the Sun SNDR commands like sndradm. For example, edit your .profile file in a text editor and add the command path:

```
PATH=$PATH:/usr/opt/SUNWesm/sbin
export PATH
```

   where $PATH indicates all other paths in your file.

2. **Add** /usr/opt/SUNWesm/man **to your** MANPATH **statement in your** .profile **file.**

   This path enables you to read the Sun SNDR-related man pages.

```
MANPATH=$MANPATH:/usr/opt/SUNWesm/man
export MANPATH
```

   where $MANPATH indicates the default man page path of /usr/share/man and other man page locations you might have. See the man(1M) man page for more information about the man command.

3. **Save this file and exit.**

▼ To Add the Paths to Your C Shell

1. **Add** `/usr/opt/SUNWesm/sbin` **to your** `path` **statement in your** `.cshrc` **file.**

   This path enables you to access the Sun SNDR commands like `sndradm`. For example, edit your `.cshrc` file in a text editor and add the command path:

   ```
   set path = ($path /usr/opt/SUNWesm/sbin )
   ```

   where `$path` indicates all other paths in your file.

2. **Save this file and exit.**

3. **Add** `/usr/opt/SUNWesm/man` **to your** `MANPATH` **statement in your** `.login` **file.**

   This path enables you to read the Sun SNDR-related man pages. For example, edit your `.login` file in a text editor and add the command path:

   ```
   setenv MANPATH "$MANPATH:/usr/opt/SUNWesm/man"
   ```

   where `$MANPATH` indicates the default man page path of `/usr/share/man` and other man page locations you might have. See the `man`(1M) man page for more information about the `man` command and the directories it searches.

4. **Save this file and exit.**

▼ To Use An Alternate Method to Read Man Pages

These procedures describe how to read man pages without having to add paths to your environment.

- **To read the Sun SNDR man pages, type:**

```
# man -M /usr/opt/SUNWesm/SUNWrdc/man manpage
```

where *manpage* is one of the following:

manpage	sndradm.1m
	sndrd.1m
	sndrstat.1m
	sndrsyncd.1m
	rdc.cf.4

- **To read related manpages, type:**

```
# man -M /usr/opt/SUNWesm/SUNWscm/man/ manpage
```

where *manpage* is one of the following:

manpage	ds.log.4
	dscfg.1m
	scmadm.1m

Creating an Optional Sun SNDR Configuration File

When you enable the Sun SNDR software using the `/usr/opt/SUNWesm/sbin/sndradm` command, you can specify an optional configuration file containing information about the volume set: volumes, primary and secondary hosts, bitmaps, Sun SNDR operating mode, and so on. (You can also enter this information from the command line.) This information resides in the Sun StorEdge 3.0.1 services configuration and is automatically added to the storage volume (SV) driver.

One advantage when using one or more configuration files is that you can operate on specific volume sets depending upon your requirements and exclude other sets from the operation. Unlike adding the volume sets to an I/O group, you can mix replication modes in a configuration file.

The fields for the configuration file specified using the `-f` *config-file* option are as follows:

phost pdev pbitmap shost sdev sbitmap `ip` {`sync`|`async`} [`g` *io-groupname*]

See TABLE 3-2 for field descriptions.

An example configuration file entry is as follows:

```
atm10 /dev/vx/rdsk/oracle816/oratest /dev/vx/rdsk/oracle816/oratest_bm \
atm20 /dev/vx/rdsk/oracle816/oratest /dev/vx/rdsk/oracle816/oratest_bm \
ip sync g oragroup
```

See the `rdc.cf` man page for more information about this configuration file format.

TABLE 3-2 Configuration File Format Fields

Field Name	Definition
phost	Primary host - server on which the primary volume resides.
pdev	Primary device - primary volume partition to be copied. Specify full path names only (for example, `/dev/dsk/c0t1d02s4`).
pbitmap	Primary bitmap - volume partition in which the bitmap (scoreboard logs) of the primary partition is stored. Specify full path names only.
shost	Secondary host - server on which the secondary volume resides.
sdev	Secondary device - secondary host volume partition. Specify full path names only.
sbitmap	Secondary bitmap - volume partition in which the bitmap (scoreboard logs) of the secondary partition is stored. Specify full path names only.
`ip`	Network transfer protocol. Specify `ip`.
`sync` | `async`	Sun SNDR software operating mode. `sync` is the mode where the I/O operation is confirmed as complete only when the remote volume has been updated. `async` is the mode where the primary host I/O operation is confirmed as complete before updating the remote volume.
`g` *io-groupname*	I/O group name - an I/O group name can be specified using the `g` character. In this example, it is `oragroup`.

Miscellaneous Information and Procedures

This section describes the following topics:

Removing and Reinstalling the Sun SNDR Version 3.0.1 Software

Perform the following procedures on each server where you plan to reinstall the Sun SNDR Version 3.0.1 software. See also "Installing the Sun StorEdge Software at Different Times" on page 37.

▼ To Remove and Reinstall the Sun SNDR Software

1. **Log on as the superuser user.**
2. **Back up your Sun StorEdge services information as described in "Using the dscfg Command to Back Up and Restore Configuration Information" on page 38.**
3. **Remove the Sun SNDR software packages.**

```
# pkgrm SUNWrdcu SUNWrdcr
```

4. **If no other Sun StorEdge services software is installed, remove the Sun StorEdge core services software packages.**

```
# pkgrm SUNWspsvu SUNWspsvr SUNWscmu SUNWscmr
```

5. **Shut down and restart your server.**

```
# shutdown -y -i 6 -g 0
```

6. **When the server completes its startup process, log in as superuser and install the packages according to the procedures described in Chapter 2.**

Note – To keep the previously designated configuration location when you reinstall Sun SNDR Version 3.0.1 software, answer **n** to the prompt `Do you want to specify the Sun StorEdge services configuration location? [y,n,?]`

---

7. **If you answered `y` to the question in Step 6 and specified a new configuration location, restore your Sun StorEdge services information as described in "Using the dscfg Command to Back Up and Restore Configuration Information" on page 38.**

8. **Shut down and restart your server.**

```
# shutdown -y -i 6 -g 0
```

Installing the Sun StorEdge Software at Different Times

If you have performed one of the following installation sequences:

- Installed the Sun StorEdge core services Version 3.0.1 software and have rebooted
- Installed the core services and one or more Version 3.0.1 data service software packages and have rebooted

You must shut down and restart your server as described in the following text after you install another Version 3.0.1 software package. This situation also applies if you want to add services software at a later date.

For example, if you have:

1. Installed the core services software.
2. Installed the Sun StorEdge Instant Image software.
3. Shut down and restarted your server.

and you wish to install the Sun SNDR software now or at a later date, you must:

1. Install the Sun SNDR software.
2. Shut down and restart your server as follows:

```
# touch /reconfigure
# /etc/shutdown -y -g 0 -i 6
```

Using the dscfg Command to Back Up and Restore Configuration Information

Caution – *Do not use this command to restore your configuration unless it is absolutely necessary.* You risk corrupting your configuration if you make any errors. Use it to back up your configuration. *Perform the restore procedure only if the volume where the configuration resides fails. Contact your Sun support person for more information.*

Use the `/usr/opt/SUNWscm/sbin/dscfg` command to back up the services software configuration information. You can safely back up the configuration when you make volume set-related changes.

Typically, you make any volume set-related changes using the `/usr/opt/SUNWesm/sbin/sndradm` command described in the *Sun StorEdge Network Data Replicator 3.0 System Administrator's Guide.*

▼ To Back Up Configuration Information

Note – Perform this step after you have set up an initial configuration and anytime you change your configuration (for example, adding and deleting volumes).

- **Write the configuration information to an ASCII file.**

```
# /usr/opt/SUNWscm/sbin/dscfg -l > ASCII-output-file
```

▼ To Restore Configuration Information

Caution – Perform the restore procedure only if the Sun StorEdge services software (Instant Image, Sun SNDR, and Fast Write Cache) is not in use. In clustered environments, no node can be using the data service software.

Note – If the original configuration location becomes corrupted, you can change it using the `dscfg -s` *full-path* command. *Use this command only if the location becomes corrupted.*

1. **Initialize the configuration file.**

Caution – All services software configuration information will be lost. The command prompts you to confirm the action before any action is taken.

```
# /usr/opt/SUNWscm/sbin/dscfg -i
```

2. **Load the configuration file parsing rules for the ASCII file.**

```
# /usr/opt/SUNWscm/sbin/dscfg -i -p /etc/opt/SUNWesm/pconfig
```

3. **Add the configuration file you created in** "To Back Up Configuration Information" on page 38**.**

```
# /usr/opt/SUNWscm/sbin/dscfg -a ASCII-output-file
```

Automatic Update Resynchronization

The `/usr/opt/SUNWrdc/lib/sndrsyncd` daemon automates update resynchronization after a network link or machine failure; if the Sun StorEdge Instant Image software is also installed, it invokes point-in-time copies when necessary to protect the data volumes being updated during a resynchronization.

When a network link being used by the Sun SNDR software becomes unavailable, the daemon attempts to invoke the Sun SNDR software update commands to resynchronize all volume sets that have autosynchronization enabled and are using the network link.

The daemon is also notified when any Sun SNDR software resynchronization starts or ends. If Instant Image software is installed, the daemon also performs point-in-time copy operations using this software. On a secondary server, the daemon checks whether a file system is currently mounted on the secondary volume and informs the kernel not to allow the synchronization to start if the file system is currently mounted.

▼ To Enable Automatic Update Resynchronization

- **On the primary and secondary hosts, use this command:**

```
# /usr/opt/SUNWesm/sbin/sndradm -a on [-g io-groupname] [-C tag] [-n] [-f config-file |
SNDR-set | set-name]
```

where:

io-groupname	The I/O group name
tag	The disk group or resource name. `-C` *tag* is used in Sun Cluster 3.0 Update 1 environments only.
SNDR-set	The fully specified volume set information
set-name	The volume set name, typically *shost*:*sdev*

Note – When you use this command on an I/O group, all volume sets in the I/O group are affected.

Swapping the Sun SNDR Hosts

In case of disaster recovery or link failure situations, you can swap the Sun SNDR host roles to provide access to your critical data. That is, the primary host can become the secondary host and the secondary host can become the primary host. This scheme enables you to recover the old primary host and, if you choose, switch back to the original roles.

The basic steps to swap hosts roles are as follows. Before performing these steps, quiesce the application writing to the Sun SNDR volumes and then unmounted those volumes.

1. Disable the Sun StorEdge Network Data Replicator software at the primary host (named Site-A). This step also discards the primary bitmap volume at Site-A.
2. At Site-A, create a text configuration file named `/etc/opt/SUNWrc/rdc.cf`. See "Creating an Optional Sun SNDR Configuration File" on page 33.
3. Edit the `/etc/opt/SUNWrc/rdc.cf` configuration file to change the host information.
4. At Site-A, unmount the volumes, if possible.
5. At the secondary host (named Site-B), disable the software.
6. At Site-B, edit the `/etc/opt/SUNWrc/rdc.cf` file to change the host information to match Site-A.
7. At Site-B (which is now the primary host), enable the Sun StorEdge Network Data Replicator software.
8. At Site-B, synchronize the volumes from Site-B to Site-A.
9. Perform any modifications or recovery procedures required by your application.

Note – For example, if you are using a database application, you might have to copy data and control files to the new secondary host after the synchronization.

Sample `rdc.cf` File Used in This Example

```
atm10 /dev/vx/rdsk/oracle816/oratest /dev/vx/rdsk/oracle816/oratest_bm \
atm20 /dev/vx/rdsk/oracle816/oratest /dev/vx/rdsk/oracle816/oratest_bm \
ip sync
```

`atm10`	**Site-A (primary host)**
`/dev/vx/rdsk/oracle816/oratest`	**Site-A host volume**
`/dev/vx/rdsk/oracle816/oratest_bm`	**Site-A host bitmap volume**
`atm20`	**Site-B (secondary host)**
`/dev/vx/rdsk/oracle816/oratest`	**Site-B host volume**
`/dev/vx/rdsk/oracle816/oratest_bm`	**Site-B host bitmap volume**
`ip`	**Transmission protocol**
`sync`	**Replication mode**

▼ To Disable the Software at Site-A

Note – This procedure assumes that you have quiesced the application writing to the Sun SNDR volumes and then unmounted those volumes.

---

1. **Disable the Sun SNDR software and discard the Sun SNDR scoreboard bitmap.**

```
# sndradm -dn -f /etc/opt/SUNWrdc/rdc.cf
# svadm -d -f /etc/opt/SUNWrdc/rdc.cf
```

2. **Edit the `rdc.cf` file to swap the Site-A primary host information and Site-B secondary host information.**

   For example, in the example entry shown in "Sample rdc.cf File Used in This Example" on page 42, change `atm10` to `atm20` and `atm20` to `atm10`.

3. **If possible, unmount the Sun SNDR volumes.**

```
# umount mount-point
```

▼ To Change the Site-B Secondary Host to the Primary Host

1. **Disable the Sun SNDR software and discard the Sun SNDR scoreboard bitmap.**

```
# sndradm -dn -f /etc/opt/SUNWrdc/rdc.cf
# svadm -d -f /etc/opt/SUNWrdc/rdc.cf
```

2. **Edit the `rdc.cf` file to swap the Site-A primary host information and Site-B secondary host information.**

   For example, in the example entry shown in "Sample rdc.cf File Used in This Example" on page 42, change `atm10` to `atm20` and `atm20` to `atm10`.

3. **Enable the Sun SNDR software.**

```
# sndradm -en -f /etc/opt/SUNWrdc/rdc.cf
```

4. **Perform a full synchronization from Site-B to Site-A.**

```
# sndradm -mn -f /etc/opt/SUNWrdc/rdc.cf
```

5. **Perform any modifications or recovery procedures required by your application.**

CHAPTER 4

Upgrading From Version 2.0

Note – Before upgrading, read the `pkgadd`(1M), `pkgrm`(1M), and `patchrm`(1M) man pages.

This chapter describes the following topics.

See also "The Sun StorEdge 3.0.1 Services Software is Not Compatible With Previous Versions" on page 7.

Upgrade Steps Summary

TABLE 4-1 shows the general steps to upgrade the Sun SNDR Version 2.0 software to Version 3.0.1 software.

TABLE 4-1 Sun SNDR Upgrade Steps Summary

Upgrade Steps	See This Section
1. If you have the Sun StorEdge Instant Image 2.0 software installed, back up the configuration information.	"Backing Up the Sun StorEdge Instant Image 2.0 Configuration Information" on page 48
2. Execute the `probe_script` validation script.	"Running the probe_script Validation Script" on page 13
3. Remove any related patches and remove any Version 2.0 and 2.0.1 Sun StorEdge services software.	"Removing the Sun SNDR 2.0 Software" on page 49
4. Install the Sun StorEdge SNDR and core services Version 3.0.1 software packages.	"Upgrading the Sun SNDR 2.0 Software" on page 51 Chapter 2
5. Optional - Install the `SUNWnvm` Version 3.0 package.	Appendix A
6. Convert any Sun SNDR bitmap files to bitmap volumes and complete other post-installation procedures.	"Converting Bitmap Files to Bitmap Volumes" on page 52 Chapter 3

Keeping the Configuration Files From Version 2.0

The upgrade procedure requires that you remove the Version 2.0 software. When you remove the Version 2.0 software using the `pkgrm`(1M) command, the `rdc.cf`, `rdc_ii.cf`, and `sv.cf` configuration files are preserved in their original locations. If the Sun SNDR software Version 3.0.1 installation process finds them in their original locations, it converts them for use with Version 3.0.1.

Therefore, the Sun SNDR software Version 3.0.1 enables you to keep using the same volumes that you used with Sun SNDR software Version 2.0.

- `/etc/opt/SUNWrdc/rdc.cf` - the default configuration file used to specify volume set information for volumes under the Sun SNDR software control.

  You may also create a customized configuration file, depending on your server connection and disaster recovery plans in the Sun SNDR 2.0 software. If this customized configuration file is named `/etc/opt/SUNWrdc/rdc.cf`, the Sun SNDR 3.0.1 installation process will use it. (If it is not named `rdc.cf`, include this information in the `rdc.cf` file so that you can use it in Version 3.0.1.)

- `/etc/opt/SUNWrdc/rdc_ii.cf` - a configuration file used to list all secondary volumes on which Sun StorEdge Instant Image software was enabled by the `rdc_ii_enable` script.

- `/etc/opt/SUNWspsv/sv.cf` - the storage volume (SV) driver interface file used to place the Sun SNDR 2.0 software volumes under SV control.

Backing Up the Sun StorEdge Instant Image 2.0 Configuration Information

The Sun StorEdge Instant Image 2.0 software does not have a configuration file.

- **Before you remove old versions and install new versions, type the following command as superuser to create a configuration file that Instant Image software Version 3.0.1 can use.**

```
# /usr/opt/SUNWesm/sbin/iiadm -i all > /etc/opt/SUNWesm/iiadm.out
```

During installation, the output of the `iiadm` command is converted to the Version 3.0.1 format, to be used by the Instant Image software Version 3.0.1.

Removing the Sun SNDR 2.0 Software

The `probe_script` described in "Running the probe_script Validation Script" on page 13 lists the packages you must remove before upgrading. The script also lists the order in which to remove them when you use `pkgrm`(1M). You must remove the packages in the order listed.

▼ To Remove the Sun SNDR 2.0 Software

1. **Log on as the superuser user.**
2. **If you have other Sun StorEdge Version 2.0 services installed (such as Sun StorEdge Instant Image Version 2.0 or 2.0.1), perform an orderly shutdown of these services.**

```
# /usr/opt/SUNWesm/bin/esm_orderly stop
```

3. **Execute the `probe_script` validation script described in "Running the probe_script Validation Script" on page 13.**
4. **Remove the following patches in the order listed using `patchrm`(1M), where *nn* specifies the patch revision.**

Operating Environment	Patch	Description
Solaris 2.6	109979-*nn*	Sun SNDR software patch
	109967-*nn*	Sun StorEdge core services software patch
Solaris 7	109981-*nn*	Sun SNDR software patch
	109969-*nn*	Sun StorEdge core services software patch
Solaris 8	109982-*nn*	Sun SNDR software patch
	109970-*nn*	Sun StorEdge core services software patch

If `patchrm` fails to remove the -06 patch revision level of the patches with the following error, you can ignore the error and continue.

`Patch` *patch*`-06 is not installed or is invalid`

where *patch* is the patch number.

5. **Remove the Sun SNDR software.**

```
# pkgrm SUNWrdcu SUNWrdcr
```

6. **Remove any other Sun StorEdge services Version 2.0 software, as indicated by the** `probe_script` **script.**

   See the related Version 2.0 Installation Guide for specific removal steps. The *Sun StorEdge Instant Image 3.0.1 Installation Guide* describes how to remove the Instant Image 2.0 software.

7. **Remove the Sun StorEdge core services software.**

```
# pkgrm SUNWspsv SUNWscm SUNWspuni
```

8. **Shut down and restart your server.**

```
# shutdown -y -i 6 -g 0
```

Upgrading the Sun SNDR 2.0 Software

Caution – Do not attempt to mix Sun SNDR software versions on primary and secondary hosts. For example, do not run the Sun SNDR 2.0 software on a primary host and attempt to enable volumes on a secondary host running the Sun SNDR 3.0.1 software. This configuration is not supported. Upgrade all hosts to the Version 3.0.1 software. Install the version 3.0.1 software on the primary host first.

The section describes how to upgrade the software to Version 3.0.1. See also "Keeping the Configuration Files From Version 2.0" on page 47.

Note – Make sure you have removed the Sun SNDR Version 2.0 software according to procedures in "To Remove the Sun SNDR 2.0 Software" on page 49.

▼ To Upgrade the Sun SNDR Software

1. **Log on as the superuser user.**
2. **Execute the `probe_script` validation script.**

   See "Running the probe_script Validation Script" on page 13. Run this script to ensure that you have removed the recommended Version 2.0 software patches and packages.
3. **Insert the Sun SNDR software CD into the CD-ROM drive.**

   Make sure that Volume Manager is running and that the CD-ROM drive is mounted according to the procedure described in "To Install the Sun SNDR Software" on page 16.
4. **Install the packages according to the procedures described in "To Install the Sun SNDR Software" on page 16.**
5. **When you finish the steps in Chapter 3, shut down and restart your server.**

   See "Shutting Down and Restarting Your System" on page 28.

Caution – Do not use the `reboot` command. Always use the `shutdown` command. The `shutdown` command also ensures that any shutdown scripts in the `/etc/init.d` directory are executed.

Converting Bitmap Files to Bitmap Volumes

Note – This procedure works correctly on enabled Sun SNDR volume sets. If you used the default configuration file named `/etc/opt/SUNWrdc/rdc.cf` to specify all volumes under Sun SNDR Version 2.0 software control, the upgrade process uses this configuration information to enable volumes under the Version 3.0.1 software. See "Keeping the Configuration Files From Version 2.0" on page 47.

If you used files to store bitmaps in Version 2.0, you must convert any bitmap files to bitmap volumes after you upgrade from Version 2.0 to Version 3.0.1. **The Sun SNDR Version 3.0.1 software does not support bitmap files**.

▼ To Convert Bitmap Files to Volumes

1. **Log on as the superuser user.**
2. **Use the Sun SNDR software to list the volume set information for enabled volume sets. For example:**

```
# /usr/opt/SUNWesm/sbin/sndradm -i

fast7 /dev/rdsk/c2t0d0s1 /dev/rdsk/c2t1d0s0 fast8 /dev/rdsk/c4t96d0s1
/bitmaps/vol1 ip sync

fast7 /dev/rdsk/c2t0d0s1 /dev/rdsk/c2t1d0s3 fast8 /dev/rdsk/c4t97d0s1
/bitmaps/vol2 ip sync

fast7 /dev/rdsk/c2t0d0s1 /dev/rdsk/c2t1d0s4 fast8 /dev/rdsk/c4t98d0s1
/bitmaps/vol3 ip async
```

The output is formatted as follows:

phost pdev pbitmap shost sdev sbitmap `ip` {`sync`|`async`}

where *pbitmap* and *sbitmap* are the primary and secondary bitmaps.

3. **Check that a bitmap is a volume or file using the `file`(1M) command.**

```
# file bitmapname
```

where *bitmapname* is the *pbitmap* or *sbitmap* shown in the `sndradm -i` command output. If the file type is ASCII text, convert the file to a volume. The volume must be the same size or larger than the file. For example:

```
# file /bitmaps/map1
/bitmaps/map1:     ascii text
```

4. **Before converting the the bitmap file to a bitmap volume, place the volume set into logging mode using the `sndradm -l` command from the primary host machine.**

```
# /usr/opt/SUNWesm/sbin/sndradm -l set-name
```

where *set-name* is the name of the Sun SNDR software volume set as assigned by the Sun SNDR software. The Sun SNDR software assigns a default volume set name of *shost:sdev*, where *shost* is the secondary host name and *sdev* is the secondary volume partition name, separated by a colon (:). You can also use the full volume set information as shown by the `sndradm -i` command.

5. **To convert the bitmap file to a bitmap volume, assign a new bitmap volume to the Sun SNDR volume set by using the `sndradm -R b {p|s}` command.**
   - Enter the command from the primary *and* secondary hosts.
   - You can only convert the bitmap file one set at a time.

   This command copies any data from the bitmap file to the bitmap volume.

```
# /usr/opt/SUNWesm/sbin/sndradm -R b p new-bitmap {set-name | full-set-info}
```

See "Example: Convert a Volume Set's Primary and Secondary Bitmap Files to Volumes" on page 54.

Example: Convert a Volume Set's Primary and Secondary Bitmap Files to Volumes

The procedure to convert the bitmaps is performed on the primary host *and* the secondary host.

This example converts the following:

- Primary host `atm90` bitmap file `/bitmaps/map1` to volume `/dev/md/rdsk/d1`
- Secondary host `atm89` bitmap file `/bitmaps/maps` to volume `/dev/md/rdsk/d0`

1. **Check the Sun SNDR volume set information.**

```
atm90# /usr/opt/SUNWesm/sbin/sndradm -i

atm90 /dev/md/rdsk/d5 /bitmaps/map1 atm89 /dev/md/rdsk/d5 /bitmaps/map2 ip sync
```

2. **Put the volume set into logging mode.**

```
atm90# /usr/opt/SUNWesm/sbin/sndradm -l atm89:/dev/md/rdsk/d5
```

Entering this command from the primary host puts both hosts' volume sets in logging mode.

3. **Check that a bitmap is a volume or file using the `file`(1M) command.**

In this procedure, both bitmaps are files and must be converted.

4. **On the primary host, type the following:**

   a. **Convert the primary bitmap file to a bitmap volume named `/dev/md/rdsk/d1` and then check the volume set information.**

```
atm90# /usr/opt/SUNWesm/sbin/sndradm -Rn b p /dev/md/rdsk/d1 \
atm90 /dev/md/rdsk/d5 /bitmaps/map1 atm89 /dev/md/rdsk/d5 /bitmaps/map2 ip sync

atm90# sndradm -i
atm90 /dev/md/rdsk/d5 /dev/md/rdsk/d1 atm89 /dev/md/rdsk/d5 /bitmaps/map2 ip
sync
```

b. Convert the secondary bitmap file to a bitmap volume named `/dev/md/rdsk/d0` **and then check the volume set information.**

```
atm90# /usr/opt/SUNWesm/sbin/sndradm -Rn b s /dev/md/rdsk/d0 \
atm90 /dev/md/rdsk/d5 /dev/md/rdsk/d1 atm89 /dev/md/rdsk/d5 /bitmaps/map2 \
ip sync

atm90 /dev/md/rdsk/d5 /dev/md/rdsk/d1 atm89 /dev/md/rdsk/d5 /dev/md/rdsk/d0 ip
sync
```

5. On the secondary host, type the following:

a. Check the Sun SNDR volume set information.

```
atm89# /usr/opt/SUNWesm/sbin/sndradm -i

atm90 /dev/md/rdsk/d5 /bitmaps/map1 atm89 /dev/md/rdsk/d5 /bitmaps/map2 ip sync
```

b. Convert the primary bitmap file to a bitmap volume named `/dev/md/rdsk/d1` **and then check the volume set information.**

```
atm89# /usr/opt/SUNWesm/sbin/sndradm -Rn b p /dev/md/rdsk/d1 \
atm90 /dev/md/rdsk/d5 /bitmaps/map1 atm89 /dev/md/rdsk/d5 /bitmaps/map2 ip sync

atm89# sndradm -i
atm90 /dev/md/rdsk/d5 /dev/md/rdsk/d1 atm89 /dev/md/rdsk/d5 /bitmaps/map2 ip
sync
```

c. Convert the secondary bitmap file to a bitmap volume named `/dev/md/rdsk/d0` **and then check the volume set information.**

```
atm89# /usr/opt/SUNWesm/sbin/sndradm -Rn b s /dev/md/rdsk/d0 \
atm90 /dev/md/rdsk/d5 /dev/md/rdsk/d1 atm89 /dev/md/rdsk/d5 /bitmaps/map2 \
ip sync

atm90 /dev/md/rdsk/d5 /dev/md/rdsk/d1 atm89 /dev/md/rdsk/d5 /dev/md/rdsk/d0 ip
sync
```

CHAPTER 5

Troubleshooting Tips

This section describes general tips to help avoid and troubleshoot any problems that might occur when using the Sun SNDR software. The following topics are described.

Troubleshooting Checklist

This table shows the troubleshooting checklist and related sections.

TABLE 5-1 Troubleshooting Checklist

Step	See This Section
1. Check for installation errors.	“Checking the Installation” on page 59
2. Check that `/dev/rdc` is created after reboot.	“Checking the Installation” on page 59
3. Check that the `sndrd` daemon is running.	“To Verify That the sndrd Daemon is Running” on page 61
4. Check the log file contents.	“Log Files to Check” on page 61
5. Check that the `/etc/nsswitch.conf` file is configured correctly.	“Making Sure that the /etc/nsswitch.conf File is Correct” on page 63
6. Check that the `rdc` service is running.	“Checking That the /dev/rdc Service is Running” on page 64 “Reasons Why the /dev/rdc Service is Not Created” on page 65
7. Check the integrity of the link.	“Checking the Integrity of the Link” on page 66
8. Check for common errors.	“Common User Errors” on page 69

Checking the Installation

The Sun StorEdge Network Data Replicator 3.0.1 software installation process installs the following packages. These packages are required to run this Sun StorEdge data service:

- SUNWscmr
- SUNWscmu
- SUNWspsvr
- SUNWspsvu
- SUNWrdcr
- SUNWrdcu

During and after the installation process, be sure to:

1. Watch the SUNWscmu postinstall process as it displays on your screen. During the core services install process, you specify a configuration location for the data services software. If an error occurs as the result of this choice, this postinstall process might fail.
2. Watch all packages complete their postinstall process and check for any error messages or failures.
3. Issue a `pkginfo -l` command on each package after the postinstall process finishes. Make sure the packages are completely installed.
4. Shut down your system by using the `shutdown` command after installing all packages. **Do not use the `reboot` command**. If you do not shut down and restart your system and try to use the software, you might see an error message like

```
SNDR: Error
No such file or directory
statistics error
```

   This error occurs because the `/dev/rdc` service has not been created yet. Shutting down your machine creates this service.

After your system restarts, check for it:

```
# ls -al /dev/rdc
lrwxrwxrwx   1 root     root          27 Aug 24 12:44 /dev/rdc ->
../devices/pseudo/rdc@0:rdc
```

If the service is not running, see "Making Sure that the /etc/nsswitch.conf File is Correct" on page 63 and "Checking That the /dev/rdc Service is Running" on page 64.

Note – If you remove the packages, make sure to shut down and restart your system. If you reinstall the packages, shut down and restart your system after installation.

Daemons, Log Files, and Services

The Sun StorEdge Network Data Replicator software is client-server software that is bidirectional. The primary and secondary hosts each act as a client *and* server in the protocol.

The `sndrd` daemon starts at boot time and runs on each host. It must be running after system startup. It is important that you take note of any `sndrd` error messages.

▼ To Verify That the `sndrd` Daemon is Running

- **Use the `ps` command to check the daemon.**

```
# ps -ef|grep sndrd
root   291    1  0   Aug 24 ?       0:00 /usr/opt/SUNWrdc/lib/sndrd
root  1132   900  0 11:04:49 pts/1    0:00 grep sndrd
```

If the daemon is not running, only the `grep sndrd` output appears.

Note – You cannot manually start the `sndrd` daemon. Check the `/var/adm/messages` log and fix any errors listed there. After you fix the errors, shut down and restart your system.

Log Files to Check

Check the following files, which help you troubleshoot problems:

- `/var/opt/SUNWesm/ds.log`

  This log contains Sun StorEdge-related error or informational messages.

- `/var/adm/messages`

  This log contains general system error or informational messages.

Example /var/adm/messages Output

This error message occurred because the /dev/rdc service was not active when the Sun StorEdge Network Data Replicator started.

```
Completing SNDR startup: sndrd Aug 16 08:37:16 sndrd[291]: Cannot get address
for transport tcp6 host \1 service rdc
Aug 16 08:37:16 sndrd[291]: Cannot establish RDC service over /dev/tcp6:
transport setup problem.
Aug 16 08:37:16 sndrd[291]: Cannot get address for transport tcp host \1 service
rdc
Aug 16 08:37:16 sndrd[291]: All transports have been closed with errors.
Exiting.
Aug 16 08:37:16 sndrd[291]: SNDR Fatal server error
sndrsyncd done
```

Example /var/opt/SUNWesm/ds.log Output

The /var/opt/SUNWesm/ds.log file contains timestamped messages about the Sun StorEdge services.

```
Aug 20 19:13:55 scm: scmadm cache enable succeeded
Aug 20 19:13:55 ii: iiboot resume cluster tag <none>
Aug 20 19:13:58 sndr: sndrboot -r first.atm /dev/vx/rdsk/rootdg/vol5
/dev/vx/rdsk/
rootdg/bm6 second.atm /dev/vx/rdsk/rootdg/vol7 /dev/vx/rdsk/rootdg/bm7
Successful
Aug 20 19:13:58 sndr: sndrboot -r first.atm /dev/vx/rdsk/rootdg/vol4
/dev/vx/rdsk/
rootdg/bm4 second.atm /dev/vx/rdsk/rootdg/vol4 /dev/vx/rdsk/rootdg/vol4
Successful
Aug 20 19:13:58 sndr: sndrboot -r first.atm /dev/vx/rdsk/rootdg/vol2
/dev/vx/rdsk/
rootdg/bm2 second.atm /dev/vx/rdsk/rootdg/vol2 /dev/vx/rdsk/rootdg/bm2
Successful
Aug 20 19:13:58 sndr: sndrboot -r first.atm /dev/vx/rdsk/rootdg/vol3
/dev/vx/rdsk/
rootdg/bm3 second.atm /dev/vx/rdsk/rootdg/vol3 /dev/vx/rdsk/rootdg/bm3
Successful
```

Making Sure that the /etc/nsswitch.conf File is Correct

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

- If the hosts: entry is incorrect, you might see volume sets not resuming after a reboot
- If the services: entry is incorrect, the rdc service might not activate and no data will be replicated

▼ To Enter the Correct Entries in the /etc/nsswitch.conf File

1. **Include the following** hosts: **and** services: **entries in the** /etc/nsswitch.conf **file. Ensure that** files **is placed before** nis **or** nisplus**.**
   - For systems using the NIS naming service:

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

   - For systems using the NIS+ naming service:

```
hosts: files nisplus
services: files nisplus
```

2. **Shut down and restart your machine.**

```
# /etc/shutdown -y -g 0 -i 6
```

Checking That the /dev/rdc Service is Running

When the Sun StorEdge Network Data Replicator software loads, it adds an entry into the /etc/services file for the /dev/rdc service. Search for an entry that looks like this:

```
# more /etc/services | grep rdc
rdc             121/tcp                         # SNDR server daemon
```

The following text shows commands to use to check the service.

- **rpcinfo**

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

where:

- -T tcp specifies the transport the service uses
- *hostname* is the name of the machine where the service is running

If the service is not running, this message displays:

```
rpcinfo: RPC: Program not registered
```

If you see this message, it is possible that the /etc/nsswitch.conf services: entry is incorrectly configured. See "Making Sure that the /etc/nsswitch.conf File is Correct" on page 63.

- **netstat**

  This messages shows that the service is running.

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

Reasons Why the /dev/rdc Service is Not Created

Note – Although other applications make entries in these files, you can edit these files to correct these problems. Make sure you make a backup copy of a file before editing it.

Some reasons why the /dev/rdc is not being created include the following:

- The /etc/devlink.tab file is missing an entry for the /dev/rdc service. This example shows a valid entry.

```
# more /etc/devlink.tab|grep rdc

type=ddi_pseudo;name=rdc        \D
```

- The /etc/name_to_major file is missing an entry for the /dev/rdc service. This example shows a valid entry (the number following rdc can be any number).

```
# more /etc/name_to_major|grep rdc

rdc 239
```

- The /usr/kernel/drv/rdc.conf file is incomplete. This example shows a valid entry.

```
# more /usr/kernel/drv/rdc.conf|grep pseudo

name="rdc" parent="pseudo";
```

Checking the Integrity of the Link

After you determine that the `rdc` service is ready, check the integrity of the TCP/IP link. As part of the installation process, you entered the primary and secondary host names and IP addresses of the machines where the software is installed into the `/etc/hosts` file. **Make sure this file contains the same information on the primary and secondary hosts**; remember, the software is bidirectional. The software uses these hosts to transfer data.

Simple tests to check link integrity include the following:

- Use the `telnet` or `rlogin` commands to connect to the hosts.
- Use the `ifconfig` command to check your network interfaces.
- Use the `ping` command to make sure packets are being transmitted.
- Use the `snoop` or `atmsnoop` commands to make sure the software is copying data.

`ifconfig`

Use the `ifconfig` command to make sure that the network interface is configured running and correctly. This example output shows all the interfaces that are configured and running:

```
# ifconfig -a
ba0: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 9180 index 1
        inet 192.9.201.10 netmask ffffff00 broadcast 192.2.201.255
        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 192.9.201.124 netmask ffffff00 broadcast 192.9.200.255
        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
```

ping

Use the ping command to check that the network interfaces can communicate and if IPv4 or IPv6 addressing is being used. Issue this command from the primary host and secondary host to make sure communication is bidirectional. Also, this command confirms whether both hosts are using the same IP protocol (IPv4 or IPv6).

This example checks the communication on host second.atm.

```
# ping -s second.atm
PING second.atm: 56 data bytes
64 bytes from second.atm (192.9.201.2): icmp_seq=0. time=1. ms
64 bytes from second.atm (192.9.201.2): icmp_seq=1. time=0. ms
64 bytes from second.atm (192.9.201.2): icmp_seq=2. time=0. ms
64 bytes from second.atm (192.9.201.2): icmp_seq=3. time=0. ms
```

snoop and atmsnoop

Use the snoop or atmsnoop utility to make sure that the software is sending and receiving data during a copy or update operation.

In this example, the command is issued from the primary host nws822 to the secondary host nws350. The network interface is hme0 and the port reported is used by the rdc service.

```
[nws822]# snoop -d hme0 port rdc
Using device /dev/hme (promiscuous mode)
 nws822 -> nws350  RPC C XID=3565514130 PROG=100143 (?) VERS=4 PROC=8
 nws350 -> nws822  RPC R (#1) XID=3565514130 Success
 nws822 -> nws350  TCP D=121 S=1018     Ack=1980057565 Seq=2524537885
Len=0 Win=33304 Options=<nop,nop,tstamp 1057486 843038>
 nws822 -> nws350  RPC C XID=3565514131 PROG=100143 (?) VERS=4 PROC=8
 nws350 -> nws822  RPC R (#4) XID=3565514131 Success
 nws822 -> nws350  TCP D=121 S=1018     Ack=1980057597 Seq=2524538025
Len=0 Win=33304 Options=<nop,nop,tstamp 1057586 843138>
 nws822 -> nws350  RPC C XID=3565514133 PROG=100143 (?) VERS=4 PROC=8
 nws350 -> nws822  RPC R (#7) XID=3565514133 Success
 nws822 -> nws350  TCP D=121 S=1018     Ack=1980057629 Seq=2524538165
Len=0 Win=33304 Options=<nop,nop,tstamp 1057686 843238>
 nws822 -> nws350  RPC C XID=3565514134 PROG=100143 (?) VERS=4 PROC=8
```

In this example, the link is ATM; in this case, use the `atmsnoop` utility.

```
# /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
```

Common User Errors

This section describes common user errors encountered when using the software.

Enabling the Software on One Host Only

A common problem among new users is forgetting to issue the `sndradm -e` enable command on the secondary host *and* the primary host. Other problems include making a mistake when you type a disk or volume name or accessing a disk that has access problems.

To check if a volume or disk is accessible, issue a `newfs -N` command and see if an error results. This command displays file system information and does not display an error if the disk or volume is accessible.

This example shows the `newfs -N` command completing successfully.

```
# newfs -N /dev/vx/rdsk/rootdg/test0
/dev/vx/rdsk/rootdg/tony0: 2048000 sectors in 1000 cylinders of 32 tracks, 64
sectors
    1000.0MB in 63 cyl groups (16 c/g, 16.00MB/g, 7680 i/g)
super-block backups (for fsck -F ufs -o b=#) at:
32, 32864, 65696, 98528, 131360, 164192, 197024, 229856, 262688, 295520,
328352, 361184, 394016, 426848, 459680, 492512, 525344, 558176, 591008,
623840, 656672, 689504, 722336, 755168, 788000, 820832, 853664, 886496,
919328, 952160, 984992, 1017824, 1048608, 1081440, 1114272, 1147104, 1179936,
1212768, 1245600, 1278432, 1311264, 1344096, 1376928, 1409760, 1442592,
1475424, 1508256, 1541088, 1573920, 1606752, 1639584, 1672416, 1705248,
1738080, 1770912, 1803744, 1836576, 1869408, 1902240, 1935072, 1967904,
2000736, 2033568,
```

This example shows a typical error caused by the secondary not being enabled or by a disk or volume that is inaccessible.

```
SNDR: first.atm /dev/vx/rdsk/rootdg/vol11 /dev/vx/rdsk/rootdg/bm11
second.atm /dev/vx/rdsk/rootdg/vol11 /dev/vx/rdsk/rootdg/bm11
SNDR: Error
SNDR: Could not open file second.atm:/dev/vx/rdsk/rootdg/vol11 on remote node
Aug 27 14:25:45 ns-east-124 rdc: NOTICE: SNDR: Interface 192.9.200.1 <==>
192.9.200.2
: Up
```

Specifying the Wrong Volume Set Name

When you first enable a set, the Sun SNDR software assigns a default volume set name of *shost*:*sdev*, where *shost* is the secondary host name and *sdev* is the secondary volume name, separated by a colon (:).

After enabling the software for a volume set, you may use the *shost*:*sdev* name for a volume set each time you issue an `sndradm` command, instead of specifying the complete primary and secondary host, volume, and bitmap information for a volume set.

If you issue an `sndradm` command *without* specifying a volume set name, the software executes the command on all configured volume sets. Make sure that you specify the correct volume set on the command line.

For example, this command updates the volume on the secondary host `calamari` from the primary host volume:

```
# sndradm -un calamari:/dev/vx/rdsk/rootdg/tony1
```

To correctly display the volume set name, use the `sndradm -p` command. See "To Find Out the Volume Set Name" on page 71.

Error Case 1 - Using the sndrstat Command

An administrator might use the sndrstat(1M) command instead of sndradm -p to find out the volume set name. The output of both commands look similar but really are not.

```
# sndrstat
Type                 Vols                                  s/n state
 S P  vx/rdsk/rootdg/tony1 => calamari:vx/rdsk/rootdg/tony1 0.00 REP
```

In the calamari:vx/rdsk/rootdg/tony1 output string, the /dev portion of the secondary volume name is omitted.

Error Case 2 - Issuing the sndradm -p Command on the Secondary Host

An administrator might correctly use the sndradm -p command to find out the volume set name but incorrectly issue the command from the secondary host. The output is different depending on which host you issue this command from.

For example, when issued from the primary host, the command shows the *correct* volume set name of calamari:/dev/vx/rdsk/rootdg/tony1:

```
# sndradm -p
/dev/vx/rdsk/rootdg/tony1       -> calamari:/dev/vx/rdsk/rootdg/tony1
```

When issued from the secondary host, the command shows the *incorrect* volume set name of tringali:/dev/vx/rdsk/rootdg/tony0. In fact, tringali:/dev/vx/rdsk/rootdg/tony0 is the name of the primary host and its volume set.

```
# sndradm -p
 /dev/vx/rdsk/rootdg/tony0       <- tringali:/dev/vx/rdsk/rootdg/tony0
```

▼ To Find Out the Volume Set Name

1. **If you do not know or are unsure of the volume set name, type the following command from the primary host:**

```
# sndradm -p
/dev/vx/rdsk/rootdg/tony1       -> calamari:/dev/vx/rdsk/rootdg/tony1
```

APPENDIX **A**

Sun StorEdge Fast Write Cache Software

This appendix describes how to remove the Sun StorEdge Fast Write Cache (Sun FWC) Version 2.0 software and install the SUNWnvm Version 3.0 software package available on the Sun StorEdge core services CD.

The SUNWnvm Version 3.0 Package and the Sun FWC Version 2.0 Product

The Sun StorEdge 3.0.1 services software is binary incompatible with the Sun StorEdge software Versions 1.x, 2.0, and 2.0.1.

However, the Sun StorEdge core services Version 3.0.1 CD contains the Sun StorEdge SUNWnvm Version 3.0 software package. This package is intended for those users whose systems include Version 2.0 of the Sun FWC hardware and software product and who wish to continue using the Sun FWC product.

If your system includes Versions 1.x and 2.0 of the Sun StorEdge Instant Image software (including Instant Image 2.0.1 with the Sun target emulation utility version 1.2), Sun SNDR software, you must remove them before installing the Version 3.0.1 services.

For example, you cannot use the Sun StorEdge Instant Image software Version 2.0 with the Sun SNDR software Version 3.0.1. When you plan to install or upgrade to a Version 3.0.1 service, you must remove all Version 1.X, 2.0, and 2.0.1 services.

Differences Between the SUNWnvm Version 3.0 and Sun FWC Version 2.0 Software Packages

- The Sun FWC Version 2.0 software includes a graphical user interface to administer its features. The SUNWnvm Version 3.0 software package does not.

  Use the command line interface fwcadm and scmadm utilities to administer the SUNWnvm Version 3.0 features. The *Sun StorEdge Fast Write Cache 2.0 System Administrator's Guide*, part number 806-2064, describes the fwcadm utility. See the scmadm man page.

- The Sun FWC Version 2.0 software includes a cache parameter configuration file named /etc/opt/SUNWscm/sd.cf. The Version 3.0 software package does not. Use the fwcadm and scmadm utilities to change configuration parameters. See "The /etc/opt/SUNWscm/sd.cf Configuration File" on page 75.

Preparing to Upgrade the Sun FWC Version 2.0 Software

Note – Read the `pkgrm`(1M) and `patchrm`(1M) man pages.

TABLE A-1 shows the general steps to upgrade the Sun FWC Version 2.0 software to the Version 3.0 software.

TABLE A-1 Sun FWC Upgrade Steps Summary

1. Perform an orderly shutdown of any Version 2.0 and 2.0.1 Sun StorEdge data services software.
2. Execute the validation script `probe_script` described in "To Run the Validation Script" on page 14.
3. Remove any related patches.
4. Remove Sun FWC Version 2.0 Management Services software.
5. Remove the Sun FWC Version 2.0 software.
6. Remove the Sun StorEdge core services Version 2.0 software packages.
7. Remove the Sun StorEdge Java and Management Services 2.0 software packages.
8. Install the Sun StorEdge core services (if needed) and `SUNWnvm` Version 3.0 software packages.
9. Shut down and restart your server.

The `/etc/opt/SUNWscm/sd.cf` Configuration File

The Sun StorEdge 3.0.1 software installation process converts the information in the Sun FWC Version 2.0 configuration file `/etc/opt/SUNWscm/sd.cf` and adds it to the Sun StorEdge Version 3.0.1 configuration. The storage device cache is then enabled with the parameters that were specified in the `sd.cf` file.

Removing the Sun FWC Version 2.0 Software

Caution – Do not execute the `probe_script` script after you have installed Version 3.0.1 of the Sun SNDR, Instant Image, and `SUNWnvm` software. Generally, you should only run the script as part of the upgrade process from Version 2.0 to Version 3.0.1.

When removing the software, the order in which you remove packages matters. Do not remove the packages out of the order reported by the validation script.

- The `probe_script` described in "To Run the Validation Script" on page 14 lists the packages you must remove before upgrading and the order in which to remove them. You must remove the packages in the order listed by using the `pkgrm`(1M) utility.
- You might have already removed the core and management services software and patches if you upgraded the Instant Image and Sun SNDR Version 2.0 software to Version 3.0.1.

▼ To Remove the Sun FWC Version 2.0 Software

1. **Log on as the root user.**

2. **Stop the Sun FWC Version 2.0 software and management services.**

```
# /usr/opt/SUNWesm/bin/esm_orderly stop
```

3. **Execute the validation script** `probe_script` **described in** **"To Run the Validation Script" on page 14****.**

   Run this script to generate a list of the recommended Version 2.0 software packages to remove.

4. **Remove the Sun FWC 2.0 Fast Write Cache and Sun StorEdge patches using** `patchrm`**(1M), where** *nn* **specifies the patch revision.**

Operating Environment	Patch	Description
All Solaris releases	109628-*nn*	Sun StorEdge Fast Write Cache software patch
Solaris 2.6	109971-*nn*	Sun StorEdge Fast Write Cache software patch
	109967-*nn*	Sun StorEdge core services software patch
Solaris 7	109973-*nn*	Sun StorEdge Fast Write Cache software patch
	109969-*nn*	Sun StorEdge core services software patch
Solaris 8	109974-*nn*	Sun StorEdge Fast Write Cache software patch
	109970-*nn*	Sun StorEdge core services software patch

   If `patchrm`(1M) fails to remove the -06 patch revision level of the patches with the following error, you can ignore the error and continue.

   `Patch` *patch*`-06 is not installed or is invalid`

   where *patch* is the patch number.

5. **Remove any supporting packages for your locale.**

   a. **For the French locale, enter:**

```
# pkgrm SUNWfmscm
```

b. For the Japanese locale, enter:

```
# pkgrm SUNWjmscm
```

c. For the Chinese locale, enter:

```
# pkgrm SUNWcmscm
```

6. Remove the Sun FWC Version 2.0 management services packages.

```
# pkgrm SUNWmscmr SUNWmscmu
```

7. Remove the Sun FWC Version 2.0 package.

```
# pkgrm SUNWnvm
```

8. If this is the last Sun StorEdge Version 2.0 or 2.0.1 service software package you are removing, remove the core services packages.

If this is not the last Version 2.0 or 2.0.1 package you are removing, skip this step.

```
# pkgrm SUNWspcsl SUNWspsv SUNWscm SUNWspuni
```

9. If this is the last Sun StorEdge Version 2.0 or 2.0.1 services software package you are removing, remove the Sun StorEdge management services supporting packages.

If this is not the last Version 2.0 or 2.0.1 package you are removing, skip this step.

Note – Do not remove these packages if you have the Sun StorEdge Component Manager software installed on your system and you plan to use it.

```
# pkgrm SUNWmjhlp SUNWmjmai SUNWmjacf locale1 SUNWesmru SUNWesmrt
locale2 SUNWdaert SUNWesm
```

where *locale1* and *locale2* are packages installed for your locale:

locale1	French — `SUNWfresm`
	Japanese — `SUNWjeesm`
	Chinese — `SUNWcesm`
locale2	French — `SUNWfrdae`
	Japanese — `SUNWjadae`
	Chinese — `SUNWcdae`

10. (Optional) Remove the Sun StorEdge service persistence files.

```
# rm /var/opt/SUNWesm/m*/persistence/*
```

11. If this is the last Version 2.0 or 2.0.1 service that you are removing, shut down and restart the system now.

```
# /etc/shutdown -y -i 6 -g 0
```

Installing the SUNWnvm Version 3.0 Software

The following procedures describe how to install the SUNWnvm Version 3.0 software. The procedures assume you have already installed other data service related packages such as the Sun StorEdge core services, Sun SNDR, and Instant Image Version 3.0 software.

Note – See "Installing the Sun StorEdge Software at Different Times" on page 37.

▼ To Install the SUNWnvm Version 3.0 Software

1. **Log on as the root user.**

   You can install this software in single user or multiuser state.

2. **Insert the Sun StorEdge core services software CD into the CD-ROM drive that is connected to your system.**

3. **Start the Volume Manager daemon** vold**(1M) (if needed) and install the** SUNWnvm **software.**

Note – This procedure assumes that you have already installed the Sun StorEdge core services software (see "To Install the Sun SNDR Software" on page 16). If you are installing more than one Sun StorEdge data service, you only need to start the Volume Manager daemon and install the core services software once. Do not start the daemon and install the core services software more than once.

```
# /etc/init.d/volmgt start
# cd /cdrom/cdrom0
# ./install_fwc
```

4. **Complete the installation.**

   - If you are installing other data services, eject the CD and continue installing those data services.

- If you are installing only the SUNWnvm Version 3.0 software or if this is the last data service you are installing, eject the CD and shut down and restart the system. ***You only need to reboot your system once, after you have installed all Sun StorEdge data software products.***

```
# cd /
# eject cdrom
# /etc/shutdown -y -g 0 -i 6
```

- See also "Installing the Sun StorEdge Software at Different Times" on page 37.

The fwcadm Administrative Utility

Note – See the fwcadm man page. The *Sun StorEdge Fast Write Cache 2.0 System Administrator's Guide*, part number 806-2064, describes the fwcadm utility in more detail.

The fwcadm utility is the administration command for the cache, NVRAM card, and the Storage Volume (SV) driver. The fwcadm utility must be specified with one of the following parameters:

- cache - enables and disables the cache, displays cache statistics, destages cache, clears the offline state of a failed disk device, or reidentifies the specified new or replaced disk device.
- nvram - displays the status of the NVRAM boards.
- volume - enables and disables the SV driver for specified disk devices, displays status, and dynamically reconfigures the system.

Syntax

Note – (See the -S option in the scmadm man page for a description of the -M, -d, -e, -l, and -z options.)

```
fwcadm cache { purge | sync | redevid } diskname
fwcadm cache { –d | –e }
fwcadm cache –s [-M] [-d time] [-l file] [-r[range]] [-z]

fwcadm nvram –s

fwcadm volume –s [-C tag ]
fwcadm volume –d {diskname | -f config-file } [-C tag ]
fwcadm volume –e {diskname | -f config-file } [-C tag ]
fwcadm volume –r {diskname | -f config-file } [-C tag ]
```

`cache` Options

Option	Description
`cache -d`	Disables the cache.
`cache -e`	Enables the storage device cache.
`cache -s`	Displays cache statistics. Press the t key to toggle between two screens. The first screen shows general statistics about the data cache, and the second screen displays total counts.
`cache purge` *diskname*	Discards the failed blocks and clears the offline state of the failed device.
`cache sync` *diskname*	Destages the failed blocks and clears the offline state of the device.
`cache redevid` *diskname*	Allows the re-identification of a replaced physical disk. This option is necessary only if pinned data exists for the device. (Pinned data is data on the NVRAM card that has not been flushed to disk.)

`nvram` Options

Option	Description
`nvram -s`	Displays the status of the NVRAM cards.

`volume` **Options**

Option	Description
`volume -d`	Disables the specified SV device, or devices specified in the configuration file (`-f` *config-file*).
`volume -e`	Enables the specified SV devices.
`volume -r`	Reconfigures the SV subsystem. It compares the contents of the configuration file to the state of the running system, and then enables and disables devices to reconfigure the running system as specified in the configuration file (`-f` *config-file*).
`volume -s [-C` *tag*`]`	Displays the current state of the SV subsystem.
diskname	Specifies the disk device to operate on.
`-f` *config-file*	Specifies a configuration file containing a list of SV disk devices.
`-C` *tag*	On a clustered node, limits operations to only those volumes belonging to the cluster resource group or disk group name, specified by *tag*. This option is illegal on a system that is not clustered. The special *tag* `local` can be used to limit operations to only those volumes which cannot switchover to other nodes in the cluster.

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