# Sun StorEdge™ Availability Suite 3.1 Remote Mirror Software Installation Guide

Sun Microsystems, Inc.
4150 Network Circle
Santa Clara, CA 95054 U.S.A.
650-960-1300

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# Preface

This document describes installation requirements, considerations, and procedures for the Sun StorEdge™ Availability Suite 3.1 remote mirror software. The intended audience includes Sun support engineers and customer system administrators.

**Note –** This software was previously known as the Sun StorEdge Network Data Replicator (Sun SNDR) software.

## How This Book Is Organized

Chapter 1 describes the requirements, considerations, and preparation for the remote mirror software installation.

Chapter 2 describes the installation steps.

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

Chapter 4 describes how to upgrade the Sun SNDR version 2.0 software to the remote mirror software version 3.1.

Chapter 5 describes how to upgrade the Sun SNDR version 3.0 or 3.0.1 software to the remote mirror software version 3.1.

Chapter 6 provides installation troubleshooting tips.

Appendix A contains quick installation instructions for experienced installers.

Appendix B describes installation error messages.

# 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.<br>Use `ls -a` to list all files.<br>`% You have mail`. |
| **`AaBbCc123`** | What you type, when contrasted with on-screen computer output. | `% su`<br>`Password:` |
| *AaBbCc123* | Book titles, new words or terms, words to be emphasized.<br>Command-line variable; replace with a real name or value. | Read Chapter 6 in the *User's Guide.*<br>These are called *class* options.<br>You *must* be `root` to do this.<br>To delete a file, type `rm` *filename.* |

| Typeface or Symbol | Meaning | Examples |
|---|---|---|
| [ ] | 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 \`<br>`**/dev/md/rdsk/d1** atm89 \`<br>`/dev/md/rdsk/d5 /bitmaps/map2 \`<br>`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

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`<br>`cron`(1M)<br>`dscfg`<br>`file`(1M)<br>`fwcadm`<br>`pkgadd`(1M)<br>`pkgrm`(1M)<br>`scmadm`<br>`svadm`<br>`dsstat` | N/A |
| Release | *Sun StorEdge Availability Suite 3.1 Remote Mirror Software Release Notes* | 816-4414 |
| | *Sun Cluster 3.0 U1 and Sun StorEdge Software 3.0 Release Note Supplement* | 816-5128 |
| | *Sun StorEdge Availability Suite 3.1 Point-In-Time Copy Software Release Notes* | 816-4314 |
| Sun Cluster with Sun StorEdge software | *Sun Cluster 3.0 and Sun StorEdge Software Integration Guide* | 816-5127 |
| Installation and user | *Sun StorEdge Availability Suite 3.1 Point-In-Time Copy Software Installation Guide* | 816-4312 |
| | *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 |
| | *Sun Enterprise 10000 InterDomain Networks User Guide* | 806-4131 |

| Application | Title | Part Number |
|---|---|---|
| System administration | *Sun StorEdge Availability Suite 3.1 Remote Mirror Software Administration and Operations Guide* | 816-4415 |
| | *Sun StorEdge Availability Suite 3.1 Point-In-Time Copy Software Administrator and Operations Guide* | 816-4313 |
| | *TCP/IP and Data Communications Administration Guide* | 805-4003 |
| | *System Administration Guide, Volume 3 (for the Solaris 8 operating environment)* | 806-0916 |
| | *System Administration Guide: IP Services* | 806-4075 |
| | *Sun StorEdge Fast Write Cache 2.0 System Administrator's Guide* | 806-2064 |
| Configuration | *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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CHAPTER 1

# Installation Requirements and Considerations

This document describes installation requirements, considerations, and procedures for the Sun StorEdge Availability Suite 3.1 remote mirror software.

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**Note –** This software was previously known as the Sun StorEdge Network Data Replicator (Sun SNDR) software and data services software.

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The topics described in this chapter are as follows:



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**Note –** The Sun StorEdge Availability Suite versions 3.0 and 3.0.1 contained the `SUNWnvm` package for Sun StorEdge Fast Write Cache 2.0 users. The 3.1 version of the suite does not contain or support any `SUNWnvm` version.

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# Quick Installation

Experienced installers should see Appendix A for a list of quick installation steps.

# Pre-installation Steps

1. Determine your data replication requirements.
2. Determine if you are upgrading from a previous version.
3. Set up the replicating TCP/IP network link.
4. Allocate storage for the local and remote volumes and bitmap volumes for the primary and secondary hosts.
5. See the *Sun StorEdge Availability Suite 3.1 Remote Mirror Software Release Notes* for late-breaking information.

# Summary of All Installation Steps

TABLE 1-1 shows all the installation steps required to successfully install the remote mirror software. To upgrade from previous versions, see Chapter 4.

**TABLE 1-1** All Installation and Post-Installation Steps

| Installation Steps | See This Section |
|---|---|
| 1. Choose a configuration location. | "Choosing the Sun StorEdge Configuration Location" on page 9 |
| 2. Run the `probe_script` validation script located on the product CD. | "Running the probe_script Validation Script" on page 15 |
| • If you have older versions of the Sun StorEdge software installed on your machine, remove them and shut down and restart your machine. | "Removing the Sun SNDR 2.0 Software" on page 61<br>"Removing the Sun SNDR 3.0 or 3.0.1 Software" on page 74 |
| • In the case of version 2.0, preserve your configuration information. | "Keeping the Configuration Files From Version 2.0" on page 59<br>"Backing Up the Sun StorEdge Instant Image 2.0 Configuration Information" on page 60 |
| 3. Install the Sun StorEdge core and product software on the primary and secondary host machines. (*Install on the primary host first.*) | "Installing the Software" on page 18 |
| 4. Install other Sun StorEdge software, if applicable. | "Installing the Software at Different Times" on page 51<br><br>*Sun StorEdge Availability Suite 3.1 Point-in-Time Copy Software Installation Guide* |
| **Post-installation Steps** | **See This Section** |
| 1. Edit the following files:<br>• `/etc/hosts`<br>• `/etc/nsswitch.conf`<br>• `/etc/system` (Solaris 2.6 systems only)<br>• (Optional) `/etc/services`<br>• (Optional) `/usr/kernel/drv/rdc.conf` | "Configuring System Files Required for Successful Operation" on page 27 |
| 2. Shut down and restart your machine. | "Shutting Down and Restarting Your System" on page 38 |
| 3. Choose the bitmap volumes location. | "Bitmap Volume Location and Size" on page 39 |
| 4. (Optional) Set up an optional volume configuration file. | "Using a Volume Set File" on page 43 |

# Supported Software and Hardware 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<br>106639-06 - rpcmod |
| Solaris 7 8/99 (also known as Update 3)<br>Solaris 7 11/99 (Update 4) | None |
| Solaris 8 | None |
| Solaris 9 | None |
| Sun StorEdge Availability Suite 3.1 remote mirror software | None |
| TCP/IP network transport software such as SunATM™ or Gigabit Ethernet transports | None |
| Sun StorEdge Availability Suite 3.1 point-in-time copy software | None |
| Volume manager software | Sun Solstice DiskSuite™<br>Sun Volume Manager (SVM)<br>VERITAS Volume Manager<br>• The Sun StorEdge software does not support metatrans devices created by using the Sun Solstice DiskSuite and Sun Volume Manager. See "Using Volume Manager Software and Metatrans Devices" on page 6. |

**TABLE 1-3** Supported Hardware, Noncluster Environments

| | |
|---|---|
| **Hardware** | A CD-ROM drive connected to the host server where the remote mirror software is to be installed.<br><br>The remote mirror 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:<br>• Sun Enterprise™ 220R, 250, 420R, and 450 servers<br>• Sun Enterprise 3500, 4500, 5500, 6500, and 10000 servers<br>• Sun Fire™ 3800, 4800, 4810, and 6800 servers<br>• Sun Fire 15K server<br>• Sun Ultra ™ 60 and 80 workstations<br>• Sun Blade™ 100 and 1000 workstations<br>• Sun Netra™ t 1400/1405 and 1120/1125 servers |
| **Disk Space** | Allocate approximately 11 Mbytes for the installation.<br>• The remote mirror software requires approximately 1.4 Mbytes.<br>• The Sun StorEdge configuration location requires 5.5 Mbytes (see "Choosing the Sun StorEdge Configuration Location" on page 9).<br>• Supporting packages require approximately 3 Mbytes. |
| **Supported Attached Storage** | The remote mirror software is storage-hardware independent. |

# Supported Software and Hardware In a Sun Cluster 3.0 Environment

If you are using the Sun StorEdge services software in a Sun Cluster 3.0 Update 1 or Update 2 environment, see the *Sun Cluster 3.0 and Sun StorEdge Software Integration Guide* for more information. Sun Cluster 3.0 Update 1 is also known as the Sun Cluster 3.0 07/01 release; Sun Cluster 3.0 Update 2 is also known as the 12/01 release.

# Important Product Information

This section describes the following important product considerations.



## Using Volume Manager Software and Metatrans Devices

The remote mirror and point-in-time copy software does not support metatrans devices (also known as trans metadevices) created by the Sun Solstice DiskSuite or Solaris Volume Manager software.

Metatrans devices are intended for use with UNIX file systems (`ufs`) without using any other layered services. Use the `ufs` logging mount option as an alternative to the use of metatrans devices. The Sun StorEdge Availability Suite software supports `ufs` logging which should be used when available instead of metratrans devices.

## Bitmap Files Are Not Supported in the Version 3.1 Software

The remote mirror 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. See "Converting Bitmap Files to Bitmap Volumes" on page 66.

# Installing This Software in a Sun Cluster 3.0 Environment

The version 3.1 software is cluster-aware in the Sun Cluster 3.0 Update 1 and Update 2 environments and provides 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 requirements, installation, and configuration. Sun Cluster 3.0 Update 1 is also known as the Sun Cluster 3.0 07/01 release; Update 2 is also known as the Sun Cluster 3.0 12/01 release. TABLE 1-4 describes the cluster terminology.

**Caution –** Do not install or try to use the Sun StorEdge Availability Suite 3.1 software on servers in an environment containing the initial release of the Sun Cluster 3.0 software. **The version 3.1 software is not cluster-aware or coexistent with the initial release of the Sun Cluster 3.0 software.**

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**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 Availability Suite 3.1 software is cluster aware in a two-node, Sun Cluster 3.0 Update 1 or Update 2 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 Availability Suite 3.1 software *is not cluster tolerant* in the initial release of the Sun Cluster 3.0 software. |

# Compatibility With Previous Versions

**Caution –** Do not attempt to mix remote mirror and 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 remote mirror 3.1 software. This configuration is not supported. Upgrade all hosts to the remote mirror version 3.1 software.

The Sun StorEdge Availability Suite 3.1 software is binary incompatible with all previous versions of the Sun StorEdge software (versions 1.x, 2.0, 2.0.1, 3.0, and 3.0.1), including all versions of the `SUNnvm` (Sun StorEdge Fast Write Cache) software:

**Note –** The Sun StorEdge Availability Suite versions 3.0 and 3.0.1 contained the `SUNWnvm` package for Sun StorEdge Fast Write Cache 2.0 users. The 3.1 version of the suite does not contain or support any `SUNWnvm` version.

- Sun StorEdge Network Data Replicator software
- Sun StorEdge Instant Image software
- Sun StorEdge Fast Write Cache product and the `SUNWnvm` package
- `SUNWte` package, also known as the Sun StorEdge Target Emulation software

When you plan to install or upgrade to the remote mirror or point-in-time copy software version 3.1, you must remove all previous versions of the Sun StorEdge data services software first. For example, you cannot use the Sun StorEdge Instant Image software version 2.0 or the `SUNWnvm` version 3.0 package with the remote mirror software version 3.1

**Note –** You can continue using the Sun StorEdge Component Manager software.

# Preparing for Installation

The preinstallation requirements and procedures include the following topics:



## Software Installation Order

If you do not install all Sun StorEdge Availability Suite 3.1 software packages at the same time, you can add other software on the product CD at any time. The installation order does not matter. For example, you can install the point-in-time copy software at any time after you install the remote mirror software.

See "Installing the Software at Different Times" on page 51.

## Choosing the Sun StorEdge Configuration Location

**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.

The installation process asks you to specify the single configuration location used by all Availability Suite 3.1 software you plan to install. Before you specify this location, see TABLE 1-5. See also "Using the dscfg Command to Back Up and Restore Configuration Information" on page 52.

**TABLE 1-5** Configuration Location Requirements and Considerations

| Item | Requirement or Consideration |
|---|---|
| Location type requirements | The configuration location must be a file name or block device for the single configuration location used by all Availability Suite 3.1 software packages you plan to install. For example, `/dev/dsk/c1t1d0s7` or `/config`<br><br>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 software is started.<br><br>• An optional volume set file (specified by the `sndradm -f` *volset-file* command) is not the same as a configuration location file. A configuration location file contains information about *all* devices used by the Sun StorEdge Availability Suite software. |
| Cluster environment | If you are installing the software in a cluster environment, your configuration location must be a block device and it must exist in the directory `/dev/did`. |
| Availability | • If the location is a block device, it cannot be the same location as the current boot device.<br>• The location must be writable by the superuser user.<br>• The location is available or persistent at system startup and reboots.<br>• The location does not exist on an invalid file system type such as `cachefs`, `tmpfs`, `nfs`, `procfs`, `hsfs`, `autofs`, `fdfs`, and `mntfs`.<br>• The location does not exist on a reserved mount point such as `/cdrom`, `/tmp`, `/proc`, `/mnt`, `/net`, `/floppy`, and `/vol`. |
| Disk space | The configuration location requires 5.5 Mbytes of disk space. If you specify a file for the configuration location during the installation, the file of the appropriate size is automatically created. |
| Mirror the location | Consider configuring RAID (such as mirrored partitions) for the location and ensure that you mirror the location to another disk in the array. The location cannot be stored on the same disk as the replicated volumes. |

# Configuring a Link Interface

Although the remote mirror software is most likely to be used with SunATM™ link-level interfaces, the remote mirror 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 29 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. Select a configuration location. | "Choosing the Sun StorEdge Configuration Location" on page 9 |
| 2. Run the `probe_script` validation script on the product CD. | "Running the probe_script Validation Script" on page 15 |
| If you have older versions of the Sun StorEdge software installed on your machine, remove them and shut down and restart your machine. | Chapter 4 - upgrading from version 2.0<br>Chapter 5 - upgrading from versions 3.0 and 3.0.1 |
| 3. Install the software on the primary and secondary host machines.<br>*Install the software on the primary host first.* | "Installing the Software" on page 18<br>"Installation Script Syntax" on page 18 |
| 4. Install other Sun StorEdge software, if applicable. | "Installing the Software at Different Times" on page 51<br>*Sun StorEdge Availability Suite 3.1 Point-In-Time Copy Software Installation Guide* |
| 5. Go to Chapter 3 to complete the installation. | After you successfully install the software and before you shut down and restart your system, you must configure certain files to help ensure that the software is operating. |

# Running the `probe_script` Validation Script

Run the `probe_script` validation script before you install the version 3.1 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 packages that you must remove and the order in which to remove them. Use the `pkgrm`(1M) program to remove these packages. See "Upgrading From Sun SNDR Version 2.0" on page 57 and "Upgrading From Versions 3.0 and 3.0.1" on page 71.

## Syntax

The `probe_script` file on the product CD has the following syntax.

---

**Note –** Run the script with no options where the root installation path is the standard root slice (/).

---

```
probe_script [-h | -j]
```

where:

| | |
|---|---|
| `-h` | Displays syntax usage. |
| `-j` | Uses standard script checking but also checks systems where the root installation path is a path other than the standard root slice (/). For example, use this option when root is located on a remotely-mounted device or when older packages might be located on a remotely-mounted device. |

## ▼ To Run the `probe_script` File

1. **Log on as the superuser user.**
2. **Insert the CD into the CD-ROM drive that is connected to your system.**
3. **Start the Volume Manager daemon `vold`(1M) (if needed) and perform one of the following:**
   - Where the package installation path is the normal root slice (/):

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

   - Where the package installation root path is located on a remotely-mounted device or when older packages might be located on a remote-mounted device:

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

   If you typed `probe_script -j`, the script prompts you as follows. Otherwise, skip to Step 5.

```
What is the root_path for this package installation? [ / ]
```

4. **If you typed `probe_script -j`, perform one of the following:**
   - Press Return to accept the default root path (/).
   - Type the full path where the root slice is mounted.

For either option in Step 3, the script begins checking your system.

- **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 a supported version for
this installation
Supported versions include: 5.6, 5.7, 5.8, 5.9
Exiting...
```

- **If the script detects that previous versions of the Sun SNDR software are currently installed on your system**, note the packages to remove as listed by the script and upgrade according the procedures in Chapter 4 and Chapter 5. For example:

```
WARNING:
Pre-existing Sun StorEdge software packages that must be uninstalled:
SUNWii SUNWrdcu SUNWrdcr SUNWspsvu SUNWspsvr SUNWscmu SUNWscmr

Installation cannot continue unless these packages are removed.

Please use pkgrm to uninstall these packages in the order they appear.
This list can be found in /tmp/pkgrmlist.04_25_02_14:44:06
```

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

5. **To install the software, go to "Installing the Software" on page 18.**

# Installing the Software

Install the remote mirror software on the primary and secondary host machines. This process also installs the core software if it is not already installed.

- "To Install the Software (Normal Root Slice)" on page 19
- "To Install the Software with the -j Option" on page 22

---

**Note –** Install the remote mirror software on the primary host first.

---

## Installation Script Syntax

The `install.sh` installation script on the product CD has the following syntax. You can install all Sun StorEdge software or just individual packages.

---

**Note –** Each option also installs the core software, required for all products. The script checks to see if the core software is already installed. If it is not, it is installed.

---

```
install.sh [-j] {-a | -p | -r}
```

where:

| | |
|---|---|
| `-j` | Install the packages where the root installation path is a path other than the standard root slice (/). For example, use this option when root is located on a remotely-mounted device and you want to install the packages on a remotely-mounted device. See "To Install the Software with the -j Option" on page 22. |
| `-a` | Install the core, remote mirror, and point-in-time copy software located on the CD. |
| `-p` | Install the core and point-in-time software. See the *Sun StorEdge Availability Suite 3.1 Point-In-Time Copy Software Installation Guide* for important information about installing this software. |
| `-r` | Install the core and remote mirror software. |

## ▼ To Install the Software (Normal Root Slice)

**Note –** See "Installation Script Syntax" on page 18.

1. **Log on as superuser.**
   - Install the software on the primary host first.
   - For a new installation, you can install this software in single-user or multiuser state.
   - For an upgrade installation, install this software in single-user mode to avoid volume data corruption. See "Shutting Down and Restarting Your System" on page 38.
2. **Insert the 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).**

```
# /etc/init.d/volmgt start
```

**Note –** You only need to start the Volume Manager daemon once. Do not start the daemon again.

4. **Install the Sun StorEdge core and remote mirror software as follows.**
   - Where the package installation root path is the normal root slice (/):

```
# cd /cdrom/cdrom0
# ./install.sh -r
```

**Note –** You can also install the point-in-time copy software at this time by using the `install.sh -a` command. See the *Sun StorEdge Availability Suite Point-in-time Copy Software Installation Guide* for more details about the point-in-time copy software.

The script prompts you as follows:

```
Attention!
By continuing with this installation, you acknowledge you have read installation
documentation and the “probe_script" has been run on this system
Do you want to continue [y,n,?]
```

5. **Type Y to continue or N to cancel the installation.**
   - The core software package installation starts and displays the following message.

```
Enter database configuration location:
```

---

**Note –** The location size must be 5.5 Mbytes. If you are re-installing the version 3.1 software and the configuration information exists, see “Removing and Reinstalling the Version 3.1 Software” on page 45 and “If The Configuration Location and Information Exists” on page 48.

---

6. **Type a file name or block device for the single configuration location used by all Sun StorEdge 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 “Choosing the Sun StorEdge Configuration Location” on page 9 for more considerations.

---

When the core software installation finishes, the remote mirror software installation starts.

When the remote mirror software installation finishes, the `install.sh` script displays an “installation complete” message.

7. **Eject the CD.**

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

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

   See “Post-Installation Steps Summary” on page 26.

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

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

   See "Shutting Down and Restarting Your System" on page 38.

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

## ▼ To Install the Software with the -j Option

1. **Log on as the superuser user.**
   - Install the software on the primary host first.
   - For a new installation, you can install this software in single-user or multiuser state.
   - For an upgrade installation, install this software in single-user mode to avoid volume data corruption. See "Shutting Down and Restarting Your System" on page 38.
2. **Insert the 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).**

```
# /etc/init.d/volmgt start
```

**Note –** You only need to start the Volume Manager daemon once. Do not start the daemon again.

4. **Install the Sun StorEdge core and remote mirror software as follows.**
   - Where the package installation root path is located on a remotely-mounted device:

```
# cd /cdrom/cdrom0
# ./install.sh -j -r
```

The script prompts you as follows:

```
Attention!
By continuing with this installation, you acknowledge you have read installation
documentation and the "probe_script" has been run on this system
Do you want to continue?
```

5. **Type Y to continue or N to cancel the installation.**

   - The script prompts you as follows:

```
Note: The following should only be changed from the default (/) if installation
is occurring on a remotely mounted device.  ex: in jumpstart environment

What is the root_path for this package installation? [ / ]
```

6. **Perform one of the following:**

   - Press Return to accept the default root path (/).
   - Type the full path on the machine where the root slice is mounted.

   The core software package installation starts and displays the following message.

```
Enter database configuration location:
```

---

**Note –** The location size must be 5.5 Mbytes. If you are re-installing the version 3.1 software and the configuration information exists, see "Removing and Reinstalling the Version 3.1 Software" on page 45 and "If The Configuration Location and Information Exists" on page 48.

---

7. **Type a file name or block device for the single configuration location used by all Sun StorEdge 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 "Choosing the Sun StorEdge Configuration Location" on page 9 for more considerations.

---

When the core software installation finishes, the remote mirror software installation starts.

When the remote mirror software installation finishes, the `install.sh` script displays an "installation complete" message.

8. **Eject the CD.**

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

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

   See "Post-Installation Steps Summary" on page 26.

---

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

---

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

    See "Shutting Down and Restarting Your System" on page 38.

---

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

---

CHAPTER 3

# Post-Installation Configuration Procedures

After you successfully install the remote mirror software *and before you shut down and restart your system*, you must configure certain files to help ensure that the remote mirror software operates correctly. See "Post-Installation Steps Summary" on page 26.

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



This chapter also describes the following topics that are not required but are 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. Configure the following files:<br>• (Solaris 2.6 systems only) `/etc/system/`<br>• `/etc/hosts`<br>• Configure the IP stack (IPv4 and IPv6).<br>• (Optional) `/etc/services`<br>• `/etc/nsswitch.conf`<br>• (Optional) `/usr/kernel/drv/rdc.conf` | "Configuring System Files Required for Successful Operation" on page 27 |
| 2. (Optional) Adjust the default number of volumes configured for use by the software. | "Increasing the Default Number of Volumes Allowed" on page 35 |
| 3. (Optional) Tune the asynchronous queue. | *Sun StorEdge Availability Suite 3.1 Remote Mirror Software Administration and Operations Guide* |
| 4. Shut down and restart your machine. | "Shutting Down and Restarting Your System" on page 38 |
| 5. Choose the bitmap volumes. | "Bitmap Volume Location and Size" on page 39 |
| 6. Add the remote mirror paths to your environment. | "Adding the sndradm Command PATH and Man Page MANPATH to Your Shell Environment" on page 40 |
| 7. (Optional) Set up an optional remote mirror volume configuration file. | "Using a Volume Set File" on page 43 |

# Configuring System Files Required for Successful 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 38.

## Editing the /etc/system File (Solaris 2.6 Only)

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

```
set kobj_map_space_len=0x200000
```

This step prevents Solaris 2.6 systems from hanging on reboot.

## Editing the /etc/hosts File

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

  Edit this file on each machine where you are installing and running the remote mirror software.

  This installation step helps ensure that the host names in the `/etc/hosts` file are read and known by machines running the version 3.1 software.See also "Configuring the IP Stack (IPv4 and IPv6)" on page 29.

# 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 remote mirror software is used. See the *System Administration Guide, Volume 3* (Solaris 8 operating environment) and the *System Administration Guide: IP Services* (Solaris 9 operating environment) for more information about IPv6. The IPv6 protocol provides increased addressability.

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 29.

## Example: Setting Up IPv6 Addresses

The following example procedure shows how to set your network interface to use IPv6 addresses. Use this procedure to test your remote mirror hosts connection. The *System Administration Guide, Volume 3* (Solaris 8 operating environment) and the *System Administration Guide: IP Services* (Solaris 9 operating environment) contains more complete information about the IPv6 interface.

The following example uses this configuration information:

| | |
|---|---|
| Network interface | `hme1` |
| Primary host interface name | `sndrpri` |
| Secondary host interface name | `sndrsec` |

**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.

## ▼ To Set Up an IPv6 Address

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 contents 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 -i 6 -g 0
```

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 –** Ensure the `/etc/inet/ipnodes` file on each system running the remote mirror 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 IPv6 `inet` primary addresses of all machines you plan to use with the remote mirror software to the `/etc/hosts` file on each machine.**

   Edit this file on each machine where you are installing and running the remote mirror software.

**Caution –** If you fail to perform this step (as described in "Editing the /etc/hosts File" on page 28), the following error message displays when you enable the remote mirror software:

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

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

   Use the `ping`(1M) command to check that the address types are defined correctly.

- 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
```

## Editing the /etc/services File

Port 121 is the default port for use by the remote mirror `sndrd` daemon.

To change the port number, edit the `/etc/services` file (using a text editor) on each machine running the remote mirror software.

---

**Note –** If you change the port number, you must change it on all hosts (that is, primary and secondary hosts, including all hosts in one-to-many, many-to-one, and multihop configurations).

---

See also "If You Have Changed the Default Port Number" on page 46.

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

You might need to edit the `/etc/nsswitch.conf`(4) file using a text editor. When the `hosts:` and `services:` entries are included in the `/etc/nsswitch.conf` file, ensure that `files` is placed before `nis`, `nisplus`, `ldap`, `dns`, or any other service the machine is using. For example, for systems using the NIS naming service:

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

---

**Note –** If you are using the IPv6 protocol, see the changes for this file in "Configuring the IP Stack (IPv4 and IPv6)" on page 29.

---

## Editing the rdc.conf File To Set the Bitmap Operation Mode

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. The default setting is 0.

- 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.

See the bold text.

```
#
# Copyright (c) 2001, by Sun Microsystems, Inc.
# All rights reserved.
#
#ident  "@(#)rdc.conf 1.9     01/04/27 SMI"
#
#
#
name="rdc" parent="pseudo";

#
# 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;

#
# rdc_max_sets
# - Configure the maximum number of RDC sets that can be enabled on
#   this host.  The actual maximum number of sets that can be enabled
#   will be the minimum of this value and nsc_max_devices (see
#   nsctl.conf) at the time the rdc kernel module is loaded.
#
rdc_max_sets=64;
```

# Increasing the Default Number of Volumes Allowed

The following sections describe how to change the default number of volumes you can use with the software.

- "Using More Than 64 Volume Sets" on page 36

  The default number of *remote mirror volume sets* you can enable is 64. Follow these procedures to increase this number.

- "Increasing the Storage Volume Device Limit" on page 37

  The default number of Storage Volume (SV) driver devices you can configure is 1024. This number of devices are divided for use between the remote mirror and point-in-time copy software. Follow these procedures to increase this number.

---

**Note –** After editing the files in this section, shut down and restart your server using the `shutdown` command for changes to take effect. Also, if you edit the `rdc.conf` file to use more than 64 volume sets, ensure that you have enough system resources (such as a large swap space).

---

## Using More Than 64 Volume Sets

If you configure more than 64 volume sets, you must edit the `rdc_max_sets` field in the `/usr/kernel/drv/rdc.conf` file on each machine running the remote mirror software. The default number of configured volume sets is 64.

For example, to use 128 sets, change the file as follows; note the semicolon character (;) at the end of the `rdc_max_sets` field:

```
#
# Copyright (c) 2001, by Sun Microsystems, Inc.
# All rights reserved.
#
#ident  "@(#)rdc.conf 1.9     01/04/27 SMI"
#
#
#
name="rdc" parent="pseudo";

#
# 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;

#
# rdc_max_sets
# - Configure the maximum number of RDC sets that can be enabled on
#   this host.  The actual maximum number of sets that can be enabled
#   will be the minimum of this value and nsc_max_devices (see
#   nsctl.conf) at the time the rdc kernel module is loaded.
#
rdc_max_sets=128;
```

# Increasing the Storage Volume Device Limit

**Note –** The default number of Storage Volume (SV) driver devices you can configure is 1024, as set by the `nsc_max_devices` setting in the `nsctl.conf` file. See "Increasing the Storage Volume Device Limit" on page 37 to change this setting.

The default number of SV driver devices (that is, volumes) you can configure is 1024, as set by the `nsc_max_devices` setting in the `nsctl.conf` file. The number of volumes allowed is divided for use between the remote mirror and point-in-time copy software.

For example, if you use the point-in-time copy software only, you can have 341 volume sets, each consisting of master, shadow, and bitmap volumes. Also, If you use the remote mirror and point-in-time copy software packages together, the number of volume sets are divided between the two packages.

The following procedure describes how to increase this default limit.

## ▼ To Increase the Storage Volume Limit

**Caution –** Increasing this limit causes more memory to be consumed. You might have to adjust the default `nsc_global_pages` value of 2 in the `/usr/kernel/drv/mc_rms.conf` file. Only an experienced system administrator should make these changes.

1. **Log on as superuser.**
2. **Open the `/usr/kernel/drv/nsctl.conf` file using a text editor.**
3. **Search for the `nsc_max_devices` field.**
4. **Edit the number in this field to increase your volume limit.**

   The default number is 1024.
5. **Save and exit the file.**

# Shutting Down and Restarting Your System

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

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

## ▼ To Shut Down and Restart Your System After a New Installation

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

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

## ▼ To Shut Down and Restart Your System Before Performing an Upgrade Installation

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

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

# Bitmap Volume Location and Size

**The remote mirror version 3.1 software does not support bitmap files**. The remote mirror software uses regular raw devices to store bitmaps.

These raw devices must be stored on a disk separate from the disk that contains the data from the replicated volumes. Configure RAID (such as mirrored partitions) for these bitmap devices and ensure that you mirror the bitmap to another disk in a different array. *The bitmap must not be stored on the same disk as the replicated volumes.*

If the bitmap and the replicated volumes reside on the same disk or array, then a single point of failure exists. In case of a disk or array failure, a greater chance of data loss exists. The bitmap might become corrupted.

In a clustered environment, a bitmap must reside only on a volume and cannot be a file. 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.)

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

This section describes how to add the remote mirror 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 remote mirror commands like sndradm without needing to type the full path. 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 environment.

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

   This path enables you to read the remote mirror-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 remote mirror commands like `sndradm` without needing to type the full path. 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 environment.

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 remote mirror-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 remote mirror 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 |
| | dsstat.1m |

# Using a Volume Set File

When you enable the remote mirror software, you can specify an optional *volume set file* containing information about the volume set: volumes, primary and secondary hosts, bitmaps, operating mode, and so on. Use the `sndradm -f` *volset-file* option when you use a volume set file.

You can also enter information about each volume set from the command line, but it might be more convenient to put this information in a file when you have multiple volume sets.

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

The fields for the volume set file specified using the `-f` *volset-file* option are:

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

An example 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 TABLE 3-2. See the `rdc.cf` man page for more information about the volume set file format.

**TABLE 3-2** Volume Set File Format Fields

| Field | Meaning | Description |
|---|---|---|
| *phost* | Primary host | Server on which the primary volume resides. |
| *pdev* | Primary device | Primary volume partition. Specify full path names only (for example, `/dev/rdsk/c0t1d0s4`). |
| *pbitmap* | Primary bitmap | Volume partition in which the bitmap 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 volume partition. Specify full path names only. |
| *sbitmap* | Secondary bitmap | Volume partition in which the bitmap of the secondary partition is stored. Specify full path names only. |
| `ip` | Network transfer protocol | Specify `ip`. |
| `sync` \| `async` | Operating mode | `sync` is the mode where the I/O operation is confirmed as complete only when the remote volume has been updated.<br><br>`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`. |

# Removing and Reinstalling the Version 3.1 Software

Perform the following procedures on each server where you plan to reinstall the remote mirror version 3.1 software. See also “Installing the Software at Different Times” on page 51.

This section also includes the following topics:

## If You Have Changed the Default Port Number

---

**Note –** If you change the port number, you must change it on all hosts (that is, primary and secondary hosts and all hosts in one-to-many, many-to-one, and multihop configurations).

---

Port 121 is the default port for use by the remote mirror `sndrd` daemon. If you changed the default port number in the `/etc/services` file on any machine for the `rdc` entry, use a text editor and change the value back to the default port 121 or delete this `rdc` entry from the file if you are completely removing the software.

Edit this value after you remove the software.

# Checking for Currently Installed Software Packages

---

**Note –** Ensure that you remove the packages in the order listed in "To Remove and Reinstall the Remote Mirror Software" on page 47.

---

If you know that you have the version 3.1 packages installed and you want to display the package names, you can use the following step:

- **Type the following:**

```
# pkginfo -x | grep StorEdge

SUNWiir    Sun StorEdge Availability Suite point-in-time copy software (root)
SUNWiiu    Sun StorEdge Availability Suite point-in-time copy software (usr)
SUNWrdcr   Sun StorEdge Availability Suite remote mirror software (root)
SUNWrdcu   Sun StorEdge Availability Suite remote mirror software (usr)
SUNWscmr   StorEdge Cache Management (root)
SUNWscmu   StorEdge Cache Management (usr)
SUNWspsvr  StorEdge Volume Driver (root)
SUNWspsvu  StorEdge Volume Driver (usr)
```

## ▼ To Remove and Reinstall the Remote Mirror Software

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

2. **Remove the remote mirror software packages in this order.**

```
# pkgrm SUNWrdcu SUNWrdcr
```

3. **If no other Sun StorEdge software (such as the point-in-time copy software) is installed, remove the core software packages in this order.**

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

4. **To completely remove this instance of the software, you can optionally delete the following files and directories:**

   Retain these files if you are reinstalling the software and want to keep configuration information.

   - `/etc/opt/SUNWesm/dscfg.cf`
   - `/usr/opt/SUNWrdc/lib/sndrd`
   - `/var/opt/SUNWesm`

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 –** If you are re-installing the version 3.1 software and the configuration information exists, see "If The Configuration Location and Information Exists" on page 48.

---

# If The Configuration Location and Information Exists

The installation process checks for any existing configuration information and location. Depending on your installation, the following messages are displayed.

- **If the script cannot find an existing configuration** (for example, as part of a new installation), the script prompts you as follows. Enter the configuration location you selected and installation continues.

```
The Sun StorEdge Availability Suite 3.1 configuration
location has not been set
Enter database configuration location: [?] /dsfile
Setting new database configuration to /dsfile...
```

- **If the script finds an existing configuration location** (for example, as part of a reinstallation), the configuration location is displayed and the script prompts you as follows.

```
The Sun StorEdge Data Services database configuration location
has already been set.
Current location: /dsfile

Would you like to keep its current location [y,n,?]
```

- If you answer **y**, the installation continues.
- If you answer **n**, you are asked for the new configuration location, after which the installation continues.

```
The Sun StorEdge Data Services database configuration location
has already been set.
Current location: /dsfile

Would you like to keep its current location [y,n,?] n

Enter database configuration location: [?] /newfile
Setting new database configuration to /newfile...
```

- **If the script finds an existing configuration location with configuration information**, (for example, as part of a reinstallation), the script prompts you as follows.

```
It appears a valid database configuration exists here already.
Would you like to preserve this information and continue?
y - preserve current configuration
n - overwrite with new configuration
maybe - view contents of current configuration

Enter appropriate value [y,n,maybe,?]
```

- If you answer **y**, the existing configuration is retained and installation continues.

```
Keeping database configuration at /newfile...
```

- If you answer **n**, the existing configuration information is overwritten and installation continues.

```
It appears a valid database configuration exists here already.
Would you like to preserve this information and continue?
y - preserve current configuration
n - overwrite with new configuration
maybe - view contents of current configuration

Enter appropriate value [y,n,maybe,?]n

Setting new database configuration to /newfile...
```

- If you answer **maybe**, the script displays the existing configuration information and prompts you to save or overwrite this information.

```
It appears a valid database configuration exists here already.

Would you like to preserve this information and continue?
        y - preserve current configuration
        n - overwrite with new configuration
        maybe - view contents of current configuration

Enter appropriate value [y,n,maybe,?] maybe

# Consolidated Dataservice Configuration
# Do not edit out whitespace or dashes
# File created on: Fri Mar 22 10:08:00 2002
# Storage Cache Manager
# thrds csiz wrtcache filpat reserved1 niobuf ntdaemon fwrthru nofwrthru
[resource group]
scm: 128 64 - - - - - - - 80cf981d
scm: 128 64 - - - - - - - 80cfceb1
# Bitmap filesystem to mount before other filesystems [resource group]
# Cache Hints
# device wrthru nordcache
# Storage volumes [mode] [resource group]
sv: /dev/vx/rdsk/testdg/50mvol1 - testdg
# SNDR
# p_host p_dev p_bmp s_host s_dev s_bmp protocol(ip/fcal_device) mode [group]
#[resource_group] [options]
.
.
.
Would you like to preserve this information and continue?
        y - preserve current configuration
        n - overwrite with new configuration
        maybe - view contents of current configuration

Enter appropriate value [y,n,maybe,?]
```

# Installing the Software at Different Times

If you have installed one or more version 3.1 software packages and have rebooted, you must shut down and restart your server as described in the following text after you install another version 3.1 software package. This situation also applies if you want to add software at a later date.

For example, if you have:

1. Installed the core and point-in-time copy software.
2. Shut down and restarted your server.

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

3. Install the remote mirror software.
4. Shut down and restart your server as follows:

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

# 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 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 Availability Suite 3.1 Remote Mirror Software Administration and Operation 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 software (point-in-time copy and remote mirror) is not in use. In clustered environments, no node can be using the Sun StorEdge 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.**

**Caution –** Any existing 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 52**.**

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

# Using a `cron` Job to Back Up The Sun StorEdge Software Configuration Information

The following shell script describes how to back up your Sun StorEdge, VERITAS Volume Manager, and Solaris Volume Manager (SVM) configuration information. Use these procedures as part of your disaster recovery plan.

Consider the following before using this technique:

- Use these commands in a shell script and run the script as part of a daily `cron`(1M) job
- Store the output of the commands to a location that is regularly backed up to tape
- The example location shown here is `/configinfo/ds`

## Shell Script Commands for the `cron` Job

```
#!/bin/sh
# Copyright (c) 2002 Sun Microsystems, Inc.
# All rights reserved.
#
# Commands for Sun StorEdge configuration backup
# ------------------------------
/usr/opt/SUNWscm/sbin/dscfg >> /configinfo/ds1
/usr/opt/SUNWscm/sbin/dscfg -l >> /configinfo/ds2
/usr/opt/SUNWesm/sbin/scmadm >> /configinfo/ds3
/usr/opt/SUNWesm/sbin/sndradm -P >> /configinfo/ds4
/usr/opt/SUNWesm/sbin/iiadm -i all >> /configinfo/ds5
#
# VERITAS volume manager commands - delete this section
# if you are using Solaris Volume Manager (SVM or SLVM)
# ------------------------------
/usr/sbin/vxdisk list >> /configinfo/vxvm1
/usr/sbin/vxdg list >> /configinfo/vxvm2

# Substitute a diskgroup name for XX. Run this command
# for each diskgroup found with the vxdg list command
# Use the output from these commands with the vxmake command to
# reconstruct the volume manager configuration.
/usr/sbin/vxprint -g XX -mhvps >> /configinfo/vxvm3
#
# Solaris Volume Manager commands
# comment out this section if you are using VERITAS vxVm
# ------------------------------
## Uncomment this command if you are using metasets (it gets their names)
# /usr/sbin/metaset >> /configinfo/md1

# Uncomment this command if you are not using metasets
#/usr/sbin/metadb -i >> /configinfo/md2
#
cat /etc/lvm/md.tab >> /configinfo/md3
/usr/sbin/metastat >> /configinfo/md4
/usr/sbin/metastat -p >> /configinfo/md5
#
# Comment out these commands if you are using disksets.
# Run these commands for each diskset XX found by using the metaset command.
/usr/sbin/metadb -s XX -i >> /configinfo/md2
cat /etc/lvm/md.tab >> /configinfo/md3
/usr/sbin/metastat -s XX >> /configinfo/md4
/usr/sbin/metastat -s XX -p >> /configinfo/md5
```

CHAPTER 4

# Upgrading From Sun SNDR Version 2.0

**Note –** Before upgrading, read the `pkgadd`(1M), `pkgrm`(1M), and `patchrm`(1M) man pages. See also "Compatibility With Previous Versions" on page 8.

This chapter describes the following topics.

# Upgrade Steps Summary

TABLE 4-1 shows the general steps to upgrade the Sun SNDR version 2.0 software to remote mirror version 3.1 software.

**TABLE 4-1** 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 60 |
| 2. Execute the `probe_script` validation script. | "Running the probe_script Validation Script" on page 15 |
| 3. If on, turn the autosynchronization feature off at both hosts. | "Removing the Sun SNDR 2.0 Software" on page 61 |
| 4. Remove any related patches and remove any version 2.0 and 2.0.1 Sun StorEdge software. | "Removing the Sun SNDR 2.0 Software" on page 61 |
| 5. Install the remote mirror version 3.1 software packages. | "Upgrading the Sun SNDR 2.0 Software" on page 65<br>Chapter 2 |
| 6. Convert any bitmap files to bitmap volumes and complete other post-installation procedures. | "Converting Bitmap Files to Bitmap Volumes" on page 66<br>Chapter 3 |

# Keeping the Configuration Files From Version 2.0

The remote mirror software version 3.1 enables you to keep using the same volumes that you used with Sun SNDR software 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 remote mirror software version 3.1 installation process finds them in their original locations, it converts them for use with version 3.1.

See TABLE 4-2.

**TABLE 4-2** Version 2.0 Configuration Files

| Version 2.0 Configuration File | Description |
|---|---|
| `/etc/opt/SUNWrdc/rdc.cf` | The default configuration file used to specify volume set information for volumes under the remote mirror software control.<br><br>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 remote mirror 3.1 installation process will use it. (If it is not named `rdc.cf`, copy this information to the `rdc.cf` file so that you can use it in version 3.1.) |
| `/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 the point-in-time copy software version 3.1 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 3.1 format.

# Removing the Sun SNDR 2.0 Software

The `probe_script` described in "Running the probe_script Validation Script" on page 15 lists the packages you must remove before upgrading. The script also lists the order in which to remove them (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. **Turn the autosynchronization feature off at both hosts.**

```
# rdcadm -a 0
```

3. **If you have other Sun StorEdge version 2.0 software installed (such as Sun StorEdge Instant Image version 2.0 or 2.0.1), perform an orderly shutdown of these products.**

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

4. **Execute the `probe_script` validation script described in "Running the probe_script Validation Script" on page 15.**

   This step displays the packages to remove and the order in which to remove them.

5. **Remove the following patches in the order listed using `patchrm`(1M), where *nn* specifies the patch revision.**

| Operating Environment | Patch | Description |
|---|---|---|
| All Solaris releases | 109628-*nn* | Sun StorEdge Fast Write Cache (FWC) software patch |
| Solaris 2.6 | 109971-*nn* | Sun StorEdge Fast Write Cache software patch |
| | 109979-*nn* | Sun SNDR software patch |
| | 109967-*nn* | Sun StorEdge core software patch |
| Solaris 7 | 109973-*nn* | Sun StorEdge Fast Write Cache software patch |
| | 109981-*nn* | Sun SNDR software patch |
| | 109969-*nn* | Sun StorEdge core software patch |
| Solaris 8 | 109974-*nn* | Sun StorEdge Fast Write Cache software patch |
| | 109982-*nn* | Sun SNDR software patch |
| | 109970-*nn* | Sun StorEdge core 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.

6. **Remove the Sun SNDR software.**

```
# pkgrm SUNWrdcu SUNWrdcr
```

7. **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
```

8. **Remove the Sun FWC version 2.0 management services packages.**

```
# pkgrm SUNWmscmr SUNWmscmu
```

9. **Remove the Sun FWC version 2.0 package.**

```
# pkgrm SUNWnvm
```

10. **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.

    See the *Sun StorEdge Availability Suite 3.1 Point-in-time Copy Software Installation Guide* for information about removing the Instant Image software.

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

11. **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` |

12. **(Optional) Remove the Sun StorEdge persistence files.**

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

13. **Shut down and restart the system in single-user mode now.**

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

# Upgrading the Sun SNDR 2.0 Software

**Caution –** Do not attempt to mix 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 remote mirror 3.1 software. This configuration is not supported. Upgrade all hosts to the version 3.1 software. Install the version 3.1 software on the primary host first.

The section describes how to upgrade the software to version 3.1. See also "Keeping the Configuration Files From Version 2.0" on page 59.

**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 61.

## ▼ To Upgrade the Software

1. **Log on as the superuser user.**
   - For an upgrade installation, install this software in single-user mode to avoid volume data corruption. See "Shutting Down and Restarting Your System" on page 38.
2. **Execute the `probe_script` validation script.**

   See "Running the probe_script Validation Script" on page 15. Run this script to ensure that you have removed all recommended version 2.0 software patches and packages. After removal, shut down and restart your machine.
3. **Insert the Sun StorEdge Availability Suite 3.1 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 Software (Normal Root Slice)" on page 19.
4. **Install the packages according to the procedures described in "To Install the Software (Normal Root Slice)" on page 19.**
5. **When you finish the steps in Chapter 3, shut down and restart your machine.**

   See "Shutting Down and Restarting Your System" on page 38.

# Converting Bitmap Files to Bitmap Volumes

**Note –** This procedure works correctly on enabled 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 3.1 software. See "Keeping the Configuration Files From Version 2.0" on page 59.

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 3.1. **The remote mirror version 3.1 software does not support bitmap files**.

See "Bitmap Volume Location and Size" on page 39.

## ▼ To Convert Bitmap Files to Volumes

1. **Log on as the superuser user.**
2. **Use the remote mirror 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. **To convert the bitmap file to a bitmap volume, assign a new bitmap volume to the 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 for one volume 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: To Convert a Volume Set's Primary and Secondary Bitmap Files to Volumes" on page 68.

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

Perform the procedure to convert the bitmaps 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/map2` to volume `/dev/md/rdsk/d0`

1. **Check the 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. **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.

3. **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# sndradm -i
atm90 /dev/md/rdsk/d5 /dev/md/rdsk/d1 atm89 /dev/md/rdsk/d5 /dev/md/rdsk/d0 ip
sync
```

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

   a. **Check the 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# sndradm -i
atm90 /dev/md/rdsk/d5 /dev/md/rdsk/d1 atm89 /dev/md/rdsk/d5 /dev/md/rdsk/d0 ip
sync
```

CHAPTER 5

# Upgrading From Versions 3.0 and 3.0.1

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

This chapter describes the following topics.



See also "Compatibility With Previous Versions" on page 8.

# Upgrade Steps Summary

TABLE 5-1 shows the general steps to upgrade the Sun SNDR version 3.0 and 3.0.1 software to the remote mirror version 3.1 software.

**TABLE 5-1** Upgrade Steps Summary

| Upgrade Steps | See This Section |
|---|---|
| 1. Execute the `probe_script` validation script. | "Running the probe_script Validation Script" on page 15 |
| 2. If on, turn the autosynchronization feature off at both hosts. | "Removing the Sun SNDR 3.0 or 3.0.1 Software" on page 74 |
| 3. Remove any related patches and remove any Version 3.0 or 3.0.1 Sun StorEdge software. | "Removing the Sun SNDR 3.0 or 3.0.1 Software" on page 74 |
| 4. Shut down and restart the machine if you removed older packages and patches | "Shutting Down and Restarting Your System" on page 38 |
| 5. Install the remote mirror version 3.1 software packages. | "Upgrading the Sun SNDR 3.0 or 3.0.1 Software" on page 76<br>Chapter 2 |
| 6. Complete other post-installation procedures. | Chapter 3 |

# Keeping Custom Volume Set Files From Version 3.0 or 3.0.1

**Note –** When you install the version 3.1 software, the installation process might detect previous configuration information. You can choose to keep or overwrite it. Remember that the configuration location size in version 3.1 must be 5.5 Mbytes.

If you created any custom volume set files containing volume set information for the Sun SNDR versions 3.0 or 3.0.1 software, back the files up for future use before upgrading. You specify these files as part of the `sndradm -f` *volset-file* command.

See also "Using a Volume Set File" on page 43.

**Caution –** If you keep your original configuration location and its contents, do not use the `dscfg` command to back up and restore your configuration location information. If you do, the restore procedure will create duplicate entries in your configuration which might cause data corruption.

# Removing the Sun SNDR 3.0 or 3.0.1 Software

The `probe_script` described in "Running the probe_script Validation Script" on page 15 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 3.0 or 3.0.1 Software

1. **Log on as the superuser user.**
2. **Execute the `probe_script` validation script described in "Running the probe_script Validation Script" on page 15.**
3. **If you have the following patches installed, remove them in the order listed using `patchrm`(1M), where *nn* specifies the patch revision.**

| Patch | Description |
|---|---|
| 111945-nn | Storage Cache Manager patch |
| 111946-nn | Storage Volume Driver patch |
| 111948-nn | Sun SNDR software patch |
| 111947-nn | Instant Image software patch |

If `patchrm` fails to remove the -02 revision level of the patches with the error stating that the patch cannot be removed ("backed out"), you can ignore the error and continue.

4. **Turn the autosynchronization feature off at both hosts.**

```
# sndradm -a off
```

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

```
# pkgrm SUNWrdcu SUNWrdcr
```

6. **Remove any other Sun StorEdge version 3.0 or 3.0.1 software (such as the Instant Image software or the `SUNWnvm` software), as indicated by the `probe_script` script.**

   See the related version 3.0 or 3.0.1 Installation Guide for specific removal steps. The *Sun StorEdge Availability Suite 3.1 Point-in-Time Copy Software Installation Guide* describes how to remove the Instant Image 3.0 or 3.0.1 software.

7. **Remove the `SUNWnvm` (if installed) and Sun StorEdge core software.**

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

8. **Shut down and restart your server in single-user mode.**

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

# Upgrading the Sun SNDR 3.0 or 3.0.1 Software

**Caution –** Do not attempt to mix software versions on primary and secondary hosts. For example, do not run the Sun SNDR 3.0 or 3.0.1 software on a primary host and attempt to enable volumes on a secondary host running the remote mirror 3.1 software. This configuration is not supported. Upgrade all hosts to version 3.1.

The section describes how to upgrade the software to version 3.1. See also "Keeping Custom Volume Set Files From Version 3.0 or 3.0.1" on page 73.

**Note –** Ensure you have removed the Sun SNDR Version 3.0 or 3.0.1 software according to procedures in "To Remove the Sun SNDR 3.0 or 3.0.1 Software" on page 74. Also ensure that the configuration location size is 5.5 Mbytes.

## ▼ To Upgrade the Software

1. **Log on as the superuser user.**
   - For an upgrade installation, install this software in single-user mode to avoid volume data corruption. See "Shutting Down and Restarting Your System" on page 38.
2. **Execute the `probe_script` validation script.**

   See "Running the probe_script Validation Script" on page 15. Run this script to ensure that you have removed the recommended software packages.
3. **Insert the Sun StorEdge Availability Suite 3.1 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 Software (Normal Root Slice)" on page 19.
4. **Install the packages according to the procedures described in** "To Install the Software (Normal Root Slice)" on page 19 **or** **"To Install the Software with the -j Option" on page 22****.**

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

   See "Shutting Down and Restarting Your System" on page 38.

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

CHAPTER 6

# Troubleshooting Tips

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



**Note –** The *Sun StorEdge Availability Suite 3.1 Remote Mirror Software Administration and Operations Guide* describes the `dsstat` and `scmadm` commands. These commands are useful for displaying information about remote mirror and point-in-time copy software volumes.

# Troubleshooting Checklist

This table shows the troubleshooting checklist and related sections.

**TABLE 6-1** Troubleshooting Checklist

| Step | See This Section |
|---|---|
| 1. Check for installation errors. | "Checking the Installation" on page 81 |
| 2. Check that `/dev/rdc` is created after reboot. | "Checking the Installation" on page 81 |
| 3. Check that the `sndrd` daemon is running. | "To Verify That the sndrd Daemon is Running" on page 83 |
| 4. Check the log file contents. | "Log Files to Check" on page 83 |
| 5. Check that the `/etc/nsswitch.conf` file is configured correctly. | "Making Sure that the /etc/nsswitch.conf File is Correct" on page 85 |
| 6. Check that the `/dev/rdc` pseudo-link is created and the `rdc` service is running. | "Checking That the rdc Service is Running" on page 86<br>"Reasons Why the /dev/rdc Link is Not Created" on page 87 |
| 7. Check the integrity of the link. | "Checking the Integrity of the Link" on page 88 |
| 8. Check for common errors. | "Common User Errors" on page 91 |

# Checking the Installation

The version 3.1 software installation process installs the following packages. These packages are required to run this Sun StorEdge Availability Suite 3.1 software:

- 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 software install process, you specify a configuration location for the remote mirror 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 pseudo-link has not been created yet. Shutting down your machine creates this link.

After your system restarts, check that the link is created:

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

If the pseudo-link is not created, see "Making Sure that the /etc/nsswitch.conf File is Correct" on page 85 and "Checking That the rdc Service is Running" on page 86.

---

**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 remote mirror 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 might help you troubleshoot problems:

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

  This log contains 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 rdc service was not active when the remote mirror software 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 software.

```
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 such as:

- 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

You might need to edit the `/etc/nsswitch.conf`(4) file using a text editor. When the `hosts:` and `services:` entries are in included in the `/etc/nsswitch.conf` file, ensure that `files` is placed before `nis`, `nisplus`, `ldap`, `dns`, or any other service the machine is using. For example, for systems using the NIS naming service:

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

- After editing the file, s**hut down and restart your machine.**

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

# Checking That the rdc Service is Running

When the remote mirror software loads, it adds an entry into the /etc/services file for the rdc service. Search for an entry that looks like this:

```
# grep rdc /etc/services
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 85.

- **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 Link 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 pseudo-link is not being created include the following:

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

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

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

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

```
# grep rdc /etc/name_to_major

rdc 239
```

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

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

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.

---

**Note –** The `scmadm -S -M` command displays volume information. The `scmadm -S` command displays link I/O statistics.

---

## `ifconfig`

Use the `ifconfig` command to make sure that the network interface is configured and running 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 used by the rdc service is reported.

```
[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 primary host *and* the secondary host. Other problems include making a mistake when you type a disk or volume name or accessing a disk that has access problems.

## Ensuring That Volumes are Accessible

To check if a volume or disk is accessible:

- Confirm each volume is available on the primary and secondary host by using the `dd`(1M) command to read a volume. Issue the following command on the primary and secondary hosts for each primary, secondary, and bitmap volume:

```
# dd if=volume-name of=/dev/null count=10

10+0 records in
10+0 records out
```

The result shows that the command was able to read 10 512-byte records, indicating that the volume 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 remote mirror 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 on the primary host. See "To Find Out the Volume Set Name" on page 94.

### 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 `ariell:/dev/vx/rdsk/rootdg/tony0`. In fact, `ariell:/dev/vx/rdsk/rootdg/tony0` is the name of the primary host and its volume set.

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

# Quick Installation Steps

This appendix is intended for experienced system and storage administrators.

**Note –** See the related chapters and sections for more detailed information. Install this software as the superuser user.



## Pre-installation Steps

1. Determine your data replication requirements.
2. Determine if you are upgrading from a previous version.
3. Set up the replicating TCP/IP network link.
4. Allocate storage for the local and remote volumes and bitmap volumes for the primary and secondary hosts.
5. See the *Sun StorEdge Availability Suite 3.1 Remote Mirror Software Release Notes* for late-breaking information.

# Installation Steps

| Installation Steps | Comments/See This Section in the Installation Guide |
|---|---|
| 1. Choose a configuration location. | "Choosing the Sun StorEdge Configuration Location" on page 9 |
| • Location type requirements | 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`<br><br>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 software is started.<br>• An optional volume set file (specified by the `sndradm -f` *volset-file* command) is not the same as a configuration location file. A configuration location file contains information about *all* devices used by the Sun StorEdge Availability Suite software. |
| • Availability | • If the location is a block device, it cannot be the same location as the current boot device.<br>• The location must be writable by the superuser user.<br>• The location is available or persistent at system startup and reboots.<br>• The location does not exist on an invalid file system type such as `cachefs`, `tmpfs`, `nfs`, `procfs`, `hsfs`, `autofs`, `fdfs`, and `mntfs`.<br>• The location does not exist on a reserved mount point such as `/cdrom`, `/tmp`, `/proc`, `/mnt`, `/net`, `/floppy`, and `/vol`. |
| • Cluster environment | If you are installing the software in a cluster environment, your configuration location must be a block device and it must exist in the directory `/dev/did`. |
| • Disk space | **The configuration location requires 5.5 Mbytes of disk space.** If you specify a file for the configuration location during the installation, the file of the appropriate size is automatically created. |

| Installation Steps | Comments/See This Section in the Installation Guide |
|---|---|
| • Mirror the location | Consider configuring RAID (such as mirrored partitions) for the location and ensure that you mirror the location to another disk in the array. The location cannot be stored on the same disk as the replicated volumes. |
| 2. Insert the product CD in the CD-ROM drive connected to your system. | Start the Volume Manager daemon `vold`(1M) (if needed) and change to the product directory as follows:<br># **`/etc/init.d/volmgt start`**<br># **`cd /cdrom/cdrom0`** |
| 3. Run the `probe_script` validation script located on the product CD. | "Running the probe_script Validation Script" on page 15<br>Run the `probe_script` validation script before you install the version 3.1 software. The script does the following:<br>• Verifies that you are logged in as the superuser (root) user<br>• Checks that you have the correct minimum required version of the Solaris OE installed<br>• Lists any installed packages that you must remove and the order to remove them. Use the `pkgrm`(1M) program to remove these packages.<br>Type **`./probe_script -h`** to show the syntax. |
| • If you have older versions of the Sun StorEdge software installed on your machine, remove them using the pkgrm(1M) command and shut down and restart your machine.<br>Before removing the software, ensure that the autosynchronization mode is off (all hosts):<br>• version 2.0: **`rdcadm -a 0`**<br>• versions 3.0/3.0.1: **`sndradm -a off`** | "Removing the Sun SNDR 2.0 Software" on page 61<br>"Removing the Sun SNDR 3.0 or 3.0.1 Software" on page 74 |
| • In the case of version 2.0, preserve your configuration information. | "Keeping the Configuration Files From Version 2.0" on page 59<br>"Backing Up the Sun StorEdge Instant Image 2.0 Configuration Information" on page 60 |

| Installation Steps | Comments/See This Section in the Installation Guide |
|---|---|
| 4. Install the Sun StorEdge core and product software on the primary and secondary host machines.<br>• *Install on the primary host first.*<br>• Follow all the installation script prompts. | Install the software on the primary and secondary host machines. *This process also installs the Sun StorEdge core software if it is not already installed.*<br>The `install.sh` installation script on the product CD has the following syntax. You can install all Sun StorEdge software or just individual packages.<br>*Each option also installs the Sun StorEdge core software,* required for all products.<br>`install.sh [-j] {-a \| -p \| -r}`<br>where:<br>-j = Install the packages where the root installation path is a path other than the standard root slice (/). For example, use this option when root is located on a remotely-mounted device and you want to install the packages on a remotely-mounted device.<br>-a = Install the remote mirror and point-in-time copy software on the CD.<br>-p = Install the point-in-time software product. See the *Sun StorEdge Availability Suite 3.1 Point-In-Time Copy Software Installation Guide* for important information about installing this software.<br>-r = Install the remote mirror software.<br>*Sun StorEdge Availability Suite 3.1 Point-in-Time Copy Software Installation Guide* |

# Post-Installation Steps

| Steps | See This Section in the Installation Guide |
|---|---|
| 1. Edit the system configuration files. | "Configuring System Files Required for Successful Operation" on page 27<br>• `/etc/system` (Solaris 2.6 systems only), add this line:<br>**`set kobj_map_space_len=0x200000`**<br>• `/etc/hosts`<br>Add the names and IP addresses of all machines you plan to use with the remote mirror software. Edit this file on each machine where you are installing and running the remote mirror software.<br>• `/etc/nsswitch.conf`<br>You might need to edit the `/etc/nsswitch.conf` file using a text editor. When the `hosts:` and `services:` entries are included in the /etc/nsswitch.conf file, ensure that `files` is placed before `nis`, `nisplus`, `ldap`, `dns`, or any other service the machine is using. For example, for systems using the NIS naming service:<br>`hosts: files nis`<br>`services: files nis`<br>• (Optional) `/etc/services`<br>Port 121 is the default port for use by the remote mirror `sndrd` daemon. To change the port number, edit this file on each machine running the remote mirror software.<br>• (Optional) `/usr/kernel/drv/rdc.conf`<br>Also see the comments in the file for information. |
| 2. Shut down and restart your machine. | "Shutting Down and Restarting Your System" on page 38<br>Type:<br>**`# cd /`**<br>**`# eject cdrom`**<br>**`# /etc/shutdown -y -g 0 -i 6`** |

| Steps | See This Section in the Installation Guide |
|---|---|
| 3. Allocate space for the bitmap volumes. | "Bitmap Volume Location and Size" on page 39<br>The remote mirror version 3.1 software does not support bitmap files. The remote mirror software uses regular raw devices to store bitmaps.<br>The bitmap must not be stored on the same disk as the replicated volumes. If you put the bitmap on the same disk or in the same array as the replicated volumes and suffer data loss, the bitmap data can become corrupted. Configure RAID (such as mirrored partitions) for these bitmap devices and ensure that you mirror the bitmap to another disk in a different array.<br>In a clustered environment, a bitmap must reside only on a volume and must be part of the same disk group or cluster resource group as the corresponding primary or secondary data volume.<br>• Bitmap Size Requirements<br>The bitmap size can be calculated using the following formula:<br>1 Kbyte + 4 Kbytes per Gbyte of device storage space<br>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.) |

APPENDIX **B**

# Installation Error Messages

**TABLE B-1** Core Software Installation Error Messages

| Error Message | Description |
|---|---|
| `There was an error installing the CORE packages; the required packages for point-in-time copy and remote mirror software.` | Perhaps installation was aborted manually or another event occurred to abort it. |
| `There was an error installing the point-in-time copy software.`<br><br>`There was an error installing the remote mirror software.` | A previous software installation was incomplete or possibly aborted. Please uninstall the package and reinstall the product using the `install` script. |
| `ERROR: A previous installation of package` *`package-name`* `was not complete.`<br>`Please remove this package with the command pkgrm, then re-run install.sh` | The installation of the package was interrupted. |
| `Cannot use a directory. You must enter a valid file name or block device.` | You can only use a file name or block device as the configuration location. If you specify a file, the file must be located in / or /usr. |
| `Block device is currently the boot device.` | Configuration location is on the boot disk. It cannot be located on the boot disk. |
| `This entry is not persistent across reboots.` | Trying to make the configuration location within the swap space device. |
| `Block device is already in use.` | The configuration location is already mounted or currently in use. |
| `Block device is not writable.`<br>`File is not writable.` | The software cannot write to the device you specified. |

**TABLE B-1** Core Software Installation Error Messages

| Error Message | Description |
|---|---|
| `Unable to determine slice number.`<br>`Unable to determine sectors. Perhaps partition has zero size.`<br>`Block device is not large enough. Must be at least 5.5MB`<br>`Not enough space to write configuration file. Must be at least 5.5MB` | The configuration location size must be 5.5 Mbytes. |
| `Cannot store configuration file in /dev or /devices directory as a file. Perhaps you entered a block device that does not exist.` | You cannot write to the specified location, which might not exist or is write protected. |
| `Cannot store configuration file in` *path*`. It is a reserved mount point` | *path* is reserved and is one of the following:<br>`cdrom`, `tmp`, `proc`, `mnt`, `net`, `floppy` `vol` |
| `This entry does not exist on a valid filesystem type.` | The file system is one of the following and is not a valid configuration location:<br>`cachefs`, `nfs`, `tmpfs`, `proc`, `procfs`, `mntfs`, `fd`, `hsfs`, `autofs` |
| `The Sun StorEdge data services configuration location has not been set.` | You gave an incorrect response such as **n** to a prompt asking you to set the configuration location. |

**TABLE B-2** Remote Mirror Software Installation Error Messages

| Error Message | Description |
|---|---|
| `There was an error installing the remote mirror software.` | Perhaps installation was aborted manually or another event occurred to abort it. Please uninstall the package and reinstall the product using the `install` script |
| `The previous version of this software cannot be unloaded (busy). To load the new modules you must reboot the system.` | A previously-installed version of the software is still running. Remove the packages, shut down and restart your system, and install the version 3.1 software. |
| `ERROR: The installation cannot be completed due to an error removing the` *`modulename`* `loadable module. The file` *`logfile`* `contains the errors. Exiting...Please fix problem and re-run pkgadd.` | |
| `ERROR: The installation cannot be completed due to an error adding the` *`modulename`* `loadable module. The file` *`logfile`* `contains the errors. Exiting...Please fix problem and re-run pkgadd.` | |

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## U



## V